

Rivermont LLC

Stockland Development Pty Ltd

Stormwater Management Plan

24-0761SMP01-V2

22 May 2026

**PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL**

Approval no: DEV-2026-WAR-4925

Date: 9 September 2026



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Document Control

24-0761SMP01-V2

Version	Date	Details	Prepared	Checked	Approved	Signed	RPEQ
V1	07/11/2025	ISSUE	MF	KM	Kelly McKendry		
V2	22/02/2026	RFI Response	KM	KM	Kelly McKendry		09892

Executive Summary

Colliers Engineering & Design, engaged by Stockland Development Pty Ltd, has prepared a Stormwater Management Plan (SMP) to support the Rivermont LLC development application to the City of Moreton Bay (COMB) over land located at 60 Litherland Road, Wagtail Grove, comprising of Lot 4 on RP886161 and Lot 5 C311690 (Approved Lot 4002 pursuant to DA/2024/2263). This development application seeks a development permit as part of the Stockland Rivermont development for a Retirement Facility (Land Lease Community) for 315 residential lots.

Calibre undertook a flood investigation for the Stockland development located on land identified as Neighbourhood Development Plan (NDP2). The results of which are presented in the Technical Memorandum (22-000135_TM02A.MS, dated 17 June 2022). The investigations and analyses undertaken demonstrated that the changes in land use associated with the overall development will not result in any alteration to peak flows or flood behaviour and no perceptible variation in flood levels or extents along the Caboolture River. Due to this a no detention strategy is proposed for the site.

Environmental best management practices have been incorporated into the proposed stormwater quality treatment strategy for the site. Runoff will be collected and conveyed to on-site Filterra Bioscapes, where it will be treated prior to discharge into the receiving environment.

In summary, for the Rivermont LLC located over 60 Litherland Road, Wagtail Grove to be developed in accordance with the City of Moreton Bay Planning Scheme (2016), Queensland Urban Drainage Manual (2017), and State Planning policy (2017), the following stormwater management strategies are required:

- *Stormwater Quality Management:*
 - *Three end of line Filterra Bioscapes are required to meet Water Quality Outcomes (WQO's) and Non-worsening:*
 - *West – 267 m² of filter area*
 - *East – 97 m² of filter area*
 - *North 78 m² of filter area*
- *Stormwater Quantity Management:*
 - *A no detention strategy is proposed and justified under the Calibre Flood Investigation in the Technical Memorandum (22-000135_TM02A.MS, dated 17 June 2022) and approved under the Flood Investigation Report (22-000135_FIA_01C, Egis, dated 2/12/2024) under DA/2024/2263.*

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Appendices

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Appendix B	Ocean Protect Documentation

1. Introduction

Colliers Engineering & Design, engaged by Stockland Development Pty Ltd, has prepared a Stormwater Management Plan (SMP) to support the Rivermont LLC development application to the City of Moreton Bay (COMB) over land located at 60 Litherland Road, Wagtail Grove, comprising of Lot 4 on RP886161 and Lot 5 C311690 (Approved Lot 4002 pursuant to DA/2024/2263). This development application seeks a development permit as part of Stockland's Rivermont development for a Retirement Facility (Land Lease Community) for 320 residential lots.

The proposed outcome of this development is to identify stormwater management options that could be implemented within the development to achieve the requirements and targets of the City of Moreton Bay (COMB) Planning Scheme "works Code" and the relevant provisions of State Planning Policy (SPP 2017). The intent of the codes associated with these documents will be achieved through the appropriate integration of stormwater management options within the proposed land use. The objectives of this Stormwater Management Plan are to:

- Detail the proposed stormwater quality management strategy and how the load reduction objectives specified by the State Planning Policy (SPP, DSDIP 2017) and Schedule 10 of the COMB Planning Scheme are achieved during the operational phase of the development.
- Consider suitable Stormwater Quality Improvement Devices (SQIDs) based on Water Sensitive Urban Design (WSUD) principles.
- Outline the maintenance requirements for the proposed stormwater quality improvement devices.
- Demonstrate how the lawful point of discharge requirements for the site will be achieved.

1.1. Development History

DA/41766/2020/V23P

On 22 June 2023, Council approved Material Change of Use – Preliminary Approval for Child Care Centre, Club, Community Care Centre, Community use, Dual Occupancy, Dwelling House, Dwelling Unit, Environmental Facility, Home Based Business, Multiple Dwelling, Educational Establishment, Emergency Services, Food and Drink Outlet, Hardware and Trade Supplies, Health Care Services, Indoor Sport and Recreation, Market, Office, Outdoor Sport and Recreation, Park, Place of Worship, Relocatable Home Park, Residential Care Facility, Retirement Facility, Sales Office, Shop, Shopping Centre, Showroom, Substation, Telecommunications Facility, Utility Installation and Veterinary Services that includes a Variation Request to vary the effect of the Moreton Bay Regional Council Planning Scheme 2016, and Reconfiguring a Lot - Development Permit for Subdivision (1 into 198 Lots).

Notably, as part of this approval, Calibre undertook a flood investigation for the Stockland development located on land identified as Neighbourhood Development Plan (NDP2). The results of which are presented in the Technical Memorandum (22-000135_TM02A.MS, dated 17 June 2022). The investigations and analyses undertaken demonstrate the following:

- Hydrological and hydraulic modelling confirms that changes in land use associated with the overall development will not result in any alteration to peak flows or flood behaviour within the Caboolture River.
- Flood conditions remain consistent with those presented for the Developed Scenario 1, inclusive of proposed landform changes, with results indicating no perceptible variation in flood levels or extents along the Caboolture River.

Given the outcome of the modelling, it was determined that no detention will be required for this proposal.

DA/2024/2263

On 28 April 2025, Council's delegate approved Reconfiguring a Lot - Development Permit for Subdivision (3 into 267 lots, plus 3 Balance Lots, 1 Public Utility Lot, 1 Neighbourhood Hub Lot, Green Network, Open Space, and New Roads) (11 stages).

1.2. Site Location

The site falls within COMB Emerging Communities Zone and is located within the Caboolture River Stormwater Catchment. The proposed development area is approximately 14.71 ha and currently the site is undeveloped and consistent with a rural area. The majority of the site is cleared with minimal vegetated areas remaining.

The site is bound by the Caboolture River on its eastern perimeter. There are private allotments on its remaining boundaries and access is currently gained from Litherland Road. The site falls and drains north and east towards the Caboolture River. The development area is not affected by the medium and high risk flood hazard overlay as shown in **Figure 1-1**.

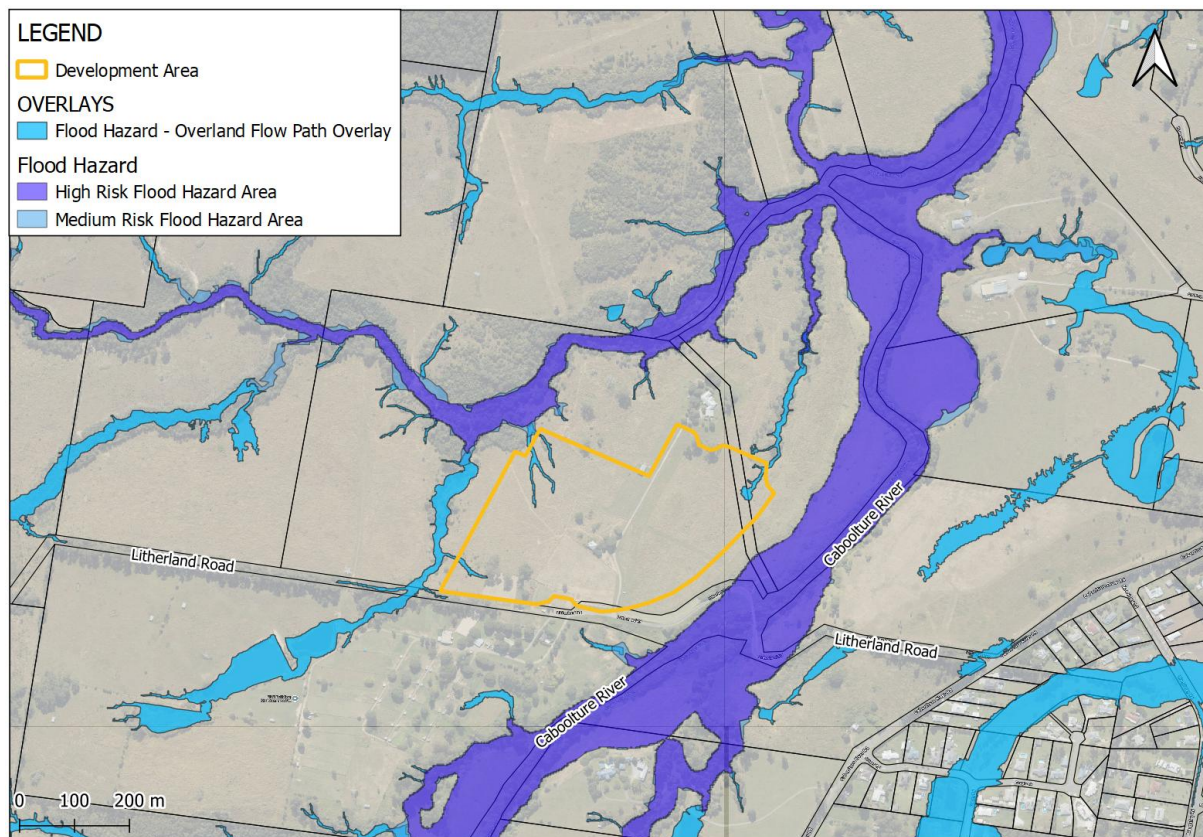


Figure 1-1: Site Location (Source: QGIS Open Street Maps, COMB data hub and interactive mapping.)

1.3. Development Description

The proposed development is for a Land Lease Community and will result in 315 lots over multiple stages. This strategy considers the site in its ultimate state with the water quality improvement devices constructed in line with the contributing stages to ensure water quality objectives are met throughout. The concept layout is shown in **Figure 1-2**.

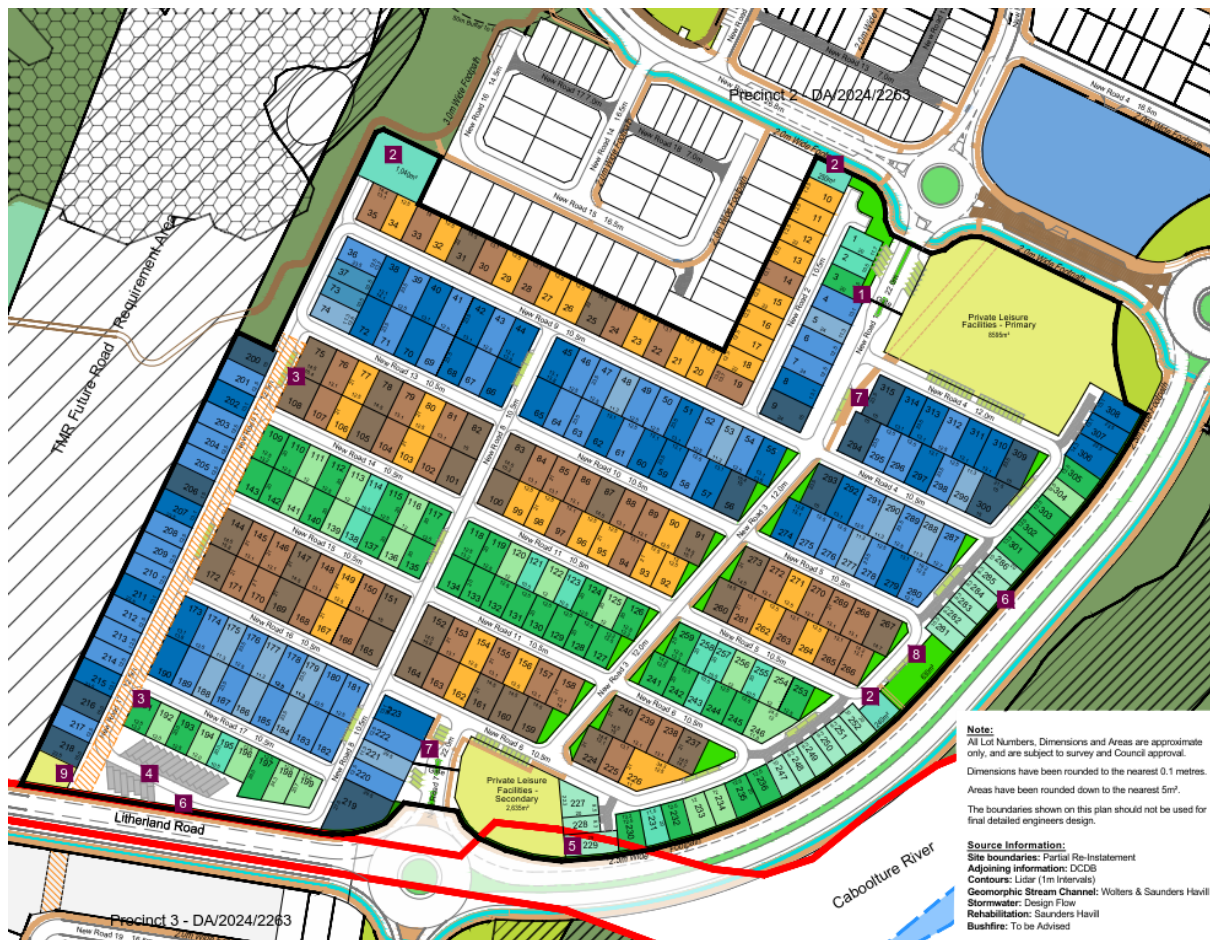


Figure 1-2: Concept Layout Plan.

1.4. RFI Response

Version 2 of this report is prepared to address the items raised by COMB in their Information Request dated 17 February 2026 and the Further Issues Letter dated 18 February 2026.

There were no issues raised in the Information Request (17 February 2026) that related directly to this document. However, any changes made to the proposal or design as a result of this Information Request have been included in this response.

The following details response to items raised in the Further Issues Letter (18 February 2026):

STORMWATER / FLOODING

2. The submitted Stormwater Management Plan (SMP) does not sufficiently demonstrate how the relevant Performance Outcomes of the Caboolture West Local Plan Code - Urban Living Precinct - Next Generation Sub-Precinct of the MBRC Planning Scheme have been addressed in relation to stormwater drainage systems—both internal and external—having the capacity to convey flows for the minor (10% AEP) and major (1% AEP) storm events for the fully developed upstream catchment, appropriately manage surface flows for the 1% AEP event, and comply with stormwater quality objectives.

Provide further information to demonstrate how the proposal complies with the Performance Outcomes. This should include an amended SMP - Quality and Quantity, prepared and certified by a suitably qualified Registered Professional Engineer Queensland (RPEQ), to demonstrate that stormwater can be managed on/from the subject land in accordance with the MBRC Planning Scheme and include the following:

a. Figures and plans, with the minimum requirements including:

i. Existing and proposed catchment, sub-catchments, flow paths and inundation extents and levels;

RESPONSE: Discussion of existing and proposed catchments are provided in Section 3. It is noted that the existing catchments are defined as the catchments approved under the overarching bulk earthworks approval for the Rivermont site and the proposed catchments within this application are consistent with that approval. Hence, the existing and proposed catchments are essentially the same extent and discharge direction.

Flowpaths within the development are limited to roads and all pipe drainage is to be designed to 1% AEP design criteria hence no inundation events above ground are to occur during normal operation of the drainage system in events of lesser magnitude than the 1% AEP (major) event.

ii. Stormwater design based on a fraction impervious percentage of 85 for both quantity and quality;

RESPONSE: The overarching approved Flood Investigation Report (EGIS, December 2024, report number 22-000135_FIA_01C, approved under DA/2024/2263) adopts a fraction impervious over the subject site of 85% (catchment 19_00671_C6).

The fraction impervious adopted for water quality modelling within this report has been increased to 85% impervious. It is noted that this request equates to a development density of 80+ dwellings/ha within the MUSIC modelling guidelines and is hence considered extremely conservative.

It is also noted that the requested change from 55% impervious to 85% impervious results in minimal change in the performance of the proposed treatment train with the exception of the non-worsening criteria for TN which fall marginally short of the requirement.

iii. Conceptual plans and drawings of the location, and the details of stormwater management measures (quantity and quality) including sizes / volumes and cross sections with dimensions, levels, batter slopes, and boundary clearances, where applicable;

RESPONSE: See engineering drawing set associated with this application. It is noted that all water quality treatment devices will remain in private ownership and will be maintained by the operator of the site. These assets will not be handed over to Council.

iv. Conceptual plans and drawings to include the design for the bypass and bio-retention basin outlet works proposed to be constructed by others;

RESPONSE: See engineering drawing set associated with this application.

v. Demonstrate the volume, velocity, depth and width of stormwater flows for all events up to and including the 1% AEP storm event proposed to enter the future State controlled road corridor from 'basin 02' outlet;

RESPONSE: Discharge to the future State Controlled Road has been approved and accepted under the overarching approvals. The discharge pipe from the site will be designed and constructed as part of the related applications and does not form part of this application. The proposal under this application does not deviate from the outcomes documented in the overarching approval.

vi. Descriptions and diagrams of the type of quality treatment measures to be provided;

RESPONSE: Water quality treatment devices are proposed to be Ocean Protect Filterra (or equivalent). Technical Information is provided in Appendix B.

vii. Proprietary stormwater quality treatment device technical documentation and maintenance manual;

RESPONSE: Water quality treatment devices are proposed to be Ocean Protect Filterra (or equivalent). Technical documentation and maintenance manuals are provided in Appendix B.

viii. Proposed development levels related to AHD; and

RESPONSE: See engineering drawing set associated with this application.

ix. Digital MUSIC model file.

RESPONSE: Submitted with this response.

2. Available Data

The data detailed in **Table 2-1** was reviewed and used in this assessment.

Table 2-1: Summary of Study Data

ID	Data	Description
1	Digital Elevation Model	1 metre resolution digital elevation model (DEM) based on Aerial LiDAR survey captured by DERM in 2014 (vertical accuracy of +/- 200mm [2 sigma error rate]).
2	Aerial Photograph	QGIS ESRI Aerial Imagery.
3	Layout	AutoCAD layout of proposed development.
4	COMB Overlays	Flood Hazard and overland flow overlays obtained from COMB data hub.

3. Stormwater Quantity

3.1. Stormwater Quantity Management Strategy

Stormwater quantity management has been addressed for the Stockland development located within the Caboolture West Neighborhood Development Plan 2 (NDP2) through Calibre's TM (Report No. 22-000135_TM01A.MS, dated 22 June 2022).

This memorandum updated the hydrological and hydraulic modelling previously undertaken as part of the Stormwater Management Plan – Caboolture West NDP1 (Report No. 16-0001367-SWMP-01D, dated November 2021).

This technical memorandum concludes through hydrologic and hydraulic modelling that peak flow mitigation (i.e., detention) is not required for the Stockland development within NDP2 runoff discharging directly to the Caboolture River. As it is proposed that the site will discharge to the Caboolture River, it has been determined the mitigation of peak flows is not required.

Further the approved Flood Investigation Report – Caboolture West NDP1 (Phase 2) and NDP2 submitted under DA/2024/2263 updates and reaffirms the findings of the above documents and explicitly includes the subject site within the analysis in the developed case with an adopted impervious fraction of 85%.

The following extracts demonstrate the inclusion of the subject site within the approved flood analysis. The relevant catchment is 19_00671_C6. The direction of routing has been confirmed to be toward the north west for this catchment.

Sub-catchment delineation for the developed scenario is presented below in **Figure 4-2**. As indicated Stockland Precinct 1 runoff will be conveyed directly to the Caboolture River under the developed scenario, instead of being conveyed north (as per the exiting scenario).

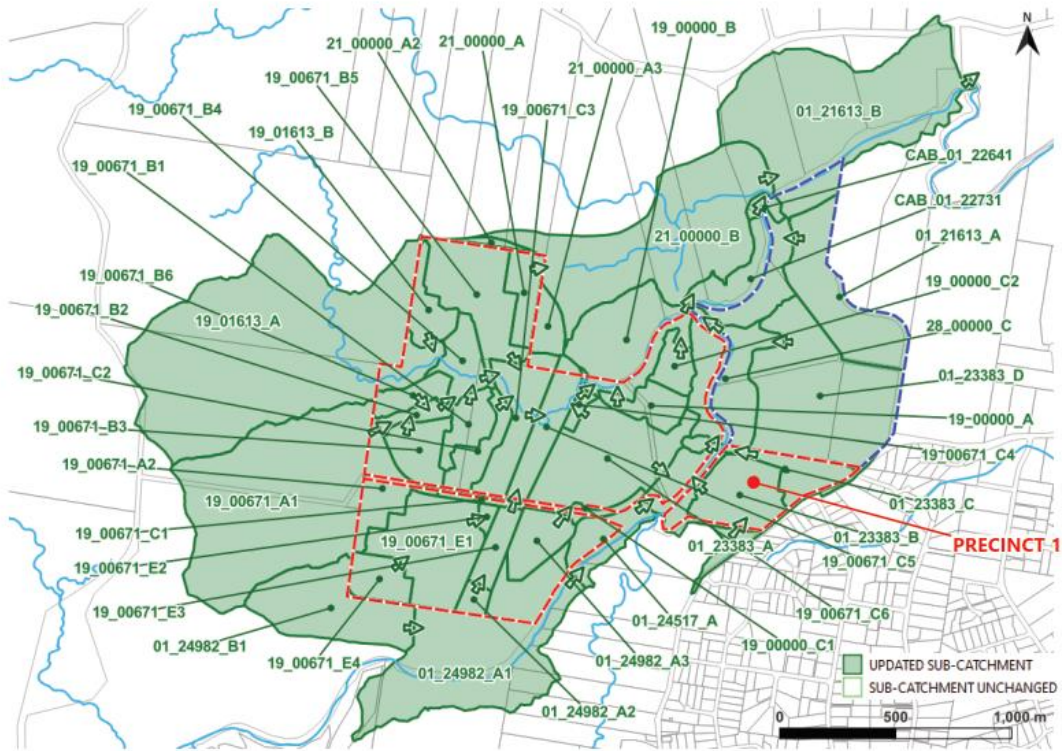


FIGURE 4-2 DEVELOPED SCENARIO WBNM CATCHMENT DELINEATION



FLOOD INVESTIGATION REPORT

22-000135_FIA_01C

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Approved Subject to Conditions of Decision Notice DA/2024/2263

28/4/2025

Figure 3-1: Extract approved Flood Investigation – overarching development application – catchment plan

Table 3-1: Extract approved Flood Investigation – overarching development application – adopted fraction impervious

Sub-catchment properties input into the WBNM for the developed scenario are summarised in **Table 4-4**.

TABLE 4-4 DEVELOPED SCENARIO SUB-CATCHMENT PROPERTIES					
SUB-CATCHMENT	AREA (HA)	IMPERVIOUS (%)	SUB-CATCHMENT	AREA (HA)	IMPERVIOUS (%)
01_21613_A	16.059	53	19_00671_B6	3.518	85
01_21613_B	47.352	2.9	19_00671_C1	1.193	57
01_23383_A	2.298	4.2	19_00671_C2	4.638	85
01_23383_B	10.360	55	19_00671_C3	9.873	1.6
01_23383_C	6.366	85	19_00671_C4	1.283	1.6
01_23383_D	31.852	35	19_00671_C5	7.178	1.6
01_24517_A	6.420	9.7	19_00671_C6	20.096	85
01_24982_A1	37.355	2.1	19_00671_E1	16.531	85
01_24982_A2	1.610	30	19_00671_E2	0.808	2.1
01_24982_A3	5.818	85	19_00671_E3	3.811	30
01_24982_B1	16.906	2.1	19_00671_E4	4.719	85
19_00000_A	4.533	85	19_01613_A	77.965	0.1
19_00000_B	16.516	0.7	19_01613_B	4.587	85
19_00000_C1	2.0490	85	21_00000_A	4.700	85
19_00000_C2	3.357	85	21_00000_A2	0.797	0.2
19_00671_A1	50.763	1.6	21_00000_A3	3.202	0.2
19_00671_A2	7.147	85	21_00000_B	40.730	0.2
19_00671_B1	4.641	85	28_00000_B	6.382	0
19_00671_B2	2.074	1.6	28_00000_C	15.117	0
19_00671_B3	5.964	85	CAB_01_22641	1.282	4.6
19_00671_B4	5.172	0.1	CAB_01_22731	11.990	1.9
19_00671_B5	14.380	85			

Note: Catchment delineation incorporates updates to account for changes to earthworks design and refinement of Catchment 21_00000_A. Fraction impervious values have also been updated for higher Next Generation Urban Residential (NDP1 Phase 2) and Urban Residential (Stockland Development) values as per Table 4-1.

3.2. Catchment Delineation

The subject site has been graded in accordance with the overarching approval and hence the existing case catchment delineation is adopted as per the approved design and is provided in Figure 3-2. The proposed catchment delineation (Figure 3-3) varies marginally however can be considered to be generally in accordance with the existing case. Detailed design associated with the subject site will account for the as constructed capacity of the downstream drainage network.

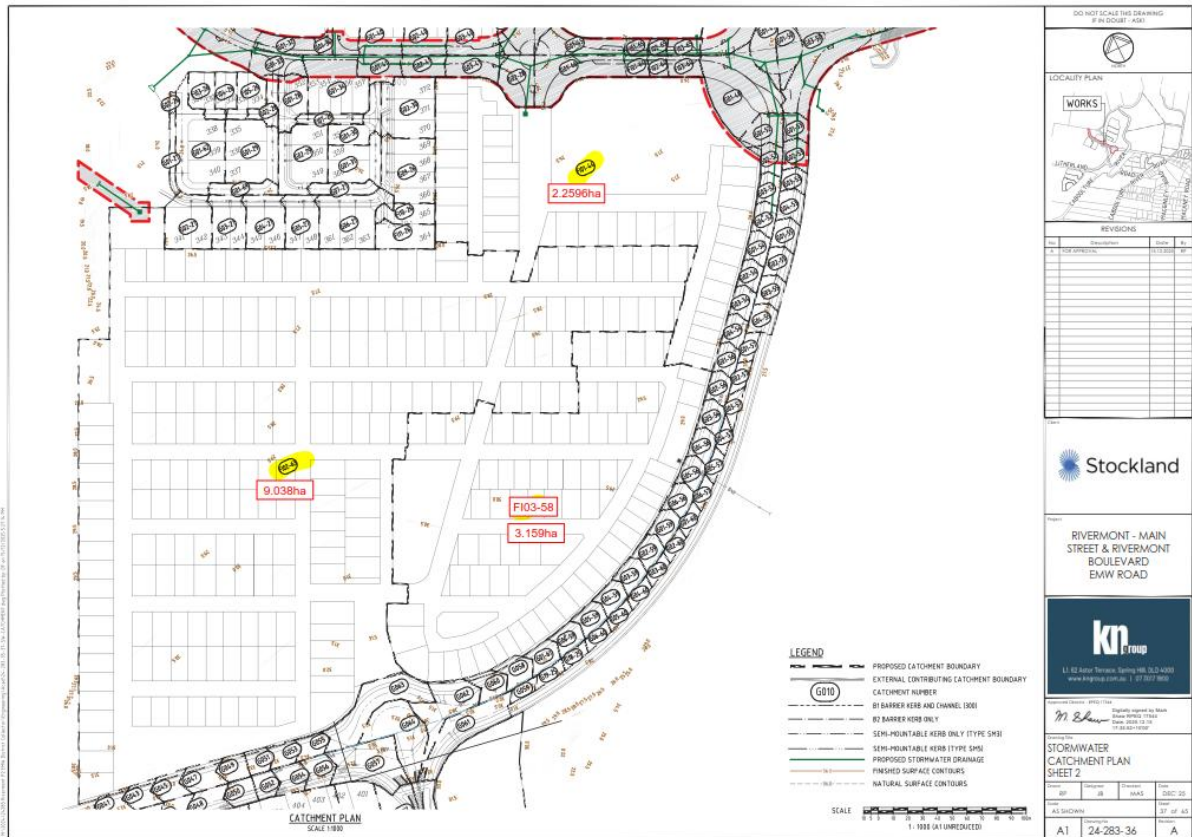


Figure 3-2: Existing Catchment Delineation

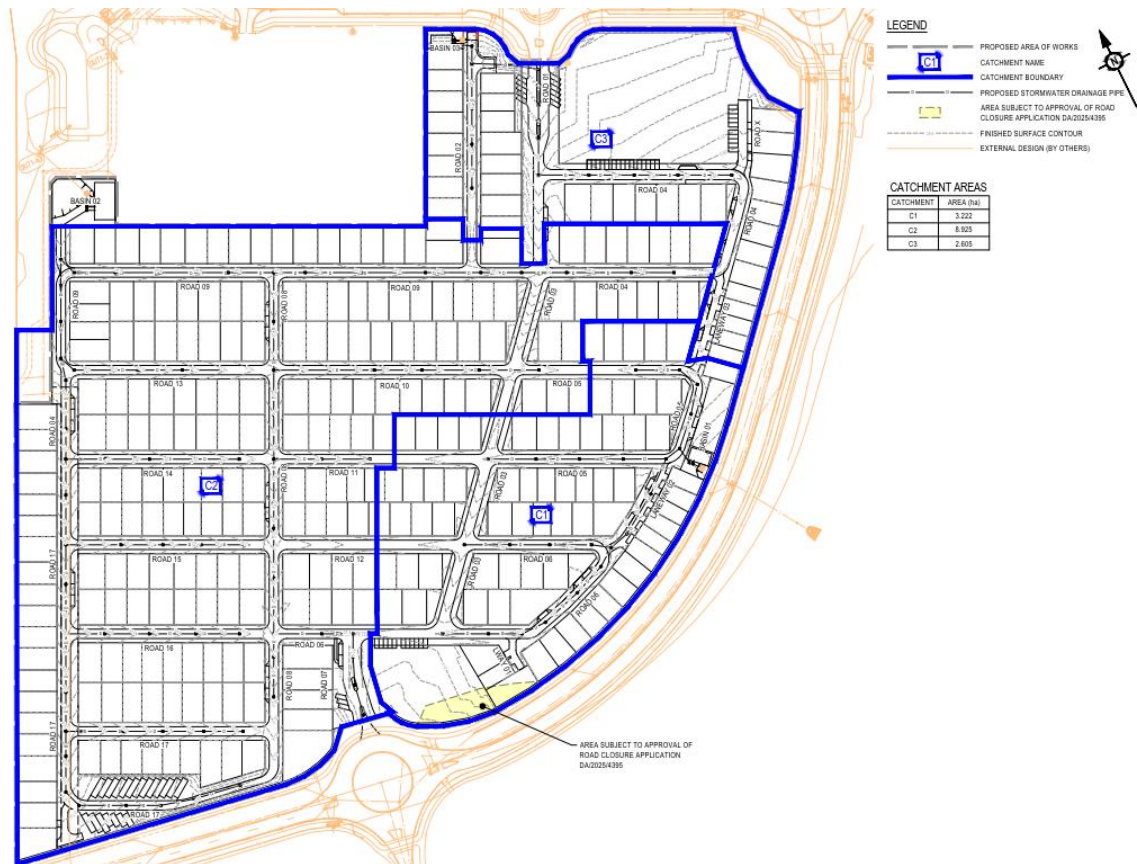


Figure 3-3: Proposed Catchment Delineation

3.3. Regional Flooding and the Flood Hazard Overlay

No part of the development site falls within the Medium and High Flood Hazard Overlay. There is no encroachment into the flood hazard overlay as part of this proposal as seen in **Figure 1-1**.

3.4. Lawful Point of Discharge

As per the COMB's PSP, all developments shall discharge to a lawful point of discharge in accordance with QUDM. As outlined by the *QUDM - 4th Edition*, one of three criteria must be met to determine whether a lawful point of discharge (LPOD) exists (Institute of Public Works Engineering Australasia, Queensland (IPWEAQ), 2017).

The three criteria for determining the lawful point of discharge (LPOD) are:

- (i) Will the proposed development alter the site's stormwater discharge characteristics in a manner that may substantially damage a third-party property?
 - If not, then no further steps are required to obtain tenure for a lawful point of discharge (assuming any previous circumstances and changes were lawful).
- (ii) Is the location of the discharge from the development site under the lawful control of the local government or other statutory authority from whom permission to discharge has been received?
 - If so, then no further steps are required to obtain tenure for a lawful point of discharge.
 - If not, then consider issue (iii).

- (iii) An authority to discharge over affected properties will be necessary. In descending order of certainty, an authority may be in the form of:
- Dedication of a drainage reserve or park;
 - A registered easement for stormwater discharge/works; or
 - Written discharge approval.
- (IPWEAQ, 2017)

It is proposed that discharge of runoff from the proposed development site will flow to the Caboolture River within an existing flow path mapped within the flood overlay. It is therefore considered the LPOD has been achieved.

3.5. Discharge to the State Controlled Road Corridor

Discharge to the State Controlled Road corridor has been approved under the overarching approvals. A snapshot is from the SARA approval showing the approved drainage corridor from Precinct 2 into the adjacent state road corridor is provided in Figure 3-4.



Figure 3-4: SARA approval for discharge location

4. Stormwater Quality

4.1. Design Objectives

This report identifies the stormwater quality management objectives for the operational phase (post-construction phase) of the proposed development. Construction based stormwater quality management objectives will need to be addressed as part of operational works documentation.

Schedule 10 of the COMB Planning Scheme (2021) defines the post-construction phase Water Quality Objectives for Emerging community is to be the greater pollutant removal of the load-based Water Quality Objectives (WQO's) stipulated in the State Planning Policy (DILGP, 2017) for the Southeast Queensland region, as shown in **Table 4-1** and a non-worsening of pollutant generation compared to the predevelopment case.

Table 4-1: Site Stormwater Quality Objectives (Operational Phase)

Minimum reductions in mean annual loads from unmitigated development (%)			
Total Suspended Solids (TSS)	Total Phosphorous (TP)	Total Nitrogen (TN)	Gross pollutants >5 mm
80	60	45	90

4.2. Stormwater Quality Analysis

4.2.1. Strategy

The objective of this report is to assess the stormwater quality measures required based on the proposed layout to support the development.

Runoff from the site will be captured and treated by Ocean Protect Filterra (or equivalent) located within one of the three catchments within the development prior to being discharged from the site. Each catchment requires the following stormwater quality improvement devices:

- West - Filterra Bioscape with 267 m² filter media area
- East - Filterra Bioscape with 97 m² filter media area
- North - Filterra Bioscape with 78 m² filter media area

It should be noted that although in the MUSIC model the strategy only shows the Filterra Bioscapes alone, it is recommended that each filterra has pretreatment.

4.2.2. MUSIC Parameters

An assessment of stormwater runoff quality from the existing conditions and proposed developed conditions has been undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) – Version 6.4, released in 2018.

Climate data for the catchment was sourced from the MUSIC model database. The rainfall and evaporation data template for this site has been based on data from Dayboro (40063) from 1/1/1980-31/12/1989 with six (6) minute rainfall duration.

Table 4-2, **Table 4-3**, and **Table 4-4** outline the adopted source node parameters from “MUSIC Modelling Guidelines” (Water By Design, 2010) that were used in the MUSIC model.

Table 4-2: Existing Conditions (Rural Lumped Node) – Pollutant Export Parameters

Land Use	Parameter	Total Suspended Solids (Log ₁₀ mg/L)		Total Phosphorous (Log ₁₀ mg/L)		Total Nitrogen (Log ₁₀ mg/L)	
		Storm Flow	Base Flow	Storm Flow	Base Flow	Storm Flow	Base Flow
Rural	Mean	2.26	0.53	-0.56	-1.54	0.32	-0.52
	Std Deviation	0.51	0.24	0.28	0.38	0.30	0.39

Table 4-3: Urban Land Use (Lumped Node) – Pollutant Export Parameters

Land Use	Parameter	Total Suspended Solids (Log ₁₀ mg/L)		Total Phosphorous (Log ₁₀ mg/L)		Total Nitrogen (Log ₁₀ mg/L)	
		Storm Flow	Base Flow	Storm Flow	Base Flow	Storm Flow	Base Flow
Urban	Mean	2.18	1.0	-0.47	-0.97	0.32	0.31
	Std Deviation	0.39	0.34	0.32	0.31	0.23	0.20

Table 4-4: MUSIC Runoff Generation Parameters

Parameter	Rural (Existing)	Urban
Rainfall Threshold (mm)	1	1
Soil Capacity (mm)	98	500
Initial Storage (%)	10	10
Field Capacity	80	200
Infiltration Capacity Coefficient a	84	211
Infiltration Capacity Coefficient b	3.3	5
Initial Depth (mm)	50	50
Daily Recharge (%)	100	28
Daily Drainage (%)	20	27
Daily Deep Seepage Rate (%)	0	0

4.2.3. Catchment Areas

The development site has been assessed using the lumped catchment method representing the total developed area reporting to the treatment devices. It should be noted that there is a road closure on Litherland Road on the southern boundary of the site that the eastern catchment footprint will extend into. For the purposes of this assessment it has been conservatively assumed this road closure will proceed and treatment basins are sized for an ultimate development footprint. The assumed areas and breakdown are provided in **Table 4-5**. The fraction imperviousness of each node was calculated by Ocean Protect. The stormwater quality catchments are provided in **Figure 4-1**.

Table 4-5: Source Node Configuration – Ocean Protect

Catchment	Total Area (ha)
West	8.925
East	3.222
North	2.605
Imperviousness (%)	85

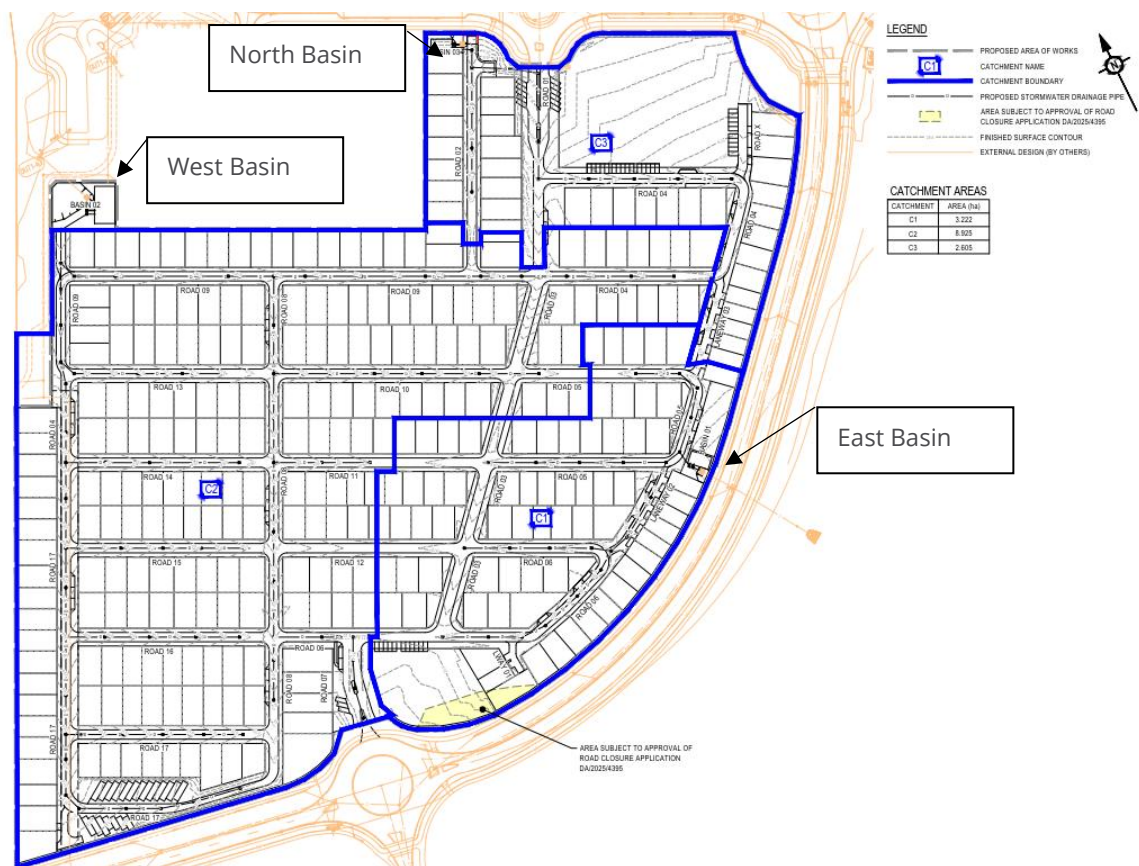


Figure 4-1: WSUD Plan

4.2.4. MUSIC Model Layout

As the management of urban stormwater needs to take a holistic approach, specific management measures need to be implemented in series to form a treatment train. The correct utilization of various devices within the treatment train is imperative to target the desired pollutants, from the gross solids to the fine colloidal partials. **Figure 4-2** shows the MUSIC model layout for the development.

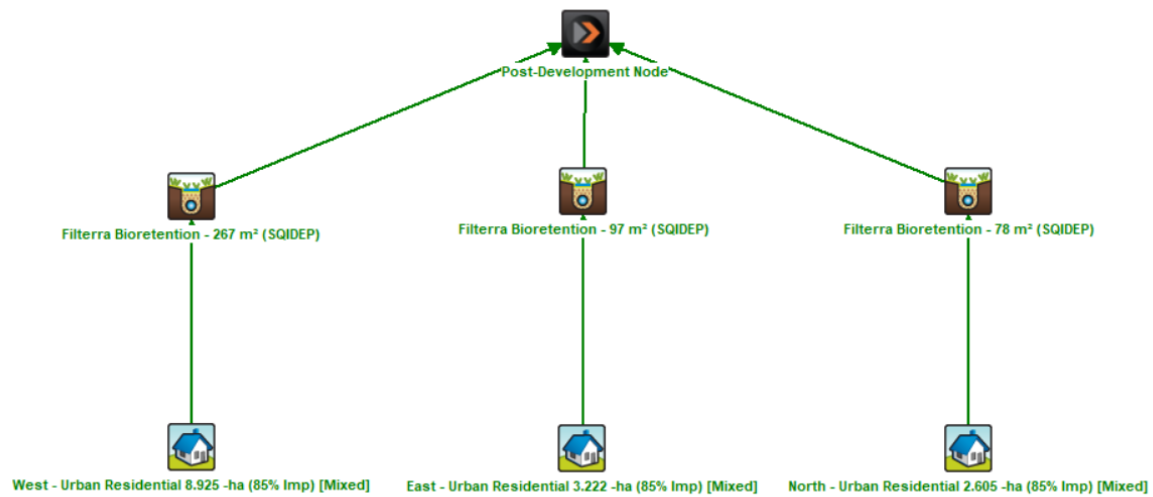


Figure 4-2: MUSIC Model Layout - LLC

4.3. Treatment Measures

Ocean Protect (OP) Filterra is a high-flow bioretention/biofiltration technology developed by Ocean Protect, designed for high volume stormwater treatment and higher pollutant removal than traditional bioretention systems in a significantly smaller footprint. **Table 4-6** summaries the proposed design parameters for the Filterra systems for this development. Technical information is provided in **Appendix B**.

Runoff from the development will be treated through proprietary treatment devices. The potential locality of the treatment devices servicing the development is shown in **Appendix A**.

Table 4-6: Bioretention Design Parameters

Parameter	West	East	North
Extended Detention Depth (m)	0.15	0.15	0.15
Storage Surface Area (m ²)	267	97	78
Filter Media Area (m ²)	267	97	78
Unlined Filter Media Perimeter (m)	0.01	0.01	0.01
Saturated Hydraulic Conductivity (mm/hr)	3550	3550	3550
Filter Depth (m)	0.53	0.53	0.53
TN Content of Filter Media (mg/kg)	1000	1000	1000
Orthophosphate Content of Filter Media (mg/kg)	40	40	40
Exfiltration Rate (mm/hr)	0	0	0
Modelled Overflow Weir Width (m)*	27	9.7	7.8

*The weir width of the bio-retention basin was modelled based on the minimum value of (surface area in m²/10m) as recommended in the MUSIC Modelling Guidelines. This weir length will not be used in construction.

4.4. Results

MUSIC modelling of the proposed treatment train for the developable area of the proposed subdivision was performed to ensure the WQO's were achieved.

4.4.1. Load Based Objectives

Table 4-7 presents the load-based outputs that are represented by this and reported at the reporting node. The results show the mitigated scenario, which achieves compliant load reductions set out within the COMB Planning Scheme.

Table 4-7: MUSIC Results – Load Based Pollutant Outputs

Pollutant	Unmitigated (kg/yr)	Mitigated (kg/yr)	Reduction Achieved (%)	Target Reduction	Compliance
TSS	33500	5820	83%	80%	✓
TP	65.5	19.3	71%	60%	✓
TN	317	170	46%	45%	✓
GP	3580	373	90%	90%	✓

4.4.2. Non-Worsening Objectives

The loads from the mitigated development are compared to the existing loads from the pre-development catchment in **Table 4-8** demonstrating non-worsening has been achieved for all but TN. It is noted that

with a impervious fraction in line with the MUSIC modelling guidelines (i.e. Version 1 of this report) all mitigated pollutants met the non-worsening criteria.

Table 4-8: MUSIC Results – non-worsening existing vs proposed

Pollutant	Existing (kg/yr)	Mitigated (kg/yr)	Reduction Achieved (kg/yr)	Compliance
TSS	15200	5820	-9380	✓
TP	28.8	19.3	-9.5	✓
TN	140	170	30	X
GP	397	373	-24	✓

4.5. Stormwater Quality Device Management

To ensure the proposed treatment train will function as per the design intent, periodic inspections and maintenance of the stormwater quality improvement devices will be required. Stockland will retain ownership in perpetuity and will ensure management and maintenance of the stormwater quality assets will be achieved. When undertaking maintenance or rectifications works of the proposed treatment devices, reference should be made to the manufacturer's specifications in addition to this report.

4.5.1. Construction and Establishment Phase

To minimise the long-term maintenance of the proposed treatment devices it is critical to protect the devices during the construction phases. Recommendations of the manufacturers will be adhered to during the construction phase.

4.5.2. Operational Maintenance

Routine inspection and maintenance of the devices will be required in order to maintain their water quality function. Inspection and maintenance shall be conducted in accordance with the manufacturer's requirements. Manuals are provided in **Appendix B**.

5. Conclusion

Colliers Engineering & Design, engaged by Stockland Development Pty Ltd, has prepared a Stormwater Management Plan (SMP) to support the Rivermont LLC development application to the City of Moreton Bay (COMB) over land located at 60 Litherland Road, Wagtail Grove, comprising of Lot 4 on RP886161 and Lot 5 C311690 (Approved Lot 4002 pursuant to DA/2024/2263). This development application seeks a development permit as part of the Stockland Rivermont development for a Retirement Facility (Land Lease Community) for 320 residential lots.

Calibre undertook a flood investigation for the Stockland development located on land identified as Neighbourhood Development Plan (NDP2). The results of which are presented in the Technical Memorandum (22-000135_TM02A.MS, dated 17 June 2022). The investigations and analyses undertaken demonstrated that the changes in land use associated with the overall development will not result in any alteration to peak flows or flood behaviour and no perceptible variation in flood levels or extents along the Caboolture River. Due to this a no detention strategy is proposed for the site.

Environmental best management practices have been incorporated into the proposed stormwater quality treatment strategy for the site. Runoff will be collected and conveyed to on-site Filterra Bioscapes, where it will be treated prior to discharge into the receiving environment.

In summary, for the Rivermont LLC located over 60 Litherland Road, Wagtail Grove to be developed in accordance with the City of Moreton Bay Planning Scheme (2016), Queensland Urban Drainage Manual (2017), and State Planning policy (2017), the following stormwater management strategies are required:

- Stormwater Quality Management:
 - Three end of line Filterra Bioscapes are required to meet Water Quality Outcomes (WQO's) and Non-worsening:
 - West – 267 m² of filter area
 - East – 97 m² of filter area
 - North 78 m² of filter area
- Stormwater Quantity Management:
 - A no detention strategy is proposed and justified under the Calibre Flood Investigation in the Technical Memorandum (22-000135_TM02A.MS, dated 17 June 2022) and approved under the Flood Investigation Report (22-000135_FIA_01C, Egis, dated 2/12/2024) under DA/2024/2263.

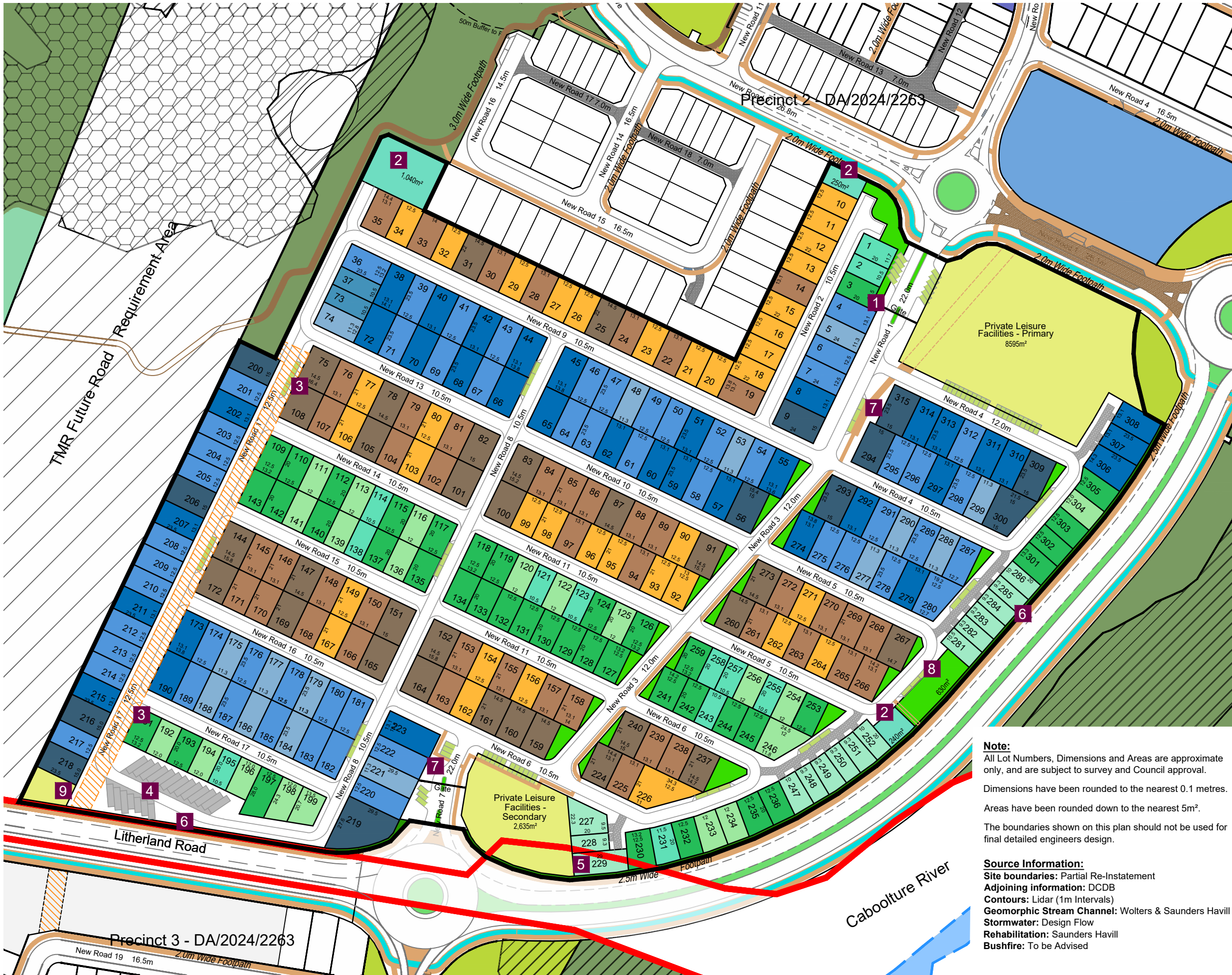
We therefore request Council approval of the engineering components for the proposed development with reasonable and relevant conditions. Detailed design may result in changes to the proposed strategy; however, the design objectives will be maintained.

6. References

- Moreton Bay Regional Council (MBRC) Planning Scheme 2016;
- <http://www.bom.gov.au/water/designRainfalls/revised-ifd> (Bureau of Meteorology, Online Rainfall IFD Data System);
- State Planning Policy (Department of Infrastructure, Local Government and Planning, 2017);
- Australian Rainfall and Runoff (Institute of Engineers Australia, 2019);
- Queensland Urban Drainage Manual – 4th Edition (Institute of Public Works Engineering Australasia, Queensland Division, 2017);
- MUSIC Modelling Guidelines Version 1.0 (Water by Design, 2010);

Appendices

Appendix A Material Change of Use Plan & Concept Engineering Drawings



Legend

Stockland Ownership

Precinct 2 - LLC Development Area - 14.76Ha

LLC - Community Facility

LLC - 10m Wide Sewer Easement

LLC - Open Space

LLC - Stormwater Treatment

LLC - Carparking: 78 Spaces

LLC - Caravan/Boat Storage: 14 Spaces

LLC - 1.5m Indicative Pedestrian Path

1

Chaser - Lots 1,2,3 & 4. Additional temporary carparking

2

Stormwater treatment

3

10m wide sewer easement. 12.5m Reserve. Confirm setback to sewer and easement requirements with Engineer/Council.

4

Van Storage. 20 Bays

5

Lease lots impacted by road closure application

6

2m Landscape zone inclusive of retaining wall and acoustic fence

7

Letterboxes

8

Dog park

9

Maintenance Shed / Buffer to future Overpass / Retaining Wall

Precinct 2 and 3 - Subject to DA/2024/2263

Neighbourhood HubLinear and Conservation Open SpaceLocal ParkTMR Future Road Requirement Area2m & 2.5m pedestrian path3m pedestrian path3m wide cycle networkEPBC regenerating vegetation - potential koala habitat to retainRehabilitation area

Lot Type	No.Lots	%	%
9.3m x 20m	15	17%	28%
10.5m x 20m	12	14%	
12m x 20m	20	23%	
12.5m x 20m	40	46%	
Sub Total	87	100%	
12.5m x 21m	36	33%	35%
13.1m x 21m	45	41%	
14.5m x 21m	29	26%	
Sub Total	110	100%	
10.5m x 23.5m	2	2%	37%
11.3m x 23.5m	15	13%	
12.5m x 23.5m	54	46%	
13.1m x 23.5m	35	30%	
15m x 23.5m	12	10%	
Sub Total	118	100%	100%
Total	315		

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information:
Site boundaries: Partial Re-Instatement
Adjoining information: DCDB
Contours: Lidar (1m Intervals)
Geomorphic Stream Channel: Wolters & Saunders Havill
Stormwater: Design Flow
Rehabilitation: Saunders Havill
Bushfire: To be Advised

WAGTAIL GROVE - CABOOLTURE WEST

LAND LEASE CONCEPT PLAN - OPTION 8

PRECINCT 2



URBAN DESIGN

Level 8

31 Duncan Street

PO Box 1559

Fortitude Valley QLD 4006

T +61 7 3539 9500

W rpsgroup.com

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PROPOSED RETIREMENT FACILITY (LAND LEASE COMMUNITY)

WAGTAIL GROVE, 4513, CABOOLTURE WEST

FOR 'STOCKLAND LAND LEASE MANAGEMENT PTY LTD'

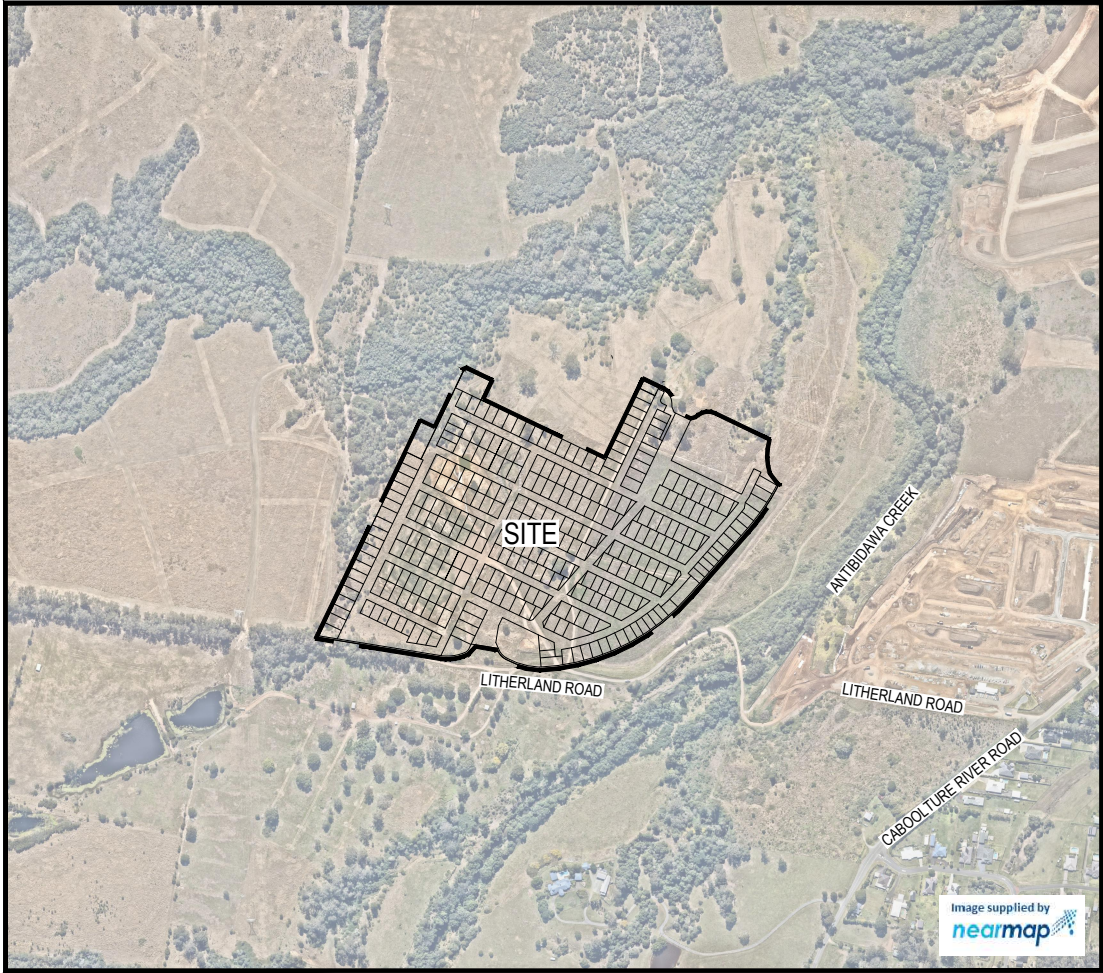
DRAWING LIST

EARTHWORKS, ROADWORKS AND DRAINAGE

24-0761-DA-0001	COVER PLAN
24-0761-DA-0002	OVERALL LAYOUT PLAN
24-0761-DA-0100	CONCEPT BULK EARTHWORKS LAYOUT PLAN SHEET 1 OF 4
24-0761-DA-0101	CONCEPT BULK EARTHWORKS LAYOUT PLAN SHEET 2 OF 4
24-0761-DA-0102	CONCEPT BULK EARTHWORKS LAYOUT PLAN SHEET 3 OF 4
24-0761-DA-0103	CONCEPT BULK EARTHWORKS LAYOUT PLAN SHEET 4 OF 4
24-0761-DA-0110	CONCEPT BULK EARTHWORKS TYPICAL SECTIONS SHEET 1 OF 2
24-0761-DA-0111	CONCEPT BULK EARTHWORKS TYPICAL SECTIONS SHEET 2 OF 2 AND TYPICAL DETAILS
24-0761-DA-0200	CONCEPT ROADWORKS AND DRAINAGE LAYOUT PLAN
24-0761-DA-0210	CONCEPT ROAD HIERARCHY LAYOUT
24-0761-DA-0220	CONCEPT TYPICAL ROAD CROSS SECTIONS
24-0761-DA-0230	TYPICAL SERVICES ARRANGEMENT PLAN AND SECTION
24-0761-DA-0300	CONCEPT STORMWATER CATCHMENT LAYOUT PLAN
24-0761-DA-0400	CONCEPT BIO-RETENTION BASIN LAYOUT PLAN AND TYPICAL SECTIONS SHEET 1 OF 2
24-0761-DA-0401	CONCEPT BIO-RETENTION BASIN LAYOUT PLAN AND TYPICAL SECTIONS SHEET 2 OF 2
24-0761-DA-0403	CONCEPT BIO BASIN DETAILS
24-0761-DA-0500	CONCEPT SEWER AND WATER RETICULATION LAYOUT PLAN

VEHICLE TURN PATHS

24-0761-SK-0010	VEHICLE TURN PATHS LAYOUT PLAN SHEET 1 OF 4
24-0761-SK-0011	VEHICLE TURN PATHS LAYOUT PLAN SHEET 2 OF 4
24-0761-SK-0012	VEHICLE TURN PATHS LAYOUT PLAN SHEET 3 OF 4
24-0761-SK-0013	VEHICLE TURN PATHS LAYOUT PLAN SHEET 4 OF 4



LOCALITY PLAN
SCALE 1:5000 (A1)
SCALE 1:10000 (A3)

PROJECT INFORMATION SUMMARY:
No. OF SITES = 315 SITES
AREA OF SITE = 14.85 ha
RP DESCRIPTION LOT 4 ON RP886161 & LOT 5 ON C311690 APPROVED LOT 4002 PURSUANT TO DA/2024/2263
DATUM LEVEL AND LOCATION P.S.M XXX RL XX.XXX AHD LOCATED LOCATED
LOCAL AUTHORITY: CITY OF MORETON BAY

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B	19.03.26	LM	BP	LOT NUMBERS AND LOT 281 ROL AMENDED			1:10000	ASSOCIATED CONSULTANT RPS GROUP PTY LTD (07) 3539 9500	WAGTAIL GROVE, 4513 CABOOLTURE WEST	PROJECT No. 24-0761
C	22.05.26	AK	BP	AMENDED TO COUNCIL RF1						DRAWING No. DA-0001
										REVISION C

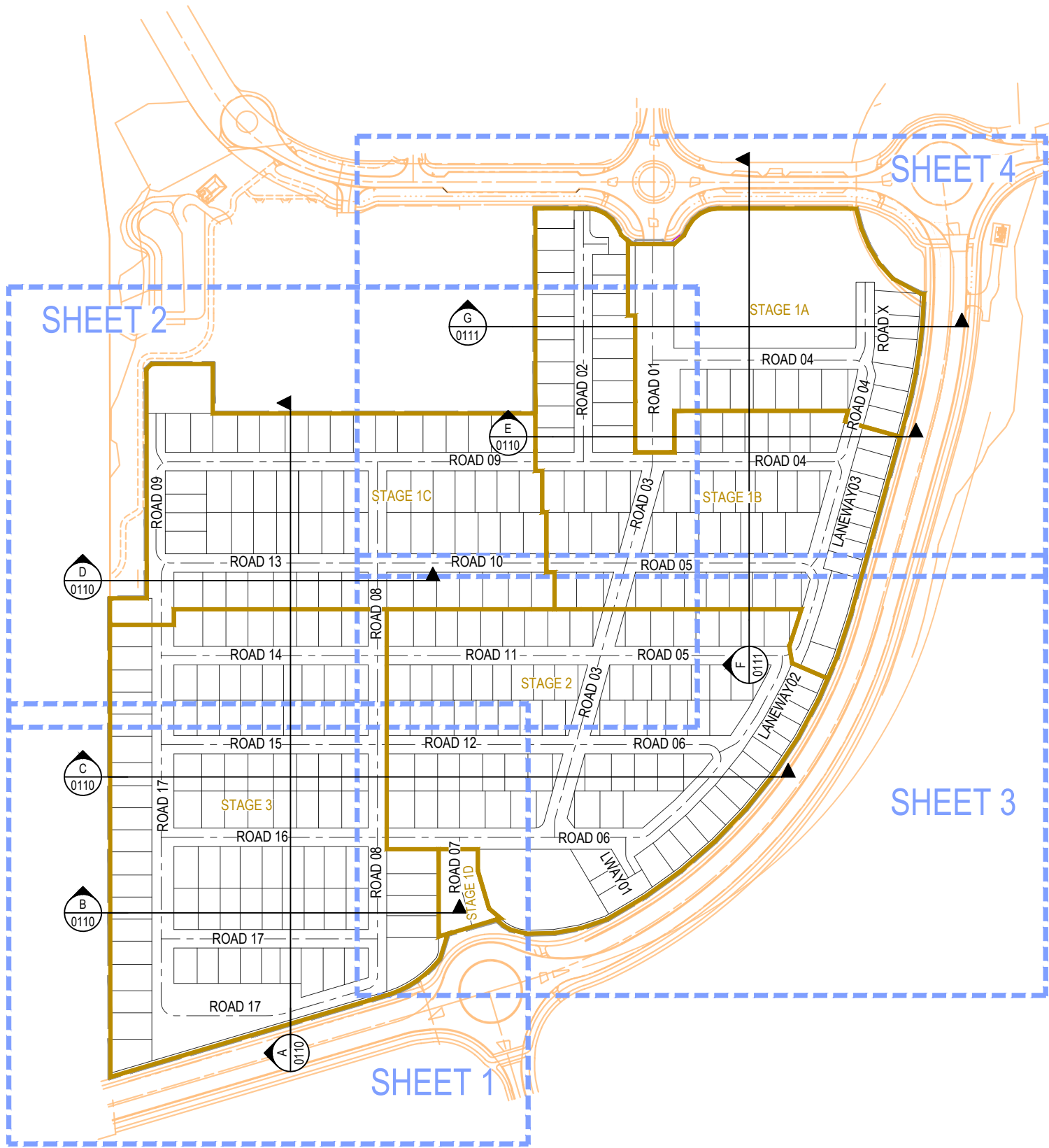
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PROPOSED AREA OF WORKS

PROPOSED STAGE BOUNDARIES

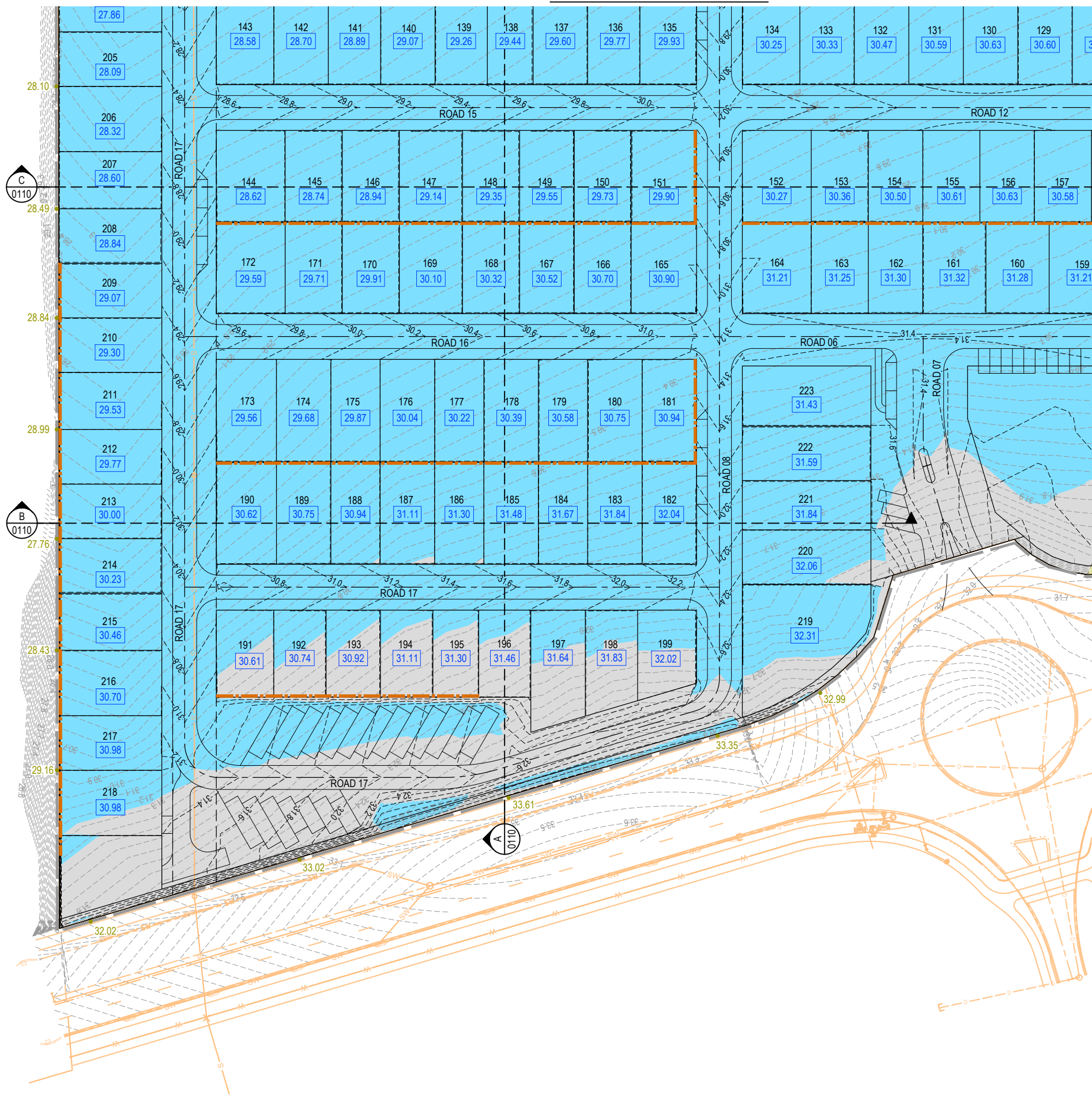
PROPOSED ROAD CONTROL LINE

EXTERNAL DESIGN (BY OTHERS)



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						CHRIS O'SULLIVAN	RPEQ 20630	DATE	22.05.26									
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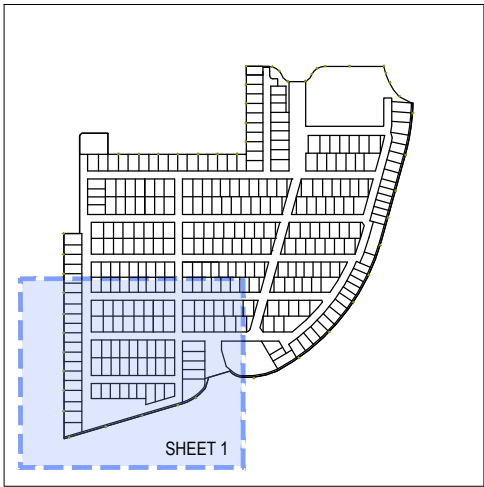
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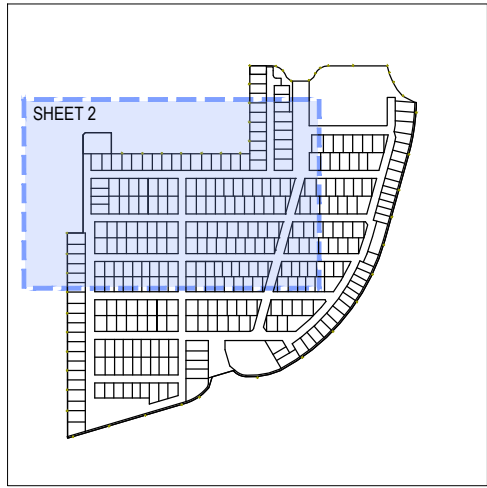
- PROPOSED AREA OF WORKS
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- PROPOSED CONCRETE SLEEPER RETAINING WALL
- AREA SUBJECT TO APPROVAL OF ROAD CLOSURE APPLICATION DA/2025/4395
- EXTERNAL DESIGN (BY OTHERS)
- PROPOSED EARTHWORKS PAD LEVEL (PL)
- PROPOSED SPOT LEVEL
- EXISTING SURFACE LEVEL (ESL)
- PROPOSED AREA OF CUT
- PROPOSED AREA OF FILL

RETAINING WALL HEIGHT NOTE:
MAX. RETAINING WALL HEIGHTS SHOWN
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LEVEL TO PAD LEVEL AND DO NOT FACTOR IN
ADDITIONAL HEIGHT TO MATCH BUILT FORM F.S.L.

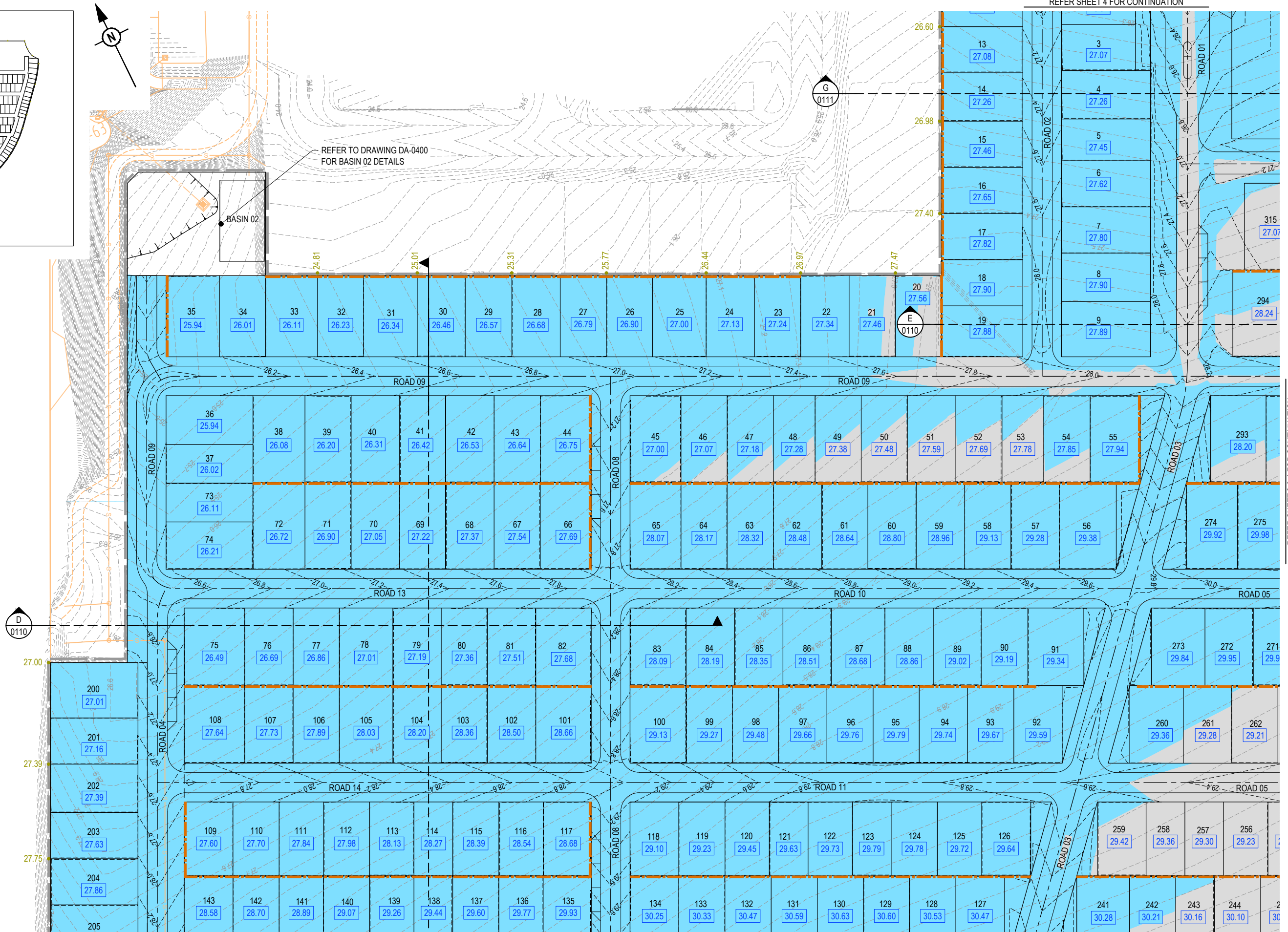


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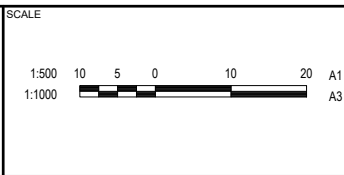


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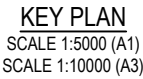
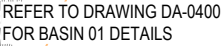
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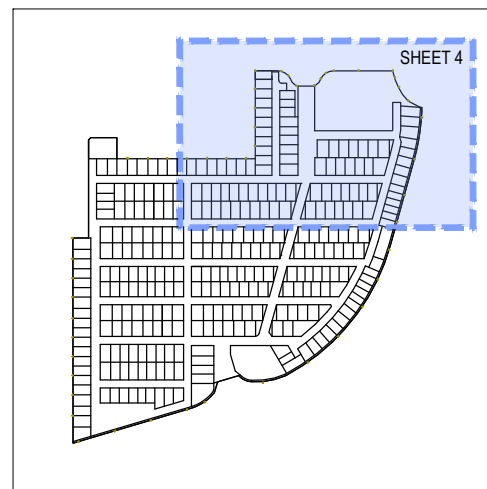


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STOCKLAND LAND LEASE MANAGEMENT PTY LTD
ASSOCIATED CONSULTANT
RPS GROUP PTY LTD (07) 3539 9500

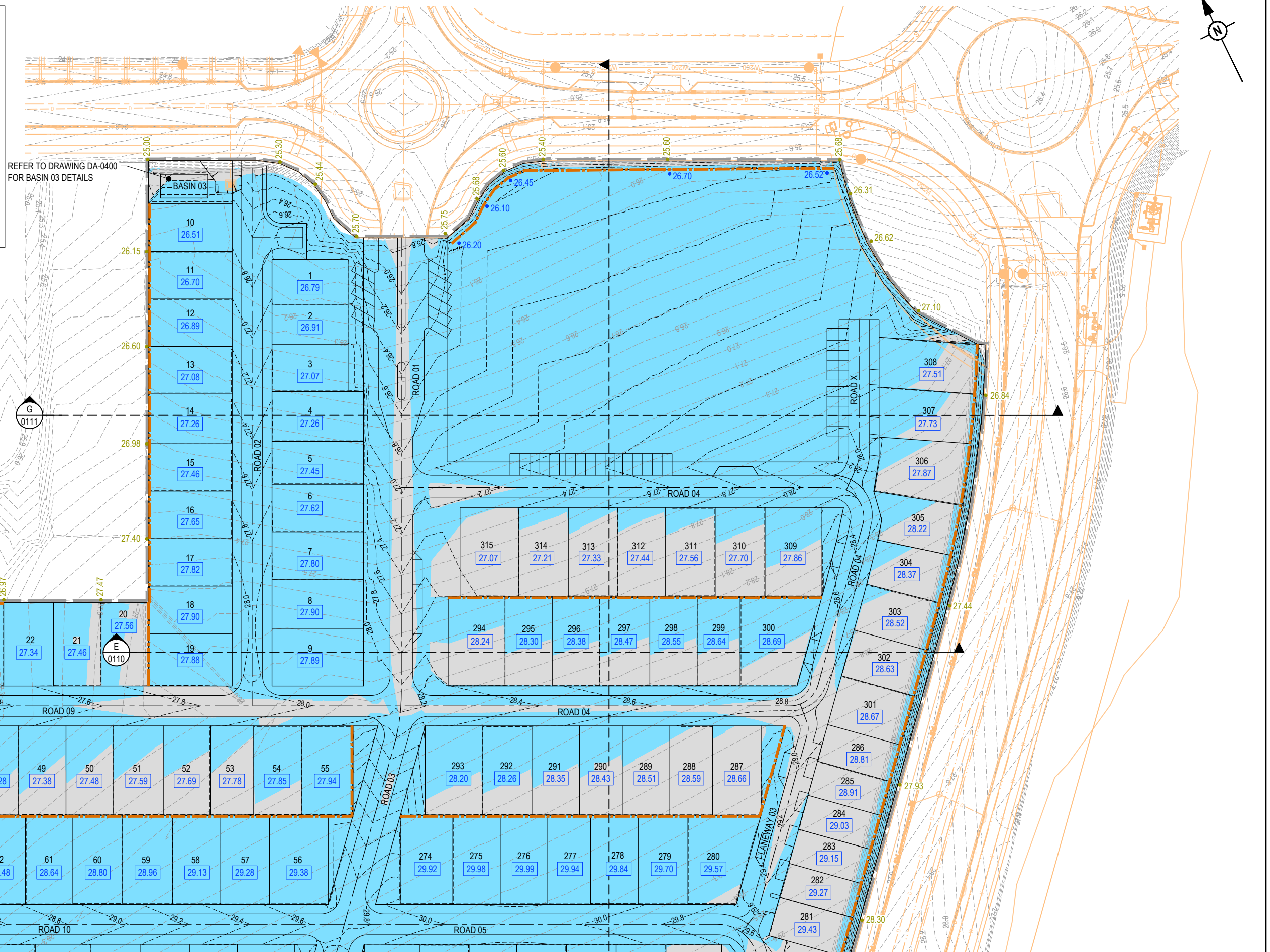
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RIVERMONT LLC
WAGTAIL GROVE, 4513 CABOOLTURE WEST

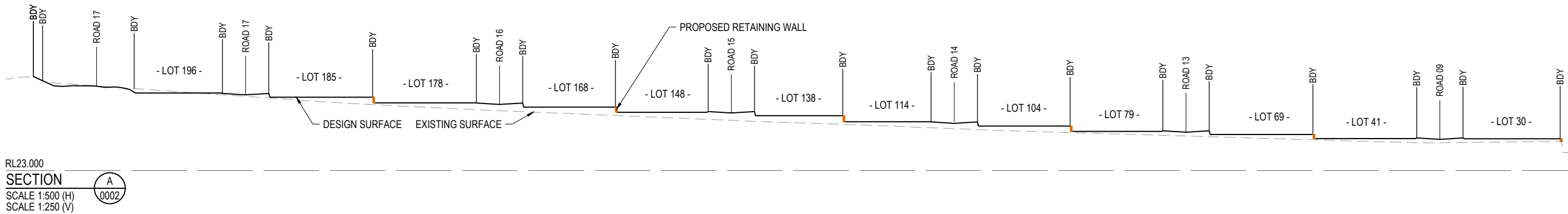
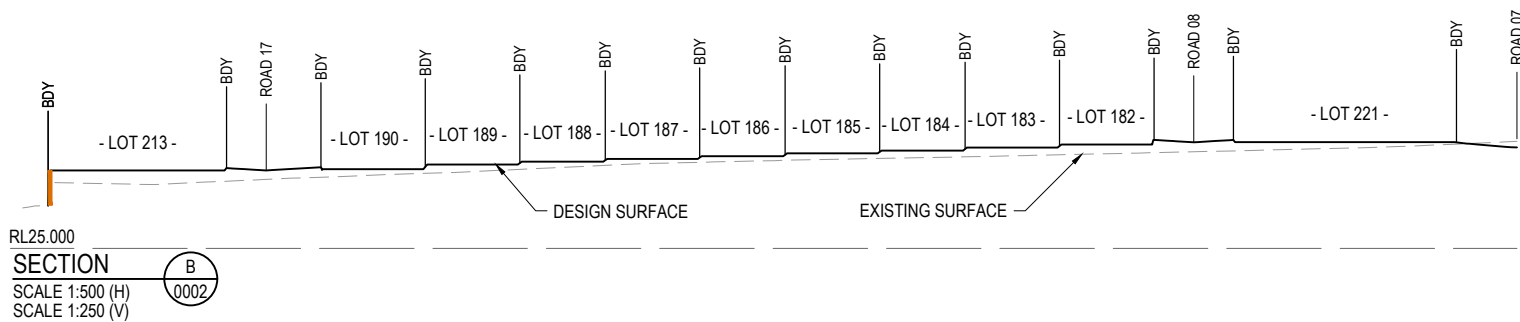
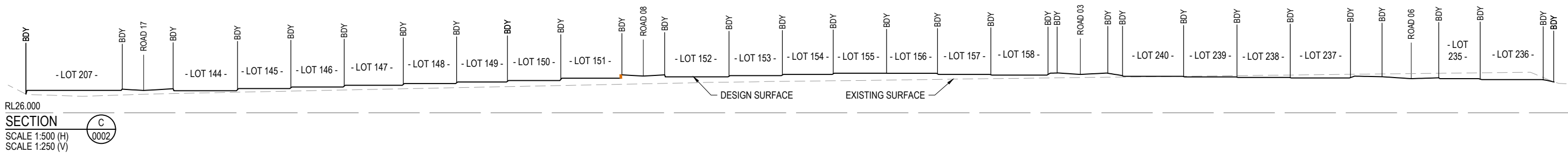
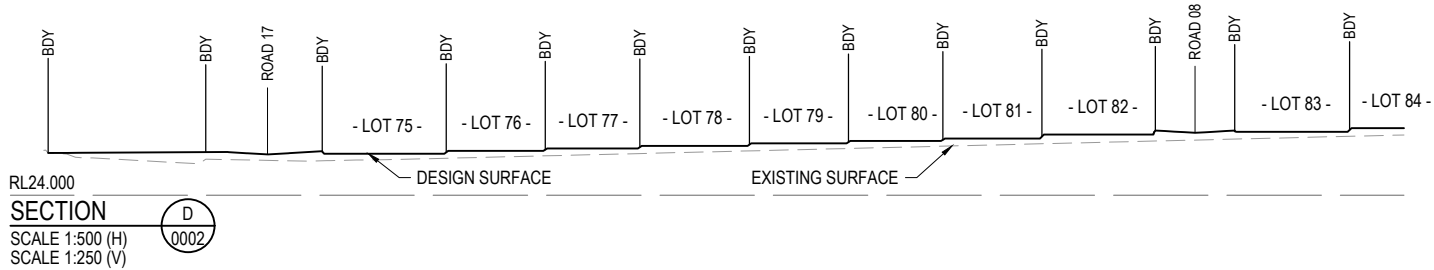
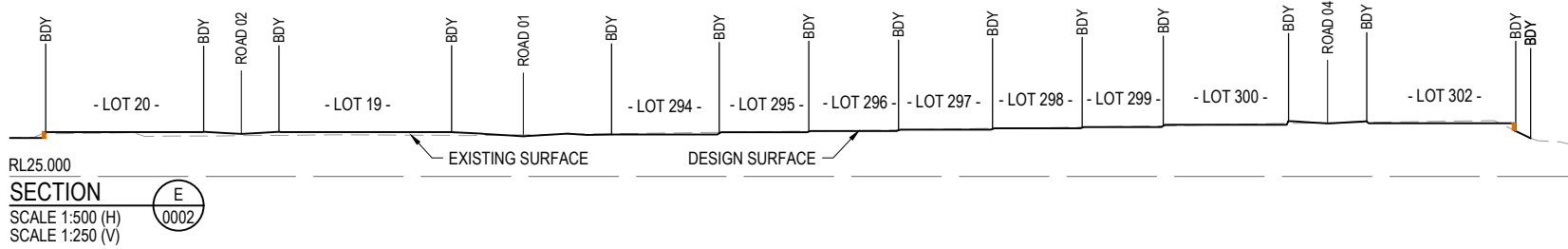
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PROJECT No.	DRAWING No.	REVISION
24-0761	DA-0101	C

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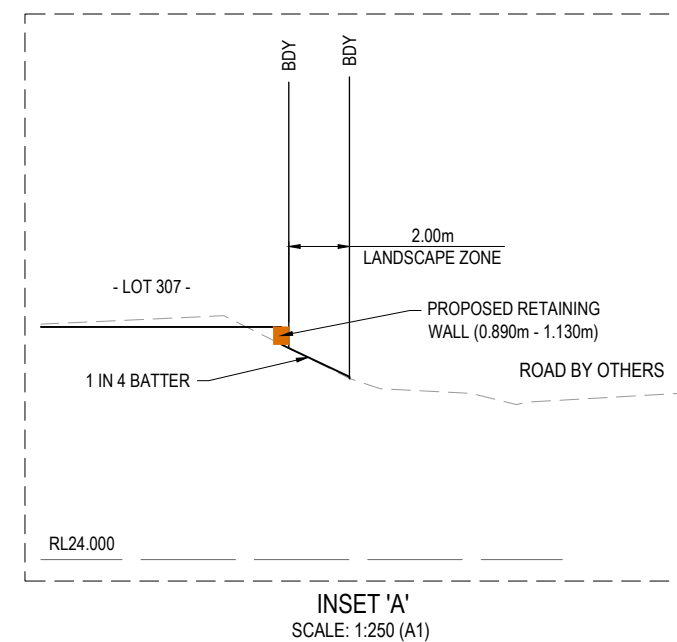


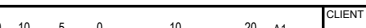
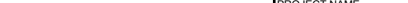
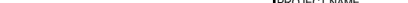
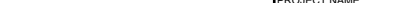
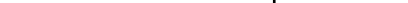
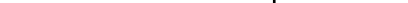
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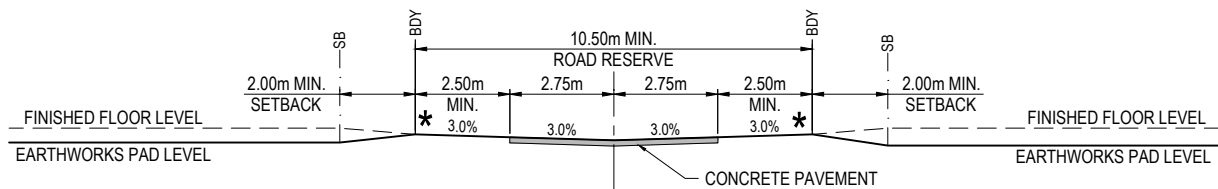
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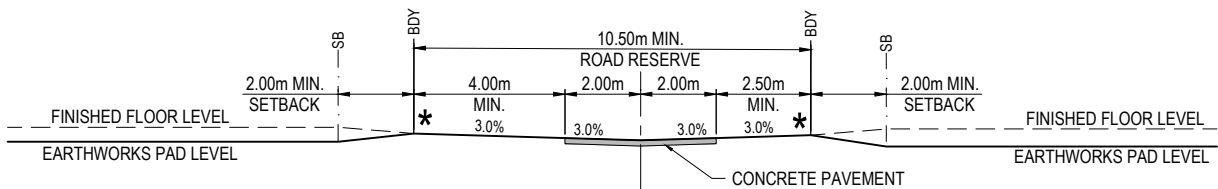


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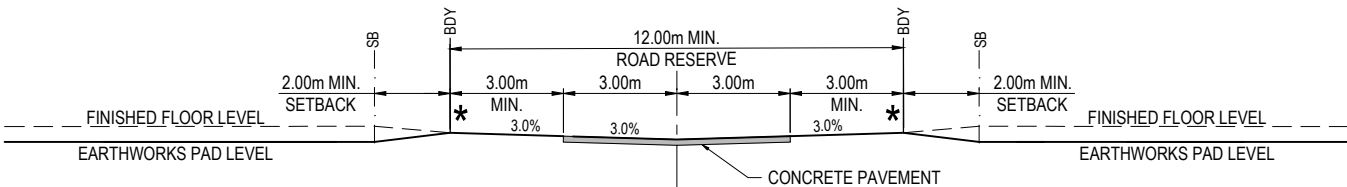
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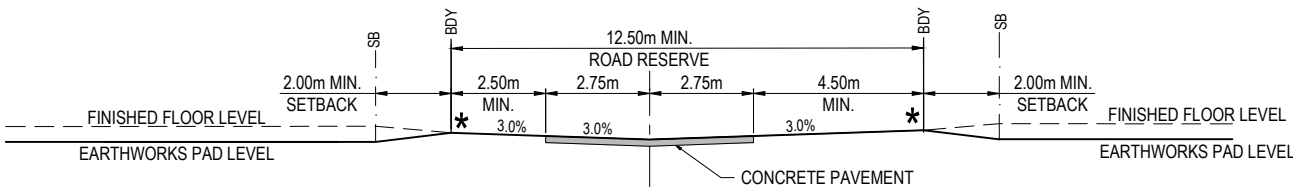
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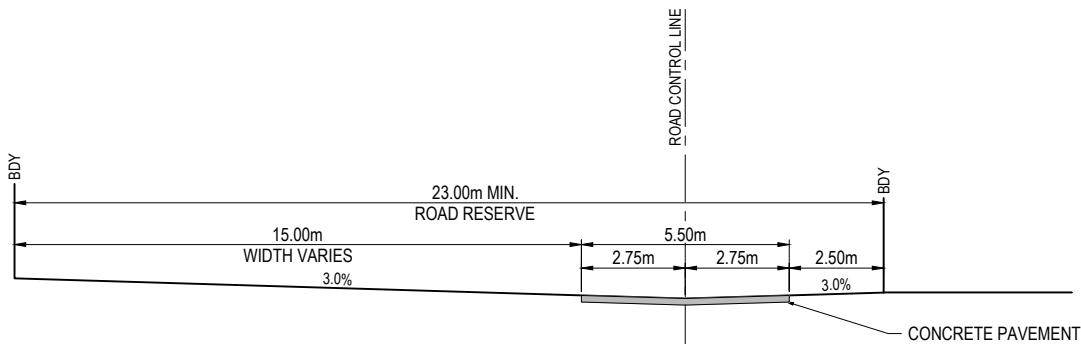
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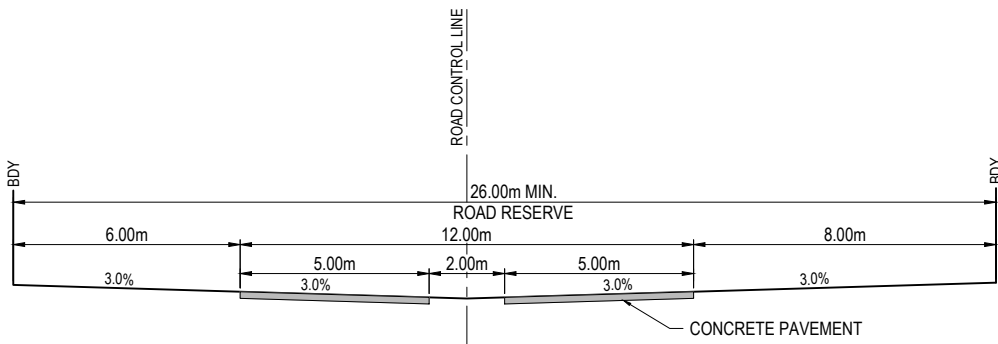
12.50m WIDE ROAD - TYPICAL CROSS SECTION

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23.0m ENTRY ROAD - TYPICAL CROSS SECTION

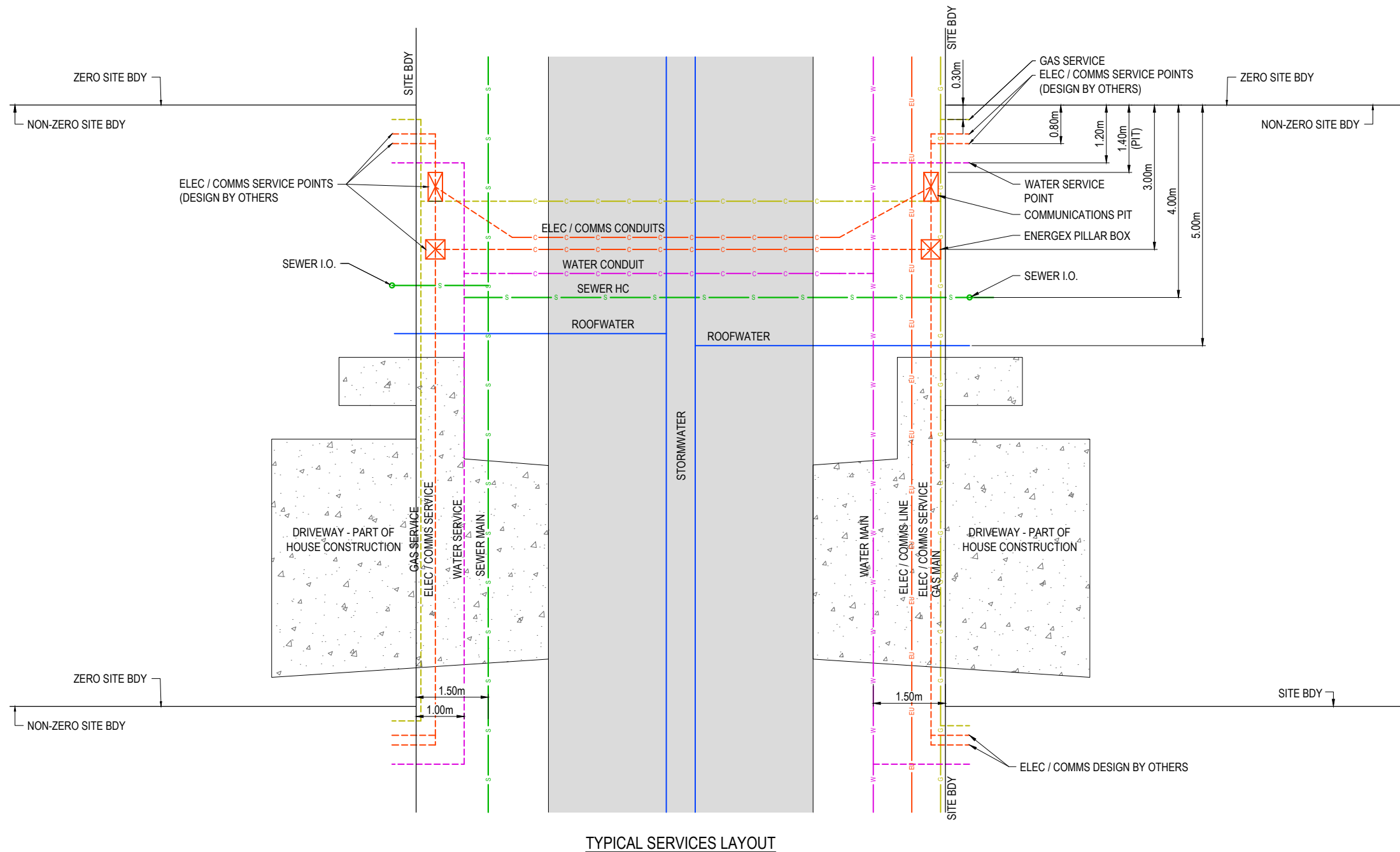
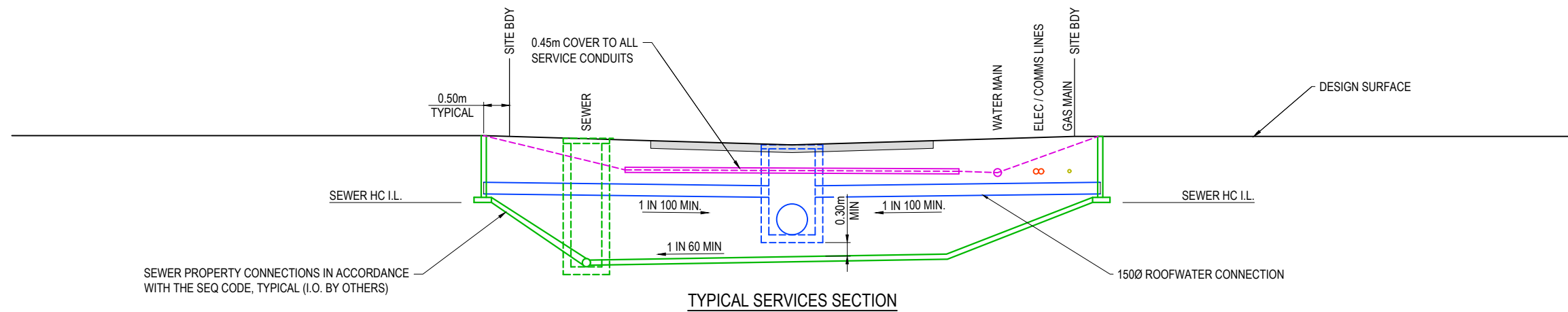
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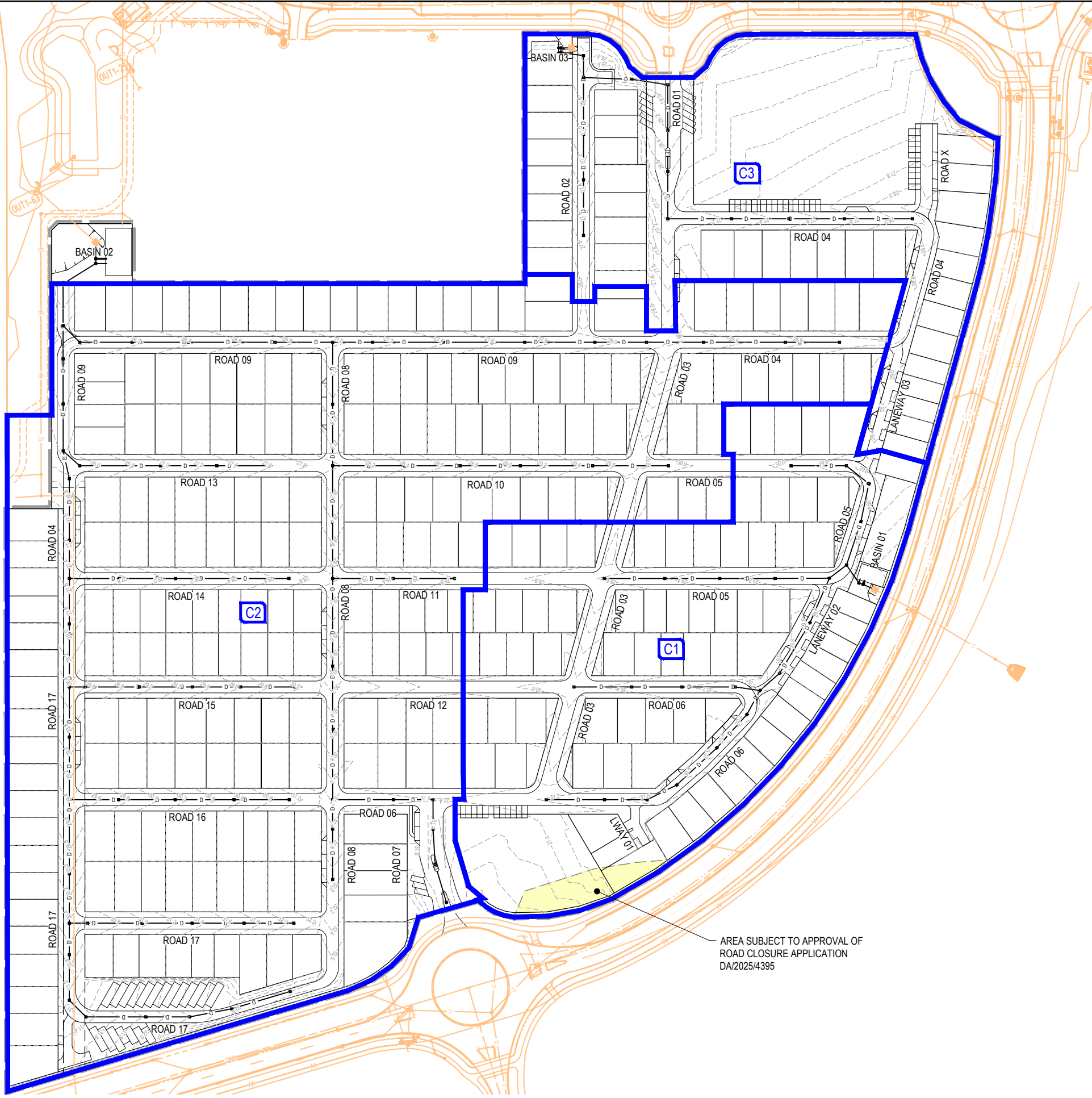
26.00m ENTRY ROAD - TYPICAL CROSS SECTION

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B	19.03.26	LM	BP	LOT NUMBERS AND LOT 281 ROL AMENDED																
C	22.05.26	AK	BP	AMENDED TO COUNCIL RFI																
							DESIGN	APPROVED	RPEQ 20630	DATE		22.05.26	ASSOCIATED CONSULTANT			WAGTAIL GROVE, 4513 CABOOLTURE WEST	PROJECT No.	DRAWING No.	REVISION	
								CHRIS O'SULLIVAN				RPS GROUP PTY LTD (07) 3539 9500			24-0761		DA-0220	C		
							FOR AND ON BEHALF OF COLLIER'S INTERNATIONAL ENGINEERING & DESIGN PTY LTD													



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B	19.03.26	LM	BP	AMENDED TO COUNCIL RFI								DRAWING No. DA-0230						
C	22.05.26	AK	BP			FOR AND ON BEHALF OF COLLIER'S INTERNATIONAL ENGINEERING & DESIGN PTY LTD		REVISION C										



LEGEND

C1

PROPOSED AREA OF WORKS

CATCHMENT NAME

CATCHMENT BOUNDARY

PROPOSED STORMWATER DRAINAGE PIPE

AREA SUBJECT TO APPROVAL OF ROAD CLOSURE APPLICATION DA/2025/4395

FINISHED SURFACE CONTOUR

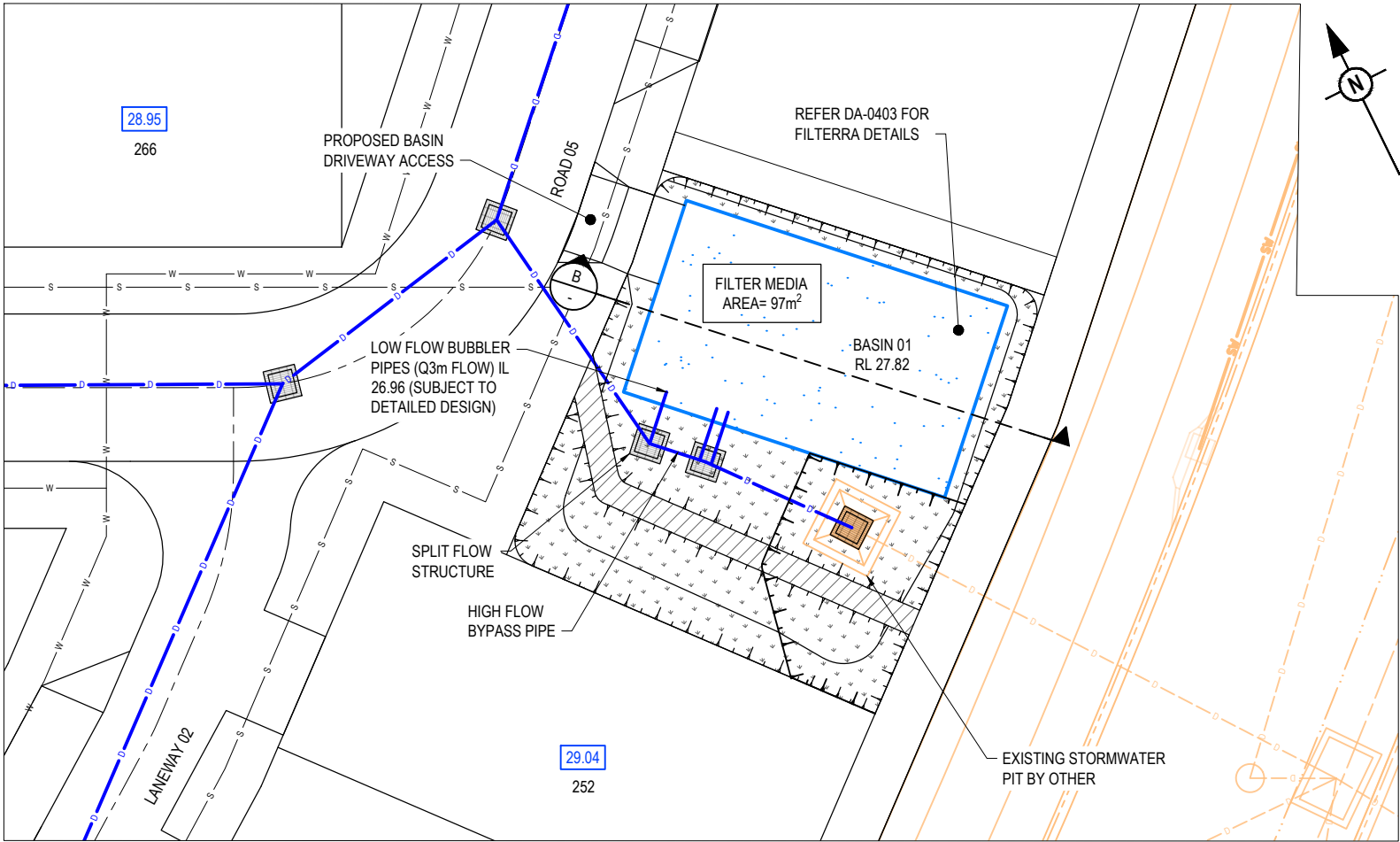
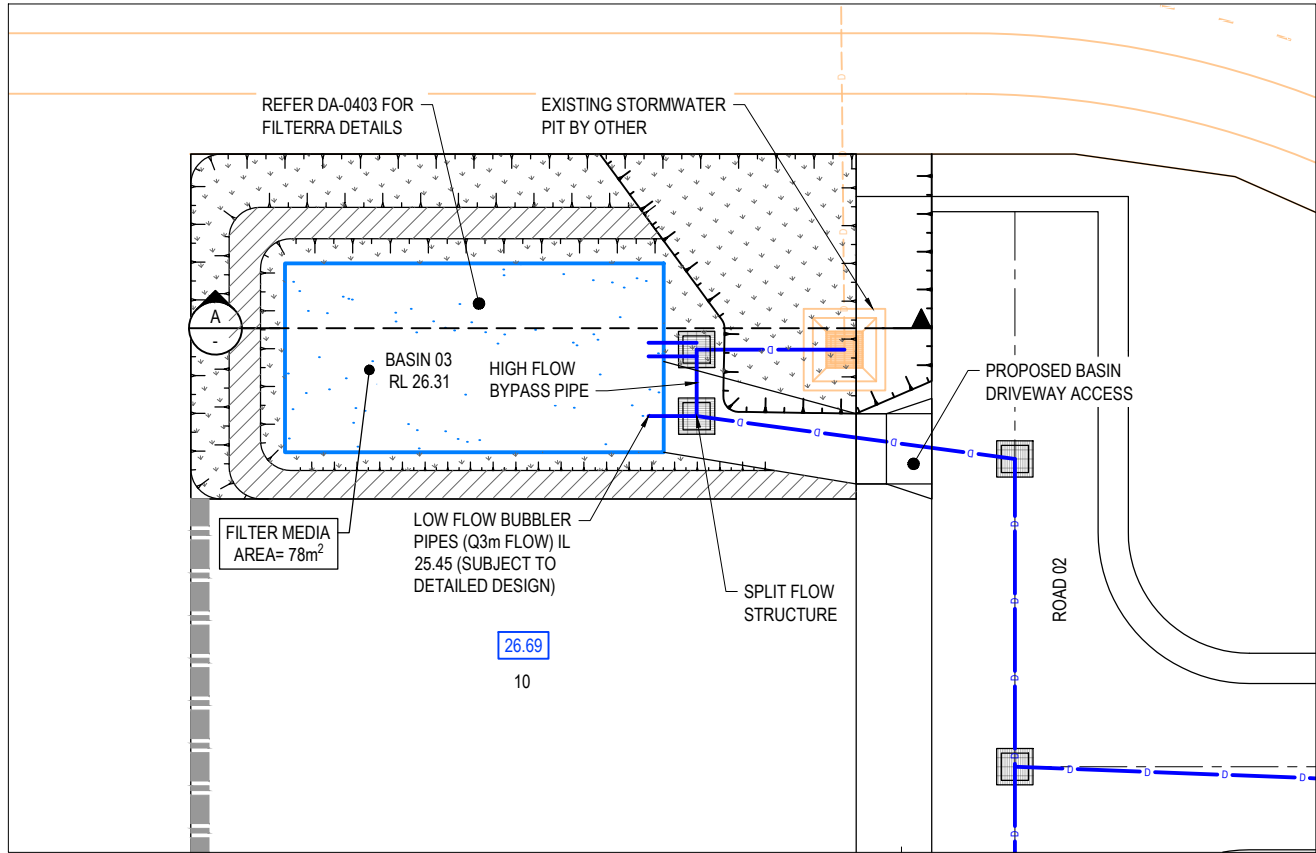
EXTERNAL DESIGN (BY OTHERS)

CATCHMENT AREAS

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C2	8.925
C3	2.605

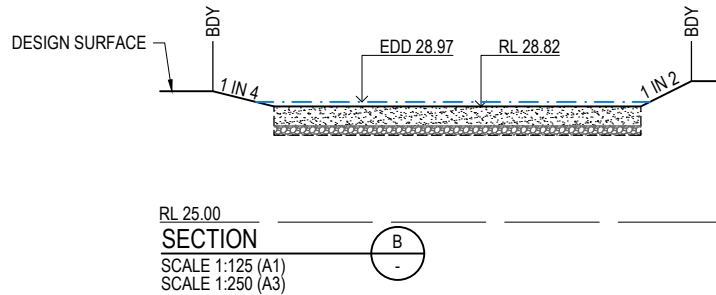
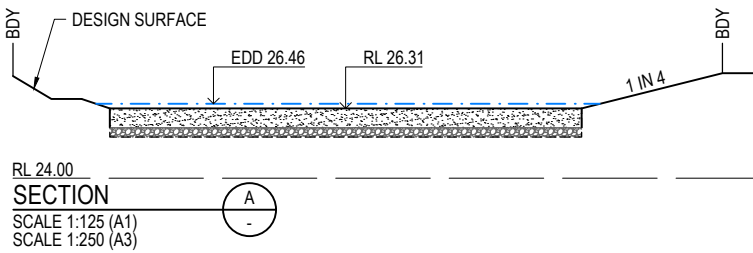
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								FOR AND ON BEHALF OF COLLIER'S INTERNATIONAL ENGINEERING & DESIGN PTY LTD															



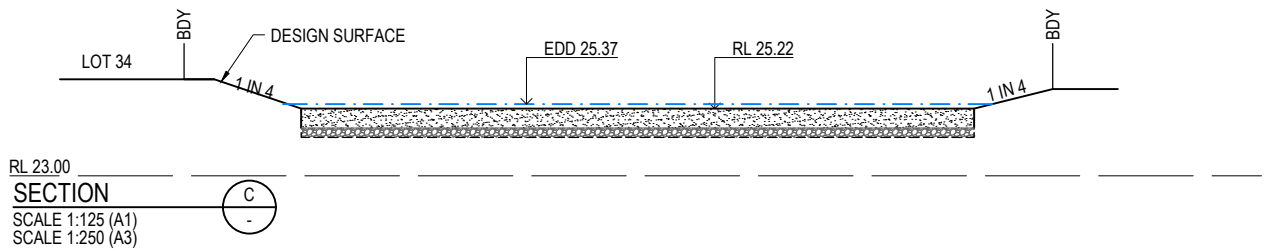
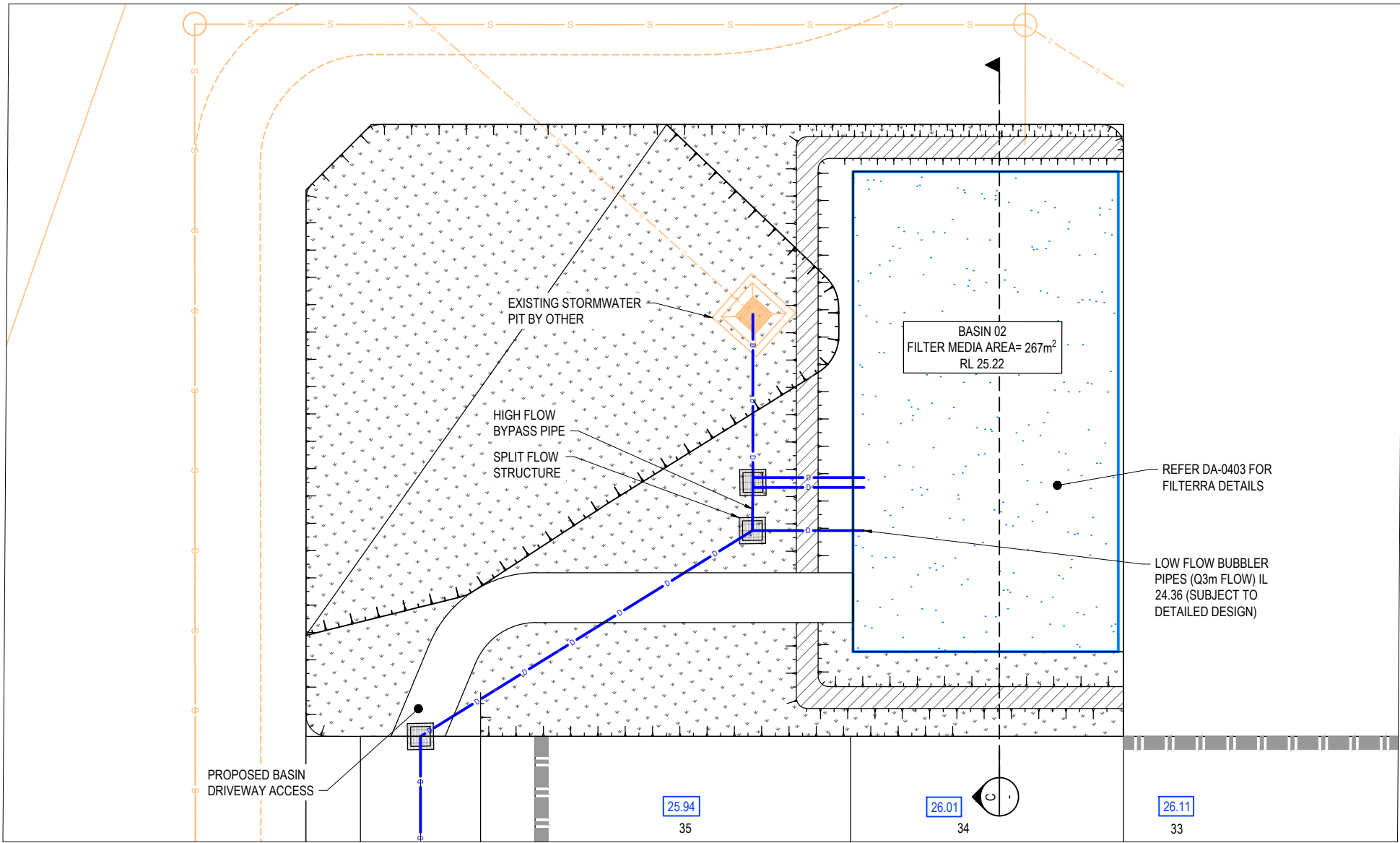
- LEGEND**
- 29.32 PROPOSED EARTHWORKS PAD LEVEL (PL)
 - PROPOSED STORMWATER DRAINAGE PIPE
 - PROPOSED BIO RETENTION FILTER AREA
 - EXTERNAL DESIGN (BY OTHERS)
 - PROPOSED PLANTED BATTER - BY LANDSCAPERS
 - PROPOSED 1.00m WIDE MAINTENANCE BENCH/BUND

NOTES:
FINAL BASIN SHAPES TO BE CONFIRMED THROUGH DETAILED DESIGN NOTING MINIMUM FILTER MEDIA AREA TO BE MAINTAINED



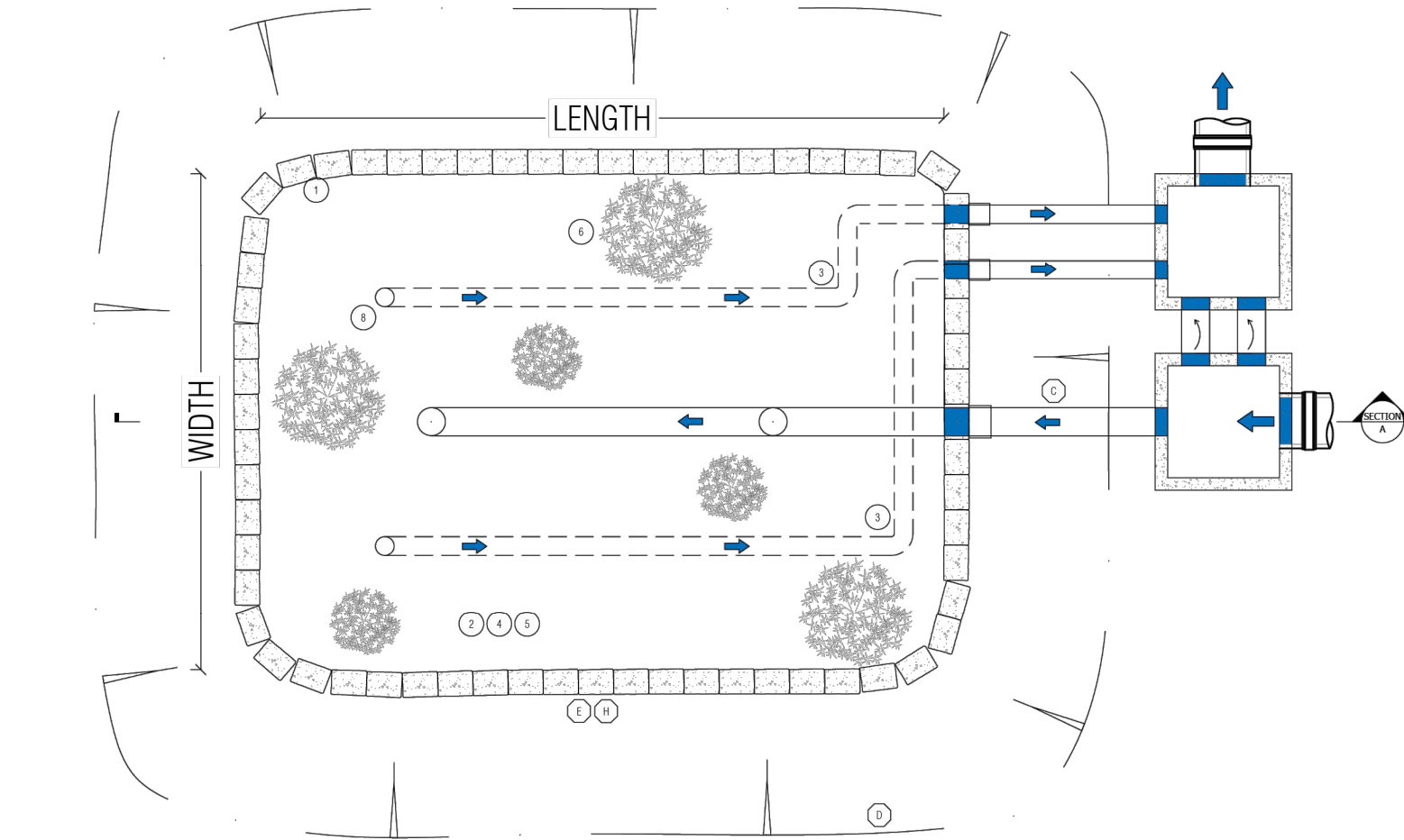
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						CHRIS O'SULLIVAN	RPEQ 20630	DATE 22.05.26		
					FOR AND ON BEHALF OF COLLIER'S INTERNATIONAL ENGINEERING & DESIGN PTY LTD					
									ASSOCIATED CONSULTANT	
									RPS GROUP PTY LTD	
									(07) 3539 9500	
										WAGTAIL GROVE, 4513 CABOOLTURE WEST

NOTES:
FINAL BASIN SHAPES TO BE CONFIRMED THROUGH
DETAILED DESIGN NOTING MINIMUM FILTER MEDIA
AREA TO BE MAINTAINED

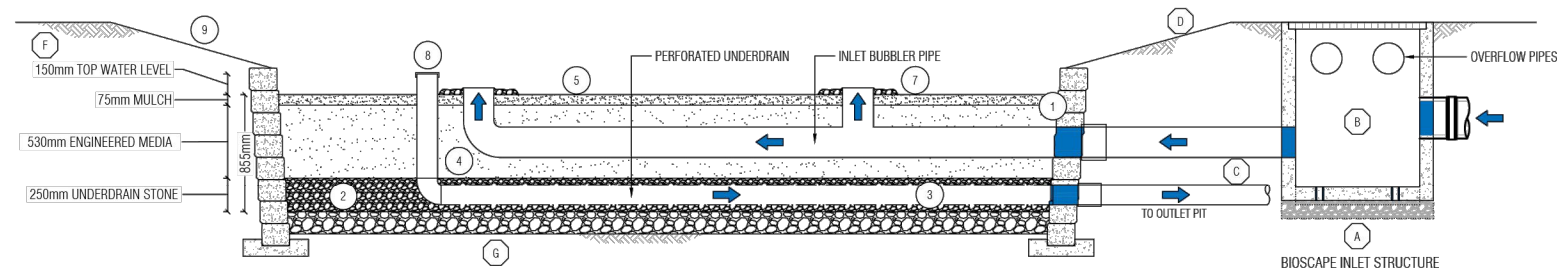


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									DRAWING No. DA-0401
									REVISION B

NOT FOR CONSTRUCTION



PLAN



SECTION A-A

(PLANTING NOT SHOWN FOR CLARITY)

LAST MODIFIED: 24-05-19

SITE SPECIFIC REQUIREMENTS		
COUNT	DESCRIPTION	INSTALLED BY
	FILTERRA SURFACE AREA (m ²)	OCEAN PROTECT
	MULCH VOLUME (m ³)	OCEAN PROTECT
	FILTERRA MEDIA DEPTH (mm)	OCEAN PROTECT
	VOLUME OF UNDERDRAIN STONE (m ³)	OCEAN PROTECT
	FILTERRA LINER (m)	OCEAN PROTECT

PLANTING SCHEDULE	
COUNT	FILTERRA BIOSCAPE SYSTEM PLANT PALETTE

- GENERAL NOTES
- CONTRACTOR SHALL CONTACT OCEAN PROTECT TO COORDINATE DELIVERY AND INSTALLATION OF FILTERRA BIOSCAPE SYSTEM. OCEAN PROTECT ACTIVATION CAN ONLY OCCUR ONCE CONTRACTOR RESPONSIBILITIES ARE COMPLETE.
 - PERFORM FILTERRA BIOSCAPE SYSTEM EXCAVATION ONLY AFTER ALL THE CONTRIBUTING DRAINAGE AREAS ARE PERMANENTLY STABILISED. IF FILTERRA BIOSCAPE SYSTEM IS IN AN AREA PREVIOUSLY USED AS EROSION AND SEDIMENT CONTROL FACILITIES PLEASE CONTACT OCEAN PROTECT. DO NOT STOCKPILE MATERIALS OR STORE EQUIPMENT IN THIS AREA. CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PREVENT CONSTRUCTION-RELATED EROSION RUNOFF FROM ENTERING THE FILTERRA MEDIA BAY.
 - FILTERRA SHALL BE INSTALLED OFFLINE AS EARLY AS POSSIBLE AFTER SITE STABILISATION TO ALLOW FOR SOIL MATURITY AND SYSTEM ESTABLISHMENT.
 - CONTRACTOR SHALL COORDINATE WITH OCEAN PROTECT BEFORE THE FILTERRA BIOSCAPE SYSTEM IS EXCAVATED TO MINIMISE THE TIME BETWEEN EXCAVATION AND COMPLETION OF THE FILTERRA BIOSCAPE SYSTEM. ONCE EXCAVATED, ANY STANDING WATER THAT ACCUMULATES IN THE EXCAVATED AREA MUST BE REMOVED BY THE CONTRACTOR BEFORE OCEAN PROTECT CAN COMMENCE THE FILTERRA BIOSCAPE SYSTEM. ANY ADDITIONAL EXCAVATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
 - CONTRACTOR SHALL PROVIDE ACCESS TO THE EXCAVATED AREA(S) FOR OCEAN PROTECT TO USE DURING THE CONSTRUCTION OF THE FILTERRA BIOSCAPE SYSTEM(S). ACCESS SHALL NOT PROHIBIT LIGHT DUTY EQUIPMENT THAT MAY BE USED TO INSTALL THE COMPONENTS (STONE, MEDIA, ETC). THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY RE-STABILIZATION THAT MAY BE REQUIRED AFTER THE FILTERRA BIOSCAPE SYSTEM INSTALLATION/ACTIVATION.
 - OCEAN PROTECT AND/OR ITS REPRESENTATIVES SHALL BE RESPONSIBLE FOR THE LIST ENTITLED 'OCEAN PROTECT INSTALLATION RESPONSIBILITIES'.
 - NO FLOW SHALL ENTER THE FILTERRA SYSTEM UNLESS OCEAN PROTECT HAS ACTIVATED THE SYSTEM AND CONFIRMED ESTABLISHMENT
 - IF FILTERRA IS WITHIN AN OVERLAND FLOW PATH, PLEASE CONTACT OCEAN PROTECT

- CONTRACTOR WORKS AND INSTALLATION RESPONSIBILITIES
- A. CONTRACTOR TO PLACE FILTERRA INLET STRUCTURE ON BEDDING AS SPECIFIED BY THE ENGINEER. OCEAN PROTECT SUGGESTS AS A MINIMUM TO USE 150MM BEDDING STONE ON COMPACTED SUB-GRADE TO 90% DENSITY. UNSUITABLE MATERIAL SHALL BE REPLACED AS ADVISED BY THE ENGINEER.
- B. CONTRACTOR SHALL PROVIDE AND INSTALL DRAINAGE ITEMS TO, FROM AND INCLUDING THE INLET AND OUTLET STRUCTURES AS PER THE APPROVED SITE PLANS.
- C. OCEAN PROTECT CAN PROVIDE COUPLERS AT THE FILTERRA INTERFACE FOR CONNECTION TO THE INLET DIVERSION PIPES. ALL DRAINAGE TO AND FROM THE FILTERRA MUST ALLOW FOR POSITIVE FLOW.
- D. CONTRACTOR TO PROVIDE BATTER ACCORDING TO DIMENSION AND SLOPE SHOWN ON PLANS. SLOPE FROM SHOULDER TO FILTERRA BIOSCAPE SYSTEM SURFACE PERIMETER SHALL NOT EXCEED 3:1. TURF IS REQUIRED TO STABILISE SIDE SLOPES SHOWN ON DETAIL AND ON PLAN SHEETS.
- E. CONTRACTOR TO EXCAVATE MEDIA AREA CORRESPONDING TO THE SIZE OF THE FILTERRA BIOSCAPE SYSTEM SURFACE AREA AS SHOWN ON DETAIL AND ON PLAN SHEETS.
- F. CONTRACTOR SHALL EXCAVATE VERTICALLY FROM BOTTOM OF UNDERDRAIN STONE OR DRAINAGE STONE IF REQUIRED, TO ELEVATION OF MULCH AS SHOWN ON THIS DETAIL.
- G. CONTRACTOR TO CONFIRM DEPTH OF EXCAVATION. IF THE EXCAVATION HAS BEEN MADE TOO DEEP AND ADDITIONAL UNDERDRAIN STONE NEEDS TO BE USED TO RAISE THE BASE OF THE FILTERRA, THIS COST SHALL BE TAKEN ON BY THE CONTRACTOR.
- H. RETAINING WALLS AND ADDITIONAL EROSION CONTROL AROUND THE FILTERRA BIOSCAPE SYSTEM. RETAINED OFFLINE FROM FILTERRA OCEAN PROTECT SUPPLY AND INSTALLATION RESPONSIBILITIES

- GEOTEXTILE FABRIC ALONG THE PERIMETER OF THE FILTERRA BIOSCAPE SYSTEM EXCAVATION.
- UNDERDRAIN STONE. TYPICALLY 250mm THICK (50mm UNDER THE PIPING 150mm AROUND THE PIPING AND 50mm ABOVE THE PIPING)
- 150mm UNDERDRAIN PIPING UNLESS OTHERWISE APPROVED BY OCEAN PROTECT. ASSOCIATED PIPING AND FITTINGS/ELBOWS TO CONNECT TO THE PIPING/FITTING(S) THAT IS PROVIDED BY CONTRACTOR (SEE CONTRACTOR INSTALLATION RESPONSIBILITIES THIS DETAIL).
- 530mm FILTERRA MEDIA.
- 75mm DOUBLE SHREDDED HARDWOOD MULCH OVER ENTIRE FILTERRA BIOSCAPE SYSTEM SURFACE AREA.
- PLANTINGS OF PLANTS SELECTED BY ENGINEER THAT MATCH OCEAN PROTECTS APPROVED PLANTING LIST.
- FLOW DISSIPATION APRON AROUND ALL FLOW ENTRY POINTS AS DESIGNED AND INDICATED ON THIS DETAIL
- CLEAN-OUT ADAPTER, PLUG AND PIPING.
- ACTIVATING THE SYSTEM



PHONE: 1300 354 722

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OCEAN PROTECT
FILTERRA BIOSCAPE SYSTEM
WITH BIOSCAPE INLET STRUCTURE
SPECIFICATION DRAWING

REV	DATE	DESIGN	DRAWN	REVISION DETAILS
A	07.11.25	LM	BP	ORIGINAL ISSUE
B	22.05.26	AK	BP	AMENDED TO COUNCIL RFI

DRAWN	STATUS
	ISSUED FOR APPROVAL
DESIGN	APPROVED CHRIS O'SULLIVAN RPEQ 20630 DATE 22.05.26
FOR AND ON BEHALF OF COLLIER'S INTERNATIONAL ENGINEERING & DESIGN PTY LTD	



SCALE

CLIENT
STOCKLAND LAND LEASE MANAGEMENT PTY LTD
ASSOCIATED CONSULTANT RPS GROUP PTY LTD (07) 3539 9500

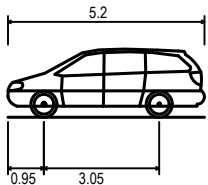
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RIVERMONT LLC
WAGTAIL GROVE, 4513 CABOOLTURE WEST

DRAWING TITLE
CONCEPT BIO BASIN DETAILS
PROJECT No. 24-0761
DRAWING No. DA-0403
REVISION B

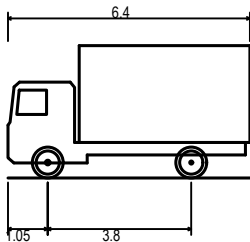


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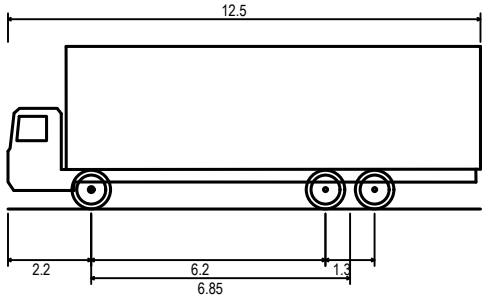
- PROPOSED AREA OF WORKS
- PROPOSED CONCRETE SLEEPER RETAINING WALL
- EXTERNAL DESIGN (BY OTHERS)
- PROPOSED FOOTPATH
- PROPOSED NEW ROAD PAVEMENT



PASSENGER VEHICLE (5.2m)
OVERALL LENGTH 5.200m
OVERALL WIDTH 1.940m
OVERALL BODY HEIGHT 1.804m
MIN BODY GROUND CLEARANCE 0.295m
TRACK WIDTH 1.840m
LOCK-TO-LOCK TIME 4.00s
CURB TO CURB TURNING RADIUS 6.300m

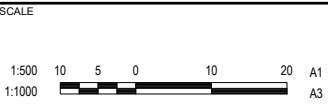


SRV - Small Rigid Vehicle
Overall Length 6.400m
Overall Width 2.330m
Overall Body Height 3.500m
Min Body Ground Clearance 0.398m
Track Width 2.330m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 7.100m



SINGLE UNIT TRUCK/BUS (12.5m)
OVERALL LENGTH 12.500m
OVERALL WIDTH 2.500m
OVERALL BODY HEIGHT 4.300m
MIN BODY GROUND CLEARANCE 0.490m
TRACK WIDTH 2.500m
LOCK-TO-LOCK TIME 6.00s
CURB TO CURB TURNING RADIUS 12.500m

REV	DATE
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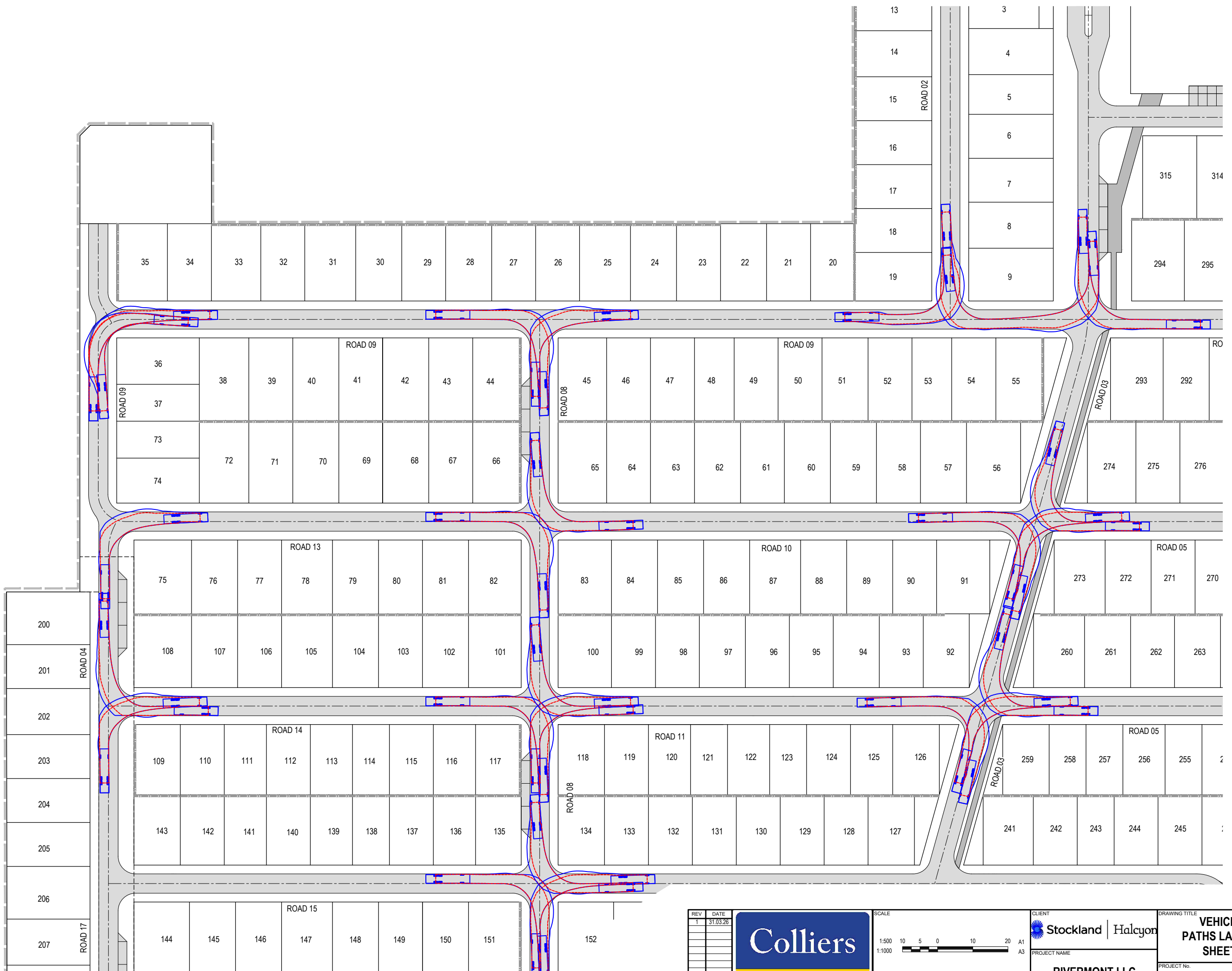


CLIENT
Stockland | Halcyon

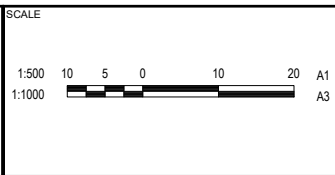
PROJECT NAME
RIVERMONT LLC

DRAWING TITLE
VEHICLE TURN PATHS LAYOUT PLAN SHEET 1 OF 4

PROJECT No. 24-0761	DRAWING No. SK-0010	REVISION 1
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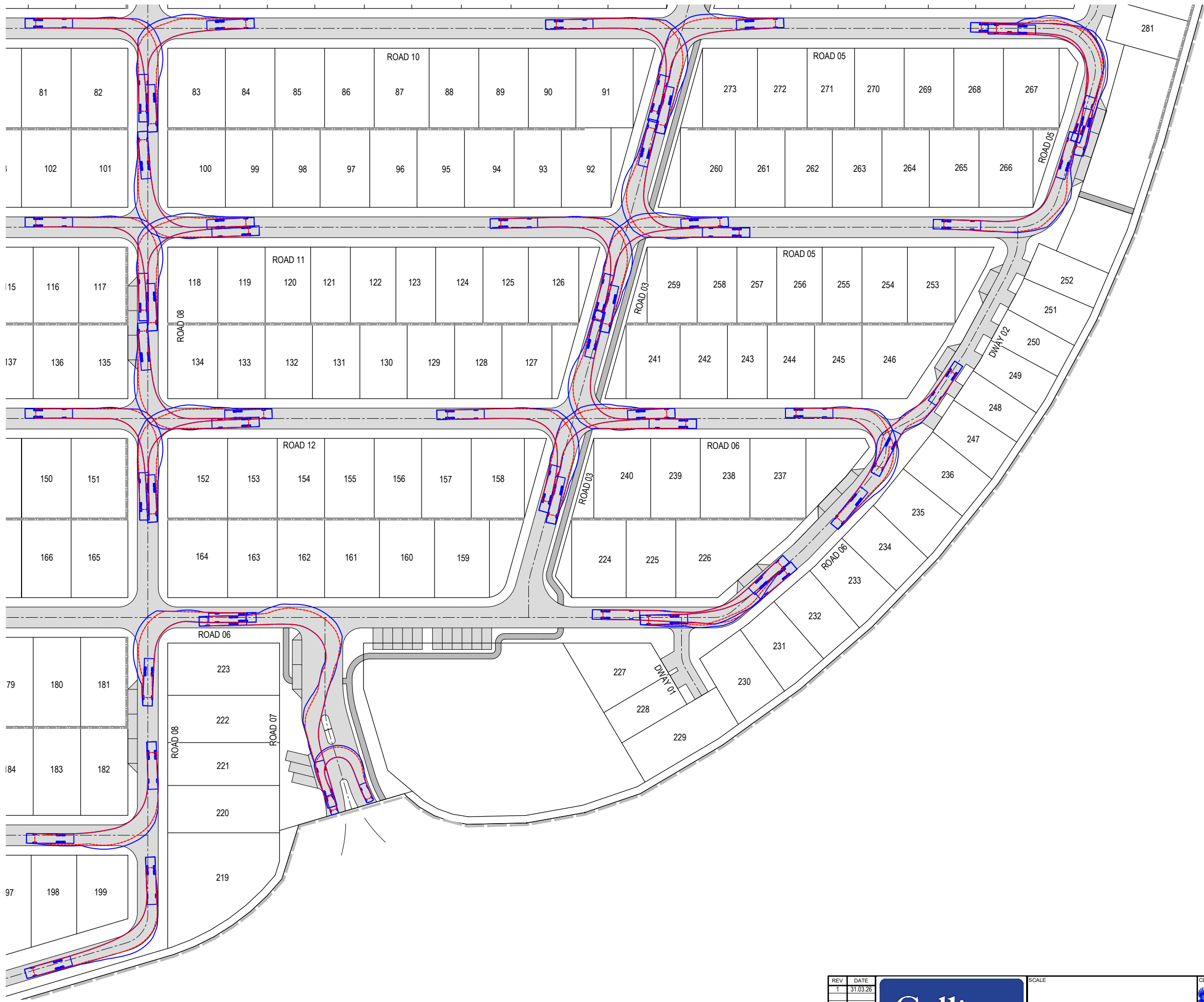


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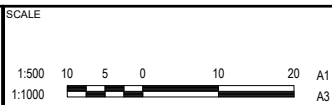


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PROJECT NAME	RIVERMONT LLC

DRAWING TITLE	VEHICLE TURN PATHS LAYOUT PLAN SHEET 2 OF 4		
PROJECT No.	24-0761	DRAWING No.	SK-0011
REVISION			1



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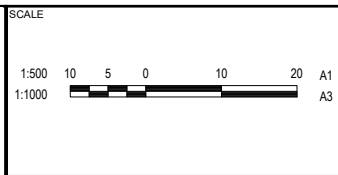


CLIENT	Stockland Halcyon
PROJECT NAME	RIVERMONT LLC

DRAWING TITLE	VEHICLE TURN PATHS LAYOUT PLAN SHEET 3 OF 4		
PROJECT No.	24-0761	DRAWING No.	SK-0012
REVISION	1		



REV	DATE
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2	01.04.26



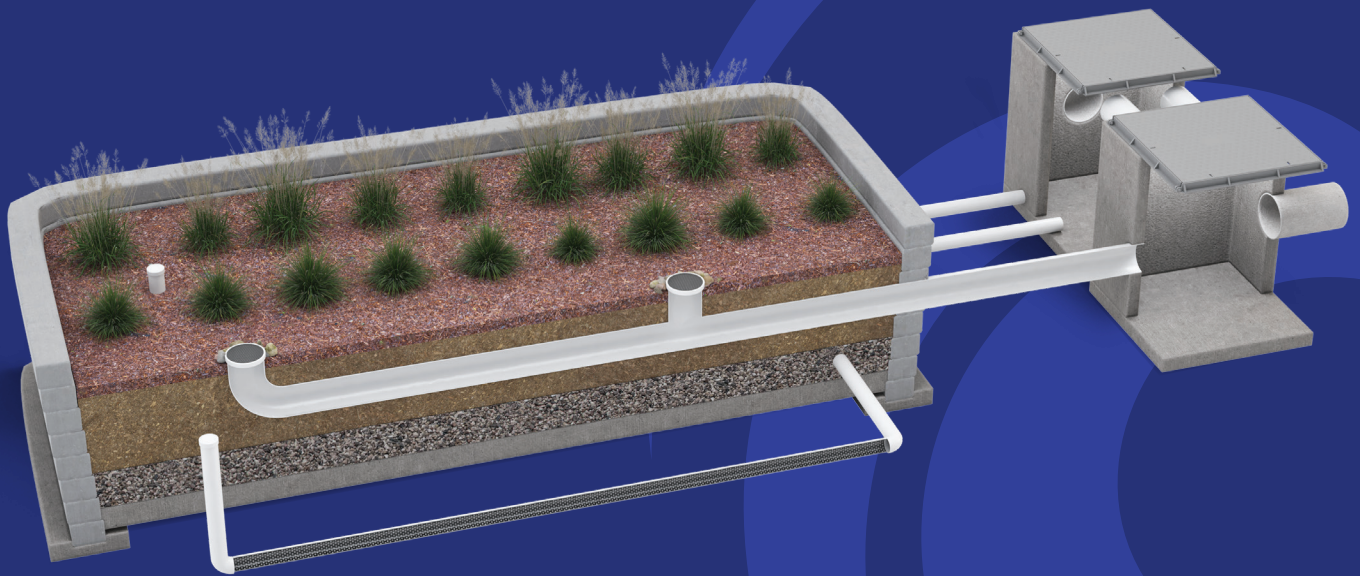
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PROJECT NAME	RIVERMONT LLC

DRAWING TITLE	VEHICLE TURN PATHS LAYOUT PLAN SHEET 4 OF 4		
PROJECT No.	24-0761	DRAWING No.	SK-0013
REVISION	2		

Appendix B Ocean Protect Documentation

Filterterra®

Technical Design Guide



Stopping Pollution Entering Waterways



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Introduction	3
Operational Overview	4
Features	5
Configurations	6
Performance and Select Approvals	8
Maintenance and Activation	8
Design Basics	9



Introduction

Filtterra® is Ocean Protect's engineered high flow, high-performance bioretention system. While it operates similarly to traditional bioretention systems, its high-flow media allows for a reduction in footprint (as low as 0.3% of catchment area). Filtterra® provides all the benefits of typical biofiltration systems whilst being ideal for tight, highly developed sites, urban development projects, commercial parking lots, residential streets, and streetscapes.

Its small footprint reduces installation costs whilst still maintaining comparable life cycle costs compared with traditional bioretention. It can be configured in a variety of ways to integrate with other Water Sensitive Urban Design (WSUD) practices, whilst also enhancing site amenity, ecology values and urban cooling. Additionally, it can increase runoff reduction through evapotranspiration and infiltration.

Operational Overview

During a storm, stormwater enters the Filterra® bioretention system through a pipe, kerb inlet, or sheet flow and ponds over the pre-treatment mulch layer, capturing heavy sediment and debris. Organics and microorganisms within the mulch layer trap and degrade metals and hydrocarbons. The mulch also provides a water retention function for the system's vegetation.

Stormwater then flows through the engineered high flow media, filtering fine pollutants and nutrients. Organic material in the media remove dissolved metals and act as a food source for root-zone microorganisms. Treated water exits through an underdrain pipe or infiltrates (if designed accordingly).

Microorganisms in the root-zone digest and transform pollutants into forms easily absorbed by plants regenerating the media's pollutant removal capacity. As roots grow, they provide a hospitable environment for the root-zone microorganisms and penetrate the media, maintaining hydraulic conductivity.

The plant trunk and foliage utilise nutrients such as Nitrogen and Phosphorus for plant health, sequester heavy metals into the biomass, and provide evapotranspiration of residual water within the system.

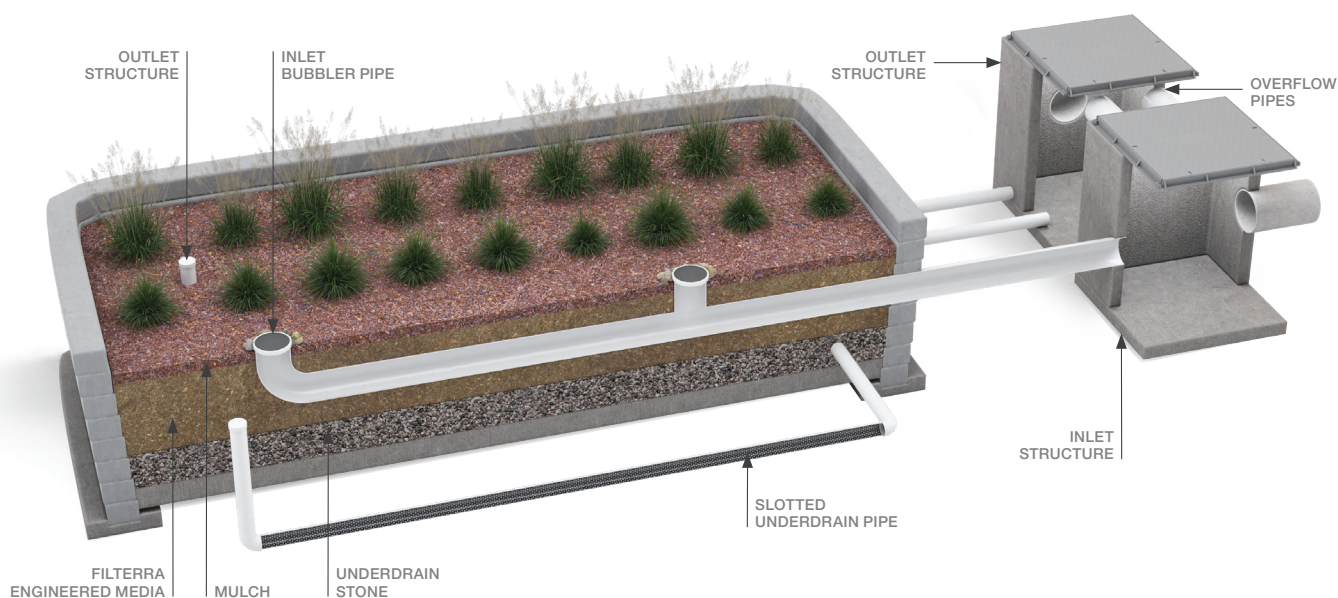


Figure 1: Filterra® components

Features

Similar to traditional retention systems, a Filterra® bioretention system consists of multiple layers. They are the mulch layer, Filterra® media layer and underdrain layer (see Figure 2).

Please Note: A minimum 150mm of extended detention depth is required for Filterra® bioretention systems

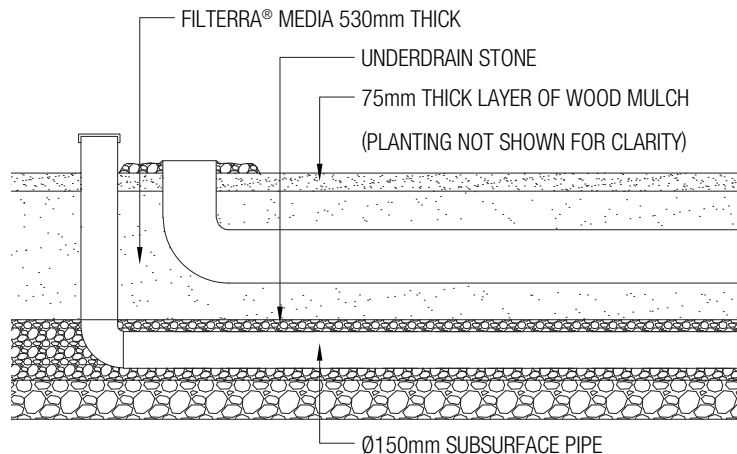


Figure 2: Filterra® sectional view

Mulch Layer

A double shredded hardwood mulch layer is used to protect the media and assists with plant health. This mulch layer essentially acts as a Gross Pollutant Trap by capturing coarse sediment, litter and debris whilst maintaining the moisture in the media below. This layer is typically 75mm thick.

Underdrain

The underdrain stone is tested for particle size distribution (PSD) to ensure permeability, proper bridging of media, and is further scrutinised to guarantee that no materials are present that could harm the vegetation. This layer ranges from 150 to 300mm thick, based on overall system size.

Planting

A range of native plants are available for the Filterra® bioretention system. Table A-1 of the report *A review of the application of Filterra® Bioretention Systems in Australia* outlines the recommended plant species across the filter media of Filterra® bioretention systems within Australia. Contact the Ocean Protect engineering team or your local representative for further information.

Filterra® Media

The Filterra® media is a high flow, high quality media designed to provide optimised pollutant removal while maintaining excellent hydraulic capacity. This layer is typically 530mm thick.

The media, manufactured by Ocean Protect under strict Quality Assurance and Quality Control processes, ensures rigorous calibration and testing through every step of new media production. No other bioretention media in Australia is produced to same exacting methods or can provide the same level of consistency across a particular batch or different manufacturing facilities. Media blends are assigned batch numbers and receive a quality control certification. The following parameters are verified and controlled:

- Particle size distribution (PSD)
- Moisture
- Organic content
- Bulk density
- Porosity
- Cation exchange capacity
- pH
- Fertility

Configurations

The Filterra® bioretention system can be arranged in a couple of ways such that it suits the site specific requirements for flow rate, hydraulics, accessibility and footprint restrictions. The standard configurations offered by Ocean Protect include pre-cast concrete tree-pits and bioscape in-situ construction.

Precast Filterra® Bioretention System

Pre-cast concrete Filterra® bioretention systems house the media and associated components within pits or vaults. These systems are simple to install as they arrive on site after being manufactured offsite to suit site specific requirements (pipe size, inlet/outlet orientation, levels etc.).

The Filterra® tree-pit is installed along the kerb line at grade immediately upstream of a separate bypass pit. Once the storm event exceeds the design capacity of the Filterra® the excess flow proceeds along the kerb and is collected by the bypass pit shown in *Figure 3*.

In some cases, the Filterra® tree-pit may need to be located with a grated drain entry or away from the kerb as shown in *Figure 4*. In this instance, a transition box is used to convey water from the kerb to the Filterra® tree-pit.



Figure 3: Filterra® tree pit – kerb inlet



Figure 4: Filterra® tree pit – grated drain inlet

Typically, larger storms are bypassed around the Filterra® bioretention system, however in some cases the bypass may be conveyed via a small pipe through Filterra® tree-pit system, for example small downpipe applications, see *Figure 5* below.



Figure 5: Filterra® tree pit – with internal bypass

Filterra® Bioscape System

The Filterra® bioscape system utilises impermeable liners placed within an excavation to create the media holding structure. The Filterra® media, underdrain and associated distribution and collection systems are installed within this structure by Ocean Protect.

The finished edges of the system can have a variety of finishes, such as timber sleepers, logs, sandstone blocks, brick or blocks with capping stone or cast in situ concrete edging. Alternatively earth bunding is also possible provided there is delineation and no contamination between the surrounding soil and Filterra® media, see *Figure 6* below.

Within larger Filterra® bioscape systems the total filtration area is divided into “cells”. Each individual cell is design to have a maximum area of 90m². Typically timber sleepers form the dividing walls between each cell (see *Figures 6 & 7* below).



Figure 6: Filterra® bioscape – soft edging

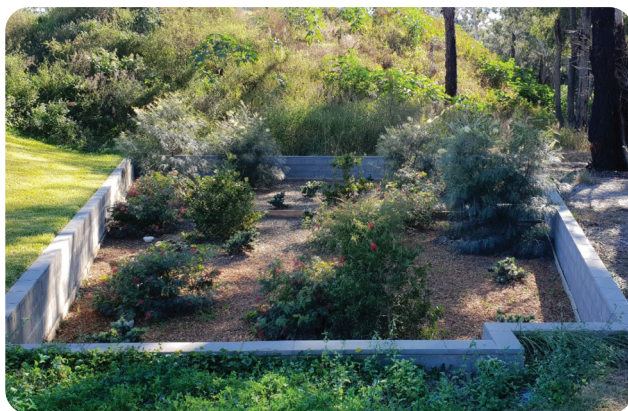


Figure 7: Filterra® bioscape – hard edging

Performance and Select Approvals

While laboratory testing provides a means to generate hydraulic and basic performance data, all filtration devices should also be complemented with long-term field data evaluations. As a minimum, field studies should generally comply with a recognised field testing protocol, for example, the Technology Acceptance Reciprocity Partnership (TARP) or the Technology Assessment Protocol – Ecology (TAPE) in the USA.

To be considered valid, all field monitoring programs should be peer reviewed by a reputable third party and replicate local pollutant concentrations including soluble fractions of nutrients together with rainfall. Such field testing has been undertaken both locally in Australia and overseas. Further information on these studies is available in *A review of the application of Filterra® Bioretention Systems in Australia*.

Specifically, Filterra® bioretention systems have been accepted by some of the most stringent stormwater quality regulators around the globe including:

- Stormwater Australia Quality Improvement Device Evaluation Protocol (SQIDEP) verification
- Brisbane City Council
- Gold Coast City Council
- Kingston City Council
- City of Charles Sturt
- Derwent Valley Council
- Wollondilly Shire Council
- Washington State Department of Ecology (TAPE) GULD – Basic, Phosphorus
- New Jersey Department of Environmental Protection (NJ DEP)
- North Carolina Department of Environmental Quality (NC DEQ)
- Maine Department of Environmental Protection (ME DEP)

Please contact your Ocean Protect representative to obtain the approval status for Filterra® bioretention systems in your area.

Maintenance and Activation

Every manufactured filtration device will eventually need routine maintenance. The question is how often and how much it will cost. Proper evaluation of long-term maintenance costs should be a consideration when selecting a manufactured treatment device.

Filterra® maintenance is low-cost, low-tech and straight forward. Simply remove the accumulated litter and sediment plus the mulch layer and replace with a fresh 75mm layer of QA/QC mulch approved by Ocean Protect. There is no confined space entry or special tools required and the mulch does not have to be purchased from Ocean Protect.

With proper and routine maintenance, the engineered media should offer a comparable life span to traditional bioretention media. Routine maintenance is included by Ocean Protect for the first year after activation. This includes a maximum of two visits to remove debris, replace mulch layer, and prune the vegetation.

For further information please refer to the *Filterra® Operations and Maintenance Manual*.

Ocean Protect provides a full install and activation service for Filterra®. This is undertaken by trained and certified personnel to ensure that the Filterra® system is installed correctly and that all of the necessary requirements are met (supervised installation options are also available for special circumstances). Included in the full installation service is the onsite activation of the Filterra® system by Ocean Protect. This will only occur once the site is fully stabilised and all drainage lines have been flushed clean. Up until the point of activation it is the responsibility of those on site to ensure adequate protection of the system.

Design Basics

The design requirements of any Filterra® system is detailed in 3 typical steps:

- 1 Hydraulic Design
- 2 Water Quality Design
- 3 Planting Design

1 Hydraulic Design

All Filterra® systems must be designed to ensure that the hydraulic requirements of the system are met without adversely impacting the upstream hydraulics (limiting the likelihood of localised flooding). **All Filterra® systems must be designed in an offline configuration.**

Kerb inlet Filterra® systems **require a bypass pit directly downstream** to ensure higher flows are bypassed along the kerb line. Ensure the kerb inlet to Filterra® system is on-grade (no sag) and that the flow enters the unit parallel to the kerb line or adjacent to the inlet to eliminate any likelihood of scour.

Base flow or constant dry weather flows will blind and foul any biofiltration system as a result of having organic material and nutrients within the media. Be sure to consider if a low-flow bypass is required for your system. Special surface treatments such as recessed converter slabs are available for applications that are required to match a paved or landscaping scheme. Contact Ocean Protect engineering team for further details.

2 Water Quality Design

Ocean Protect recommends and uses the widely endorsed Model for Urban Stormwater Improvement Conceptualisation (MUSIC), which makes it easy to correctly sizing an appropriate Filterra® system for your site.

A complimentary design service which includes MUSIC modelling is provided by the Ocean Protect engineering team. Simply email your project details to design@oceanprotect.com.au or alternatively you can always call one of our engineers for a discussion or to arrange a meeting in your office. The team will provide you with an efficient design containing details of the devices required to meet your water quality objectives together with budget estimates, product drawings and the MUSIC (.sqz) file.

It is recommended that the treatment performance of Filterra® bioretention systems be modelled within MUSIC using the bioretention treatment node, with appropriate properties, as given in Table 1.

Parameter	Recommended Value	Comments
Inlet properties		
Low-flow bypass (m ³ /s)	User defined	
High-flow bypass (m ³ /s)	User defined	
Storage properties		
Extended detention depth (m)	≤ 0.3	150mm is a typical value, equal to the depth of air space above the mulch layer
Surface area	User defined	
Filter and media properties		
Filter area (m ²)	User defined and to be at least 0.3% of the catchment area	
Unlined filter media perimeter (m)	User defined	
Saturated hydraulic conductivity (mm/hour)	3550	
Filter depth (m)	0.53	
Total Nitrogen (TN) content (mg/kg)	1000	
Orthophosphate content	40	
Infiltration properties		
Exfiltration rate (mm/hr)	User defined	
Lining properties		
Is the base lined?	User defined	
Vegetation properties		
Plant selection	User defined	'Vegetated with nutrient effective plants' recommended for optimal performance
Outlet properties		
Overflow weir width (m)	User defined	
Underdrain present	Yes	
Submerged zone with carbon present	No	
Depth (of submerged zone)	-	

Table 1: Filterra® Bioretention node properties in MUSIC

The properties given in Table 1 above are consistent with the Stormwater Australia SQIDEP verification certificate for Filterra® bioretention.

All details such as drawings, specifications and maintenance manuals can also be downloaded for integration into your project's documentation. Additionally, the Ocean Protect team is available to review your model and provide additional assistance and guidance on the configuration of the Filterra® system(s) for your project.

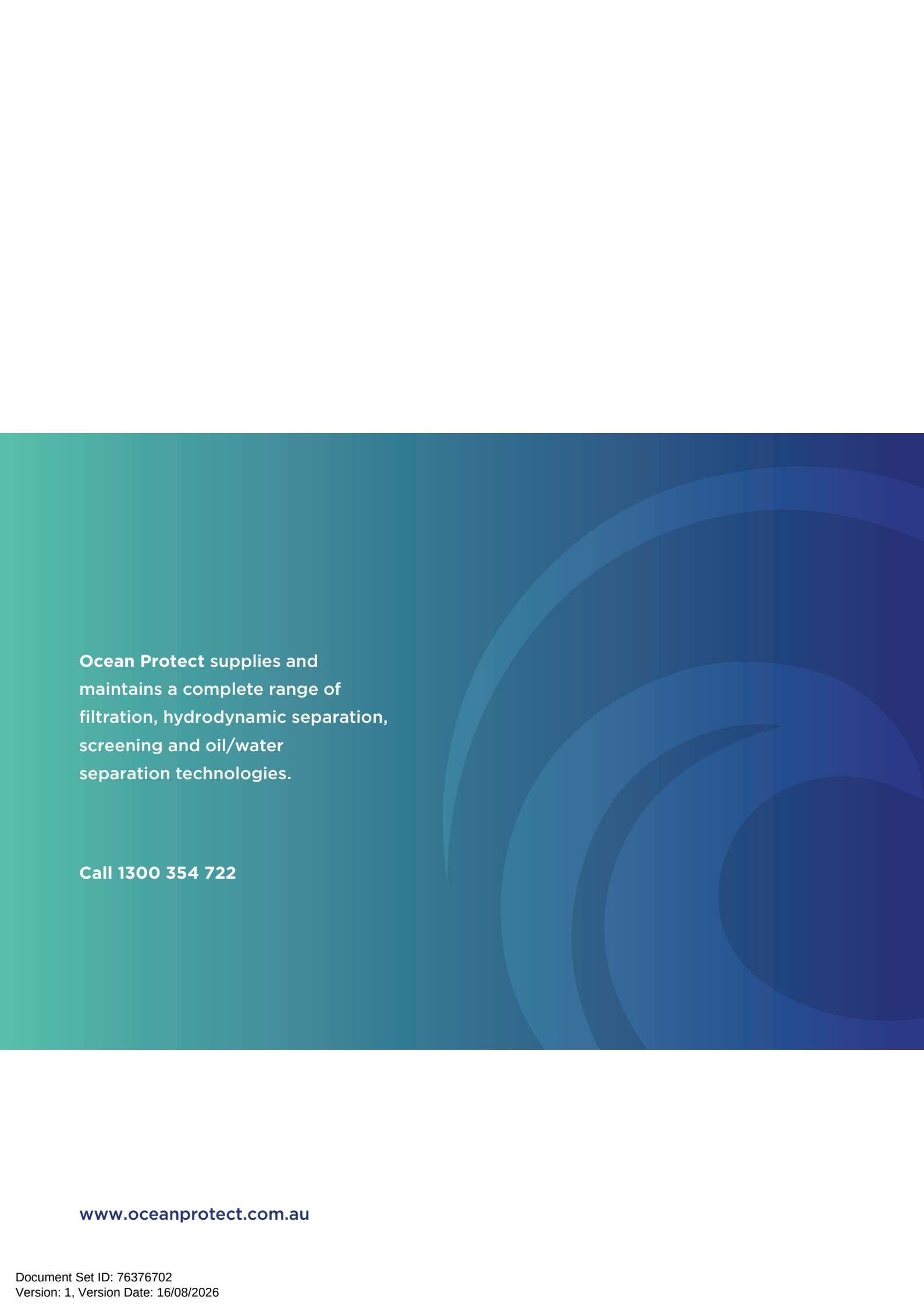
3 Planting Design

Filtterra® systems require both vegetation and media to function properly. When evaluating the quantity and size of plantings, it is essential that system aesthetics are weighed against the overall perform of the system.

For appropriate planting, Filtterra® bioretention systems must have the following:

- Adequate access to undertake maintenance
- Adequate plant spacing to prevent roots from matting together
- Adequate sunlight necessary to sustain plantings and aid in evapotranspiration following storm events whilst minimising the drying out of the media

A combination of trees, shrubs and grasses is recommended and Ocean Protect has a comprehensive suite of recommended plant species. Recommended plants take into consideration attributes like hardiness, longevity and water quality benefits along with the expected adult size and growing region. For guidance on the available options please refer to Table A-1 of the report *A review of the application of Filtterra® Bioretention Systems in Australia* or contact Ocean Protect.



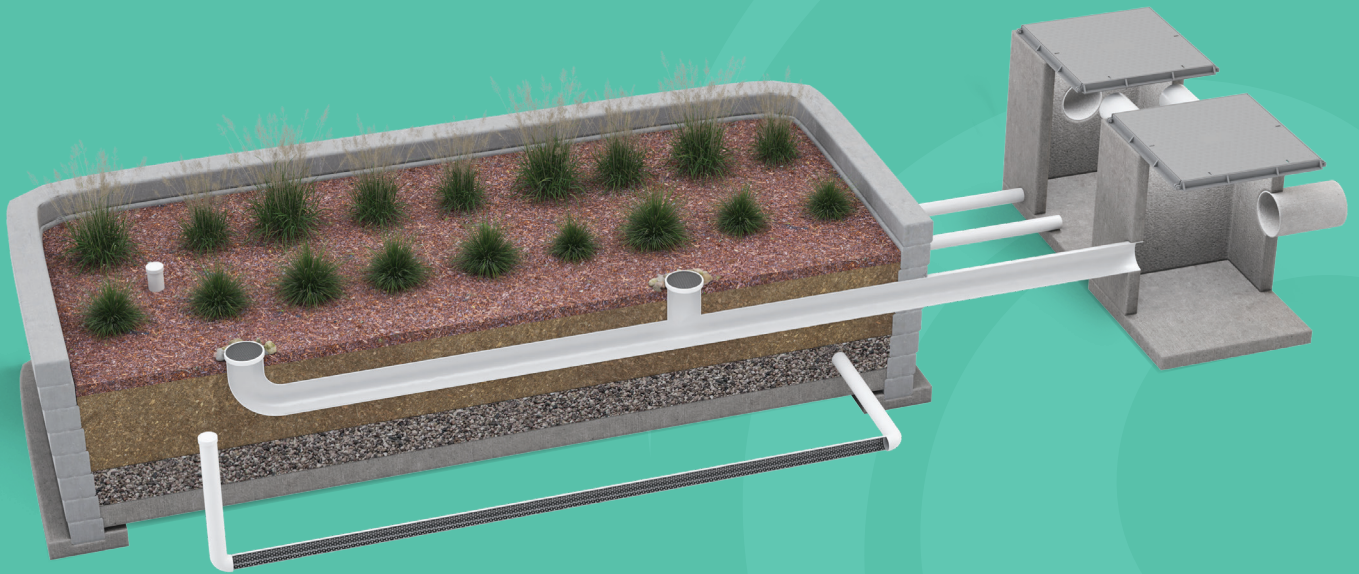
Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

Call 1300 354 722

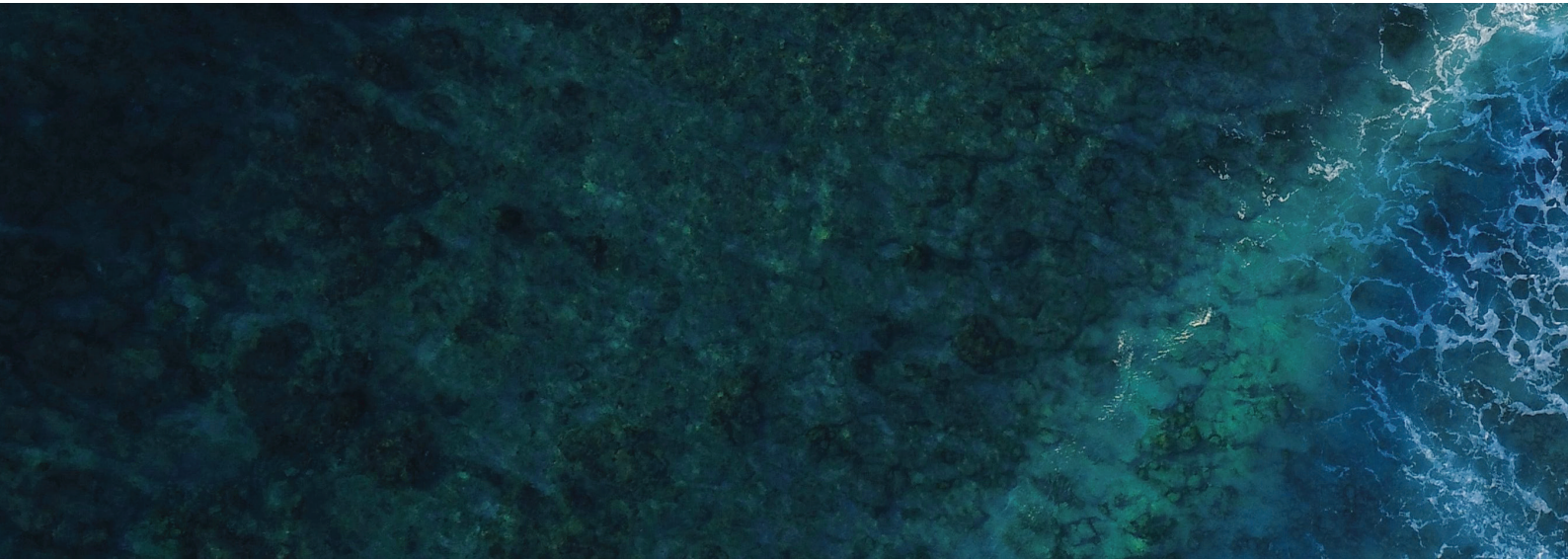
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Filterra®

Operations & Maintenance Manual



Stopping Pollution Entering Waterways



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Overview

General Description

The following general specifications describe the operations and maintenance requirements for the Ocean Protect stormwater bioretention system, the Filterra®. The system utilises physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The treatment system can be a fully equipped, pre-constructed drop-in place unit or a Bioscape basin system designed for applications in the urban landscape to treat contaminated stormwater runoff.

Stormwater flows through a specially designed filter media mixture where pollutants are immobilized, decomposed, volatilized and incorporated into the biomass of the Filterra® system's micro/macro fauna and flora. Stormwater runoff flows through into an underdrain pipe at the bottom of the system where the treated water is discharged. Higher flows are designed to bypass the Filterra® to a downstream structure.

Maintenance is simple, inexpensive and a safe operation that does not require confined space access, pumping or vacuum equipment or specialized tools. Properly trained landscape personnel can effectively maintain Filterra® Stormwater systems by following instructions in this manual.

Basic Operations

During a storm, stormwater enters the Filterra® bioretention system through a pipe, kerb inlet, or sheet flow and ponds over the pre-treatment mulch layer, capturing heavy sediment and debris. Organics and microorganisms within the mulch layer trap and degrade metals and hydrocarbons. The mulch also provides a water retention function for the system's vegetation.

Stormwater then flows through the engineered high flow media, filtering fine pollutants and nutrients. Organic material in the media remove dissolved metals and act as a food source for root-zone microorganisms. Treated water exits through an underdrain pipe or infiltrates (if designed accordingly).

Design and Installation

Each project presents different scopes for the use of Filterra® systems. To ensure the safe and specified function of the stormwater BMP, Ocean Protect reviews each application before supply. Information and help may be provided to the design engineer during the planning process. Correct Filterra® sizing (by MUSIC and/ or mass load analyses) is essential to predict pollutant removal rates for a given area. The contractor is responsible for the correct installation of Filterra precast units as shown in approved plans. At any time, Ocean Protect staff and engineers are available to meet during planning stages to run through installation procedures.

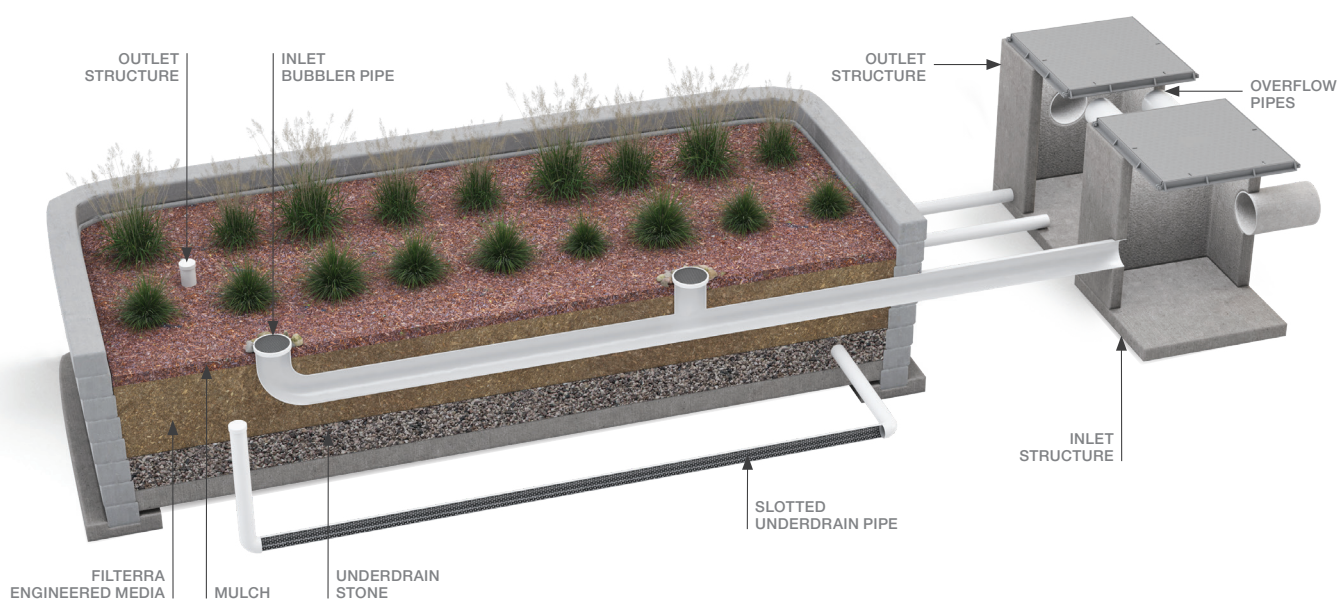


Figure 1: Filterra® components

Maintenance

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated within the development approval process and documentation as a legally binding BMP maintenance agreement.

- Avoid legal challenges from your Council's maintenance enforcement program
- Prolong the expected lifespan of your Filterra® media
- Avoid more costly media replacement
- Help reduce pollutant loads leaving your property

Simple maintenance of the Filterra® is required to continue effective pollutant removal from stormwater runoff before discharge into downstream waters. This procedure will also extend the longevity of the living bioretention system. The system will recycle and accumulate pollutants within the biomass, but is also subjected to other materials collected during stormwater runoff. This may include litter, silt, leaves etc. which will be contained on top of the mulch layer. Too much silt may inhibit the Filterra's flow rate, which is the reason for site stabilisation before activation. Regular replacement of the mulch stops accumulation of such sediment.

Ocean Protect includes a minimum 1-year maintenance plan with each system purchase. Annual included maintenance consists of a maximum of one to two (1-2) scheduled visits. Additional maintenance may be necessary depending on sediment and litter loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated for full operation. Full operation is defined as the system installed, kerb and gutter and transitions in place and activation (by Ocean Protect) when mulch and plant/s are added and temporary protection/offline baffles removed.

Activation cannot be carried out until the site is fully stabilised (full landscaping, grass cover, final paving and street sweeping completed). Maintenance visits are scheduled by Ocean Protect.

A first inspection to determine if maintenance is necessary should be performed at least twice annually or after every major storm event of greater than (25-40mm) twenty-five to forty millimetres total depth (subject to regional climate). Please refer to the maintenance checklist for specific conditions that indicate if maintenance is necessary.

It has been found that in regions which receive greater than 760mm of annual rainfall (without rainwater tanks installed on-lot), (2) two visits are generally required. Regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency (e.g. some fast food restaurants require more frequent litter removal). Contributing drainage areas which are subject to new development wherein the recommended erosion and sediment control measures have not been implemented require additional maintenance visits.

Some sites may be subjected to extreme sediment or litter loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the Supplier and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the (maintenance) Supplier of any damage to the plant(s), which constitute(s) an integral part of the bioretention technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance to the Ocean Protect (i.e. no pruning or fertilizing).

Exclusion of Services

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant of the Filterra® bioretention system. Please contact Ocean Protect for advice on water requirements if prolonged dry periods or abnormally low rainfall occur.

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the Supplier maintenance contract. Should a major contamination event occur, the Owner must block off the outlet pipe of the Filterra® (where the cleaned runoff drains to, such as drop-inlet) and block off the throat/inlet of the Filterra®. The Supplier should be informed immediately.

Maintenance Visit Summary

Regardless of the type of Filtterra® system (e.g. Precast Pit Filtterra, Filtterra Bioscape) the processes for maintenance is the same. Each maintenance visit consists of the following simple tasks (detailed instructions below).

- 1 Inspection of Filtterra® and surrounding area
- 2 Removal of tree grate and erosion control stones (for precast systems)
Removal of pollutants from forebay area (for bioscape systems)
- 3 Removal of debris, litter and mulch
- 4 Mulch replacement
- 5 Plant health evaluation and pruning or replacement as necessary
- 6 Clean area around Filtterra® as required
- 7 Complete paperwork

Maintenance Tools Safety Equipment and Supplies

Ideal tools include camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of litter is unknown, high visibility clothing and barricades when working in close proximity to traffic and also safety hats and shoes. A T-Bar or crowbar should be used for moving the tree grates (up to 70kg ea.).

Ocean Protect should be contacted for details about the mulch volume required. Ocean Protect also offers complimentary laboratory testing for mulch if sourced independently ensuring compliant mulch is used in the system.

Maintenance Visit Procedure – Precast Filterra® System



1 Inspection of Filterra® and surrounding area

Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example on page 13) the following:

Record on Maintenance Report the following:

Standing Water	Y / N
Damage to Box Structure	Y / N
Damage to Grate	Y / N
Is Bypass Clear	Y / N

If YES answered to any of these observations, record with close-up photograph (numbered)



2 Removal of tree grate and erosion control stones

Remove metal grates for access into Filterra® box.

Dig out silt (if any) and mulch and remove litter & foreign items.

Record on Maintenance Report the following:

Silt / Clay	Y / N
Cups / Bags	Y / N
Leaves	Y / N
Buckets Removed	# of



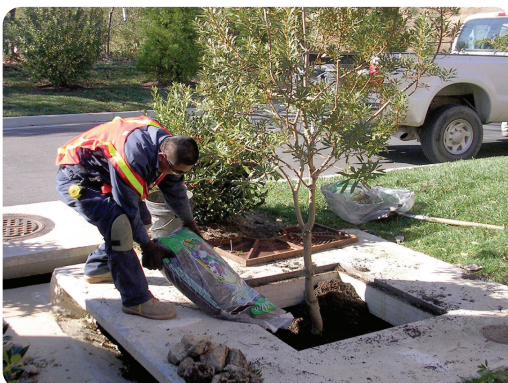
3 Removal of debris, litter and mulch

After removal of mulch and debris, measure distance from the top of the Filterra® engineered media soil to the bottom of the top slab.

If this distance is greater than 305mm, add Filterra® media (not top soil or other) to recharge to a 230mm distance.

Record on Maintenance Report the following:

Distance to Bottom of Top Slab	(mm)
Buckets of Media Added	# of



4 Mulch replacement

Add double shredded mulch evenly across the entire unit to a depth of 75mm.

Ensure correct repositioning of erosion control stones by the Filterra® inlet to allow for entry of litter during a storm event.

Replace Filterra® grates correctly using appropriate lifting or moving tools, taking care not to damage the plant.



5 Plant health evaluation and pruning or replacement as necessary

Examine the plant's health and replace if dead.

Prune as necessary to encourage growth in the correct directions.

Record on Maintenance Report the following:

Height above Grate	(mm)
Width at Widest Point	(mm)
Health	Alive/Dead
Damage to Plant	Y / N
Plant Replaced	Y / N



6 Clean area around Filterra®

Clean area around unit and remove all refuse to be disposed of appropriately.



7 Complete paperwork

Deliver Maintenance Report and photographs to appropriate location (normally Ocean Protect during maintenance contract period).

Some Council's may require submission of maintenance reports in accordance with approvals. It is the responsibility of the Owner to comply with local regulations.

Maintenance Visit Procedure – Bioscape Filterra® System



1 Inspection of Filterra® and surrounding area

Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see *example on page 13*) the following:

Record on Maintenance Report the following:

Standing Water	Y / N
Damage to Forebay Structure	Y / N
Damage to Grate	Y / N
Is Bypass Clear	Y / N

If YES answered to any of these observations, record with close-up photograph (numbered)



2 Removal Forebay pollutions and erosion control stones

Dig out silt (if any) and mulch and remove litter & foreign items.

Record on Maintenance Report the following:

Silt / Clay	Y / N
Cups / Bags	Y / N
Leaves	Y / N
Buckets Removed	# of



3 Removal of debris, litter and mulch

After removal of mulch and debris, measure distance from the top of the Filterra® engineered media soil to the bottom of the top slab.

If this distance is greater than 305mm, add Filterra® media (not top soil or other) to recharge to a 230mm distance.

Record on Maintenance Report the following:

Distance to Bottom of Top Slab	(mm)
Buckets of Media Added	# of



4 Mulch replacement

Add double shredded mulch evenly across the entire unit to a depth of 75mm.

Ensure correct repositioning of erosion control stones by the Filterra® inlet to allow for entry of litter during a storm event.



5 Plant health evaluation and pruning or replacement as necessary

Examine the plant's health and replace if dead.

Prune as necessary to encourage growth in the correct directions.

Record on Maintenance Report the following:

Height above Grate	(mm)
Width at Widest Point	(mm)
Health	Alive/Dead
Damage to Plant	Y / N
Plant Replaced	Y / N



6 Clean area around Filterra®

Clean area around unit and remove all refuse to be disposed of appropriately.



7 Complete paperwork

Deliver Maintenance Report and photographs to appropriate location (normally Ocean Protect during maintenance contract period).

Some Council's may require submission of maintenance reports in accordance with approvals. It is the responsibility of the Owner to comply with local regulations.

Maintenance Checklist

Drainage System Failure	Problem	Conditions to Check For	Conditions That Should Exist	Actions
Inlet	Excessive sediment or litter accumulation	Accumulated sediments and litter impair free flow of water into Filterra®	Inlet should be free of obstructions allowing free distributed flow of water into Filterra®	Sediments and/or litter should be removed
Mulch Cover	Litter and floatable debris accumulation	Excessive litter and/or debris accumulation	Minimal litter or other debris on mulch cover	Litter and debris should be removed and mulch cover raked level. Ensure bark nugget /woodchip mulch is not used
Mulch Cover	"Ponding" of water on mulch cover	"Ponding" in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils	Stormwater should drain freely and evenly through mulch cover	Recommend contact manufacturer and replace mulch as a minimum
Vegetation	Plants not growing or in poor condition	Soil/mulch too wet, evidence of spill Incorrect plant selection Pest infestation Vandalism to plants	Plants should be healthy and pest free	Contact manufacturer for advice
Vegetation	Plant growth excessive	Plants should be appropriate to the species and location of Filterra®		Trim/prune plants in accordance with typical landscaping and safety needs
Structure	Structure has visible cracks	Cracks wider than ½ inch or evidence of soil particles entering the structure through the cracks		Vault should be repaired
Maintenance is ideally to be performed twice annually. Inspection to be performed after every major storm event >25-40mm total depth, subject to climate.				

Filterra® Project Maintenance Order

Project Address	
Directions	
Project Owner	
Company	
Contact Name	
Telephone#	
Owner Notified of Mtce on (date)	
Filterra Units on this Order Total	
Units on this Project	
Date of Maintenance	
Arrival Time	
Departure Time	
# of Workers	
Notes on Project	
Maintenance Supervisor	

Filterra® Structure Maintenance Report

Project		Structure Number	
Plant Type		Structure Size	
Date		GPS	
		Pre Mtce Photo #	

Initial Observations			
Standing Water	Y	N	Damage to Grate
(IF Yes, STOP NOW & call 1300 354 722)			Is Bypass Clear
			Notes
Damage to Box/Forebay Structure	Y / N		
(If YES to any observation take close-up photo)			

Waste			
Silt / Clay	Y	N	Buckets Removed (# of)
Cups / Bags	Y	N	Notes
Leaves	Y	N	
Other			

Media			
Distance to Bottom of Top Slab (mm)			Notes
Buckets of Media Added (# of)			

Mulch			
Netting Replaced	Y	N	Bags of Mulch Added (# of)
Stones Replaced	Y	N	Notes

Plant	#1	(#2)	#1	(#2)
Height above Grate (mm)			Plant Replaced	Y / N
Width at Widest Point (mm)			Notes	
Health	Alive/Dead	Alive/Dead		
Damage to Plant	Y / N	Y / N		
(If YES to plant damage, take close-up photo)				

Other Notes (use back if necessary)

Resources

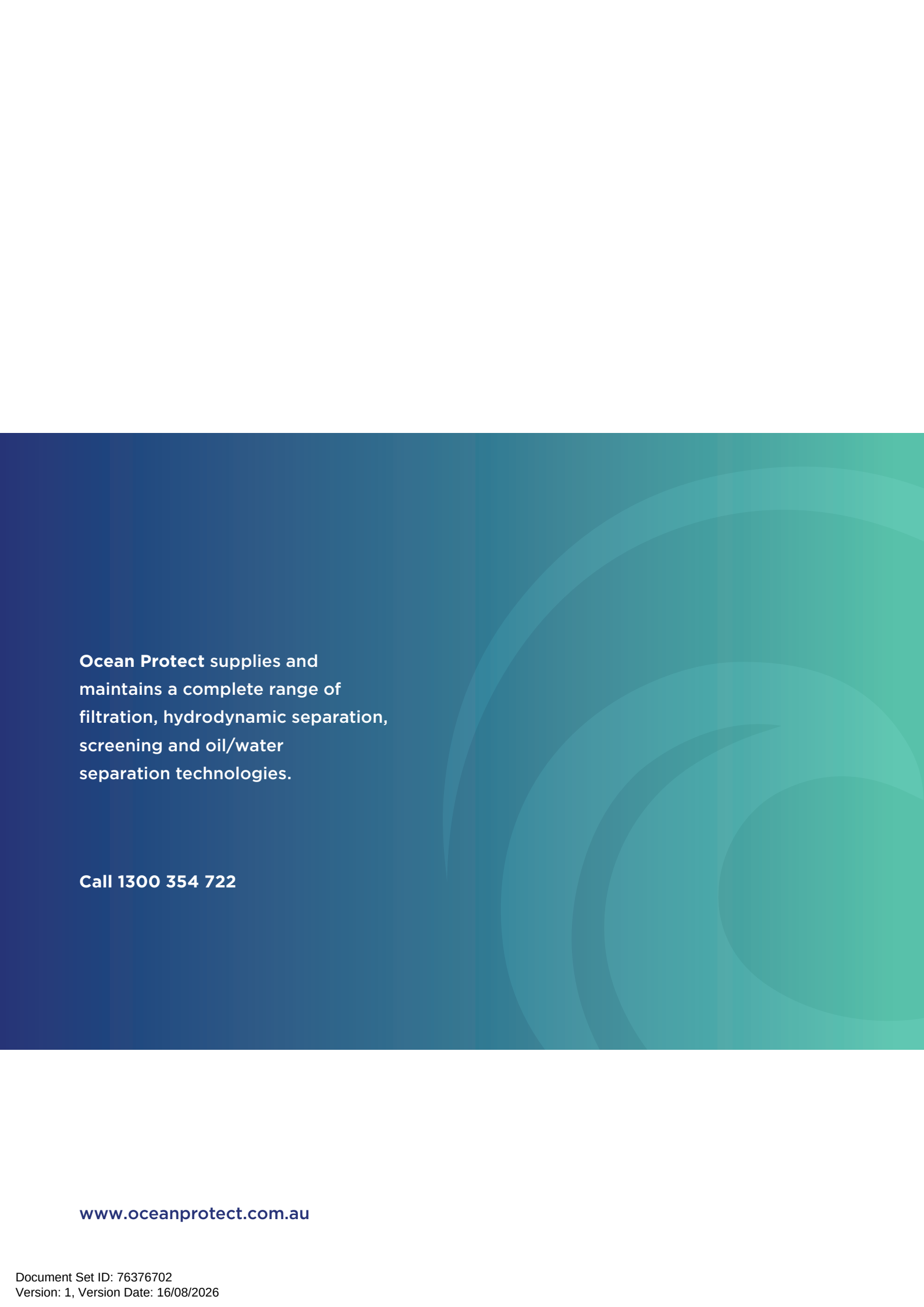
Filterra® Warranty

Seller warrants goods sold hereunder against defects in materials and workmanship only, for a period of (1) year from date the Seller activates the system into service. Seller makes no other warranties, express or implied.

Seller's liability hereunder shall be conditioned upon the Buyer's installation, maintenance, and service of the goods in strict compliance with the written instructions and specifications provided by the Seller. Any deviation from Seller's instructions and specifications or any abuse or neglect shall void warranties.

In the event of any claim upon Seller's warranty, the burden shall be upon the Buyer to prove strict compliance with all instructions and specifications provided by the Seller.

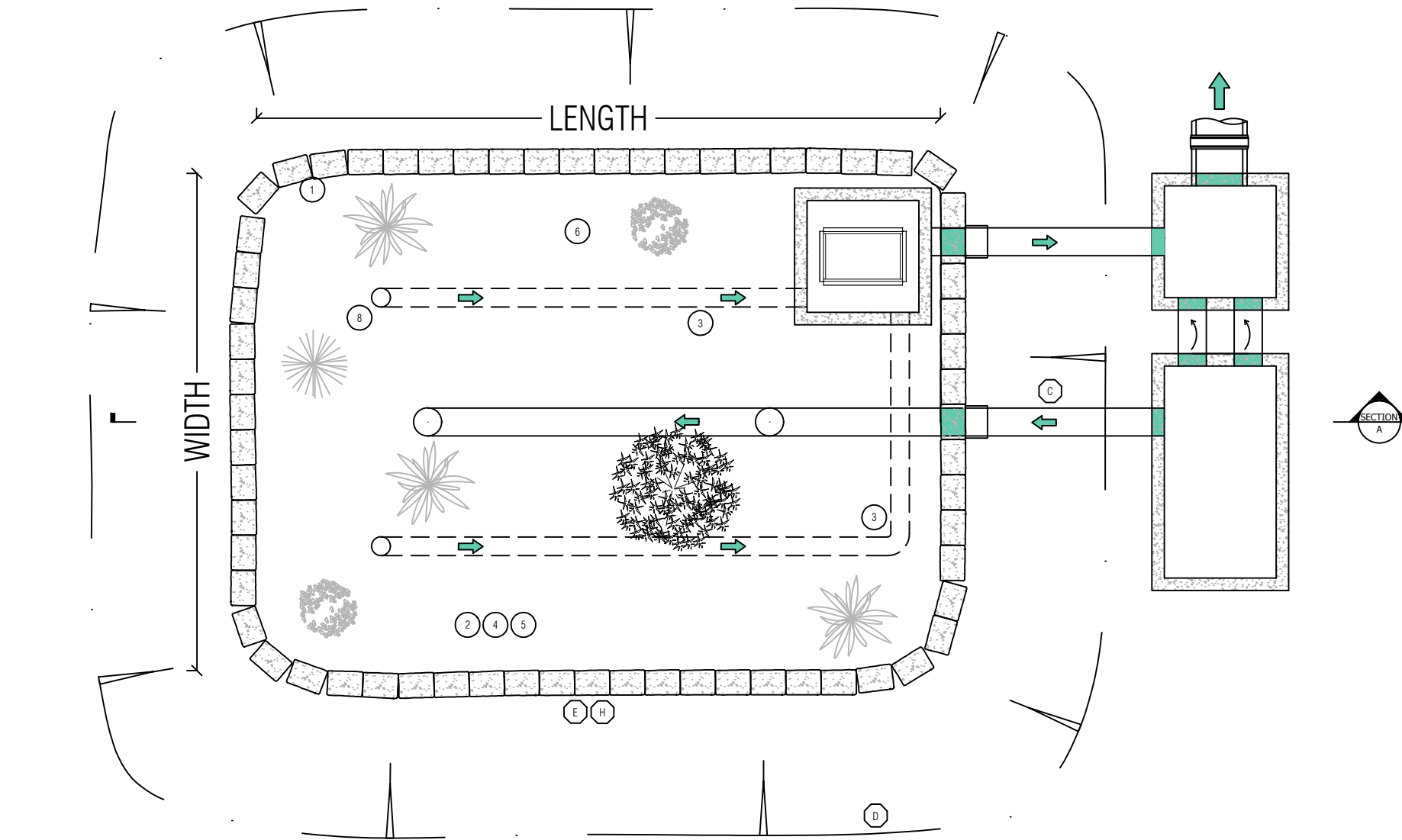
Seller's liability hereunder shall be limited only to the cost or replacement of the goods. Buyer agrees that Seller shall not be liable for any consequential losses arising from the purchase, installation, and/or use of the goods.



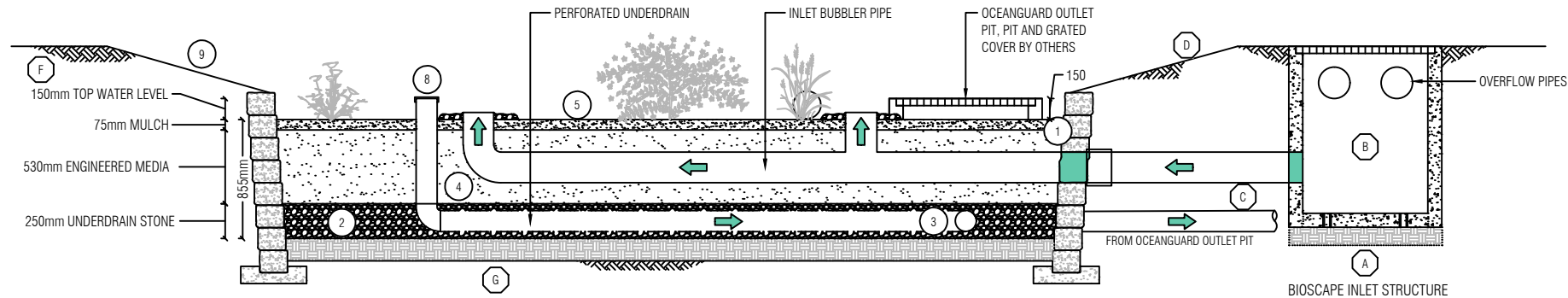
Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

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PLAN



SECTION A-A

(PLANTING NOT SHOWN FOR CLARITY)

SITE SPECIFIC REQUIREMENTS		
COUNT	DESCRIPTION	INSTALLED BY
	FILTERRA SURFACE AREA (m²)	OCEAN PROTECT
	MULCH VOLUME (m³)	OCEAN PROTECT
	FILTERRA MEDIA DEPTH (mm)	OCEAN PROTECT
	VOLUME OF UNDERDRAIN STONE (m³)	OCEAN PROTECT
	FILTERRA LINER (m)	OCEAN PROTECT

PLANTING SCHEDULE	
COUNT	FILTERRA BIOSCAPE SYSTEM PLANT PALETTE

- GENERAL NOTES**
- CONTRACTOR SHALL CONTACT OCEAN PROTECT TO COORDINATE DELIVERY AND INSTALLATION OF FILTERRA BIOSCAPE SYSTEM. OCEAN PROTECT ACTIVATION CAN ONLY OCCUR ONCE CONTRACTOR RESPONSIBILITIES ARE COMPLETE.
 - PERFORM FILTERRA BIOSCAPE SYSTEM EXCAVATION ONLY AFTER ALL THE CONTRIBUTING DRAINAGE AREAS ARE PERMANENTLY STABILISED. IF FILTERRA BIOSCAPE SYSTEM IS IN AN AREA PREVIOUSLY USED AS EROSION AND SEDIMENT CONTROL FACILITIES PLEASE CONTACT OCEAN PROTECT. DO NOT STOCKPILE MATERIALS OR STORE EQUIPMENT IN THIS AREA. CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PREVENT CONSTRUCTION-RELATED EROSION RUNOFF FROM ENTERING THE FILTERRA MEDIA BAY.
 - FILTERRA SHALL BE INSTALLED OFFLINE AS EARLY AS POSSIBLE AFTER SITE STABILISATION TO ALLOW FOR SOIL MATURITY AND SYSTEM ESTABLISHMENT.
 - CONTRACTOR SHALL COORDINATE WITH OCEAN PROTECT BEFORE THE FILTERRA BIOSCAPE SYSTEM IS EXCAVATED TO MINIMISE THE TIME BETWEEN EXCAVATION AND COMPLETION OF THE FILTERRA BIOSCAPE SYSTEM. ONCE EXCAVATED, ANY STANDING WATER THAT ACCUMULATES IN THE EXCAVATED AREA MUST BE REMOVED BY THE CONTRACTOR BEFORE OCEAN PROTECT CAN COMMENCE THE FILTERRA BIOSCAPE SYSTEM. ANY ADDITIONAL EXCAVATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
 - CONTRACTOR SHALL PROVIDE ACCESS TO THE EXCAVATED AREA(S) FOR OCEAN PROTECT TO USE DURING THE CONSTRUCTION OF THE FILTERRA BIOSCAPE SYSTEM(S). ACCESS SHALL NOT PROHIBIT LIGHT DUTY EQUIPMENT THAT MAY BE USED TO INSTALL THE COMPONENTS (STONE, MEDIA, ETC). THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY RE-STABILIZATION THAT MAY BE REQUIRED AFTER THE FILTERRA BIOSCAPE SYSTEM INSTALLATION/ACTIVATION.
 - OCEAN PROTECT AND/OR ITS REPRESENTATIVES SHALL BE RESPONSIBLE FOR THE LIST ENTITLED 'OCEAN PROTECT INSTALLATION RESPONSIBILITIES'.
 - NO FLOW SHALL ENTER THE FILTERRA SYSTEM UNLESS OCEAN PROTECT HAS ACTIVATED THE SYSTEM AND CONFIRMED ESTABLISHMENT
 - IF FILTERRA IS WITHIN AN OVERLAND FLOW PATH, PLEASE CONTACT OCEAN PROTECT

- CONTRACTOR WORKS AND INSTALLATION RESPONSIBILITIES**
- A. CONTRACTOR TO PLACE FILTERRA INLET STRUCTURE ON BEDDING AS SPECIFIED BY THE ENGINEER. OCEAN PROTECT SUGGESTS AS A MINIMUM TO USE 150MM BEDDING STONE ON COMPACTED SUB-GRADE TO 90% DENSITY. UNSUITABLE MATERIAL SHALL BE REPLACED AS ADVISED BY THE ENGINEER.
 - B. CONTRACTOR SHALL PROVIDE AND INSTALL DRAINAGE ITEMS TO, FROM AND INCLUDING THE INLET AND OUTLET STUCTURES AS PER THE APPROVED SITE PLANS.
 - C. OCEAN PROTECT CAN PROVIDE COUPLERS AT THE FILTERRA INTERFACE FOR CONNECTION TO THE INLET DIVERSION PIPES. ALL DRAINAGE TO AND FROM THE FILTERRA MUST ALLOW FOR POSITIVE FLOW.
 - D. CONTRACTOR TO PROVIDE BATTER ACCORDING TO DIMENSION AND SLOPE SHOWN ON PLANS. SLOPE FROM SHOULDER TO FILTERRA BIOSCAPE SYSTEM SURFACE PERIMETER SHALL NOT EXCEED 3:1. TURF IS REQUIRED TO STABILISE SIDE SLOPES SHOWN ON DETAIL AND ON PLAN SHEETS.
 - E. CONTRACTOR TO EXCAVATE MEDIA AREA CORRESPONDING TO THE SIZE OF THE FILTERRA BIOSCAPE SYSTEM SURFACE AREA AS SHOWN ON DETAIL AND ON PLAN SHEETS.
 - F. CONTRACTOR SHALL EXCAVATE VERTICALLY FROM BOTTOM OF UNDERDRAIN STONE OR DRAINAGE STONE IF REQUIRED, TO ELEVATION OF MULCH AS SHOWN ON THIS DETAIL.
 - G. CONTRACTOR TO CONFIRM DEPTH OF EXCAVATION. IF THE EXCAVATION HAS BEEN MADE TOO DEEP AND ADDITIONAL UNDERDRAIN STONE NEEDS TO BE USED TO RAISE THE BASE OF THE FILTERRA, THIS COST SHALL BE TAKEN ON BY THE CONTRACTOR.
 - H. RETAINING WALLS AND ADDITIONAL EROSION CONTROL AROUND THE FILTERRA BIOSCAPE SYSTEM. RETAINED OFFLINE FROM FILTERRA

- OCEAN PROTECT SUPPLY AND INSTALLATION RESPONSIBILITIES**
- 1. GEOTEXTILE FABRIC ALONG THE PERIMETER OF THE FILTERRA BIOSCAPE SYSTEM EXCAVATION.
 - 2. UNDERDRAIN STONE. TYPICALLY 250mm THICK (50mm UNDER THE PIPING 150mm AROUND THE PIPING AND 50mm ABOVE THE PIPING)
 - 3. 150mm UNDERDRAIN PIPING UNLESS OTHERWISE APPROVED BY OCEAN PROTECT, ASSOCIATED PIPING AND FITTINGS/ELBOWS TO CONNECT TO THE PIPING/FITTING(S) THAT IS PROVIDED BY CONTRACTOR (SEE CONTRACTOR INSTALLATION RESPONSIBILITIES THIS DETAIL).
 - 4. 530mm FILTERRA MEDIA.
 - 5. 75mm DOUBLE SHREDDED HARDWOOD MULCH OVER ENTIRE FILTERRA BIOSCAPE SYSTEM SURFACE AREA.
 - 6. PLANTINGS OF PLANTS SELECTED BY ENGINEER THAT MATCH OCEAN PROTECTS APPROVED PLANTING LIST.
 - 7. FLOW DISSIPATION APRON AROUND ALL FLOW ENTRY POINTS AS DESIGNED AND INDICATED ON THIS DETAIL
 - 8. CLEAN-OUT ADAPTER,PLUG AND PIPING.
 - 9. ACTIVATING THE SYSTEM



PHONE: 1300 354 722 www.oceanprotect.com.au

OCEAN PROTECT
FILTERRA BIOSCAPE SYSTEM
WITH BIOSCAPE INLET STRUCTURE
SPECIFICATION DRAWING



At Colliers, we are **enterprising.**

We maximise the potential of property to accelerate the success of our clients and our people.

Our expert advice to property occupiers, owners and investors leads the industry into the future. We invest in relationships to create enduring value. What sets us apart is not what we do, but how we do it. Our people are passionate, take personal responsibility and always do what's right for our clients, people and communities. We attract and develop industry leaders, empowering them to think and act differently to drive exceptional results. What's more, our global reach maximizes the potential of property, wherever our clients do business.

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