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Project Dune

Stormwater Management Plan

Reference: P529578

Revision: 2

2026-04-10

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Document control						
Report title	Stormwater Management Plan					
Document code	529578-SITE-AUR-RP-BC-00001		**Project number**	529578		
File path	**Project Dune – Stormwater Management Plan**					
Client						
Client contact			**Client reference**	-		
Rev	**Date**	**Revision details/status**	**Author**	**Reviewer**	**Verifier** (if required)	**Approver**
1	2025-12-01	Issued for DA Planning Submission	S.Bui	B.McMillan	R.M-Smith	H.Attia
2	2026-04-10	Issued for DA Planning Submission	S.Bui	B.McMillan	R.M-Smith	J.Perry
Current revision	**2**					

Approval			
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1 Executive Summary

Project Dune is a proposed data centre development located at 340 Barry Road, Campbellfield which will be referred to as 'the site'. Situated in Melbourne's northern industrial district, the new centre will be designed to support the increasing need for large scale data storage and processing in Australia's technology sector. The development also aims to contribute to the revitalisation of the Greater Broadmeadows area, as outlined in the Victorian Planning Authority framework plan.

The purpose of this report is to outline the stormwater management strategy for the development and detail how stormwater quality and quantity control will meet the obligations of Best Practices Environmental Management Guidelines, Clause 53.18 of the Hume Planning Scheme and Melbourne Water MUSIC Modelling Guidelines 2018.

The overarching water quality and quantity objectives and outcomes of the project are shown in Table 1-1

Table 1-1 Stormwater Quantity and Quality Results

	Objective	Result
Stormwater Quantity	The development will not generate additional flow for minor and major storm events to council/Melbourne Water assets and roadways.	▪ The stormwater quantity target has been achieved for this project, with post-development discharge not exceeding pre-development 1% AEP flows. This was accomplished through on-site detention storage, comprising a 1,500 m³ tank for Lot 5 and a 600 m³ tank for Lot 6. ▪ Preliminary storage volumes for each lot were provided by the subdivision developer and consequently a total storage allowance should be made for approximately 2,300m³ for Lot 5 & 6. However, it is expected that once the subdivision SMP is endorsed, the permissible site discharge (PSD) limits for each lot will be provided so that modelling can be updated to demonstrate that the proposal will ultimately attenuate flows as required. ▪ DRAINS software was used to model the pit and pipe connections of the site under pre- and post-development conditions to determine peak flow values for both minor (10% AEP) and major (1% AEP) events. ▪ Lot 6 drainage is proposed to connect into the subdivision drainage network, which ultimately discharges to Merlynston Creek via an existing drain within the easement traversing the site. There is an existing S173 agreement which outlines that if the existing capacity of the drainage within the easement is exceeded, then it will need to be upgraded. Given the only connection to this existing drain will be designed and constructed as part of the subdivision development, it is expected that the endorsed subdivision SMP will demonstrate that flows to this existing drain will not be increased.

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Stormwater Quality	To achieve best practice water quality performance objectives set out in the *Urban Stormwater Best Practice Environmental Management Guidelines*, *CSIRO 1999*. Namely: ▪ **Total Suspended Solids (TSS)** - 80% retention of typical urban annual load ▪ **Total Nitrogen (TN)** - 45% retention of typical urban annual load ▪ **Total Phosphorus (TP)** - 45% retention of typical urban annual load **Litter (gross pollutants, GP)** - 70% reduction of typical urban annual load	▪ MUSIC model results show the proposed development meets TSS, TN, TP and GP requirements.

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2 Introduction

2.1 Purpose

The purpose of this report is to present the stormwater management strategy for the site, detailing how best practice stormwater quantity and quality has been approached and implemented in design.

The scope of this concept Stormwater Management Plan includes:

- Describe the existing / pre-development site conditions;
- Describe the proposed / post-development site conditions;
- Define the target compliance standards with respect to stormwater quantity and quality;
- Describe the proposed development site drainage system and stormwater treatment measures; and
- Model and assess the performance of the proposed site drainage system and stormwater treatment measures, to confirm that BPEMG requirements and Hume City Council Requirements can be achieved.

2.2 Limitations

This report is based on the information available at the time of submission and is reliant on the following information:

- BPEMG Standards (Victoria Stormwater Committee, 1999)
- Hume City Council Drainage Design Guidelines 2020
- Plan of Subdivision of Consolidation (Ref: 23461P-EDP-G2)
- Land Survey of existing conditions, prior to Pre-development works (Ref: 23461-0-FL-C, 2020)
- Melbourne Water MUSIC Modelling Guidelines - input parameters and modelling approaches (2018)
- AS3500: Plumbing and Drainage (2003)
- Australian Rainfall and Runoff (2019)

2.3 Definitions

Table 2-1 Definitions

Term	Definition
Gross Pollutants (GP)	Litter and vegetation with particles size > 5mm
Sediments (course)	Particles with a size > 0.125 mm
Total Suspended Solids (TSS)	Sediment with a particle size < 1mm
AEP	Average Exceedance Probability of storm
GPT	Gross pollutant trap
WSUD	Water sensitive urban design
Primary treatment	Removal of gross pollutants, rubbish and litter
Secondary treatment	Removal of fine sediment and hydrocarbons
Tertiary Treatment	Removal of dissolved components (Nitrogen and Phosphorus)
LGA	Local Government Authority / Municipal Authority

MUSIC	Model for Urban Stormwater Improvement Conceptualisation ***MUSIC is applied across Australia by government and private entities for the conceptual design and assessment of stormwater runoff treatment designs***

2.4 Design Guidelines

Based on the standards and guidelines indicated above, the following design criteria have been adopted:

Table 2-2 Stormwater design guidelines

Item	Design Storm Event	Notes
Roof Catchments	1% AEP	Connection to the roof drainage system, to be designed and specified by the hydraulic engineer in accordance with AS3500.3.
Internal Underground Site Drainage	10% AEP	Minimum freeboard within pits of 150mm.
Sag Locations	5% AEP	Where pits are positioned in sag locations, ensure they have inlet capacity for the 5% AEP storm event. Sag pits assumed to be a 0.5 blockage factor.
Detention of post-development flows	1% AEP	As per the Stormwater Management Strategy, post-development 1% AEP flows for Lots 5 and 6 are to be detained within separate on-site detention tanks provided for each lot.
Overland flow path	1% AEP	Minimum freeboard of 500mm to all building and infrastructure finished floor levels.

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3 Predevelopment site conditions

3.1 Upfield Ford Estate

The Project Dune site is located within the approved Upfield Ford Site (industrial estate), within the suburb of Campbellfield, located approximately 25 kilometres north of Melbourne CBD. The Upfield Ford estate has already obtained subdivision development approval (P25910.01) separate to the Project Dune project, and the tender drainage design has been developed based on the key reference document:

- Assembly Broad Meadows – Proposed Finished Surface Layout Plan – 3148/M/EW01

3.1.1.1 Location

As a component of the Upfield Ford estate, new lot sub-divisions are proposed to be established. The Project Dune site is to extend across Lots 5 and 6, as shown in Figure 2-1 below. The site is currently a brownfield and has a total footprint of approximately 22ha, with Lot 5 covering an area of 16ha and Lot 6 covering 6ha. New connector roads providing site access will be designed by the subdivision developer.

Figure 3-1 Project Dune location within proposed tenure

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3.2 Current site status

It should be noted that at the time of reporting, the subject site has undergone extensive remediation works, including the demolition of the former Ford manufacturing building and the excavation and disposal of contaminated soil. However, it is assumed that there is still a risk of encountering contaminated soils within the site. Future bulk earthworks will be undertaken to prepare the site associated with subdivision permit P25910.01.

For the purpose of this SMP, the pre-development condition is defined as the prepared and vacant Upfield Ford Lots 5 and 6, which is the site after bulk earthworks but before Project Dune site development.

3.3 Indicative estate-wide earthworks and stormwater management strategy

As a component of the Upfield Ford estate approved works, bulk earthworks will be undertaken across all Lots in the estate. (Reference: Assembly Broadmeadows Finished Surface project, DPM Consulting Group). Figure 3-2 and Figure 3-3 shows an extract from the preliminary finished surface layout plans. Refer to Appendix A for complete plans.

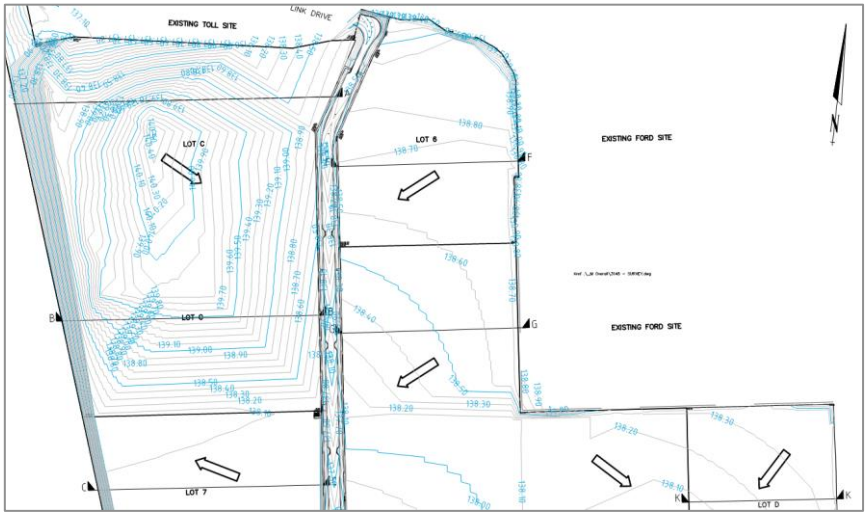

Figure 3-2 Proposed Upfield Ford estate finished levels across the Project Dune site (Northern catchments)

Figure 3-3 Proposed Upfield Ford estate finished levels across the Project Dune site (Southern catchment)

Based on the plans, on completion of the estate bulk earthworks, the pre-development site conditions will comprise of compacted earthwork pads across all Lots except the existing commercial site located in the South-east corner of the estate. The earthworks levels will be graded at a minimum 0.2% fall to direct surface runoff towards the estate access roads (Link Drive and New Road) and stormwater drainage network.

Figure 3-4 and Figure 3-5 presents an excerpt from the Upfield Ford Estate drainage layout drawing, illustrating the proposed estate-wide stormwater management strategy as it relates to stormwater discharge from Lots 5 and 6, the location of the proposed Project Dune development. It should be noted that this strategy is currently under consideration and has not yet received formal approval.

The estate's current drainage concept incorporates two primary discharge points:

Lot 6

Stormwater is proposed to be conveyed via a drainage pipeline running along Link Drive, which connects westward to an existing 1650mm drainage line located within a designated easement. This line ultimately discharges via a proposed culvert outlet into Merylston Creek. There is an existing S173 agreement which outlines that if the existing capacity of the drainage within the easement is exceeded, then it will need to be upgraded. Given the only connection to this existing drain will be designed and constructed as part of the subdivision development, it is expected that the endorsed subdivision SMP will demonstrate that flows to this existing drain will not be increased.

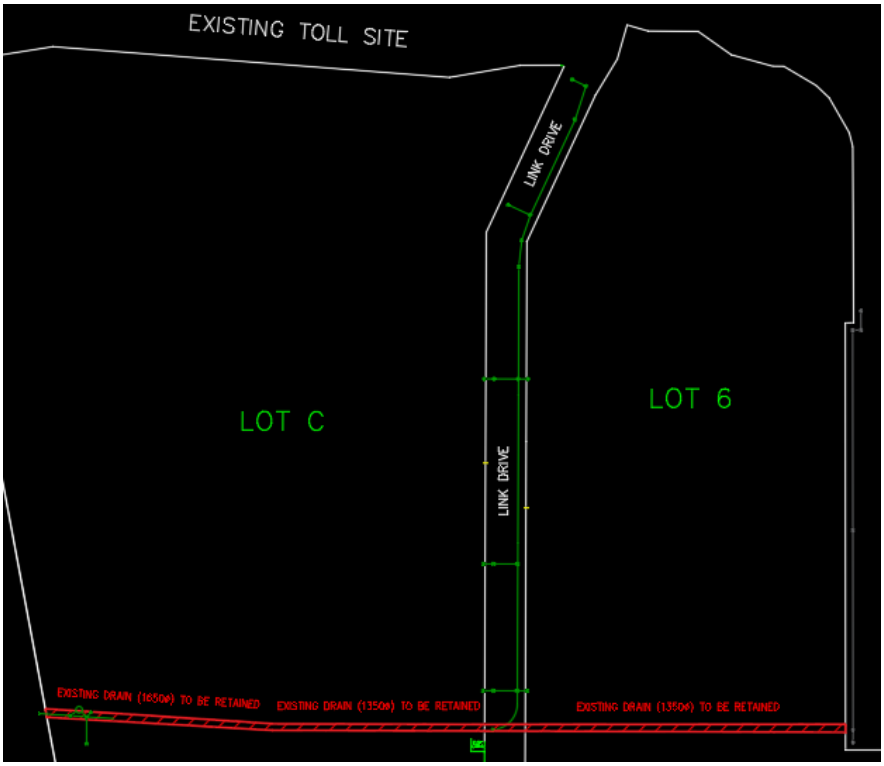

Figure 3-4 Proposed Upfield Ford estate stormwater design relevant to the Project Dune site (Lot 6)

Lot 5

A drainage pipeline extends southward from Link Drive before turning east and running under New Road, collecting runoff from Lot 5 and upstream areas. The collected flow is then directed into a 4000m^3 detention tank (Atlan MegaVault).

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Figure 3-5 Proposed Upfield Ford estate stormwater design relevant to the Project Dune site (Lot 5)

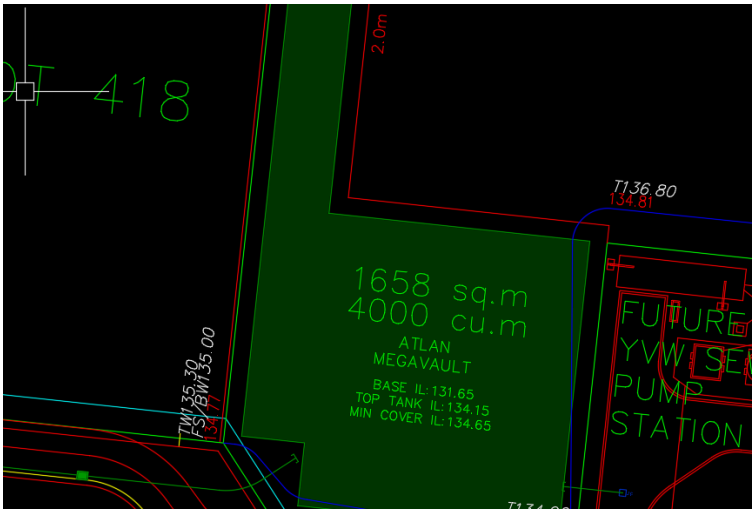

Figure 3-6 Proposed Upfiled Ford estate detention tank details (Lot 5)

3.4 Stormwater Design Assumptions for Project Dune

In the absence of detailed information regarding the broader estate's stormwater management strategy, the following assumptions have been made to guide the stormwater design for the Project Dune site:

- For the purpose of this SMP, the pre-development condition is defined as the prepared and vacant Upfield Ford Lots 5 and 6, which is the site after bulk earthworks but before Project Dune site development.
- The proposed legal points of discharge for stormwater runoff from the Project Dune site are located at the tie-in connections to the Upfield Ford Estate stormwater main, positioned at the western boundary of Lot 6 and the south-eastern corner of Lot 5.
- The broader estate stormwater strategy has not allowed for the treatment and detention for all Lots within the estate, and therefore OSD and stormwater quality treatment will be proposed within each of the developments Lots 5 and 6. Conservative assumptions regarding lot discharge requirements have been made and consequently, future opportunities for detention optimisation should be noted.

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4 Project Dune Catchments

As noted above, for the purpose of this SMP the pre-development site condition is considered to be the prepared and vacant Upfield Ford Estate Lots 5 and 6 (i.e. post estate bulk earthworks but pre-Project Dune site development).

4.1.1 Climate

The mean annual rainfall for Hume City Council is 600mm.

4.1.2 Background

This report will be focusing on the internal private property boundary which contains Lot 5 and 6, (shown as red hatch) in Figure 4-1 below.

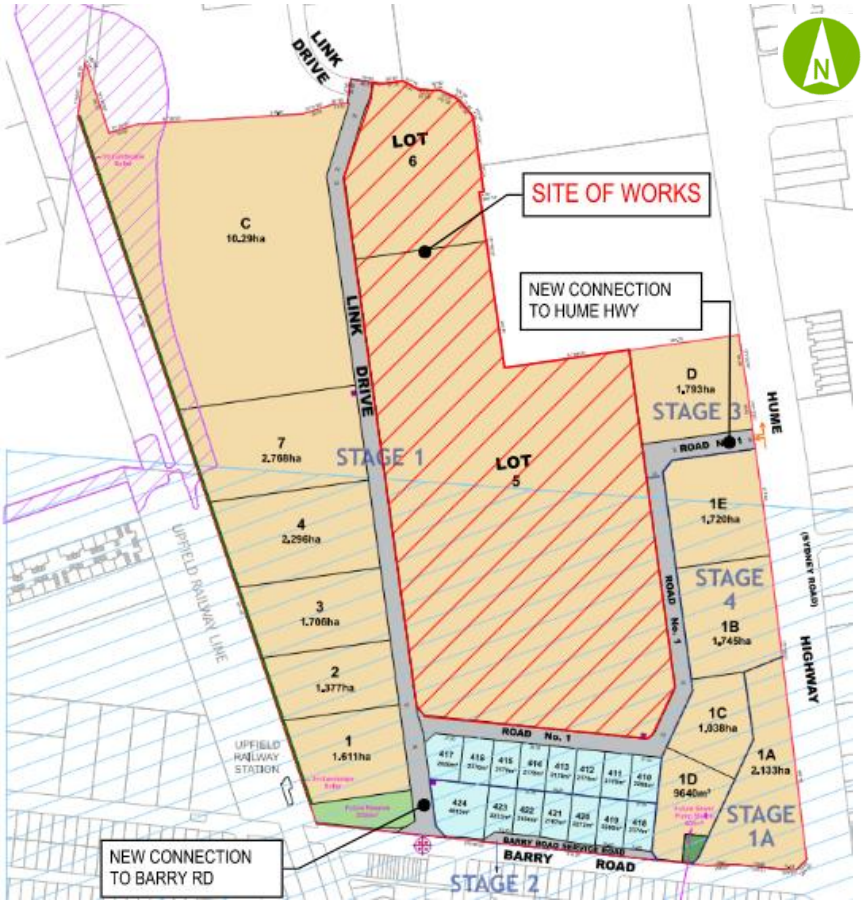

Figure 4-1 Site Locality

It is recognised that the internal boundary separating Lot 5 and Lot 6 differs from the proposed boundary shown in the master plan (refer to Figure 5-1). It is anticipated that a future reconfiguration of Lots 5 and 6 will be undertaken to better align with the master plan layout and the areas listed in the catchment tables. However, this reconfiguration will form part of a separate application.

4.1.3 Contributing Catchment Area

In the absence of the subdivision stormwater management strategy, conservative assumptions have been made regarding the pre-development impervious fraction, which has been adopted as 75% in line with Melbourne Water's recommendations for hydrological assumptions for industrial lots. This assumption reflects the pre-demolition site conditions within the Lot 5 and Lot 6 area and dictates the pre-development flows that have been taken as the site discharge limits.

The pre-development contributing catchment area for the site is shown in Table 4-1.

Table 4-1 Pre-Development Contributing Catchment Areas

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Area Type	Area (m^2)	Fraction Impervious	Area (Ha)
Lot 5	159,300	0.75	15.93
Lot 6	61,400	0.75	6.14
Total Site Area	220,700	0.75	22.07

4.1.4 Existing Underground Conveyance

Refer to Section 3.3 for assumptions regarding underground conveyance.

4.1.5 Pre-development Stormwater Conditions

Prior to the demolition works that have occurred across the broader site and the proposed subdivision works, the Upfield Ford Estate site was almost entirely made up of hardstand areas. Flows were drained towards Merlynston Creek and the existing council drainage assets external to the southern and eastern boundaries.

Lot 6 will drain towards the proposed subdivision drainage network before ultimately discharging to Merlynston Creek via an existing drainage line within an easement traversing the broader site.

Lot 5 will drain towards the proposed subdivision drainage network before ultimately discharging to existing council drainage external to the southern boundary of the subdivision via an underground stormwater detention tank.

Figure 4-2 Topography Map

4.2 External Catchments and Flood Hazard

The broader site sits partially within a Land Management Overlay, specifically SBO (Special Building Overlay), under Clause 44.05 of the Hume Planning Scheme. The overlay identifies areas subject to inundation during a 1% Annual Exceedance Probability (AEP) flood event. Within the context of the broader site, this overlay relates to Merlynston Creek flooding. The proposed development footprint within lot 5 & 6 is located entirely outside the overlay extent and given the subject site will be built up to Finished Floor Levels, the site is considered to have a low risk of being impacted by flooding.

Figure 4-3 Existing 1% AEP Inundation Map

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5 Proposed Development

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5.1 Proposed development layout

The Project Dune site is proposed to be constructed in stages as shown in Figure 5-1, with Stage 1 being the current stage at time of reporting. However, for the catchment analysis, the entire site has been assessed; and has been divided into groups based on surface imperviousness:

- Pavement area (11.32 Ha)
- Roof area (5.93 Ha)
- Landscape (4.82 Ha)

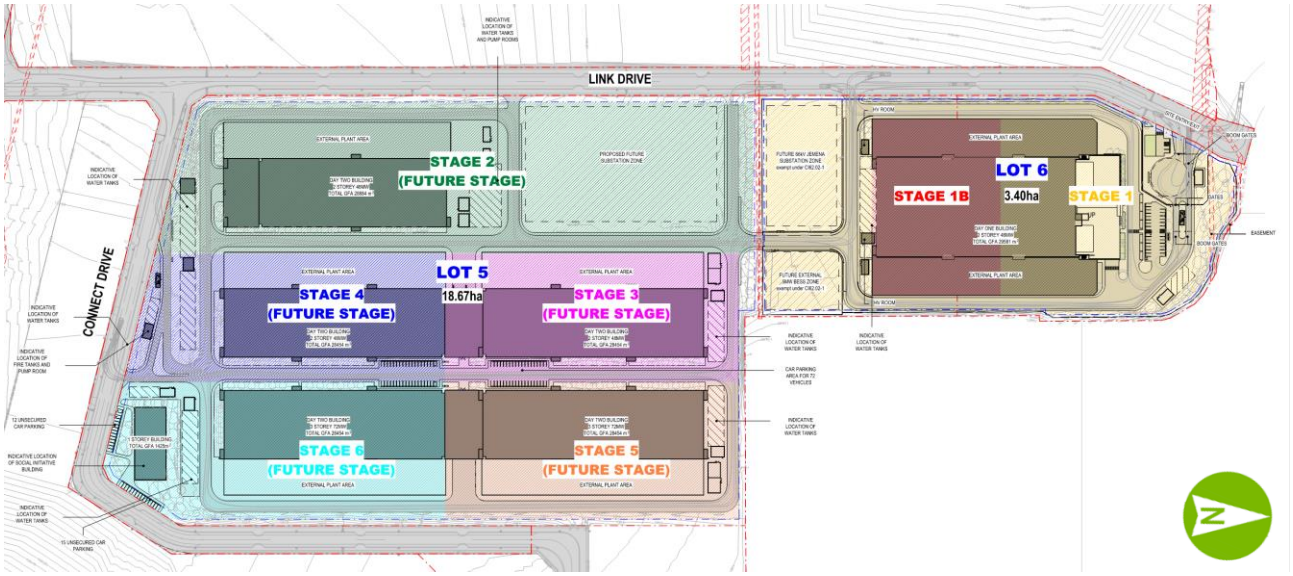

Figure 5-1 Proposed Development Layout

It is proposed to develop the site for commercial use consisting of five standalone buildings, relevant car parking spaces, and two substations (5MW BESS).

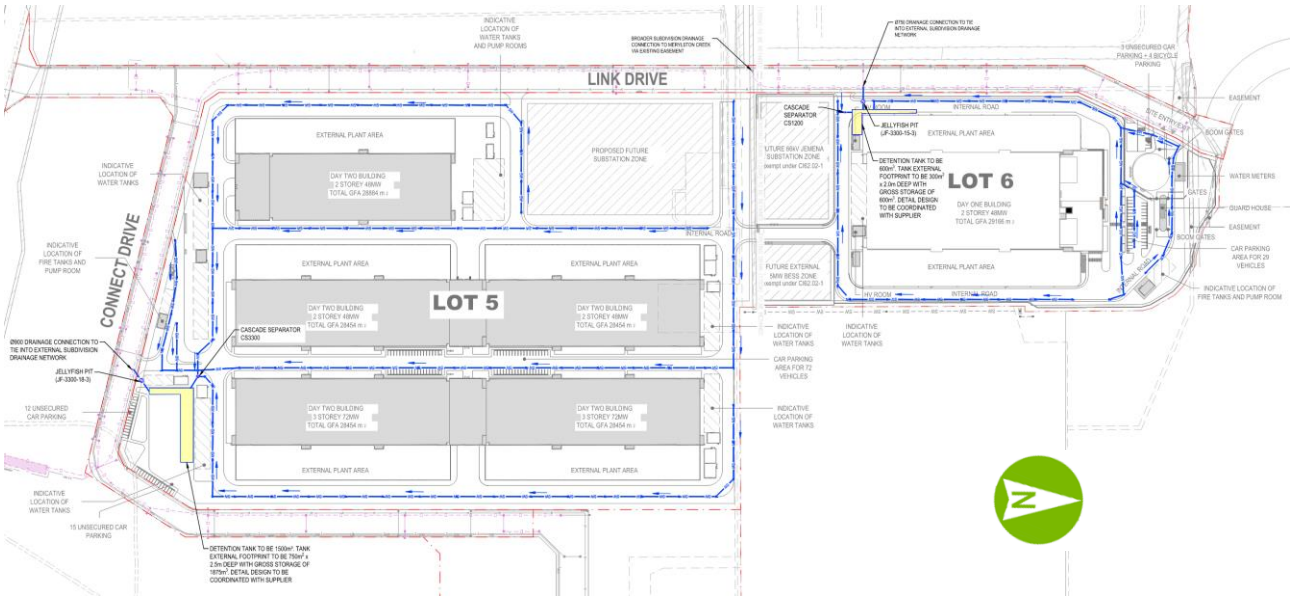

Figure 5-2 Proposed Stormwater Layout

As per Figure 5-2 , there are two proposed stormwater discharge points, one to the west servicing lot 6 and one to the south servicing lot 5. Receiving drains in the subdivision road are to be designed by the subdivision developer.

5.2 Post Development Catchment

The contributing catchments, which includes proposed roof, pavement and landscape areas for the proposed site in shown in Table 5-1.

Table 5-1 Post-Development Contributing Catchment Areas

Area Type	Area (m2)	Fraction Impervious (Pre-development)	Fraction Impervious (Post-development)	Area (Ha)
Lot 5	159,300	0.75	0.95	15.93
Lot 6	61,400	0.75	0.95	6.14
Total	220,700	0.75	0.95	22.07

5.3 Site Erosion and Sediment Control

Site erosion and sediment control during the construction phase of the site has been documented in accordance with Clause 4.17 of the Hume Planning Scheme (refer Appendix A). The control measures will adhere to EPA and Hume City Council guidelines on erosion and sediment control construction techniques and will include, but not be limited to, the following:

- Stockpile management, dust control and environmental controls
- Temporary water diversion strategies during construction with erosion controls
- Site planning, entry/exit locations, contractor site area with controls for washdown areas
- Vegetation controls, clearing controls and tree protection zones
- Batter construction controls
- Sediment basin bunding controls during construction to minimise sediment build-up

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6 Site Stormwater Quality Management

6.1 Water Quality Management Objectives

The stormwater quality objectives have been set out to achieve best practice water quality performance objectives in accordance with Clause 53.18 of the Hume Planning Scheme, specifically addressing the objective and standard requirements of Clauses 53.18-5 and 53.18-6:

Clause 53.18-5: Stormwater management objectives for buildings and works

- Meet the current best practice performance objectives for stormwater quality as contained in
- the Urban Stormwater - Best Practice Environmental Management Guidelines (Victorian Stormwater Committee, 1999).
- Minimise the impact of chemical pollutants and other toxicants including by, but not limited to, bunding and covering or roofing of storage, loading and work areas.
- Contribute to cooling, improving local habitat and providing attractive and enjoyable spaces.

Clause 53.18-6: Site management objectives

- An application should describe how the site will be managed prior to and during the construction period and may set out requirements for managing:
  - Erosion and sediment.
  - Stormwater.
  - Litter, concrete and other construction wastes.
  - Chemical contamination.

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The design aims to meet the performance targets set out in the *Urban Stormwater: Best Practice Environmental Management Guidelines* (CSIRO, 1999), including:

- **Total Suspended Solids (TSS)** - 80% retention of typical urban annual load
- **Total Nitrogen (TN)** - 45% retention of typical urban annual load
- **Total Phosphorus (TP)** - 45% retention of typical urban annual load
- **Litter (gross pollutants)** - 70% reduction of typical urban annual load

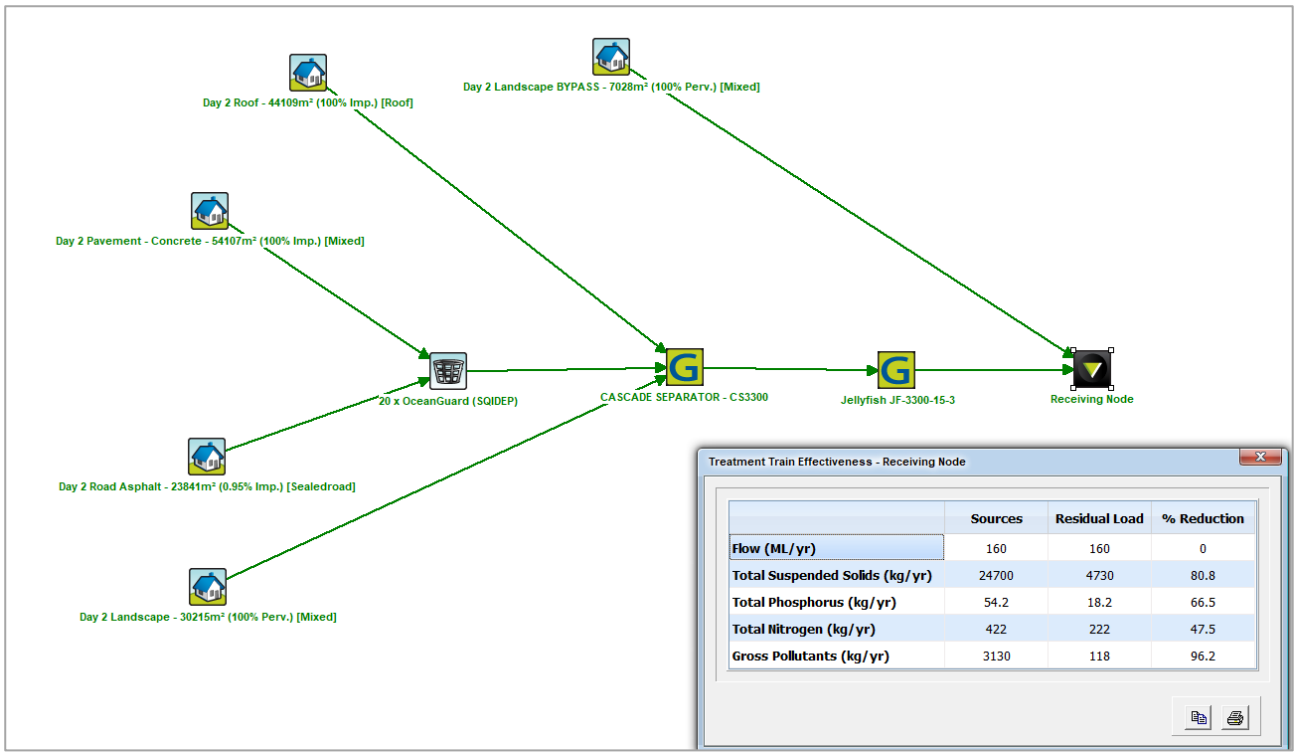
Hume City Council accept the use of MUSIC model to demonstrate the treatment train achieves the above targets.

6.2 Stormwater Treatment Strategy

It is noted that in the absence of an overarching stormwater management strategy from the subdivision developer, several assumptions have been made to inform this design. The final stormwater quantity and quality treatment measures will need to be reviewed and aligned with the broader subdivision strategy once it is available.

Lot 5 and Lot 6 have independent connections to the external drainage system, and separate treatment trains have been adopted for each lot.

For Lot 5, the site is designed to capture surface runoff via trash baskets (OceanGuards) before being directed to a hydrodynamic separator (Cascade Separator) for treatment before discharging into a detention tank. The outflow from the detention tank is then conveyed to a tertiary filtration system (Jellyfish Filter) prior to discharge into the external drainage network. Lot 6 follows a similar treatment approach, with catchments connecting into two Cascade Separators instead of one for Lot 5.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	160	160	0
Total Suspended Solids (kg/yr)	24700	4730	80.8
Total Phosphorus (kg/yr)	54.2	18.2	66.5
Total Nitrogen (kg/yr)	422	222	47.5
Gross Pollutants (kg/yr)	3130	118	96.2

Figure 6-1 Lot 5 MUSIC Model

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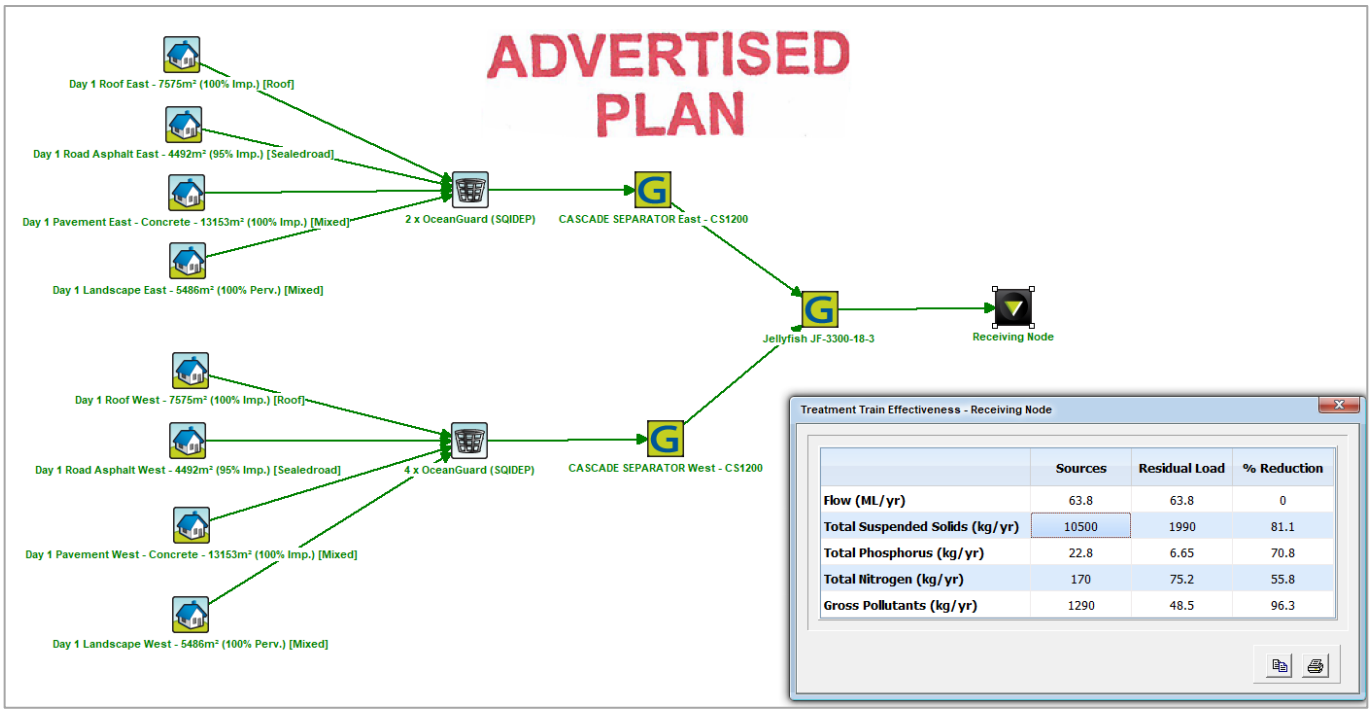

	Sources	Residual Load	% Reduction
Flow (ML/yr)	63.8	63.8	0
Total Suspended Solids (kg/yr)	10500	1990	81.1
Total Phosphorus (kg/yr)	22.8	6.65	70.8
Total Nitrogen (kg/yr)	170	75.2	55.8
Gross Pollutants (kg/yr)	1290	48.5	96.3

Figure 6-2 Lot 6 MUSIC Model

6.3 MUSIC Modelling

The post development conditions were modelled in MUSIC. These models incorporate primary and tertiary treatment, including trash baskets fitted within inlet pits (gross pollutant traps), Cascade Separators and JellyFish filters.

The treatment train for each Lot includes:

Lot 5

- Ocean Guards (or approved equivalent) fitted within inlet pits;
- Ocean Protect Cascade Separator (CS3300) or approved equivalent;
- Ocean Protect Jelly Fish (JF3300-18-3) or approved equivalent.

Lot 6

- Ocean Guards (or approved equivalent) fitted within inlet pits;
- Ocean Protect Cascade Separator (CS1200) or approved equivalent;
- Ocean Protect Jelly Fish (JF3300-15-3) or approved equivalent.

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The treatment parameters provided by Ocean Protect were adopted.

The treatment train effectiveness is shown in Table 6-1

Table 6-1 Lot 5 and 6 MUSIC Model Results

Pollutants	Best Practice targets %	Post-development Reduction Lot 5 %	Post-development Reduction Lot 6 %
TSS	80	80.8	81.1
TP	45	66.5	70.8
TN	45	47.5	55.8
GP	70	96.2	96.7

As seen in the above table, the proposed treatment train for Lot 5 and 6 has achieved the BPEMG target.

6.3.1 Discussion of adopted quality treatment methods

Table 6-2 Stormwater treatment methods justification

Stormwater Treatment Method	Proposal	Justification
GPT (Gross pollutant trap) – Ocean Guard Refer to Figure 6-3 and Figure 6-4	Install a GPT to capture larger particles and pollutants	Gross pollutant traps are commonly used in primary treatment due to their ability to remove large, non-biodegradable pollutants from water. However, they do require regular cleaning to keep them functioning optimally.

Cascade Separator	Install a separator for oily water and hydrocarbon removal	Cascade Separators ae devices designed to remove hydrocarbons and sediment with associated pollutants from stormwater runoff.
Filtration cartridges - Jelly Fish Refer to Figure 6-5	Install filtration cartridges to increase removal percentage of TSS, TP and TN	Filtration cartridge is a stormwater quality treatment technology featuring high flow pretreatment and membrane filtration in a compact stand-alone system. The system can remove floatable, trash, oil, debris, TSS, fine silt-sized particles, and a high percentage of particulate-bound pollutants; including phosphorus, nitrogen, metals and hydrocarbons. They can be utilised in the proposed stormwater design to achieve the desired reduce figures, as per the Melbourne Water standards.

Figure 6-3 - OceanGuard

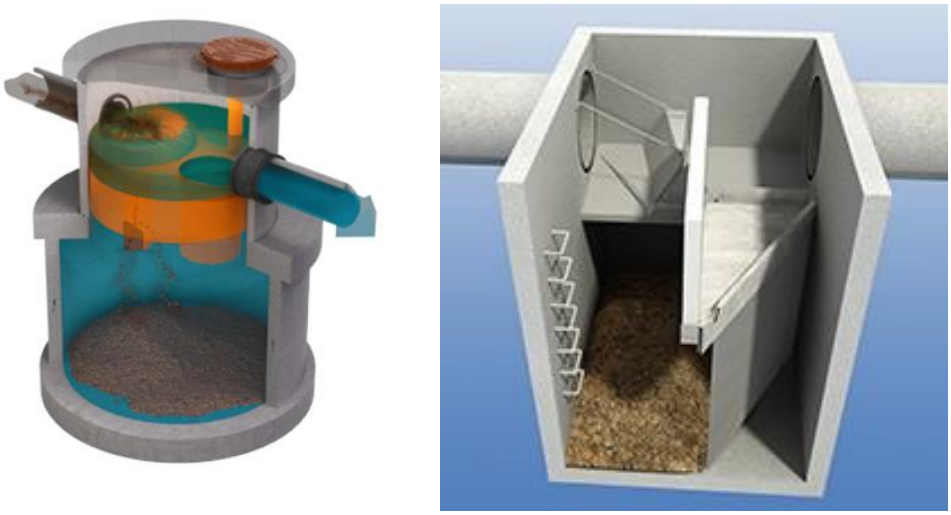

Figure 6-4 Gross Pollutant Traps. The Cascade Separator (left) is included to remove oily water and hydrocarbons.

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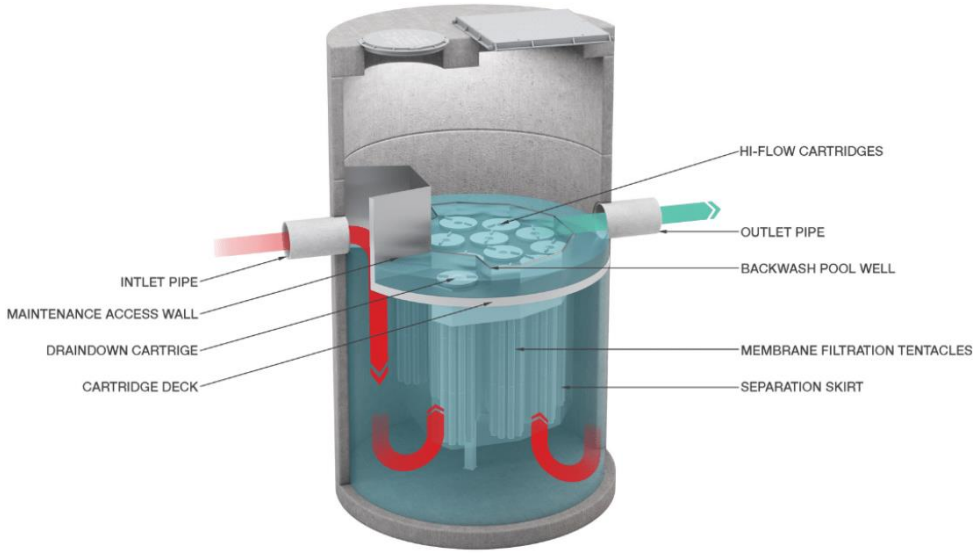

Figure 6-5 Filtration Cartridge

6.4 Rainwater Reuse

At this stage, rainwater harvesting has not been incorporated into the post-development MUSIC model prepared for this submission. An additional 150kL of storage has been included within the detention basin to account for the potential capture of the Lot 5 and 6 roof runoffs for reuse. All flows are conservatively assumed to be treated via the adopted stormwater quality treatment measures.

The rainwater harvesting system, including filtration and treatment requirements, will be incorporated and assessed during detailed design and reflected in future model iterations. The inclusion of rainwater harvesting tanks is anticipated to provide a net improvement to stormwater treatment performance.

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7 Stormwater Quantity

7.1 Design Intent

Hume City Council stormwater management and design philosophy requires that the proposed development design is to maintain the pre-development flow (at the legal point of discharge), the proposed development shall not increase or alter the downstream conditions negatively.

The proposed site development will increase the impervious catchment areas which will in turn increase rainfall runoff from the site. Therefore, on-site detention (OSD) has been considered. Additionally, the staged delivery of works results in Lot 5 and Lot 6 having separate discharge locations; therefore, individual detention systems have been sized for each lot accordingly.

DRAINS software was used to compare predevelopment flows with post development flows. DRAINS analysis was undertaken for the 10% AEP and 1% AEP.

7.2 Peak Flow results

The stormwater quantities below depict the pre-development flow rate for both the minor (10% Annual Exceedance Probability [AEP]) and major storm events (1% AEP).

7.2.1 Pre-Development Flows

The pre-development hydrograph produced in DRAINS is shown below.

7.2.1.1 Lot 5 Pre-Development 10% AEP Max

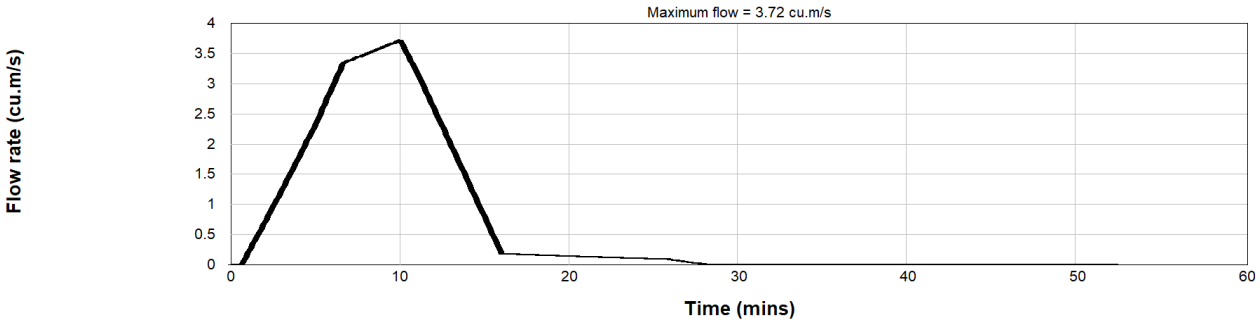
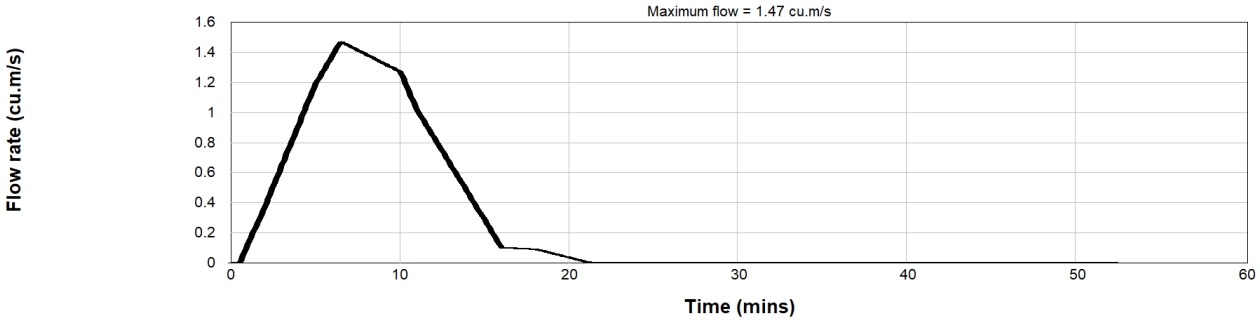


Figure 7-1 Pre-Development 10% AEP Max Graph

7.2.1.2 Lot 6 Pre-Development 10% AEP Max



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PLAN

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7.2.1.3 Lot 5 Pre-Development 1% AEP Max

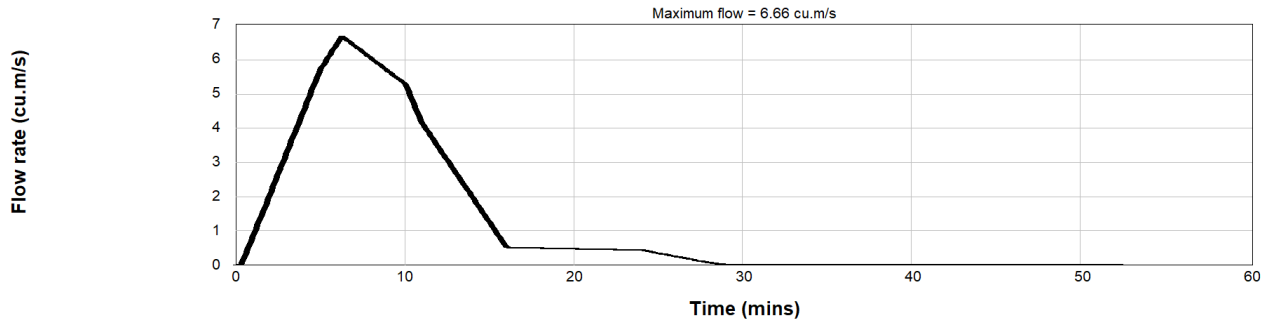
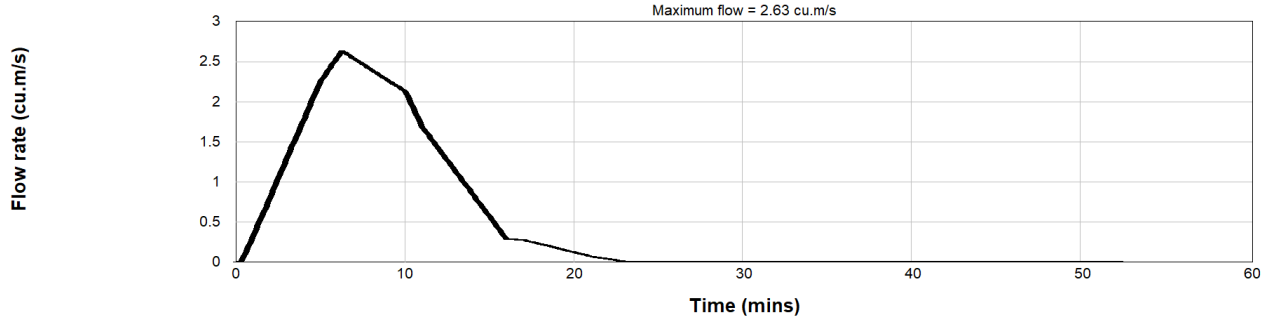


Figure -7-2 - Pre-Development 1% AEP Max Graph

7.2.1.4 Lot 6 Pre-Development 1% AEP Max



7.3 Post-Development (Unmitigated)

The post-development hydrographs are shown below.

7.3.1.1 Lot 5 Post-Development 10% AEP Max (Unmitigated)

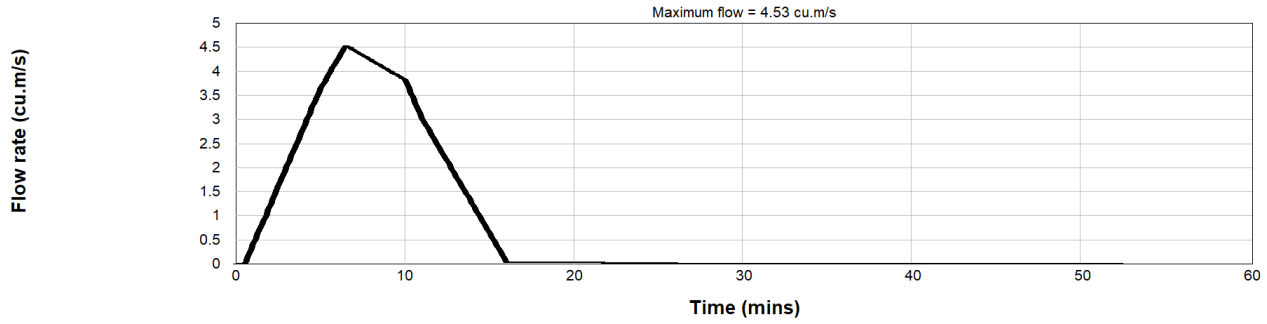
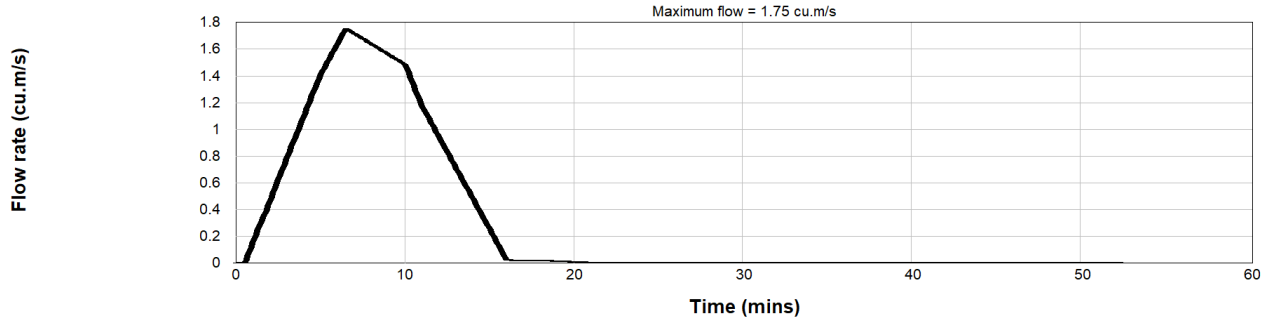


Figure 7-3 - Post-Development 10% AEP Max Graph

7.3.1.2 Lot 6 Post-Development 10% AEP Max (Unmitigated)



ADVERTISED PLAN

7.3.1.3 Lot 5 Post-Development 1% AEP Max (Unmitigated)

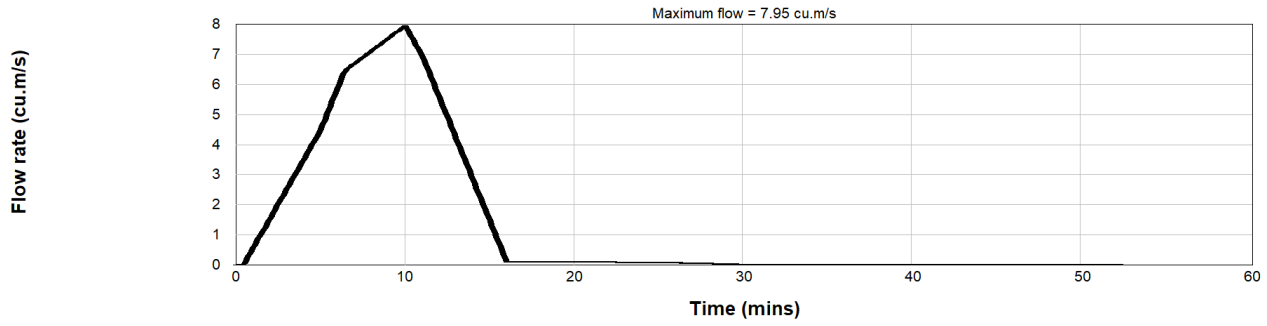
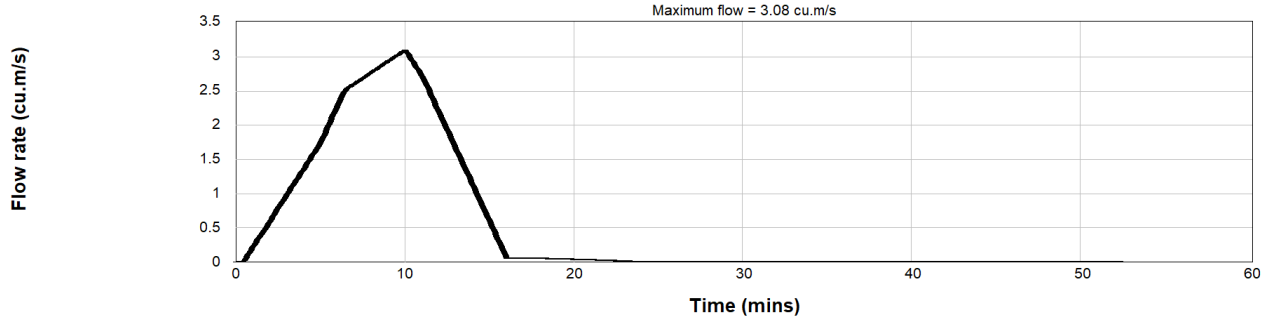


Figure -7-4 - Post-Development 1% AEP Max Graph

7.3.1.4 Lot 6 Post-Development 1% AEP Max (Unmitigated)



7.3.2 Results Table

The comparison between predevelopment and post development unmitigated is shown in Table 7-1.

Condition	Lot 5 – Minor (10% AEP)	Lot 5 – Major (1% AEP)	Lot 6 – Minor (10% AEP)	Lot 6 – Major (1% AEP)
Pre-Development	3.72 m3/s	6.66 m3/s	1.47 m3/s	2.63 m3/s
Post Development (Unmitigated)	4.53 m3/s	7.95 m3/s	1.75 m3/s	3.08 m3/s
Change in Peak Flow	+0.81 m3/s (Increase)	+1.29 m3/s (Increase)	+0.28 m3/s (Increase)	+0.45 m3/s (Increase)

Table 7-1 Flow Rate Comparison – Unmitigated

It is clear from the modelling there is an increase in flow for both the 10% AEP and 1% AEP. To mitigate the peak flows, detention tanks are required to be incorporated in the DRAINS model.

7.3.3 Post-Development – Mitigated Condition

The post-development mitigated hydrographs produced in DRAINS are shown below.

Underground detention tanks were iterated until the Minor and Major Peak flows did not exceed the pre-development restricted flows 1% AEP flows.

As documented on the Proposed Finished Surface Layout Plan provided by DPM Consulting Group Revision 02 Dated 26 June 2025, the external subdivision developer has designed a 4000 m³ detention tank within the adjacent road reserve. While this system may have been designed to accommodate flows from the subject site, this external tank is not assumed to provide any detention for Lot 5 until details regarding the subdivision stormwater management strategy are confirmed.

7.3.3.1 Detention Storage – Lot 5

The required storage of the basin for Lot 5 is approximately 1472kL (1472m^3) as shown in Figure 7-5. The detention tank size adopted is 1500 m^3, with the outlet attenuated to a 750mm outlet.

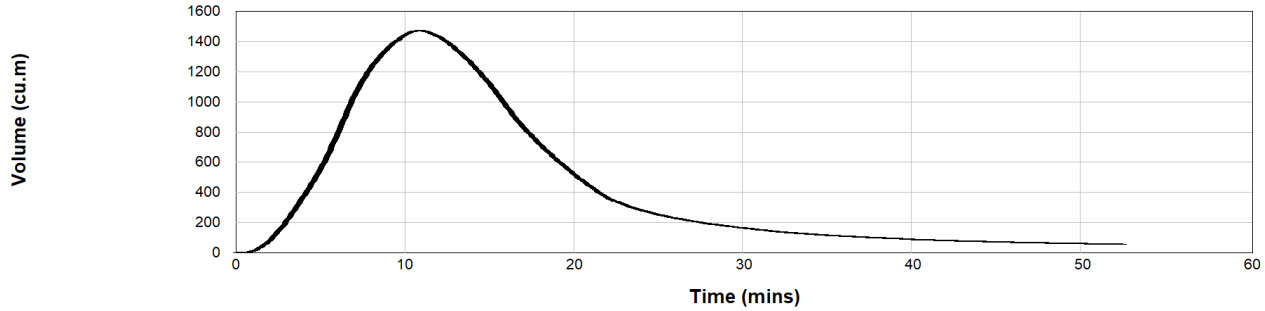


Figure 7-5 – Detention Storage – Lot 5

7.3.3.2 Detention Storage – Lot 6

The required storage of the basin for Lot 6 is approximately 569kL (569m^3) as shown in Figure 7-6. The detention tank size adopted is 600 m^3, with the outlet attenuated to a 750mm outlet.

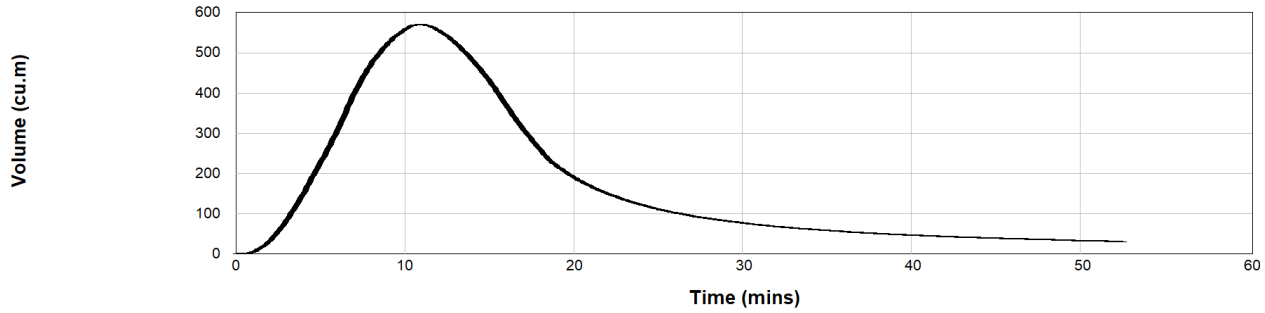


Figure 7-6 Detention Storage - Lot 6

7.3.4 Results Table

The 10% AEP and 1% AEP mitigated results are shown in the DRAINS extract in Table 7-2 Flow Rate Comparison – mitigated Table 7-2

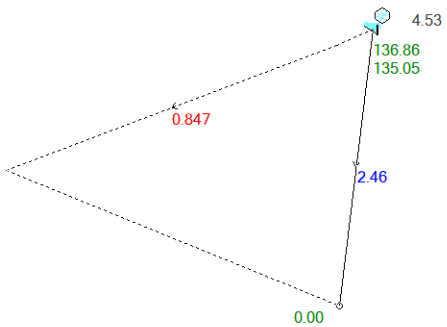


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Figure 7-7 10% AEP Discharge to Legal Point of Discharge – Lot 5

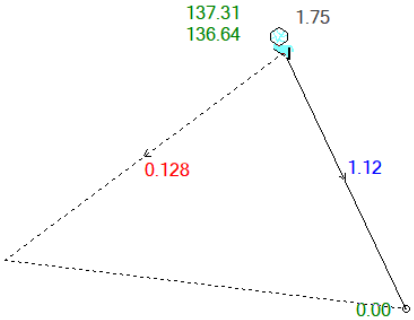

Figure 7-8 - 10% AEP Discharge to Legal Point of Discharge – Lot 6

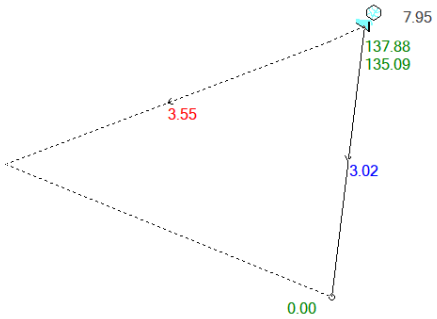

Figure 7-9 - 1% AEP Discharge to Legal Point of Discharge – Lot 5

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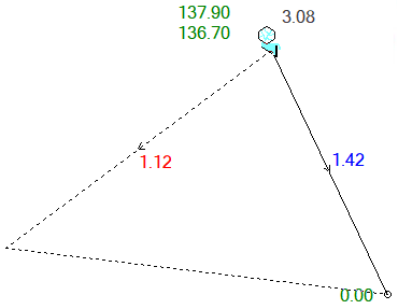

Figure 7-10 - 1% AEP Discharge to Legal Point of Discharge – Lot 6

The comparison between predevelopment and post development mitigated is shown in Table 7-2.

Table 7-2 Flow Rate Comparison – mitigated

Condition	Lot 5 – Minor (10% AEP)	Lot 5 – Major (1% AEP)	Lot 6 – Minor (10% AEP)	Lot 6 – Major (1% AEP)
Pre-Development	3.72 m3/s	6.66 m3/s	1.47 m3/s	2.63 m3/s
Post Development (Mitigated)	3.307 m3/s	6.57 m3/s	1.248 m3/s	2.54 m3/s
Change in Peak Flow	0.413 m3/s (Decrease)	0.09 m3/s (Decrease)	0.222 m3/s (Decrease)	0.09 m3/s (Decrease)

As seen within above table, the detention tank volumes of 1500m^3 and 600m^3 for Lots 5 and 6 respectively, are suitably sized to attenuate the stormwater to meet pre-development restricted flows.

Preliminary storage volumes for each lot were provided by the subdivision developer and consequently a total storage allowance should be made for approximately 2,300m^3 for Lot 5 & 6. However, it is expected that once the subdivision SMP is endorsed, the permissible site discharge (PSD) limits for each lot will be provided so that modelling can be updated to demonstrate that the proposal will ultimately attenuate flows as required.

Conclusion

- The post-development site comprises two catchments, Lots 5 and 6, where the increase in impervious surfaces will lead to higher stormwater runoff volumes. Each lot discharges to a separate legal point of discharge, with post-development flows designed to be controlled to pre-development flows for the 10% and 1% AEP storm events.
- The stormwater management strategy includes two on-site detention systems. Lot 5 incorporates a 1,500 m^3 detention tank fitted with a 900 mm outlet, while Lot 6 is provided with a 600 m^3 tank and a 750 mm outlet. Both systems have been designed to attenuate post-development peak flows so that they do not exceed pre-development 1% AEP discharge rates. Modelling was undertaken using DRAINS for the 10% and 1% AEP design events to confirm the performance of the proposed detention volumes. A total storage allowance of 2,300m^3 shall be adopted in order to align with preliminary subdivision lot storage requirements until such time as lot PSD limits are provided to allow refined modelling.
- Lot 6 drainage is proposed to connect into the subdivision drainage network, which ultimately discharges to Merlynston Creek via an existing drain within the easement traversing the site. There is an existing S173 agreement which outlines that if the existing capacity of the drainage within the easement is exceeded, then it will need to be upgraded. Given the only connection to this existing drain will be designed and constructed as part of the subdivision development, it is expected that the endorsed subdivision SMP will demonstrate that flows to this existing drain will not be increased.
- The treatment train incorporates proprietary Ocean Protect systems (or approved equivalents). Lot 5 includes Ocean Guards fitted within inlet pits, a Cascade Separator (CS3300), and a Jellyfish Filter (JF3300-18-3), while Lot 6 includes Ocean Guards, two Cascade Separators (CS1200) and a Jellyfish Filter (JF3300-15-3). Design parameters were adopted from Melbourne Water MUSIC Modelling Guidelines, with performance outcomes summarised in Table 6-1.
- Overall, the proposed detention and treatment systems provide effective mitigation of the hydrological impacts associated with the increased impervious areas and ensure compliance with BPEMG Standards and Hume City Council guidelines.
- Assumptions were made in lieu of details regarding the subdivision stormwater management strategy. The proposed stormwater management strategy should be updated once this information is available. It should be noted that there will be potential opportunities for design optimisation when this occurs.

ADVERTISED
PLAN

Appendix A – Upfield Ford Estate Proposed finished level plans (pre-development site condition)

ADVERTISED
PLAN

EXISTING TOLL SITE

LINK DRIVE

EXISTING FORD SITE

LOT C

LOT 6

LOT C

EXISTING FORD SITE

LOT 7

LOT 8

LOT 5

LOT D

LOT 9

LOT 1E

LOT 10

LOT 1B

LOT A

LOT 1C

LOT 417 LOT 416 LOT 415 LOT 414 LOT 413 LOT 412 LOT 411 LOT 410

LOT 424 LOT 423 LOT 422 LOT 421 LOT 420 LOT 419 LOT 418

STAGE 2

LOT 1D

EXISTING COMMERCIAL SITE

FUTURE YYW SEWER PUMP STATION

UPFIELD RAILWAY LINE

SYDNEY ROAD

DUNSTAN PARADE

BARRY ROAD

CORDEN STREET

ROAD 2

FORD DRIVE (EXISTING)

FORD DRIVE (EXISTING)

ADVERTISED PLAN

LEGEND

- CONTOURS MAJOR 0.5m
- CONTOURS MINOR 0.1m
- LOT BOUNDARIES

0 10 20 40 60 80

SCALE 1:1500 AT A1 SIZE

PRELIMINARY ISSUE

REV.	REVISION	DATE	REG ENG
-	-	-	-
-	-	-	-
-	-	-	-
P2	LOT LEVELS AMENDED	26-06-25	J.M.
P1	PRELIMINARY ISSUE	05-03-25	J.M.

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AUTHORISED:	J.MATHIOS
PE REG NO:	-
DATE:	05-03-25

AUTHORITY: HUME CITY COUNCIL

PROJECT: **ASSEMBLY BROADMEADOWS FINISHED SURFACE**

DETAILS: **PROPOSED FINISHED SURFACE LAYOUT PLAN**

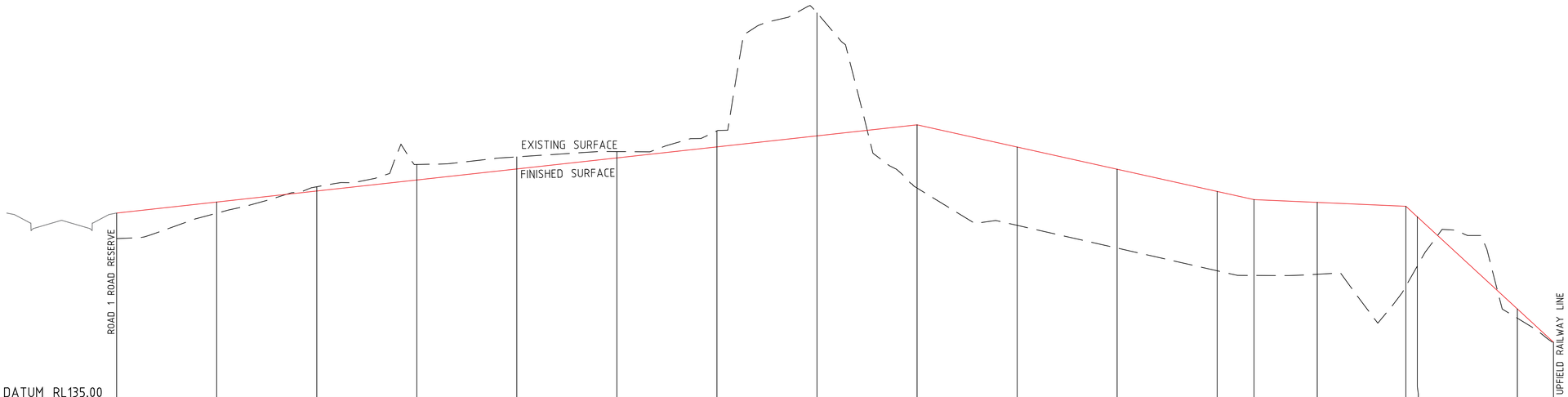
SCALE 1:1500 @ A1

LEVEL DATUM AHD

SHEET 1 OF 6

DRAWING No. **3148/M/EW01**

REV. P2



DATUM RL135.00

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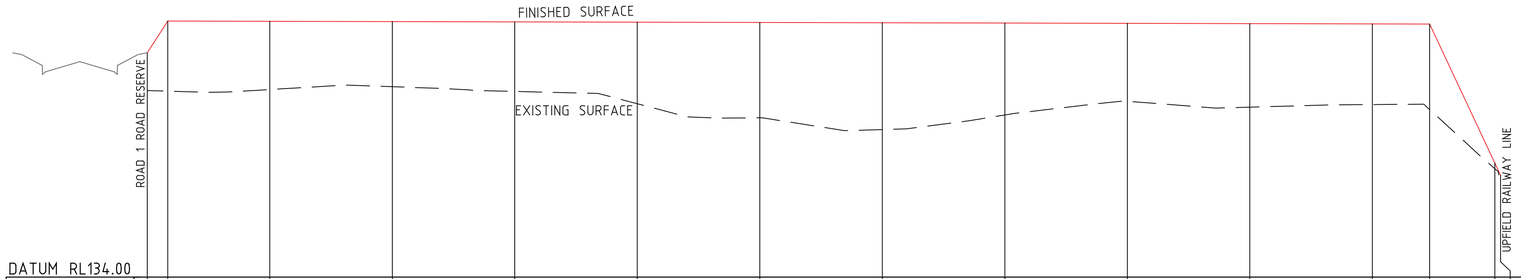

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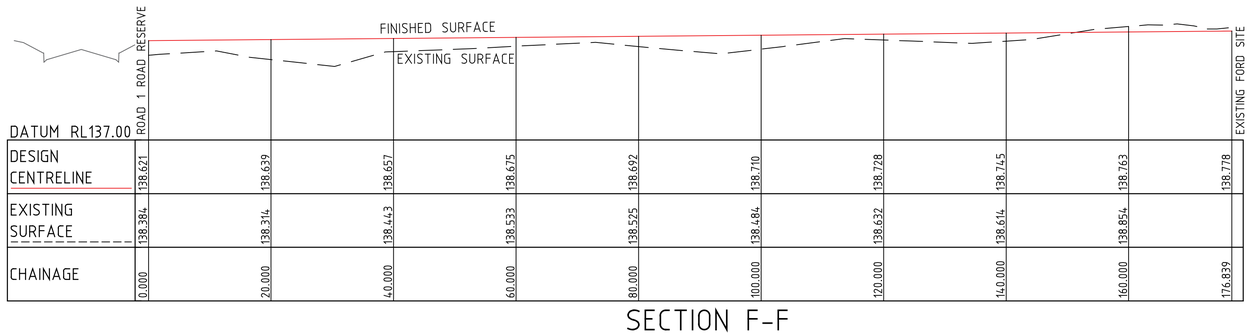
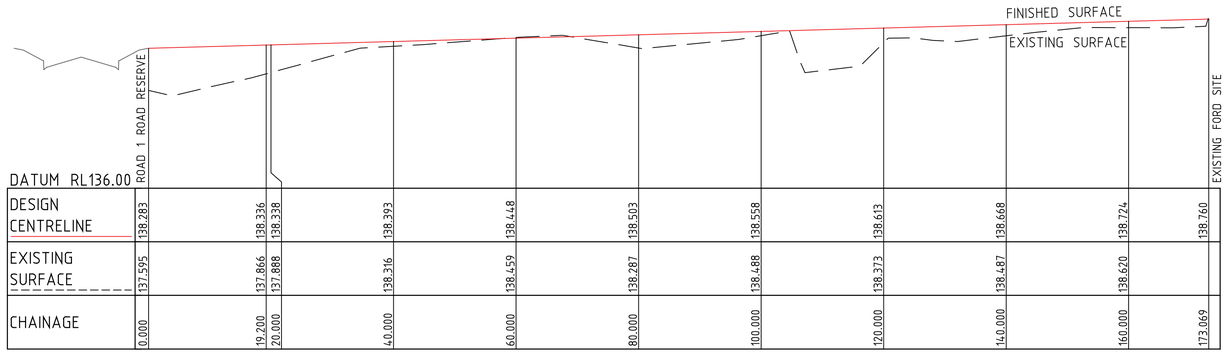
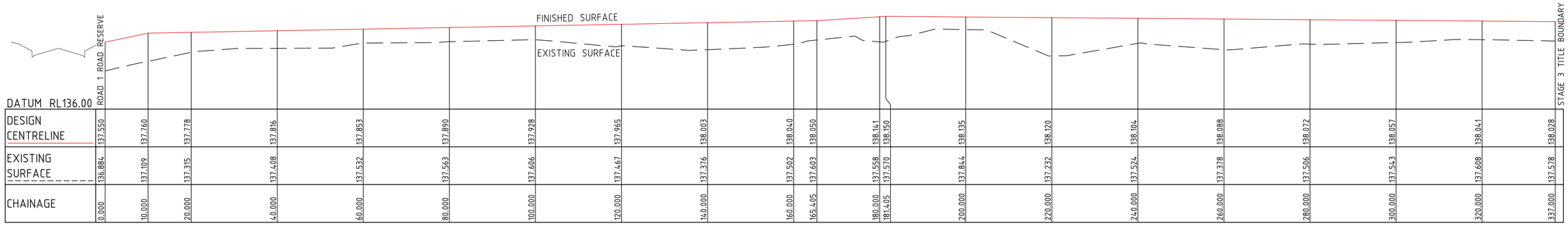


SECTION F-F



SECTION G-G



SECTION H-H

ADVERTISED PLAN

HORIZONTAL 0 2 4 8 12 16

VERTICAL 0 1 2 4 6 8

HORIZONTAL SCALE 1:200 AT A1 SIZE
VERTICAL SCALE 1:100 AT A1 SIZE

PRELIMINARY ISSUE

REV.	REVISION	DATE	REG ENG
P2	LOT LEVELS AMENDED	03-07-25	J.M.
P1	PRELIMINARY ISSUE	05-03-25	J.M.

LEGEND

GAS MAIN	HOUSE DRAIN PROPOSED/EX.	CH270.00 TP144.36	CHAINAGES AND TANGENT POINTS
WATER MAIN	PROPERTY INLET, DRAINAGE PITS	20.06	EXISTING SURFACE LEVEL
RECYCLED WATER MAIN	EX./FUT. INLET, DRAINAGE PITS	FS21.35	FINISHED LEVEL (TITLE BOUNDARY)
ELECTRICITY CABLE	DRAINAGE PIT STAGE/NUMBER	T21.35	DESIGN TOP/TOE OF BATTER LEVEL
TELECOMMUNICATIONS CABLE	SEWER LINE AND STRUCTURES	P21.350	DESIGN PAVEMENT LEVEL
WATER CONDUIT	EX.SEWER LINE AND STRUCTURES	19.28	PROPOSED CONTOUR LINE & LEVEL
GAS CONDUIT	KERB AND CHANNEL	19.28	EXISTING CONTOUR LINE & LEVEL
RECYCLED WATER CONDUIT	EX./FUT. KERB AND CHANNEL		FILLING IN EXCESS OF 200mm
COMBINED SERVICES CONDUIT	KERB TO BE REMOVED OFFSITE		CATCH DRAIN AND INVERT LEVEL
T.B.M. ▲ P.S.M.	STREET SIGN		EX. BATTER PROP. BATTER

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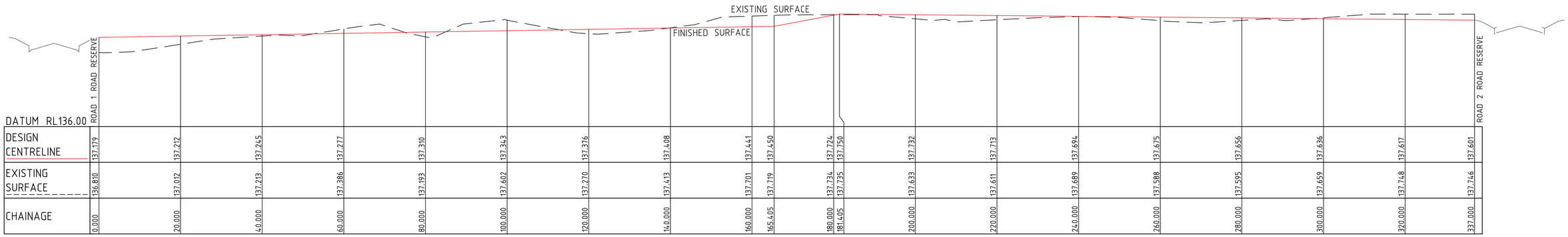
DESIGNED:	L.PAPAZOIS
CHECKED:	L.PAPAZOIS
AUTHORISED:	J.MATHIOS
PE REG NO:	-
DATE:	05-03-25

AUTHORITY: **HUME CITY COUNCIL**
PROJECT: **ASSEMBLY BROADMEADOWS**
FINISHED SURFACE
DETAILS: **SECTIONS SHEET 3 OF 5**

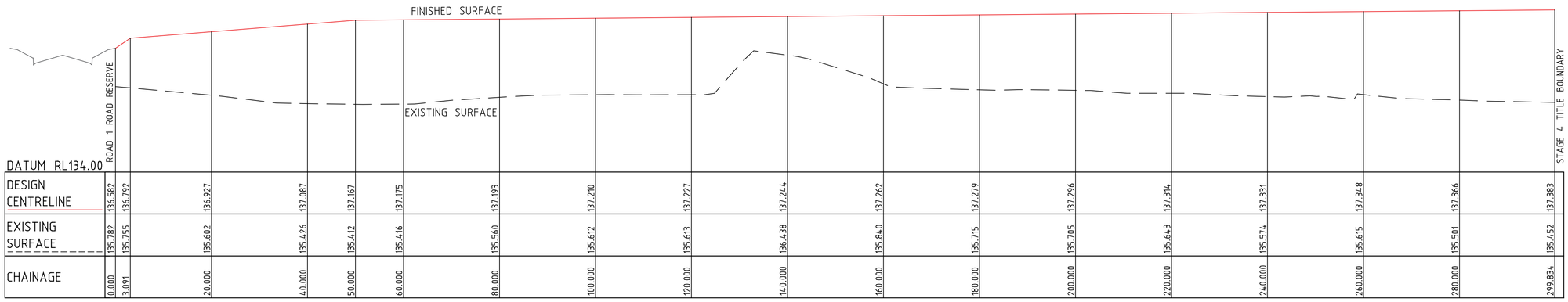
SCALE AS SHOWN
LEVEL DATUM AHD
SHEET 4 **OF** 6
DRAWING No. **3148/M/EW04** **REV.** P2



DATUM RL136.00

DESIGN CENTRELINE	137.179	137.212	137.245	137.277	137.310	137.343	137.376	137.408	137.441	137.450	137.724	137.750	137.732	137.713	137.694	137.675	137.656	137.636	137.617	137.601
EXISTING SURFACE	136.810	137.012	137.213	137.386	137.193	137.602	137.270	137.413	137.701	137.719	137.734	137.735	137.633	137.611	137.689	137.588	137.595	137.659	137.748	137.746
CHAINAGE	0.000	20.000	40.000	60.000	80.000	100.000	120.000	140.000	160.000	165.405	180.000	181.405	200.000	220.000	240.000	260.000	280.000	300.000	320.000	337.000

SECTION I-I



DATUM RL134.00

DESIGN CENTRELINE	136.582	136.792	136.927	137.087	137.167	137.175	137.193	137.210	137.227	137.244	137.262	137.279	137.296	137.314	137.331	137.348	137.366	137.383				
EXISTING SURFACE	135.782	135.755	135.602	135.476	135.412	135.416	135.560	135.612	135.613	136.438	135.840	135.715	135.705	135.643	135.574	135.615	135.501	135.452				
CHAINAGE	0.000	3.091	20.000	40.000	50.000	60.000	80.000	100.000	120.000	140.000	160.000	180.000	200.000	220.000	240.000	260.000	280.000	299.834				

SECTION J-J

ADVERTISED PLAN

HORIZONTAL 0 2 4 8 12 16

VERTICAL 0 1 2 4 6 8

HORIZONTAL SCALE 1:200 AT A1 SIZE
VERTICAL SCALE 1:100 AT A1 SIZE

PRELIMINARY ISSUE

REV.	REVISION	DATE	REG ENG
P2	LOT LEVELS AMENDED	03-07-25	J.M.
P1	PRELIMINARY ISSUE	05-03-25	J.M.

LEGEND

GAS MAIN	HOUSE DRAIN PROPOSED/EX.	Cobra 87 TP24.36	CHAINAGES AND TANGENT POINTS
WATER MAIN	PROPERTY INLET, DRAINAGE PITS	20.06	EXISTING SURFACE LEVEL
RECYCLED WATER MAIN	EX./FUT. INLET, DRAINAGE PITS	FS21.35	FINISHED LEVEL (TITLE BOUNDARY)
ELECTRICITY CABLE	DRAINAGE PIT STAGE/NUMBER	T21.35	DESIGN TOP/TOE OF BATTER LEVEL
TELECOMMUNICATIONS CABLE	SEWER LINE AND STRUCTURES	P21.350	DESIGN PAVEMENT LEVEL
WATER CONDUIT	EX.SEWER LINE AND STRUCTURES	19.20	PROPOSED CONTOUR LINE & LEVEL
GAS CONDUIT	KERB AND CHANNEL	19.20	EXISTING CONTOUR LINE & LEVEL
RECYCLED WATER CONDUIT	EX./FUT. KERB AND CHANNEL		FILLING IN EXCESS OF 200mm
COMBINED SERVICES CONDUIT	KERB TO BE REMOVED OFFSITE		CATCH DRAIN AND INVERT LEVEL
T.B.M. ▲ P.S.M.	STREET SIGN		EX. BATTER / PROP. BATTER

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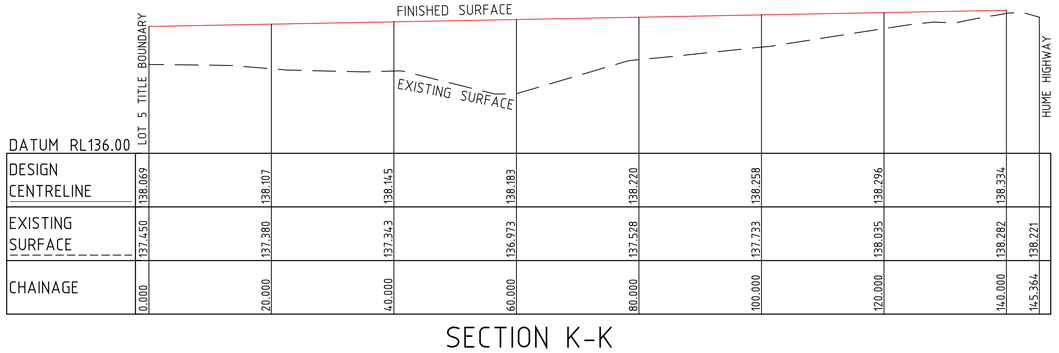
PE REG NO:	-
DATE:	05-03-25

AUTHORITY:	HUME CITY COUNCIL
PROJECT:	ASSEMBLY BROADMEADOWS
	FINISHED SURFACE
DETAILS:	SECTIONS SHEET 4 OF 5

SCALE	AS SHOWN
LEVEL DATUM	AHD
SHEET 5 OF 6	
DRAWING No.	REV.
3148/M/EW05	P2



DATUM RL136.00									
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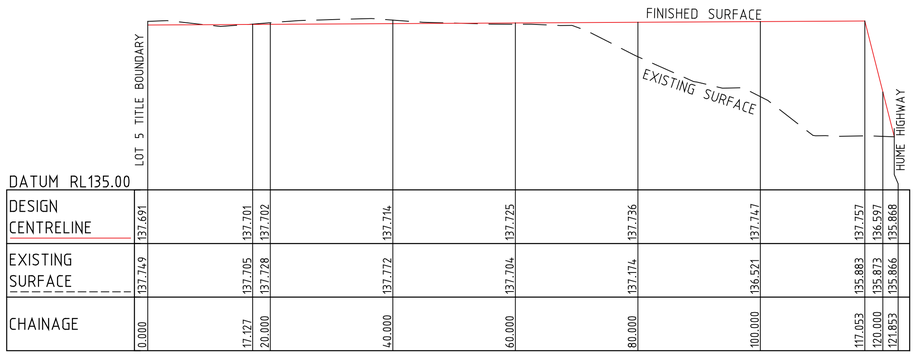
EXISTING SURFACE	137.450	137.380	137.343	136.973	137.528	137.733	138.035	138.282	138.221
CHAINAGE	0.000	20.000	40.000	60.000	80.000	100.000	120.000	140.000	145.364

SECTION K-K



DATUM RL135.00									
DESIGN CENTRELINE	137.691	137.701	137.702	137.714	137.725	137.736	137.747	137.757	136.597	135.868
EXISTING SURFACE	137.749	137.705	137.728	137.772	137.704	137.174	136.521	135.883	135.873	135.866
CHAINAGE	0.000	17.127	20.000	40.000	60.000	80.000	100.000	117.053	120.000	121.853

SECTION L-L

ADVERTISED PLAN

HORIZONTAL 0 2 4 8 12 16

VERTICAL 0 1 2 4 6 8

HORIZONTAL SCALE 1:200 AT A1 SIZE
VERTICAL SCALE 1:100 AT A1 SIZE

PRELIMINARY ISSUE

REV.	REVISION	DATE	REG ENG
P2	LOT LEVELS AMENDED	03-07-25	J.M.
P1	PRELIMINARY ISSUE	05-03-25	J.M.

LEGEND

GAS MAIN	HOUSE DRAIN PROPOSED/EX.	CH#0.00 TP#0.00	CHAINAGES AND TANGENT POINTS
WATER MAIN	PROPERTY INLET, DRAINAGE PITS	20.06	EXISTING SURFACE LEVEL
RECYCLED WATER MAIN	EX./FUT. INLET, DRAINAGE PITS	FS21.35	FINISHED LEVEL (TITLE BOUNDARY)
ELECTRICITY CABLE	DRAINAGE PIT STAGE/NUMBER	T21.35	DESIGN TOP/TOE OF BATTER LEVEL
TELECOMMUNICATIONS CABLE	SEWER LINE AND STRUCTURES	P21.350	DESIGN PAVEMENT LEVEL
WATER CONDUIT	EX.SEWER LINE AND STRUCTURES	19.20	PROPOSED CONTOUR LINE & LEVEL
GAS CONDUIT	KERB AND CHANNEL	19.20	EXISTING CONTOUR LINE & LEVEL
RECYCLED WATER CONDUIT	EX./FUT. KERB AND CHANNEL		FILLING IN EXCESS OF 200mm
COMBINED SERVICES CONDUIT	KERB TO BE REMOVED OFFSITE	CATCH DRAIN AND INVERT LEVEL	
T.B.M. ▲ P.S.M.	STREET SIGN	EX. BATTER / PROP. BATTER	

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Consulting Group

DRAWN:	J.DEMERTZIDIS
DESIGNED:	L.PAPAZOIS
CHECKED:	L.PAPAZOIS
AUTHORISED:	J.MATHIOS
PE REG NO:	-
DATE:	05-03-25

AUTHORITY: **HUME CITY COUNCIL**

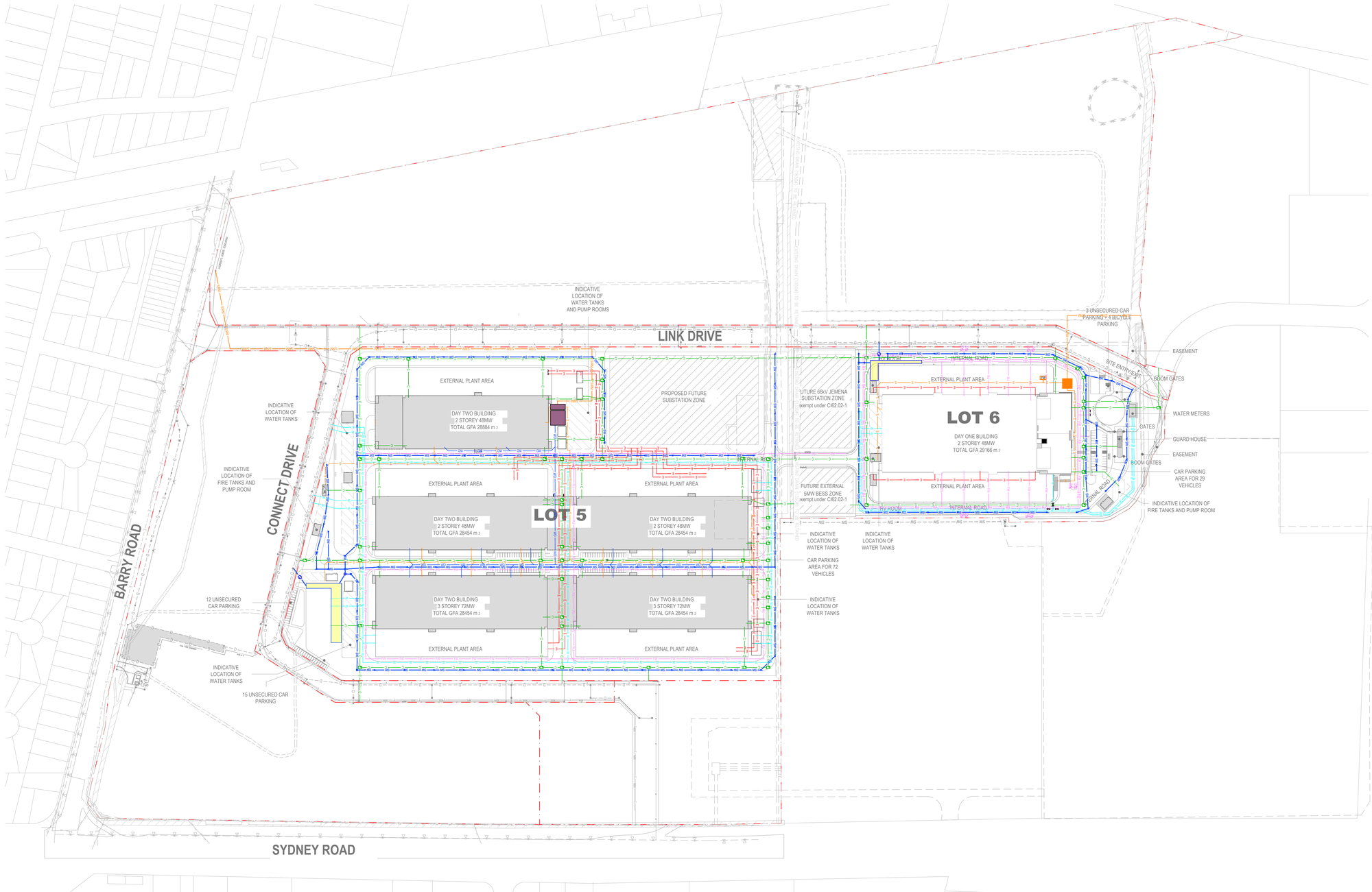
PROJECT: **ASSEMBLY BROADMEADOWS**
FINISHED SURFACE

DETAILS: **SECTIONS SHEET 5 OF 5**

SCALE AS SHOWN
LEVEL DATUM AHD
SHEET 6 **OF** 6
DRAWING No. **3148/M/EW06** **REV.** P2

Appendix B – Project Dune Combined Services Plan (proposed development)

ADVERTISED
PLAN



ADVERTISED PLAN

WIP

LEGEND:

- PROPERTY BOUNDARY
- EXISTING BUILDING TO REMAIN
- EXISTING ROAD EDGE
- EXISTING TOP OF BATTER
- EXISTING TOE OF BATTER
- PROPOSED BUILDING
- PROPOSED ROAD SHOULDER
- PROPOSED ROAD EDGE OF PAVEMENT
- PROPOSED ROAD CENTRE
- PROPOSED TOP OF BATTER
- PROPOSED TOE OF BATTER
- PROPOSED ROCK LINED SWALE CENTRE
- PROPOSED FENCE ALIGNMENT
- EXISTING OH ELECTRICAL MAIN
- EXISTING UG WATER MAIN
- EXISTING UG ELECTRICAL CABLE
- EXISTING SEWERAGE MAIN
- EXISTING UG STORMWATER PIPES
- EXISTING COMMUNICATIONS MAIN
- PROPOSED WATER MAIN
- PROPOSED WASTEWATER PIPES
- PROPOSED UG ELECTRICAL LINE
- PROPOSED COMMUNICATION MAIN
- PROPOSED FIRE WATER
- PROPOSED SEWERAGE MAIN
- PROPOSED SEWERAGE RISING MAIN
- PROPOSED STORMWATER PIPES

1:1500 15 0 30 60 m

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CLIENT

REV	DATE	REVISION DETAILS	APPROVED
A	12.08.2025	10% CONCEPT AND RE-MASSING	B.MCMILLAN
B	14.11.2025	DA PLANNING ISSUE.	B.MCMILLAN

SCALE	SIZE
1:1500	A0

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWN: S.PALMER
DESIGNED: S.BUI
REVIEWED: B.MCMILLAN
APPROVED: DATE

PROJECT
PROJECT DUNE
SITEWIDE

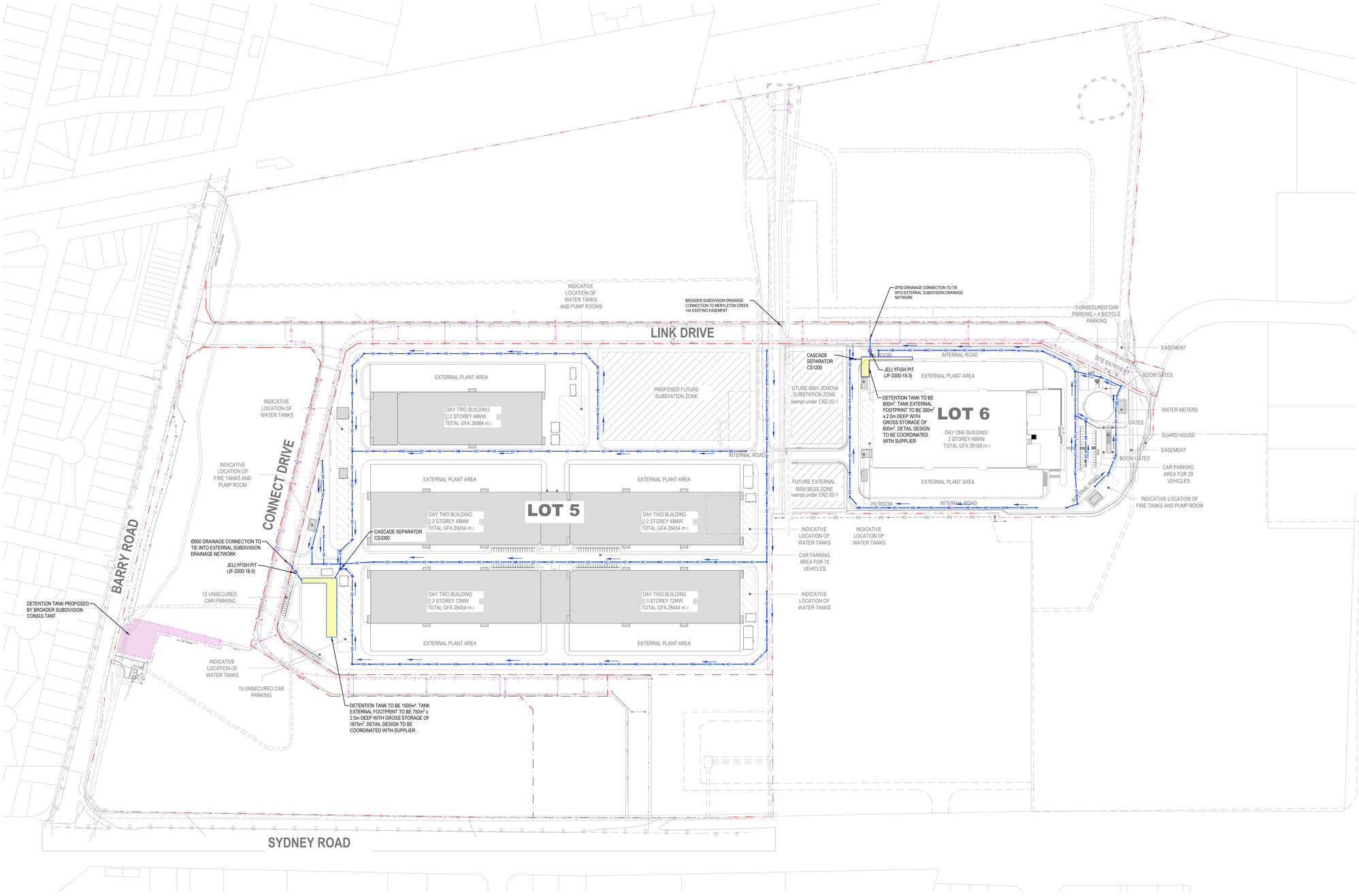
TITLE
CIVIL WORKS
OVERALL COMBINED SERVICES

DRAWING NUMBER

PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
529578 -	SITE	- AUR	-DRG-	BC-50000	- B

Appendix C – Project Dune Tender Drainage Plan (post-development site condition)

ADVERTISED
PLAN



ADVERTISED PLAN

WIP

LEGEND:

- PROPERTY BOUNDARY
- EXISTING BUILDING TO REMAIN
- EXISTING ROAD EDGE
- EXISTING TOP OF BATTER
- EXISTING TOE OF BATTER
- EXISTING SWALE
- PROPOSED BUILDING
- PROPOSED ROAD SHOULDER
- PROPOSED ROAD EDGE OF PAVEMENT
- PROPOSED ROAD CENTRE
- PROPOSED TOP OF BATTER
- PROPOSED TOE OF BATTER
- PROPOSED ROCK LINED SWALE CENTRE
- PROPOSED FENCE ALIGNMENT
- EXISTING OH ELECTRICAL MAIN
- EXISTING UG WATER MAIN
- EXISTING UG ELECTRICAL CABLE
- EXISTING COMMUNICATIONS MAIN
- EXISTING SEWERAGE MAIN
- EXISTING UG STORMWATER PIPES
- PROPOSED STORMWATER PIPES
- SIDE ENTRY PIT
- PROPOSED MAJOR CONTOUR (138.00)
- PROPOSED MINOR CONTOUR
- PROPOSED STORMWATER DETENTION TANK
- DIRECTION OF DRAINAGE FLOW
- PROPOSED JELLYFISH PIT
- PROPOSED CASCADE PIT

NOTE:

1. PIPE SIZES HAVE BEEN DESIGNED FOR 10% AEP.
2. CLASH DETENTION OF PROPOSED STORMWATER PIPES AGAINST OTHER SERVICES ARE TO BE COORDINATED IN NEXT DESIGN PHASE.
3. ALL DRAINAGE INLET PITS TO BE FITTED WITH OCEANGUARD TRASH BASKETS (OR APPROVED EQUIVALENT).
4. REFER TO STORMWATER MANAGEMENT PLAN (529578-SITE-AUR-RP-BC-00001) FOR DETAILS REGARDING DRAINAGE NETWORK INCLUDING STORMWATER QUANTITY AND QUALITY MEASURES.

15 0 30 60 m
1:1500

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CLIENT

REV	DATE	REVISION DETAILS	APPROVED
A	12.08.2025	10% CONCEPT AND RE-MASSING	B.MCMILLAN
B	14.11.2025	DA PLANNING ISSUE	B.MCMILLAN

SCALE	SIZE
1:1500	A0

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWN: S.PALMER
DESIGNED: D.MIAO
REVIEWED: B.MCMILLAN
APPROVED: DATE

PROJECT
PROJECT DUNE
SITEWIDE

TITLE
CIVIL WORKS
PROPOSED DRAINAGE LAYOUT PLAN

DRAWING NUMBER

PROJECT NO.	AREA	TYPE	DISC	NUMBER	REV
529578 -	SITE	- AUR -	DRG -	BC-51000	- B

ADVERTISED
PLAN

Aurecon offices are located in:
Angola, Australia, Botswana, China, Ghana, Hong Kong, Indonesia, Kenya, Lesotho, Macau, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam.

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