# PART 3A SPECIALIST REPORTS

- Civil information response cover letter
- Updated civil engineering report
- Updated stormwater management plan
- Updated waste management plan

INFORMATION RESPONSE – COM/2026/92

2 Karingal Drive, PIMPAMA

JOB – 25218

MICHEL
GROUP SERVICES

Our Ref: BE200223 - RFI Response
Enquiries to: Armand Beukes

13 July 2026

Adam Morris
A/Coordinator Planning North

**Attention: Adam Morris**

Dear Council Representative,

**Re: Lot 19 RP152380 on 2 Karingal Drive, Pimpama QLD 4209**
**Information Request Response (CoGC Ref: COM/2026/92)**

We refer to the Council of the City of Gold Coast Information Response dated 27 April 2026 regarding the above project. Please find below appropriate responses to the issues raised.

## Submission

| Item | Information Requested | Response |
|---|---|---|
| **Planning Assessment/City Architects** | | |
| **Streetscape and Façade Treatment – Lots 1 to 10 (North-West Elevations)** | | |
| **Retaining walls** | | |
| **4.** | The applicant has stipulated in the common materials that retaining walls are proposed within the development, however no drawings, elevations or details have been provided demonstrating these. To enable assessment, Officer's request the applicant provide amended drawings clearly outlining the proposed retaining wall locations, height and finishes. | Complies. Section details have been provided indicating the requested retaining wall heights and positions. See Bulk earthworks plans as well as section details on sheets C2001 - C2204 – Rev B of the BE20023 plan set prepared by Burchills Engineering Solutions |
| **Landscape** | | |
| **Karingal Drive interface** | | |
| **7.** | The applicant is requested to amend all plans including the Architectural Plans and Statement of Landscape Intent to improve the visual amenity of the Karingal Drive interface with the subject site. The proposed retaining walls and associated fence are requested to be wholly setback within the subject site by 600mm to provide for a row of screening shrubs along the continuous frontage of Karingal Drive. In addition to this, five (5) 1.5m wide by 3m long fence indentations are requested to accommodate canopy trees with a clear 3m separation to the outermost projection of the building. | Complies. See section A & B on sheet C2200 & C2201 of the BE20023 – Rev B plan set prepared by Burchills Engineering Solutions. |

| | | |
|---|---|---|
| | Provide cross-sections of the Karingal Drive interface and development demonstrating showing the requested landscape treatment and retaining wall and fence. | |
| **Flood impacts to adjacent public open space** | | |
| **8.** | Post development flood impacts appear to impact upon Council Drainage Reserve Lot 900 SP347477. The applicant is requested to demonstrate owners' consent for the acceptance of this increase in flood volume or alternatively amend all plans to mitigate flood impacts within the subject site. | Communications have began with Property services to obtain consent for the minor increase in flood levels over Council Drainage Reserve Lot 900 SP347477. The updated Hydraulic Impact Assessment prepared by Burchills demonstrate that water level increases over Drainage Reserve Lot 900 SP347477 have been reduced from what was originally reported on in HIA-01 as a result of updated survey data being included in the hydraulic modelling. |
| **Stormwater outlets** | | |
| **9.** | Engineering plans detail three (3) stormwater outlets which empty into proposed public open space for conservation purposes. The applicant is requested to review the location of these outlet points to limit the impact of private infrastructure within this area. These outlets could be moved closer to the development footprint or an alternative structure such as a level spreader could be designed at the development footprint interface. | Complies. The proposed Outlets have been moved closer to the development footprint. Please refer to Roadworks & Drainage Layout Plan on sheet C3001 & C3002 – Rev B of the BE20023 plan set prepared by Burchills Engineering Solutions. |
| **Amended Rehabilitation Management Plan** | | |
| **10.** | The applicant is requested to amend the Rehabilitation Management Plan titled: Rehabilitation Management Plan – 2 Karingal Drive, Pimpama, dated March 2026, prepared by Burchills to include the following: | Addressed in attached RMP-01 that was prepared and revised by Burchills Engineering Solutions. |
| | a) Amend Establishment and On-maintenance periods to 12 months for each period. | Addressed in attached RMP-01 that was prepared and revised by Burchills Engineering Solutions. |
| | b) Amend section 4.4 Revegetation to increase the average density of trees to 1 plant per 2.25 square metres (1.5m by 1.5m centres) to ensure quick canopy establishment and closure. | Addressed in attached RMP-01 that was prepared and revised by Burchills Engineering Solutions. |
| | c) An average density of 1 plant per square metre is to be achieved over the entire rehabilitation area. | Addressed in attached RMP-01 that was prepared and revised by Burchills Engineering Solutions. |
| **Frontage Landscaping** | | |
| **12.** | The sewer and water reticulation plans detail sewer and water reticulation within the frontage of the proposed dwellings. Canopy trees are proposed to be installed within the frontage garden beds as shown on the Statement of Landscape Intent. The applicant is requested to demonstrate that proposed landscaping including canopy trees is not adversely impacted upon by the underground infrastructure. | Complies. The sewer has been moved into the road. See Sewer and Water Reticulation Plan on sheet C4501 – Rev B of the BE20023 plan set prepared by Burchills Engineering Solutions. |
| **Retaining Walls** | | |
| **14.** | It is noted that the submitted plans indicate the presence of retaining walls; in order to facilitate assessment against PO9/AO9 of the General development provisions code, the applicant is requested to provide plans that identify the location, height, type, colours and finishes of the proposed retaining walls. It is requested that where they are proposed | Retaining Wall location and heights have been indicated on the Bulk Earthworks Layout Plans. Please refer to sheet C2001 & C2002 – Rev B of the BE20023 plan set prepared by Burchills Engineering Solutions. |

| | | |
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| | adjacent landscape planting areas, wall types are vertical, narrow types with discrete footings (e.g. concrete sleeper) as opposed to boulder walls which occupy significant space (displacing landscaping) and blockwork walls (which have a significant, continuous footing that displaces landscaping). It is also requested that walls which will be visible in the long term are coloured (e.g. charcoal) and textured (e.g. wood pattern or split face). | |
| **Transport** | | |
| **Road Access** | | |
| **15.** | **a) <u>Vehicle Access – Karingal.</u>**<br>In the event of development approval being granted, conditions would be applied requiring the upgrade of Karingal Drive (including the provision of a cul-de-sac head). Road upgrades do not appear to have been directly addressed in the Traffic Engineering or Civil Engineering reports. While drawings appended to Burchills' Civil Engineering Report appear to show an upgraded formation of Karingal Drive (including cul-de-sac head), it's unclear from the drawings to exactly what 'standard' the proposed road upgrade has been designed.<br><br>A 'functional layout drawing', in addition to supporting information (including swept paths), shall be submitted, demonstrating that the upgraded formation of Karingal Drive achieves the following: | Complies. An additional plan has been prepared, see plan set prepared by Burchills Engineering Solutions Drawing Number C3010– Rev A. |
| | i. A 'Residential Access Street' standard, with a pavement width of 7.5m, and demonstrating how the upgrade ties into the existing formation of Karingal Drive (noting that Karingal Drive, immediately east of the subject site, has a pavement width greater than 7.5m). | Complies. See section A & B on sheet C2200 & C2201 – Rev B of the BE20023 plan set prepared by Burchills Engineering Solutions. |
| | ii. Minimum 4.5m wide verges maintained (on all sides). | Complies. See section A & B on sheet C2200 & C2201 – Rev B as well as C3010– Rev A of the BE20023 plan set prepared by Burchills Engineering Solutions. |
| | iii. A cul-de-sac head suitable to accommodate turn-around by a waste collection vehicle, as demonstrated by a revised swept path (including clearances per AS2890.2 requirements).<br><br>*Note - Burchills' swept path (Civil Engineering Report) shows a HRV turning around within the proposed cul-de-sac head; however, the HRV relies on private property (subject site) to turn around. Revised swept paths shall demonstrate the ability for a waste collection vehicle to turn-around within the carriageway (road pavement) of the cul-de-sac head, without reliance on private property.* | Complies. See sheet C3010 – Rev A of the BE20023 plan set prepared by Burchills Engineering Solutions. A 10.51m front load waste collection vehicle has been used to complete the swept path analysis which indicates that the vehicle can maneuver the proposed cul de sac effectively without relying on private property. |
| | iv. Drawings shall clearly demonstrate any land dedication required from the subject site to achieve the required road upgrade. Particular attention shall be paid to the location of existing property boundaries (development side and opposite side of Karingal Drive) where the cul-de-sac head is required (and noting that 4.5m wide verges (minimum) must be maintained). | Complies. See sheet C3010 – Rev A of the BE20023 plan set prepared by Burchills Engineering Solutions. |

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| | In the event of development approval being granted, conditions would also be applied requiring the construction of a 2m wide footpath for the full site frontage to Karingal Drive, and provision of kerb and channel for the extent of the road upgrade works | |
| | **b) <u>Vehicle access - Imelda Way</u>**<br>Confirm that vehicle access from Imelda Way is proposed by way of a vehicle crossing, rather than an extension of the public road.<br><br>Of note, both the Traffic Engineering report and the Civil Engineering Report indicate that an extension of Imelda Way is proposed for vehicle access to the southern portion of the development; however, development drawings indicate that vehicle access from Imelda Way will be via a vehicle crossing and private roadway (rather than extension of the public road). | Complies. See plan on sheet C3002 – Rev B of the BE20023 plan set prepared by Burchills Engineering Solutions. |
| **General** | | |
| **18.** | To demonstrate compliance with AO19.1, the following information shall be provided: | |
| | i. Show pedestrian sight triangles, on the departure sides of both access driveways (to Karingal Drive and Imelda Way), in accordance with AS2890.1 requirements (2m wide ×2.5m long, located alongside driveways, and located wholly within the bounds of the site). The following notation shall be included on development drawings: *'Pedestrian sight triangles to be kept clear of obstructions to visibility. Low level landscaping permitted to a maximum mature height of 500mm above driveway level'.* | N/A |
| | ii. Demonstrate that the driveway of 'dwelling 16' has a minimum length of 5.4m (for a width of 2.4m) tin order to accommodate the second parking space required for the dwelling, within the driveway. | N/A |
| | iii. Identify surface gradients for internal roadways, demonstrating compliance with AS2890.2 requirements to accommodate circulation by an 8.8m Medium Rigid Vehicle. | Complies. See long sections on sheet C3200 – C3202 – Rev B of the BE20023 plan set prepared by Burchills Engineering Solutions |
| **Civil Engineering** | | |
| **Stormwater tank detail and maintenance** | | |
| **19.** | Council officers acknowledge the Conceptual Stormwater Management Plan (CSMP) prepared by Burchills Engineering Solutions (dated 13 March 2026), which includes a conceptual stormwater layout indicating a proposed 400 m² detention tank. However, the level of detail provided for the tank is insufficient to demonstrate compliance with the Healthy Waters Code. The applicant is requested to provide the following: | |
| | a) Provide cross-sectional and site plan details for the detention tank, clearly identifying the location of the filter cartridge bay containing 8 × ATLAN filter cartridges. Ensure the treatment area of the tank is not included in the detention volume calculations and Atlan filters are positioned before the detention component. | Complies. See section 1 & 2 on sheet C3050 – Rev B of the BE20023 plan set prepared by Burchills Engineering Solutions. |

| | | |
|---|---|---|
| | b) Demonstrate maintenance access to the detention tank for both quality and quantity (i.e. two maintenance access points). | As above. |
| | c) Update the Operational Control Plan showing location of Stormsacks. | Complies. See Roadworks & Drainage Layout Plan on sheet C3001 & C3002 – Rev B of the BE20023 plan set prepared by Burchills Engineering Solutions. |
| | d) Provide erosion protection measures to outlets. | As above. |
| | e) Provide long sections of the proposed stormwater drainage systems (e.g., pits, pipes, bioretention basin, tank, outlets) demonstrating invert level, grade, cover, connection and discharge | Long sections of the proposed drainage systems are to be provided during the detailed design phase of this project. |
| **Unjustified Additional Discharge Outlet for proposed Lot 192 (The Fernhurst development)** | | |
| **20.** | The provided drawings number C3000 and C3002 of the Conceptual Stormwater Management Plan (CSMP) prepared by Burchills Engineering Solutions (dated 13 March 2026) are inconsistent with the details in the report. The drawings indicate a discharge outlet located upstream of the bioretention basin; however, this outlet is not referenced or described within the report. The applicant is required to: | |
| | a) Provide justification for the purpose and function of the additional discharge outlet; and | The additional discharge outlet forms part of the proposed splitter pit arrangement. Q3 month flows are diverted to the bioretention basin for treatment, while major flows bypass the basin via the splitter pit and discharge to the existing creek, ensuring the treatment system operates within its design capacity.<br><br>It should be noted that the proposed bio basin A2 does not provide any detention or quantity mitigation and is for quality treatment purposes only. |
| | b) Ensure that all modelling and reporting details are consistent with the corresponding stormwater layout drawings. | Complies. Refer to amended reports prepared by Burchills Engineering Solutions. |
| **Hydraulics Impact Assessment – neighboring lots affected** | | |
| **21.** | Council officers acknowledge the Hydraulics Impact Assessment (HIA) prepared by Burchills Engineering Solutions (dated 19 March 2026). The report indicates that post-development conditions result in afflux impacts on neighboring lots immediately to the east during the 1% and 2% AEP flood events.<br>Compliance with PO6 requires that afflux impacts remain within the limits prescribed in the Council's Flood Model Noise Practice Note. Specifically:<br>- For open space, designated drainage areas, road reserves/corridors, and council parks, the tolerable afflux must not exceed 10 mm.<br>- For ancillary areas (outside a building footprint) of residential properties in an urban setting, the tolerable afflux must not exceed 5 mm.<br><br>Based on the submitted modelling, the afflux impact on neighboring lots ranges between 0.02–0.03 m (noting that the legend incorrectly identifies units as millimeters rather than meters). Accordingly, the development does not comply with | |

| | | |
|---|---|---|
| | PO6 of the Flood Overlay Code. The applicant is requested to provide one of the following: | |
| | a) Remodel the post-development scenario to mitigate impacts on neighboring lots ensuring consistency with the outcomes of the above practice note and provide amended HIA report and plans; or | The post-development flood model has been updated to incorporate the latest survey information, including recently constructed infrastructure. The revised modelling results are presented in the updated Hydraulic Impact Assessment (HIA). The modelled outcomes still results in some areas with water level increases of greater than 10mm however Burchills have began communications with council to obtain owners consent for the water level increases over Drainage Reserve Lot 900 SP347477. |
| | b) Provide written consent from all affected property owners. | Communications have began with Property services to obtain consent for the minor increase in flood levels over Council Drainage Reserve Lot 900 SP347477. The updated Hydraulic Impact Assessment prepared by Burchills demonstrate that water level increases over Drainage Reserve Lot 900 SP347477 have been reduced from what was originally reported on in HIA-01 as a result of updated survey data being included in the hydraulic modelling. Please see correspondence attached. |
| **Amend waste collection vehicle swept paths** | | |
| **22.** | The applicant is required to resubmit swept path drawings related to the refuse collection vehicle that are signed and certified by an RPEQ-qualified professional. | Complies. An additional plan has been prepared, see plan set prepared by Burchills Engineering Solutions Drawing Number C3010– Rev B. |

If additional information is needed or you require clarification on any of the issues addressed, please do not hesitate to contact Armand Beukes on (07) 5509 6400.

Yours faithfully

**ROD BARRY**
Civil Engineer RPEQ

cc: BOS Property – Attention: Justin Hansard

## Armand Beukes

**From:** Joshua Micallef
**Sent:** Thursday, 2 July 2026 2:59 PM
**To:** NELSON Gerry; Property Services
**Cc:** Fraser Lucas; Armand Beukes
**Subject:** RE: COM/2026/92 - 2 Karingal Drive, Pimpama - Water Level Increase in Drainage Reserve

Hi Gerry and Anita,

Just following up on this one. We will soon be responding to the formal information request with updated reports, and just want to make sure the flood impacts on the downstream property are generally supportable on Council's end.

Kind regards,



**Joshua Micallef**
**Civil & Water Engineer**
**P** 07 5509 6400 | **Teams** Call / Chat
**E** Joshua.Micallef@burchills.com.au

**Gold Coast | Brisbane | Toowoomba | Sunshine Coast | Ipswich | Roma | Bangalow | Fraser Coast | Moreton Bay**




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**From:** NELSON Gerry <GNELSON@goldcoast.qld.gov.au>
**Sent:** Thursday, 25 June 2026 12:48 PM
**To:** Joshua Micallef <joshua.micallef@burchills.com.au>
**Subject:** FW: COM/2026/92 - 2 Karingal Drive, Pimpama - Water Level Increase in Drainage Reserve [Filed 25 Jun 2026 13:16]

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Hello Joshua

Anita is currently on annual leave, returning next week. I have checked the file and can't see any reply emails from internal stakeholders but it's possible responses have been sent directly to Anita's email.

I will include this matter on the list to discuss with her when she returns.

Kind regards

**Gerry Nelson**
Senior Property Officer
Facilities and Property
Third Floor Waterside East, Holden Place Bundall
City of Gold Coast

**P:** 07 5581 6432
PO Box 5042 Gold Coast Mail Centre Q 9726
**cityofgoldcoast.com.au**

CITY OF GOLDCOAST.

---

**From:** Joshua Micallef <Joshua.Micallef@burchills.com.au>
**Sent:** Wednesday, 10 June 2026 1:21 PM
**To:** Property Services <PropertyServices@goldcoast.qld.gov.au>
**Cc:** Rod Barry <rod.barry@burchills.com.au>; Armand Beukes <armand.beukes@burchills.com.au>
**Subject:** FW: COM/2026/92 - 2 Karingal Drive, Pimpama - Water Level Increase in Drainage Reserve

Good Afternoon Anita,

Just following up on the status of this one, we have received the survey data on Lot 900 on SP347477 and the updated modelling results look more positive than what was originally submitted.

Have you heard anything back from the relevant teams involved?

Kind regards,



**Joshua Micallef**
**Civil & Water Engineer**
**P** 07 5509 6400 | **Teams** Call / Chat
**E** Joshua.Micallef@burchills.com.au

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**From:** Property Services <PropertyServices@goldcoast.qld.gov.au>
**Sent:** Wednesday, 20 May 2026 2:19 PM
**To:** Joshua Micallef <Joshua.Micallef@burchills.com.au>
**Cc:** Armand Beukes <armand.beukes@burchills.com.au>; Rod Barry <rod.barry@burchills.com.au>

**Subject:** RE: COM/2026/92 - 2 Karingal Drive, Pimpama - Water Level Increase in Drainage Reserve [Filed 21 May 2026 08:01]

Hi Joshua

I refer to the request below, seeking comment on whether the City would accept an increase in the water level in the basin located on Lot 900 on SP347477. The City holds the land in freehold but in trust for drainage and open space purposes. I have forwarded your email to the relevant teams to review and provide comment back to your enquiry.

regards

**Anita Ramsay**
Coordinator, Property Services
Facilities and Property
Third Floor, Waterside East, Holden Place, Bundall
City of Gold Coast

**P:** 07 5581 6441
PO Box 5042 Gold Coast Mail Centre Qld 9726
**cityofgoldcoast.com.au**

---

**From:** Joshua Micallef <Joshua.Micallef@burchills.com.au>
**Sent:** Wednesday, 20 May 2026 12:57 PM
**To:** Property Services <PropertyServices@goldcoast.qld.gov.au>
**Cc:** Armand Beukes <armand.beukes@burchills.com.au>; Rod Barry <rod.barry@burchills.com.au>
**Subject:** COM/2026/92 - 2 Karingal Drive, Pimpama - Water Level Increase in Drainage Reserve

Dear Property Services / Parks Team,

Burchills Engineering Solutions is currently assisting with a development application located adjacent to Council-owned detention basin land. As part of the application, a Hydraulic Impact Assessment (HIA) has been prepared to assess potential flood impacts associated with the proposed development.
The assessment is documented within Hydraulic Impact Assessment Report BE200223-RP-HIA-01, prepared by Burchills Engineering Solutions. The report details the hydraulic model setup, proposed development layout, flood mapping outcomes, and assessment of potential flood level increases associated with the development.

Council's information request notes that minor afflux impacts occur within neighbouring land during the 1% and 2% AEP flood events. The affected area includes a portion of Council-owned detention basin land – **Lot 900 on SP347477** .

Our current 1% AEP impact map is shown below, noting that this is subject to change once we have received updated topographic and drainage information (currently underway and discussed below).

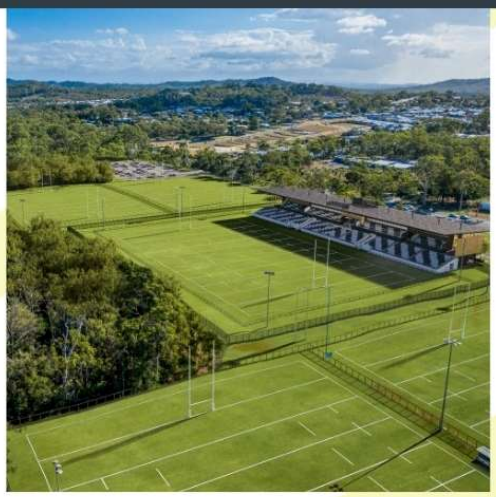
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# 2 Karingal Drive, Pimpama
# Civil Engineering Report for DA Submission

| | |
|---|---|
| **Client:** | Bosform Pty Ltd |
| **Project Number:** | BE200223 |
| **Document Number:** | BE200223-RP-CER-01 |
| **Date of Issue:** | March 2026 |

# Document Control Record

| | |
|---|---|
| Prepared by: | Armand Beukes |
| Position: | Civil Engineer |
| Signed: |  |
| Date: | 8/07/2026 |

| | |
|---|---|
| Approved by: | Rod Barry |
| Position: | Principal Civil Engineer |
| Signed: | |
| Date: | 8/07/2026 |

| Version No. | Description | Date | Prepared | Approved |
|---|---|---|---|---|
| 00 | First Issue | 8/01/2021 | FL | JC |
| 01 | Revised Issue | 19/03/2026 | AB | RB |
| 02 | Revised Issue | 8/07/2026 | AB | RB |

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**Coote Burchills Engineering Pty Ltd ACN: 166 942 365**

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**MORETON BAY I ROMA I IPSWICH I BANGALOW**



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Appendix A – Development Concept Plans

Appendix B - Detailed Site Survey

Appendix C - Burchills Engineering Solutions Drawings

Appendix D – Code Compliance Responses

# 1. Introduction

Bosform Pty Ltd has engaged Burchills Engineering Solutions to prepare a Civil Engineering Report to be considered as part of a Development Application to the City of Gold Coast Council, for a proposed 57 lot multi-unit development at 2 Karingal Drive, Pimpama.

This report has determined that the site is suitable for the proposed development, in terms of those matters particularly relating to civil engineering design parameters and site constraints. The development can be undertaken in accordance with the current City of Gold Coast guidelines, SEQ Water Supply and Sewerage, Design and Construction Code and best management practices.

## 1.1 Scope of Report

This report describes the existing physical conditions of the site, and suitability for the proposed development with particular respect to:

- Site Earthworks;
- Roadworks, Access and Traffic;
- Stormwater Drainage;
- Water Supply;
- Sewer Reticulation;
- Electricity Supply;
- Telecommunications Supply.

This report represents an assessment of the facts and circumstances pertaining to these matters, as they are known to the writer at the time of preparation.

## 2. Project Identification

### 2.1 Real Property Description

The site is legally described as Lot 19 on RP 152380 and is situated between Karingal Drive and Imelda Way. The total site area is approximately 2.459 Ha.

The site is to be developed as shown on the Site Layout Plan prepared by MPS Architects, which is included within Appendix A of this report. A detailed site survey has been completed by Michel Group Services and is included within Appendix B of this report. The location of the subject site is shown on Figure 2.1 below.




**Figure 2.1 Site Locality Plan**

## 2.2 Physical Description

The site is currently accessed from Karingal Drive bounding its northern property boundary. The end stub of Imelda Way also bounds the sites southern property boundary, however is not currently utilised for access purposes.

There is an existing waterway traversing diagonally through the site, entering the site in the southern corner, and exiting the site at the northern corner of the site. The extents of this waterway are depicted within the Detailed Site Survey included within Appendix B.

All portions of the site generally fall towards this central waterway that splits the site into two (2) catchments. The highest points in the site are at RL 10.0m AHD in the north-west corner, and RL 8.0m AHD in the south-east corner of the site. The site is currently vacant and is vegetated with grass and tree cover, where various material stockpiles are also scattered throughout the site.

The site is bounded by the following existing land uses:

North: Karingal Drive;

East: Vacant Land (mapped as medium-density residential);

South: Imelda Way, Residential Dwellings, and Conservation Land;

West: Railway Corridor.

## 3. Proposed Development

The proposed development is seeking Council approval for Material Change of Use (multiple dwellings), Reconfiguring a Lot (2 management lots and a park Lot) and Operational Works (change to ground level and vegetation clearing). Specifically, the proposal involves a new townhouse development which comprises a complex of 16 townhouses accessing from Imelda Way and a complex of 41 townhouses accessing from Karingal Drive. The reconfiguring a lot component involves creation of management lots for these two townhouses developments and a park lot to be dedicated to Council for the drainage reserve traversing the site.

The proposed Site Layout Plan is shown below in Figure 3.1, in reduced form and a full-scale drawing is included within Appendix A of this report.

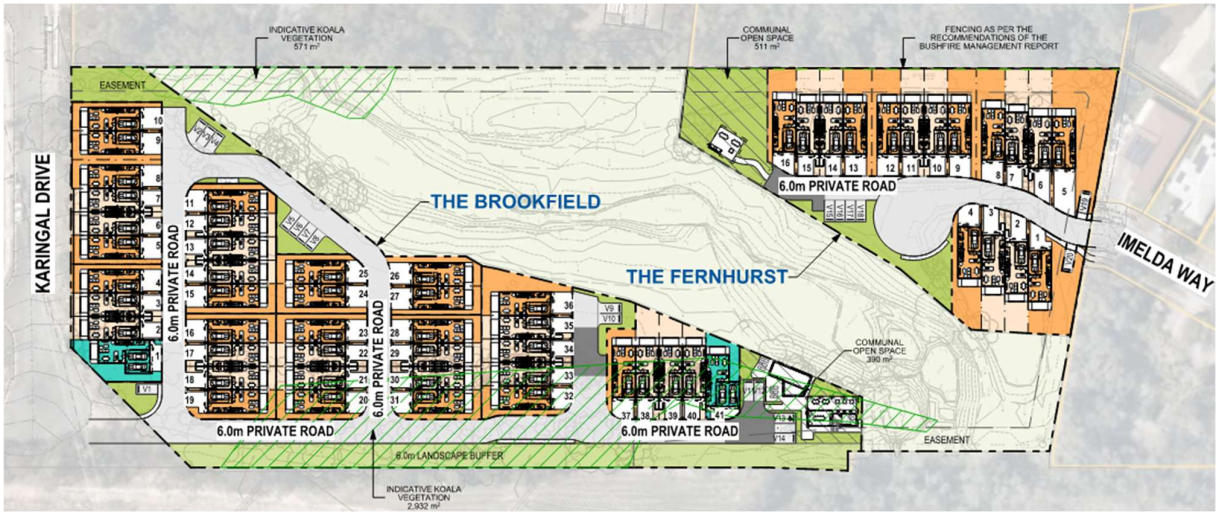



**Figure 3.1 Site Layout Plan**

Based on the SEQ Water Supply and Sewerage Design & Construction Code, the Equivalent Tenements (ET) and Equivalent Population (EP) for the proposed development are shown below in Table 3.1.

**Table 3.1 Development Summary**

| Use | Unit | Total Units | ET's/Unit | EP's/ET | Total ET | Total EP |
|---|---|---|---|---|---|---|
| 3 Bedroom Multi-Unit Residential | Dwelling | 57 | 0.9 | 2.73 | 51.3 | 140 |
| **Total Proposed** | **-** | | **-** | **-** | **51.3** | **140** |

# 4. Site Earthworks

Site earthworks associated with the proposed development will be limited to general shaping and profiling of building platforms associated with the development, construction of internal roadways, and excavation for services trenches. The proposed earthworks are shown on the Earthworks Layout Plan, Drawing BE200233-C2000-C2002 Rev A, prepared by Burchills Engineering Solutions and included within Appendix C of this report.

## 4.1 Sediment and Erosion Control

The best management practices will be implemented according to the IECA Best Practice Erosion and Sediment Control (2008) guidelines.

The following is a procedure of water quality controls to be implemented for the construction stage of the development.

### 4.1.1 Phase 1 – Stripping & Bulk Earthworks

- Identify and erect exclusions zones.
- Prior to any demolition, stripping or bulk earthworks on site, sediment fences, inlet traps, gully protection and entry/exit pad shall be put in place.
- A wash-down area and entry/exit pad will be provided at the construction site entrance to minimise the amount of sediment being tracked off the site.
- The wash-down area will be drained to a suitable sediment capture device installed downstream of the construction entry.
- Sediment fences are to be installed along the downstream property boundaries prior to stripping and earthworks commencing.
- Construct an appropriately-sized sediment basin for the development.
- If refuelling of machinery is to occur on site, appropriate absorbent products for cleaning oil spills will be provided.
- Provide bins on site for the disposal of waste and building debris.
- If it is anticipated that stockpiled material will not be used for a period of two weeks or more, a polythene cover (or equivalent) shall be used to prevent sediment transport by rain during wet periods. Conversely, during dry spells a cover shall be used to prevent fine sediments becoming airborne.
- The contractor shall provide on-going monitoring and maintenance of sediment and erosion control devices around the site.
- The contractor is to stage all works so that disturbed areas remain exposed for as short a period as practical.

Measures to minimise airborne pollutants during construction in the form of dust during dry and/or windy weather shall include the following:

- Exposed soils shall be kept damp to prevent particulates becoming airborne; and
- Stockpiles exposed for more than two weeks shall be covered to prevent wind erosion.

### 4.1.2 Phase 2 – Infrastructure, Building & Roadworks

- The site stormwater pipes and pits shall be installed with drop inlets provided to all pits.
- Provide sediment fences, sandbags or fine mesh cover to all gully pits.
- Monitoring of new stormwater pipes and infrastructure (including the stormwater quality improvement devices) to ensure they are free of sediment and debris.
- Maintain shake-down and wash-down area at site entry/exit.

- All disturbed areas are to be surfaced or landscaped/grassed (maintained to minimum 70% ground cover) as soon as practicable after completion of localised works.

### 4.1.3 Phase 3 – Finishing Works & Defects Liability Period

All erosion and sediment control measures, including sediment fences and inlet traps shall be maintained until completion of surface finishes, including landscaping and turfing:

- Maintain sediment fences.
- Tend to landscaped areas to maintain ground cover.

## 5. Roadworks, Access and Traffic

Karingal Drive will be upgraded to facilitate the proposed development and provide an appropriate standard of access and servicing. The proposed works include the extension of the existing kerb and channel and adjoining footpath from their current termination point along the development frontage, together with the upgrade of the existing cul-de-sac to a Residential Access Street standard. The upgraded road will provide a minimum 7.5 m wide carriageway and maintain minimum 4.5 m wide verges on all sides. The upgraded cul-de-sac has been designed to accommodate the turning requirements of a Waste Removal Vehicle, with swept path assessment demonstrating that the vehicle can turn entirely within the road carriageway, including the required AS 2890.2 clearances, without reliance on private property. The proposed road upgrade has also been designed to tie into the existing Karingal Drive formation to the east of the development.

Access to the development is proposed from two locations; one being a new vehicle crossover from Karingal Drive that connects to the internal private roadway servicing The Brookfield Parcel, and the other being a new vehicle crossover from Imelda Way that services The Fernhurst Parcel via an internal private roadway.

Note that all internal roadways and carpark areas under this proposal are intended to remain private infrastructure, under the ownership and control of the body corporate.

Design and grading of the internal roadways and carpark areas will generally be in accordance with the City of Gold Coast Land Development Guidelines, along with AS/NZS 2890 – Parking Facilities.

The general concept for the proposed access roads and carpark areas is shown on the Site Layout Plan prepared by MPS Architects and contained within Appendix A of this report.

## 6. Stormwater Drainage

All site stormwater runoff within the development footprint (excluding waterway) will be collected via stormwater drainage lines within the roadways, and conveyed to an OSD tank and filtration system for The Brookfield Parcel and a bio retention basin for The Fernhurst Parcel which will be positioned adjacent to the waterway.

The proposed stormwater drainage layout is shown on the Roads and Drainage Layout Plan prepared by Burchills Engineering Solutions, which are included in Appendix A of this report.

A Conceptual Stormwater Management Plan (CSMP), Report No. BE200223-RP-CSMP-01, has been prepared by Burchills Engineering Solutions. This study reviews the hydrology and hydraulics of the site for pre-development and post-development conditions.

Based on this study, the following recommendations have been made:

*Stormwater Quantity*

- The Lawful Point of Discharge for the site has been defined as the existing waterway traversing the site.
- Stormwater runoff from Catchment A1 will be conveyed to a detention tank, where it will be released at the LPD in a controlled manner to ensure that there is non-worsening peak flow in the post-developed scenario. The detention tank A1 will have a 1% AEP volume of 468.8m3.
- There is a 141.69 ha external catchment which is conveyed through the site via an existing waterway, no development is proposed within this waterway;
- Peak discharge from the developed catchment will be that of or less than the pre-developed scenario.
- As the site is within the Woongoolba flood mitigation scheme catchment area, peak outflows and timings have been assessed for Q2, Q5 and Q10 for rainfall events up to 72 hours and does not change as a result of development

*Stormwater Quality*

- To achieve the City of Gold Coast's Water Quality Objectives, it is proposed to use a mix of bioretention systems and proprietary devices to treat stormwater runoff. These bioretention systems will be private infrastructure, owned and maintained by the body corporate.
- The required treatment for catchment A1 will be 8 ATLAN Stormsacks and 8 ATLAN Filters.
- The bioretention device positioned within Catchment A2 will have a total filter media footprint of 40m2.

## 7. Flood Storage Requirements

The overall flood storage balance for the site has been assessed and achieved in accordance with City of Gold Coast requirements, as part of the overall site bulk earthworks.

A Hydraulic Impact Assessment, Report No. BE200223-RP-HIA-01, has been completed by Burchills Engineering Solutions and is intended to accompany this Development Application. Further detailed flood-storage modelling will be carried out under the detailed design phase for this development.

# 8. Water Supply

There is an existing 150mm water main on Imelda Way bounding the southern boundary of the site. The Fernhurst Parcel of the development will gain its potable water supply via connection to this main.

There is an additional 150mm water main on Karingal Drive on the northern side of the road. The Brookfield Parcel of the development will gain its potable water supply via connection to this main.

Being a private development, the sites will be serviced via a master water meter and connection to the Council-owned main on Imelda Way as well as Karingal Drive; where the internal reticulation will be owned by the development Body Corporate.

The Overall Sewer and Water Reticulation Plan prepared by Burchills Engineering Solutions, depicts the proposed internal water reticulation and is contained within Appendix A of this report.

Sizing of the development's water connection, master-meter and internal reticulation is to occur at the detailed design phase of the development.

## 8.1 Water Demand Calculation

To determine suitable pipe sizing for the proposed development, water demands are calculated according to the intended new development. The water criteria and design parameters are based on the following references:

- Gold Coast Water (GCW) Desired Standards of Service (DSS);
- SEQ Water Supply and Sewerage Design & Construction Code (SEQ WS&S D&C Code); and
- Water Services Association of Australia – WSA 03-2013 Water Supply Code of Australia, Part 1: Planning and Design.

The service mains internal of each building will be designed and constructed in accordance with AS/NZS 3500.1:2003 Plumbing and Drainage – Water services (Standards Australia, 2003).

The water flow parameters shown in Table 8.1, Table 8.2 and Table 8.3 required to meet Council's Standards of Service and have been based on Single Supply (Drinking Water Only) Network parameters shown in SEQ Design Criteria Table 4.1.

**Table 8.1 Potable Water Supply Demand and Peaking Factor**

| Property Type | Average Day Demand L/EP/day | Non-Revenue L/EP/day | Peaking Factors | | |
|---|---|---|---|---|---|
| | | | MDMM | PD | PH |
| Commercial | 220 | 20 | 1.06 | 2.07 | 2.32 |
| Multi-Unit Residential | 220 | 20 | 1.27 | 2.05 | 2.97 |

Notes:

MDMM Mean Day Maximum Month Demand

PD Peak Day Demand

AD Average Day Demand

PH Peak Hour Demand

Table 8.2 Potable Water Pressure Parameters

| Item | Pressure Parameter |
|---|---|
| Minimum Service Pressure | 22 metres (adjoining the property boundary) |
| Maximum Service Pressure | Target 55 metres (at the property boundary)<br>Max. 80 metres (subject to installation of pressure reducing valves) |

Table 8.3 Fire Fighting Parameters

| Item | Pressure Parameter |
|---|---|
| Minimum Residential Mains Pressure (Emergency Fire operating conditions) | 12 metres at the main at the property boundary<br>9 metres elsewhere |
| Fire Flow Urban Residential | 15 L/s for a duration of 2 hrs |
| Fire Flow Commercial | 30 L/s for a duration of 4 hrs |
| Background Demand | 2/3 x Peak Hour demand (not less than Average Day demand) |

The calculated water supply demand for the proposed development is shown in Table 8.4.

Table 8.4 Water Supply Demand Calculations

| Use | EP | AD Flow | Non-Revenue | AD (L/s) | PH (L/s) |
|---|---|---|---|---|---|
| Proposed 3-Bedroom Multi-Unit | 140 | 220 | 20 | 0.39 | 1.09 |
| **Total Proposed** | **140** | | | **0.39** | **1.09** |

Calculations of maximum peak demand and demand multiplier for the residential aspect of the development are based on an allowance of 220 L/EP/day and a peak hour factor of 2.97 while applying the Non-Revenue flows of 20 L/EP/day, as follows:

Maximum Hour Demand = PHF x Demand Rate x EP's + NR

= 2.97 x 220 x 140 + 20 x 140

= 94.28 kL/day

= 1.1 L/s

Demand Multiplier = Maximum Demand / EP's

= 0.0079

# 9. Sewerage Reticulation

There is an existing 375mm trunk gravity sewer main within the site that traverses along the boundary of the site. It is anticipated that wastewater generated from the development will be conveyed via internal private gravity sewer to this existing trunk main.

The Overall Sewer and Water Reticulation Plan prepared by Burchills Engineering Solutions, depicts the proposed internal sewerage reticulation and is contained within Appendix A of this report.

Sizing of the development's sewerage reticulation is to occur at the detailed design phase of the development.

## 9.1 Sewer Demand Calculation

The sewer criteria and design parameters are based on the following references:

- Gold Coast Water (GCW) Desired Standards of Service (DSS)
- SEQ Water Supply and Sewerage Design & Construction Code (SEQ WS&S D&C Code); and
- Water Services Association of Australia – WSA 02-2014 Sewerage Code of Australia, Part 1: Planning and Design.

The sewer flow generation, pipe design parameters, minimum sewer pipe grades and maximum capacity are shown below in Table 9.1, Table 9.2 and Table 9.3. The following parameters are based on a Reduced Infiltration Gravity System (RIGS):

**Table 9.1 Sewer Flow Generation Parameters**

| Flow | Parameter |
|---|---|
| Average Dry Weather Flow (ADWF) | 200 L/EP/d |
| Peak Dry Weather Flow (PDWF) | $C_2$ x ADWF where $C_2 = 4.7 \times (EP)^{-0.105}$ |
| Peak Wet Weather Flow (PWWF) | 5 x ADWF |

**Table 9.2 Pipe Design Parameters**

| Flow | Parameter |
|---|---|
| Mannings 'n' | 0.013 |
| Minimum velocity @ PDWF | 0.7 m/s |
| Depth of Flow @ PWWF – Existing system | Up to 1.0 m below MH cover level and no spillage through overflow structures |
| Depth of Flow @ PWWF – Proposed sewers | Max flow depth shall not exceed ¾ pipe full (75% d/D). |

**Table 9.3 Minimum Pipe Capacity – New Sewers Flowing ¾ Full**

| Pipe Size (mm) | Min Pipe Grade (1 in x) | Capacity (L/s) |
|---|---|---|
| 150 | 180 | 10.4 |
| 225 | 300 | 23.6 |

The total development yield has been taken into account, not just the increase in equivalent persons on the subject site. The calculated sewer demand generation for the proposed development is shown in Table 9.4.

Table 9.4 Sewer Demand Calculation

| Use | EP | ADWF Rate | ADWF (kL/d) | ADWF (L/s) | PWWF (kL/d) | PWWF (L/s) |
|---|---|---|---|---|---|---|
| Total Proposed | 140 | 200 | 28.0 | 0.32 | 140 | 1.6 |

The calculations indicate that the total post development demand at PWWF will be approximately 1.6 L/s. The existing trunk sewer main therefore has the capacity to service the proposed development. A detailed sewer reticulation layout for development will be prepared under the detailed civil design phase.

## 10. Electrical and Communications

A detailed site survey has been prepared by Michel Group Services and is included within Appendix B. A Dial Before You Dig search has also been completed.

The survey indicates that there are existing electrical and telecommunications services in the vicinity of Imelda Way and Karingal Drive. It is envisaged that adequate power supply can be provided to the site from the existing infrastructure. However, a specialist electrical consultant will need to be engaged to provide advice in relation to internal electrical reticulation requirements, to prepare detailed designs and to liaise with the relevant authorities.

## 11. Conclusion

The findings of this Civil Engineering Report support the proposed site use outlined in this Development Application to the City of Gold Coast Council.

Site earthworks associated with the proposed development will be limited to general shaping and profiling of building platforms, construction of internal roadways, and excavation for service trenches required to accommodate essential infrastructure.

Access to the development is proposed via two locations. The first comprises a new vehicle crossover from Karingal Drive, providing connection to the internal private roadway servicing the Brookfield Parcel of the development. The second consists of an extension of Imelda Way, which will connect to the internal private roadway servicing the Fernhurst Parcel of the development.

Stormwater runoff generated within the development footprint will be collected via stormwater drainage infrastructure located within the internal roadways and conveyed to a detention tank positioned adjacent to the waterway within the Brookfield Parcel as per CSMP Report No. BE200223-RP-CSMP-01.

Potable water supply will be provided via existing water infrastructure surrounding the site. A 150 mm water main is located in Imelda Way along the southern boundary of the site, with an additional 150 mm water main located in Karingal Drive. The Brookfield parcel will be serviced from the Karingal Drive main, while the Fernhurst parcel will be supplied from the Imelda Way main, as shown on Drawings BE200233-C4500 to C4502 Rev A prepared by Burchills Engineering Solutions (refer Appendix C).

Wastewater generated by the development will be conveyed via internal private gravity sewer infrastructure to an existing 375 mm trunk gravity sewer main that traverses the boundary of the site as per Drawing BE200233-C4500-C4502 Rev A, prepared by Burchills Engineering Solutions (refer Appendix C).

All required essential services can be suitably provided to the development, including:

- Stormwater Drainage;
- Reticulated Water Services;
- Reticulated Sewerage Services;
- Electricity Supply;
- Telecommunications Supply.

# Appendix A – Development Concept Plans



| SHEET | DRAWING | SCALE |
|---|---|---|
| DA01 | COVER PAGE | |
| DA02 | SITED STRUCTURE PLAN | 1:1000 |
| DA03 | OVERALL SITE PLAN | 1:1000 |
| DA04 | INDICATIVE STAGING PLAN | 1:1000 |
| DA05 | OVERALL CLUSTER PLAN | 1:1000 |
| DA06 | OVERALL GROUND FLOOR PLAN | 1:1000 |
| DA07 | GROUND FLOOR PLAN<br>(LOTS 1 - 4 & 16 - 19) | 1:200 |
| DA08 | FIRST FLOOR PLAN<br>(LOTS 1 - 4 & 16 - 19) | 1:200 |
| DA09 | ROOF PLAN<br>(LOTS 1 - 4 & 16 - 19) | 1:200 |
| DA10 | GROUND FLOOR PLAN<br>(LOTS 5 - 8 & 11 - 15 ) | 1:200 |
| DA11 | FIRST FLOOR PLAN<br>(LOTS 5 - 8 & 11 - 15 ) | 1:200 |
| DA12 | ROOF PLAN<br>(LOTS 5 - 8 & 11 - 15 ) | 1:200 |
| DA13 | GROUND FLOOR PLAN<br>(LOTS 9 - 10) | 1:200 |
| DA14 | FIRST FLOOR PLAN<br>(LOTS 9 - 10) | 1:200 |
| DA15 | ROOF PLAN<br>(LOTS 9 - 10) | 1:200 |
| DA16 | GROUND FLOOR PLAN<br>(LOTS 20 - 23 & 28 - 31) | 1:200 |
| DA17 | FIRST FLOOR PLAN<br>(LOTS 20 - 23 & 28 - 31) | 1:200 |
| DA18 | ROOF PLAN<br>(LOTS 20 - 23 & 28 - 31) | 1:200 |
| DA19 | GROUND FLOOR PLAN<br>(LOTS 24 - 27) | 1:200 |
| DA20 | FIRST FLOOR PLAN<br>(LOTS 24 - 27) | 1:200 |
| DA21 | ROOF PLAN<br>(LOTS 24 - 27) | 1:200 |
| DA22 | GROUND FLOOR PLAN<br>(LOTS 32 - 36) | 1:200 |
| DA23 | FIRST FLOOR PLAN<br>(LOTS 32 - 36) | 1:200 |
| DA24 | ROOF PLAN<br>(LOTS 32 - 36) | 1:200 |
| DA25 | GROUND FLOOR PLAN<br>(LOTS 37 - 41) | 1:200 |
| DA26 | FIRST FLOOR PLAN<br>(LOTS 37 - 41) | 1:200 |
| DA27 | ROOF PLAN<br>(LOTS 37 - 41) | 1:200 |
| DA28 | GROUND FLOOR PLAN<br>(LOTS 1-4) | 1:200 |
| DA29 | FIRST FLOOR PLAN<br>(LOTS 1-4) | 1:200 |
| DA30 | ROOF PLAN<br>(LOTS 1-4) | 1:200 |
| DA31 | GROUND FLOOR PLAN<br>(LOTS 5 - 12) | 1:200 |
| DA32 | FIRST FLOOR PLAN<br>(LOTS 5 - 12) | 1:200 |

| SHEET | DRAWING | SCALE |
|---|---|---|
| DA33 | ROOF PLAN<br>(LOTS 5 - 12) | 1:200 |
| DA34 | GROUND FLOOR PLAN<br>(LOTS 13 - 16) | 1:200 |
| DA35 | FIRST FLOOR PLAN<br>(LOTS 13 - 16) | 1:200 |
| DA36 | ROOF PLAN<br>(LOTS 13 - 16) | 1:200 |
| DA37 | FENCING & REFUSE PLAN | 1:500 |
| DA38 | FENCING & REFUSE PLAN | 1:500 |
| DA39 | PRODUCT SUMMARY | |
| DA40 | STREETSCAPE<br>CLUSTER 1 (LOTS 1-4) | 1:200 |
| DA41 | STREETSCAPE<br>CLUSTER 2 (LOTS 5-8) | 1:200 |
| DA42 | STREETSCAPE<br>CLUSTER 3 (LOTS 9-10) | 1:200 |
| DA43 | STREETSCAPE<br>CLUSTER 4 (LOTS 11-15) | 1:200 |
| DA44 | STREETSCAPE<br>CLUSTER 5 (LOTS 16-19) | 1:200 |
| DA45 | STREETSCAPE<br>CLUSTER 6 (LOTS 20-23) | 1:200 |
| DA46 | STREETSCAPE<br>CLUSTER 7 (LOTS 24-25) | 1:200 |
| DA47 | STREETSCAPE<br>CLUSTER 8 (LOTS 26-27) | 1:200 |
| DA48 | STREETSCAPE<br>CLUSTER 9 (LOTS 28-31) | 1:200 |
| DA49 | STREETSCAPE<br>CLUSTER 10 (LOTS 32-36) | 1:200 |
| DA50 | STREETSCAPE<br>CLUSTER 11 (LOTS 37-41) | 1:200 |
| DA51 | STREETSCAPE<br>CLUSTER 12 (LOTS 1-4) | 1:200 |
| DA52 | STREETSCAPE<br>CLUSTER 13 (LOTS 5-8) | 1:200 |
| DA53 | STREETSCAPE<br>CLUSTER 14 (LOTS 9-12) | 1:200 |
| DA54 | STREETSCAPE<br>CLUSTER 15 (LOTS 13-16) | 1:200 |
| DA55 | INDICATIVE PERSPECTIVES | |
| DA56 | INDICATIVE PERSPECTIVES | |
| DA57 | BROOKFIELD COMMUNITY FACILITY<br>GROUND FLOOR | 1:100 |
| DA58 | BROOKFIELD COMMUNITY FACILITY<br>STREETSCAPE | 1:200 |
| DA59 | BROOKFIELD COMMUNITY FACILITY<br>INDICATIVE PERSPECTIVES | |
| DA60 | FERNHURST COMMUNITY FACILITY<br>STREETSCAPE | 1:200 |
| DA61 | SECTION | 1:200 |
| DA62 | SECTION | 1:200 |
| DA63 | SECTION | 1:200 |
| DA64 | SECTION | 1:200 |

# COVER PAGE

# 2 KARINGAL DRIVE & 60 IMELDA WAY

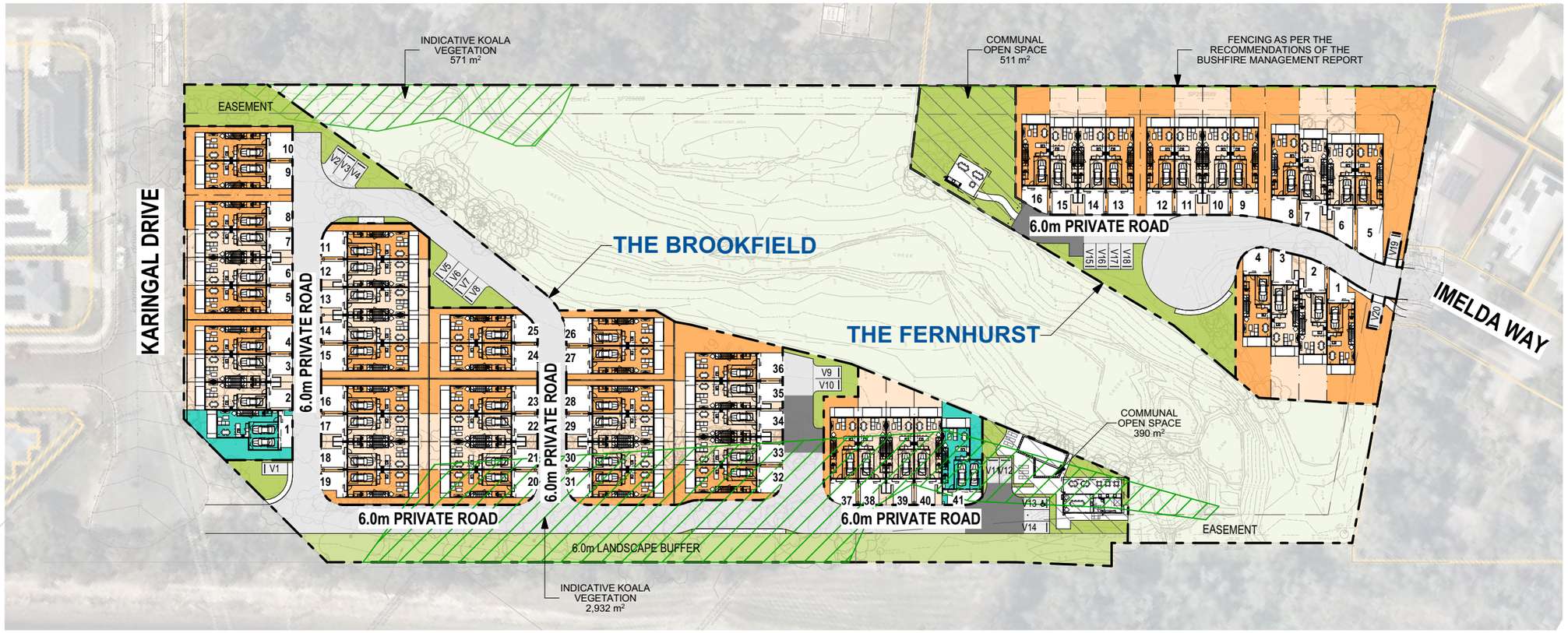
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## PARCEL A - THE FERNHURST
**60 IMELDA WAY**

### SITE SUMMARY
APPROX. NET SITE AREA 0.491 ha
APPROX. NET DENSITY 32.59 du/ha

### DEVELOPMENT SUMMARY

| | |
|---|---|
| **TYPE C**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 8 |
| **TYPE C END**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 8 |
| **TOTAL** | 16 |

## PARCEL B - THE BROOKFIELD
**2 KARINGAL DRIVE**

### SITE SUMMARY
APPROX. NET SITE AREA 1.073 ha
APPROX. NET DENSITY 38.21 du/ha

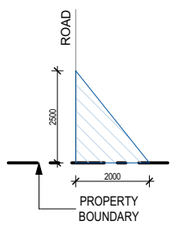
### DEVELOPMENT SUMMARY

| | |
|---|---|
| **TYPE C**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 19 |
| **TYPE C END**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 20 |
| **TYPE D**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 2 |
| **TOTAL** | 41 |

**NOTE:** GCCC

LOT BOUNDARIES AND AREAS ARE BASED OFF PDF PLAN AND ARE INDICATIVE ONLY SIZES TO BE CONFIRMED

INDICATIVE KOALA VEGETATION AREA




PEDESTRIAN SIGHT TRIANGLES TO BE KEPT CLEAR OF OBSTRUCTIONS TO VISIBILITY. LOW LEVEL LANDSCAPING PERMITTED TO A MAXIMUM MATURE HEIGHT OF 500mm ABOVE DRIVEWAY LEVEL.

# SITED STRUCTURE PLAN

0 10 20 30 40 50m
Scale 1:1000 @ A3

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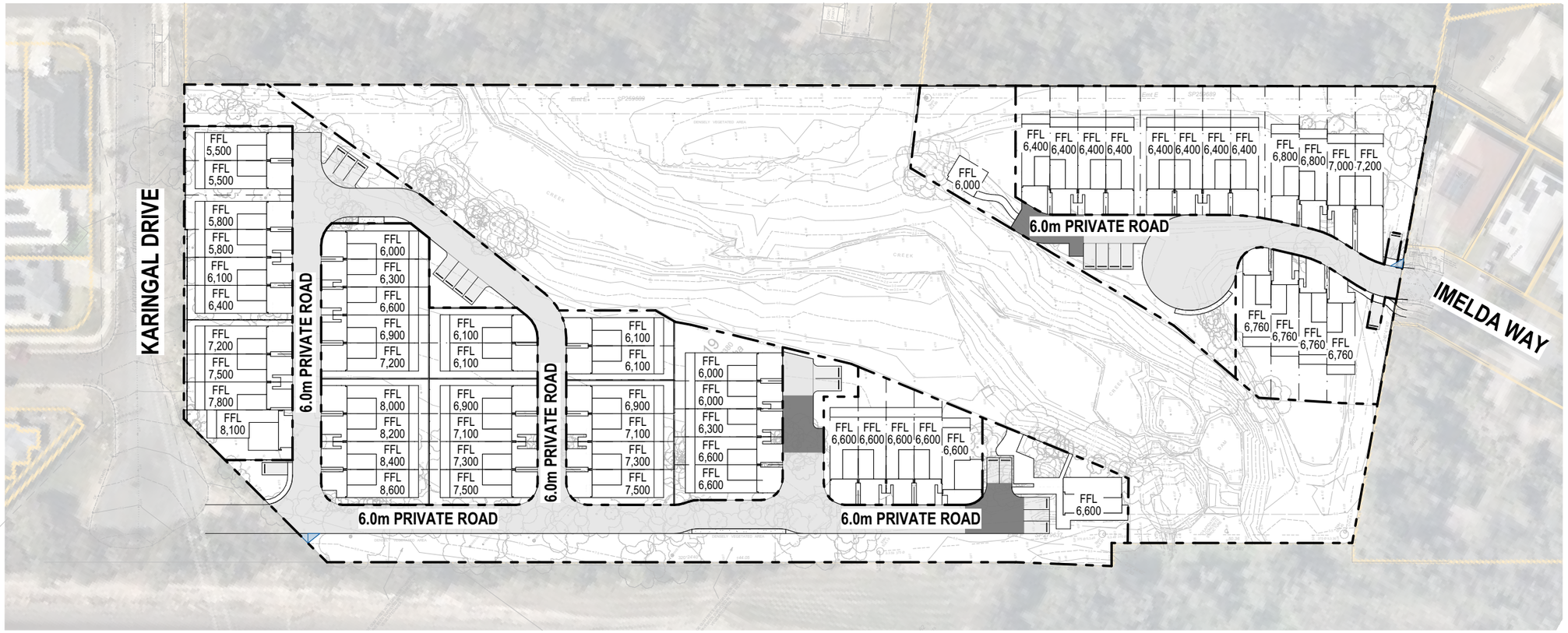
# 2 KARINGAL DRIVE & 60 IMELDA WAY
## PIMPAMA

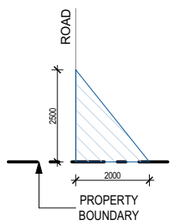
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PEDESTRIAN SIGHT TRIANGLES TO BE KEPT CLEAR OF OBSTRUCTIONS TO VISIBILITY. LOW LEVEL LANDSCAPING PERMITTED TO A MAXIMUM MATURE HEIGHT OF 500mm ABOVE DRIVEWAY LEVEL.

# OVERALL SITE PLAN

0 10 20 30 40 50m

Scale 1:1000 @ A3

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# 2 KARINGAL DRIVE & 60 IMELDA WAY

## PIMPAMA

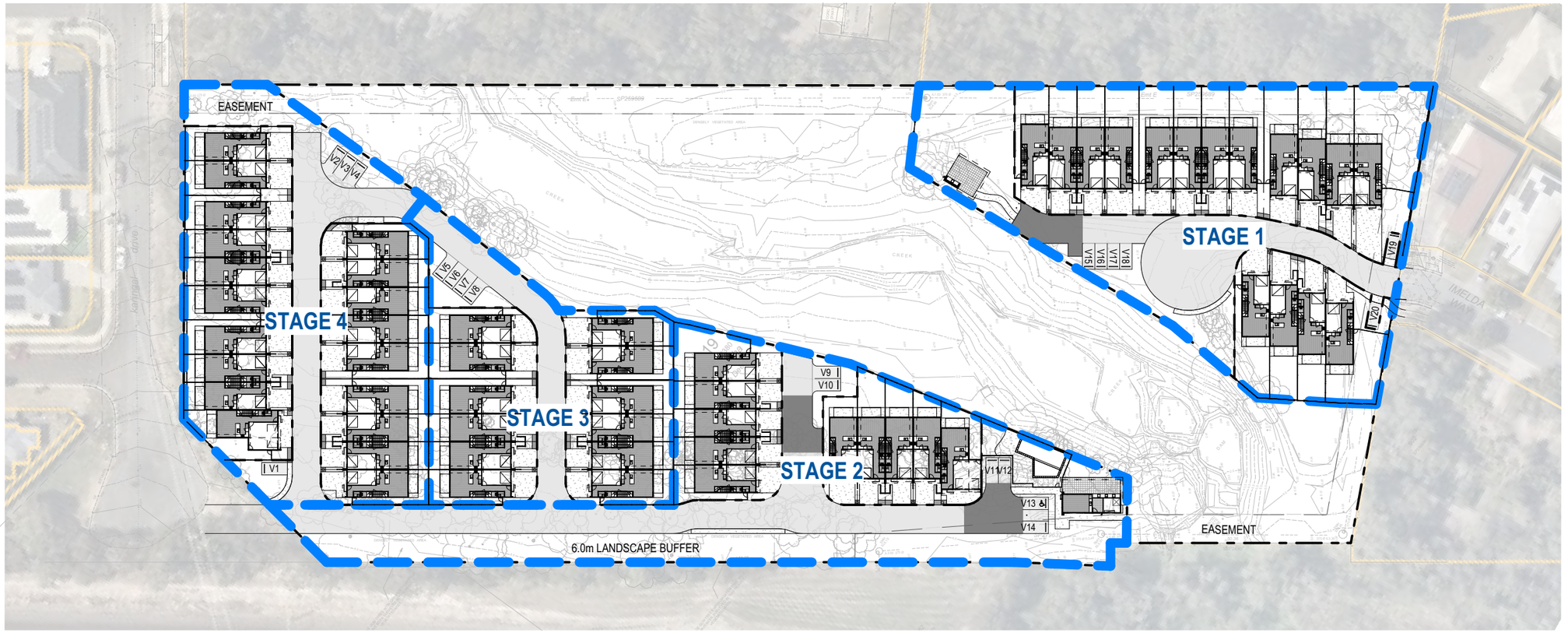
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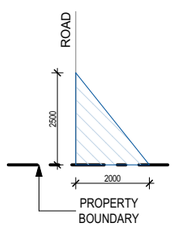
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## STAGED SITE SUMMARY

| | | |
|---|---|---|
| **STAGE 1** | | |
| | SITE AREA | 0.491 ha |
| | DWELLINGS | **16** |
| **STAGE 2** | | |
| | SITE AREA | 0.4354 ha |
| | DWELLINGS | **10** |
| **STAGE 3** | | |
| | SITE AREA | 0.2430 ha |
| | DWELLINGS | **12** |
| **STAGE 4** | | |
| | SITE AREA | 0.3921 ha |
| | DWELLINGS | **19** |
| **TOTAL** | | **57** |




PEDESTRIAN SIGHT TRIANGLES TO BE KEPT CLEAR OF OBSTRUCTIONS TO VISIBILITY. LOW LEVEL LANDSCAPING PERMITTED TO A MAXIMUM MATURE HEIGHT OF 500mm ABOVE DRIVEWAY LEVEL.

# INDICATIVE STAGING PLAN

0 10 20 30 40 50m

Scale 1:1000 @ A3

F:\Projects\4104-Karingal Drive, Pimpama\03 Drawings\02 Da\260617 KARINGAL DRIVE, PIMPAMA.pln

# 2 KARINGAL DRIVE & 60 IMELDA WAY

## PIMPAMA

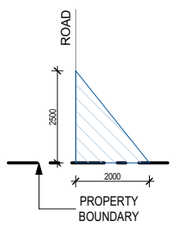
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| Site Coverage (Clusters) | | | |
|---|---|---|---|
| **Parcel** | **Cluster** | **Lots** | **Site Coverage** |
| B | 1 | 1-4 | 369m² |
| | 2 | 5-8 | 355m² |
| | 3 | 9-10 | 178m² |
| | 4 | 11-15 | 443m² |
| | 5 | 16-19 | 355m² |
| | 6 | 20-23 | 355m² |
| | 7 | 24-25 | 178m² |
| | 8 | 26-27 | 178m² |
| | 9 | 28-31 | 355m² |
| | 10 | 32-36 | 443m² |
| | 11 | 37-41 | 461m² |
| A | 12 | 1-4 | 355m² |
| | 13 | 5-8 | 355m² |
| | 14 | 9-12 | 355m² |
| | 15 | 13-16 | 355m² |
| | | **Total** | **5,090m²** |




PEDESTRIAN SIGHT TRIANGLES TO BE KEPT CLEAR OF OBSTRUCTIONS TO VISIBILITY. LOW LEVEL LANDSCAPING PERMITTED TO A MAXIMUM MATURE HEIGHT OF 500mm ABOVE DRIVEWAY LEVEL.

# OVERALL CLUSTER PLAN

0 10 20 30 40 50m

Scale 1:1000 @ A3

F:\Projects\4104-Karingal Drive, Pimpama\03 Drawings\02 Da\260617 KARINGAL DRIVE, PIMPAMA.pln

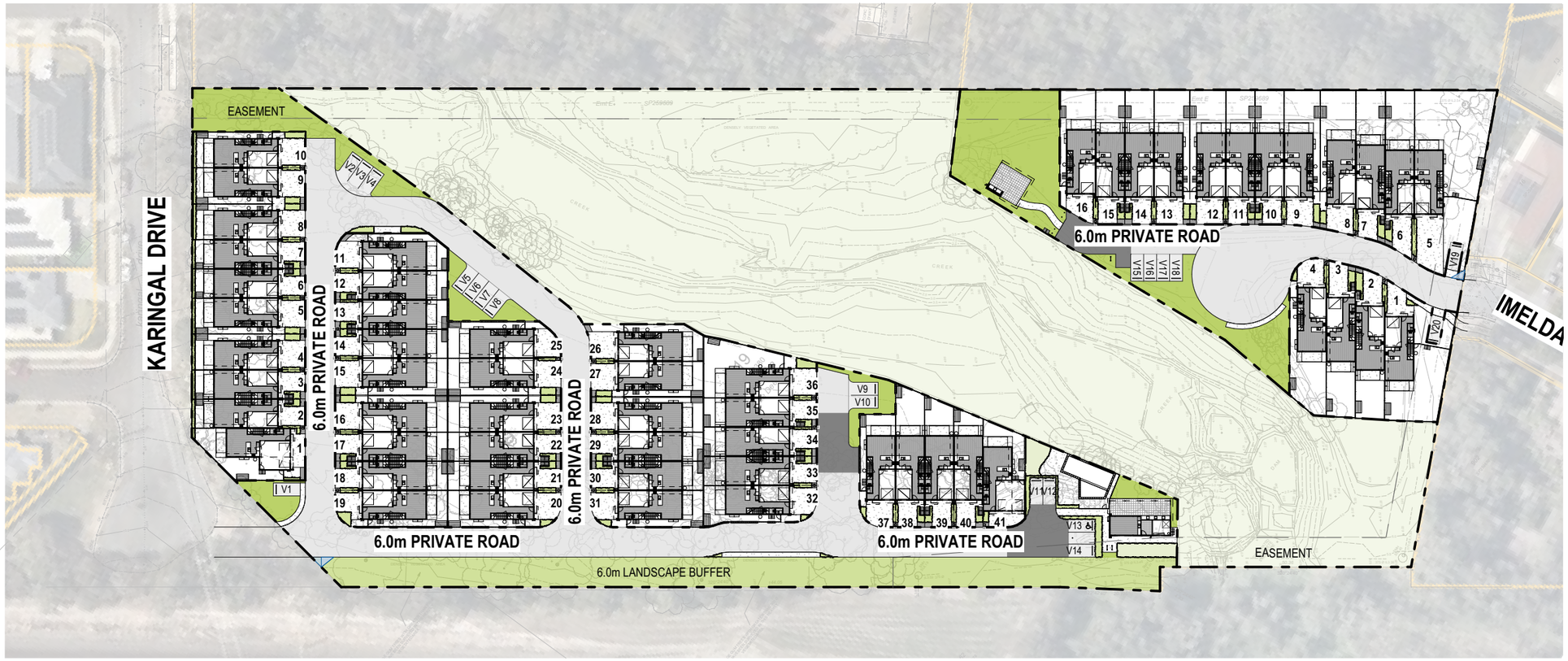
# 2 KARINGAL DRIVE & 60 IMELDA WAY

## PIMPAMA

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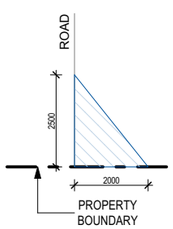
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| Private Open Space The Brookefield | |
|---|---|
| **Lot** | **Proposed Area** |
| 1 | 65m² |
| 2 | 26m² |
| 3 | 25m² |
| 4 | 31m² |
| 5 | 31m² |
| 6 | 25m² |
| 7 | 25m² |
| 8 | 31m² |
| 9 | 31m² |
| 10 | 31m² |
| 11 | 24m² |
| 12 | 25m² |
| 13 | 25m² |
| 14 | 25m² |
| 15 | 32m² |
| 16 | 32m² |
| 17 | 25m² |
| 18 | 25m² |
| 19 | 32m² |
| 20 | 32m² |
| 21 | 25m² |
| 22 | 25m² |
| 23 | 32m² |
| 24 | 32m² |
| 25 | 32m² |
| 26 | 27m² |
| 27 | 30m² |
| 28 | 30m² |
| 29 | 25m² |
| 30 | 25m² |
| 31 | 32m² |
| 32 | 32m² |
| 33 | 25m² |
| 34 | 25m² |
| 35 | 25m² |
| 36 | 101m² |
| 37 | 31m² |
| 38 | 55m² |
| 39 | 41m² |
| 40 | 27m² |
| 41 | 32m² |
| **Total** | **1,307m²** |
| **Average** | **32m²** |

| Private Open Space The Fernhurst | |
|---|---|
| **Lot** | **Proposed Area** |
| 1 | 146m² |
| 2 | 57m² |
| 3 | 65m² |
| 4 | 84m² |
| 5 | 263m² |
| 6 | 70m² |
| 7 | 64m² |
| 8 | 72m² |
| 9 | 62m² |
| 10 | 50m² |
| 11 | 50m² |
| 12 | 62m² |
| 13 | 62m² |
| 14 | 50m² |
| 15 | 50m² |
| 16 | 58m² |
| **Total** | **1,265m²** |
| **Average** | **79m²** |

| Communal Open Space | |
|---|---|
| **Parcel** | **Proposed Area** |
| The Brookefield | 390m² |
| The Fernhurst | 511m² |
| **Total** | **901m²** |




PEDESTRIAN SIGHT TRIANGLES TO BE KEPT CLEAR OF OBSTRUCTIONS TO VISIBILITY. LOW LEVEL LANDSCAPING PERMITTED TO A MAXIMUM MATURE HEIGHT OF 500mm ABOVE DRIVEWAY LEVEL.

# OVERALL GROUND FLOOR PLAN

0 10 20 30 40 50m

Scale 1:1000 @ A3

F:\Projects\4104-Karingal Drive, Pimpama\03 Drawings\02 Da\260617 KARINGAL DRIVE, PIMPAMA.pln

# 2 KARINGAL DRIVE & 60 IMELDA WAY

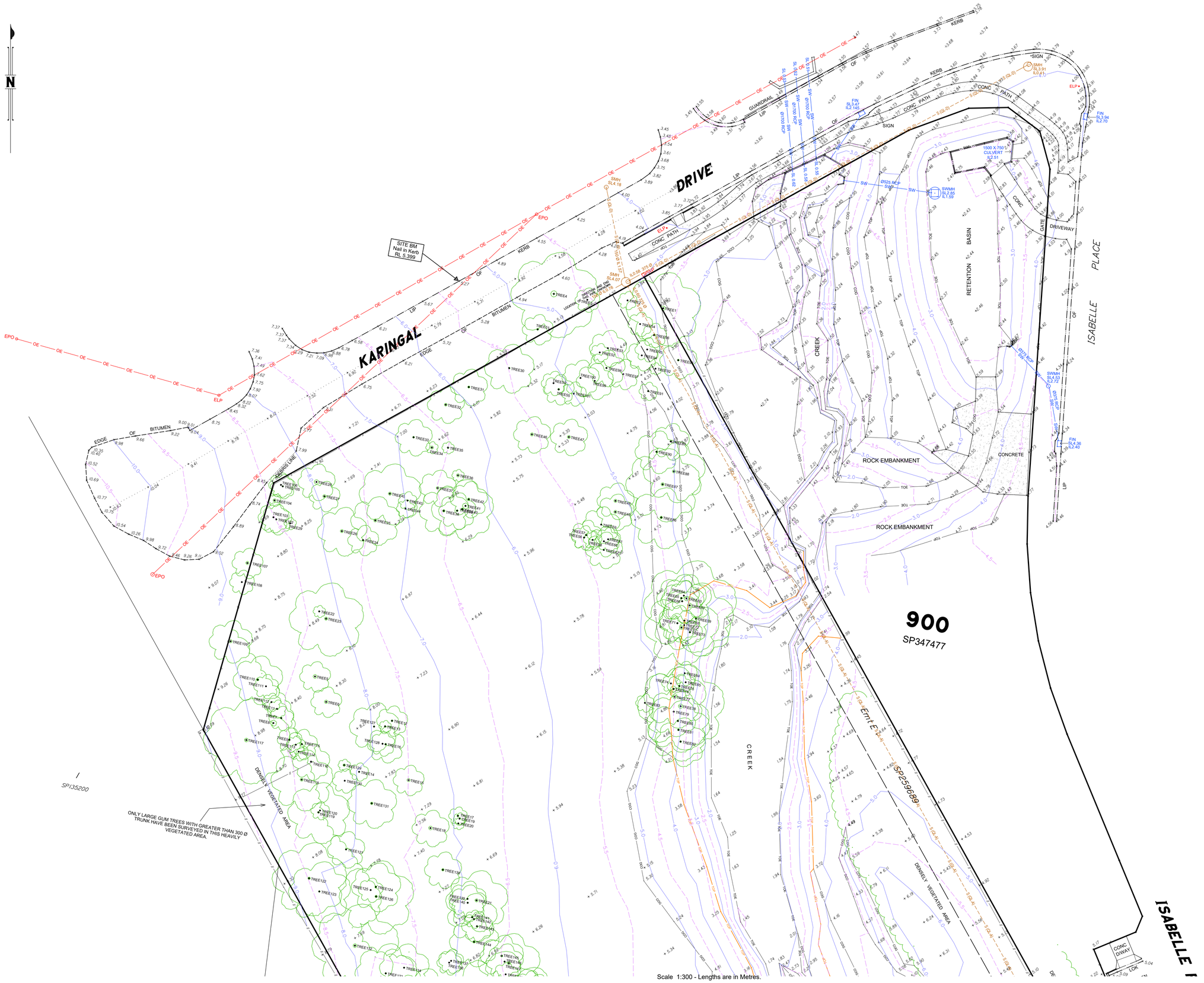
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## Appendix B - Detailed Site Survey




| ISSUE | SUBJECT | BY | DATE |
|---|---|---|---|
| B | ADDITIONAL SURVEY ADDED | PG | 19/05/26 |
| A | TOP OF BANK ADDED | PG | 03/02/26 |

AMENDMENTS

## NOTES & DISCLAIMERS

1. This plan was prepared for BOSFORM PTY LTD from a combination of field survey and existing records for the purpose of DESIGN and must not be used for any other purpose, particularly demolition, excavation or construction.
2. The title boundaries shown on this plan were not surveyed as part of this survey and have been compiled from RP152380 and not by field measurement and therefore could be subject to error.
3. Services shown on this plan have been located where possible by field survey. If underground and not able to be so located, services have been plotted from the records (where available) of the relevant Authority and have been noted accordingly on this plan. Only Council records of Stormwater, Sewer & Water have been searched and shown as per records. No Dial Before You Dig (DBYD) have been searched or shown on this plan, services may therefore be incomplete and/or erroneous.
4. Contour Interval is 0.5m.
5. Refer to trees table on sheet 1 for tree information data. Tree information also contained in CAD file (turned off layer).
6. Only trees with greater than 100 mm Ø trunk located within the approximate stage boundaries have been surveyed.
7. Only large gum trees greater than 300 mm Ø trunk within heavily vegetated areas also within the stage boundaries have been surveyed.
8. Refer to CAD file for additional levels not shown on face of plan for clarity purposes.
9. This note is an integral part of this plan.

### *SURVEY LEGEND:*

| | |
|---|---|
| EPO | .... Electrical Pole |
| ELP | .... Light Pole |
| TPT | .... Telstra Pit |
| SVA | .... Stop Valve |
| FHY | .... Fire Hydrant |
| WAM | .... Water Meter |
| SMH | .... Sewer Manhole |
| SWMH | .... Stormwater Manhole |
| FIN | .... Field Inlet |
| GLY | .... Gully Pit |

**UNDERGROUND SERVICES EXPLANATION.**

Underground line-styles explanation - examples provided below:

- DRAINAGE = (+-0.050mm)
- COMMUNICATION = (+-0.3Hx0.5V)
- GAS = (+-0.300mm_2D)
- SEWER = (EXISTING RECORDS)

### LINETYPE LEGEND:

| | |
|---|---|
| Sewer | S (QL-A) |
| Sewer (Via Records) | S (QL-D) |
| Water (Via Records) | W (QL-D) |
| Stormwater (Via Records) | D (QL-D) |
| Overhead Electricity | OE |
| Fence | F |
| Kerb Line | |
| Edge of Bitumen | |
| Top of Bank | TOP |
| Toe of Bank | TOE |
| Change of Grade | COG |


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PROJECT
**2 KARINGAL DRIVE PIMPAMA**

CLIENT
**BOSFORM PTY LTD**

DRAWING TITLE
**PLAN OF LEVEL & FEATURE SURVEY OF LOT 19 ON RP152380 AND PART OF LOT 900 ON SP347477 ON MGA 2020 (PLANE) DATUM 2 KARINGAL DRIVE PIMPAMA**

| | | |
|---|---|---|
| SCALE | DATE | DRAWN |
| 1:300 @ A1 | 30/01/26 | JW |
| LEVEL DATUM | LEVEL ORIGIN | ORIGIN RL |
| AHD | PM 197770 | 4.521 |
| AZIMUTH | CO-ORD SYSTEM | CO-ORD ORIGIN |
| RP152380 | MGA 2020 (PLANE) | PM 197770 |
| EASTING | NORTHING | SURVEYOR |
| 530231.803 | 6921727.958 | DA |
| AUTOCAD FILE | SURVEY FILE | JOB No. |
| 25218-2B | 25218009 | 25218-01 |
| CHECKED | QT | DATE IMAGED |
| DA | TC | 30/01/26 |

SHEET NUMBER 1 OF 2

PLAN No. **25218-2**

ISSUE **B**

| ISSUE | SUBJECT | BY | DATE |
|---|---|---|---|
| B | ADDITIONAL SURVEY ADDED | PG | 19/05/26 |
| A | TOP OF BANK ADDED | PG | 03/02/26 |

AMENDMENTS

## NOTES & DISCLAIMERS

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5. Refer to trees table on sheet 1 for tree information data. Tree information also contained in CAD file (turned off layer).
6. Only trees with greater than 100 mm Ø trunk located within the approximate stage boundaries have been surveyed.
7. Only large gum trees greater than 300 mm Ø trunk within heavily vegetated areas also within the stage boundaries have been surveyed.
8. Refer to CAD file for additional levels not shown on face of plan for clarity purposes.
9. This note is an integral part of this plan.

*SURVEY LEGEND:*

| | |
|---|---|
| EPO | .... Electrical Pole |
| ELP | .... Light Pole |
| TPT | .... Telstra Pit |
| SVA | .... Stop Valve |
| FHY | .... Fire Hydrant |
| WAM | .... Water Meter |
| SMH | .... Sewer Manhole |
| SWMH | .... Stormwater Manhole |
| FIN | .... Field Inlet |
| GLY | .... Gully Pit |

**UNDERGROUND SERVICES EXPLANATION.**

Underground line-styles explanation - examples provided below:

| | | |
|---|---|---|
| - DRAINAGE | – – – – D (QL-A) – | = (+-0.050mm) |
| - COMMUNICATION | – – – – C (QL-B) – | = (+-0.3Hx0.5V) |
| - GAS | – – – – G (QL-C) – | = (+-0.300mm, 2D) |
| - SEWER | – – – – S (QL-D) – | = (EXISTING RECORDS) |

LINETYPE LEGEND:

| | |
|---|---|
| Sewer | – – – S (QL-A) – |
| Sewer (Via Records) | – – – S (QL-D) – |
| Water (Via Records) | – – – W (QL-D) – |
| Stormwater (Via Records) | – – – D (QL-D) – |
| Overhead Electricity | OE |
| Fence | # |
| Kerb Line | |
| Edge of Bitumen | |
| Top of Bank | TOP |
| Toe of Bank | TOE |
| Change of Grade | COG |


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PROJECT
**2 KARINGAL DRIVE PIMPAMA**

CLIENT
**BOSFORM PTY LTD**

DRAWING TITLE
**PLAN OF LEVEL & FEATURE SURVEY OF LOT 19 ON RP152380 AND PART OF LOT 900 ON SP347477 ON MGA 2020 (PLANE) DATUM 2 KARINGAL DRIVE PIMPAMA**

| | | |
|---|---|---|
| SCALE | DATE | DRAWN |
| 1:300 @ A1 | 30/01/26 | JW |
| LEVEL DATUM | LEVEL ORIGIN | ORIGIN RL |
| AHD | PM 197770 | 4.521 |
| AZIMUTH | CO-ORD SYSTEM | CO-ORD ORIGIN |
| RP152380 | MGA 2020 (PLANE) | PM 197770 |
| EASTING | NORTHING | SURVEYOR |
| 530231.803 | 6921727.958 | DA |
| AUTOCAD FILE | SURVEY FILE | JOB No. |
| 25218-2B | 25218009 | 25218-01 |
| CHECKED | QT | DATE IMAGED |
| DA | TC | 30/01/26 |

SHEET NUMBER 2 OF 2

PLAN No. **25218-2**

ISSUE **B**

*TREES TABLE*

| Tree ID | Type | Diametre (m) | Spread (m) |
|---|---|---|---|
| 1 | Gum | 0.7 | 12 |
| 2 | Unknown | 0.1 | 3 |
| 3 | Unknown | 0.15 | 4 |
| 4 | Gum | 1 | 14 |
| 5 | Palm | 0.6 | 5 |
| 6 | Palm | 0.55 | 5 |
| 7 | Palm | 0.275 | 4 |
| 8 | Unknown | 0.15 | 1 |
| 9 | Unknown | 0.2 | 4 |
| 11 | Unknown | 0.2 | 3 |
| 12 | Unknown | 0.3 | 5 |
| 13 | Unknown | 0.275 | 2 |
| 14 | Unknown | 0.25 | 3 |
| 15 | Unknown | 0.5 | 5 |
| 16 | Unknown | 0.3 | 6 |
| 17 | Unknown | 0.3 | 3 |
| 18 | Unknown | 0.6 | 6 |
| 19 | Unknown | 0.2 | 2 |
| 20 | Unknown | 0.25 | 2 |
| 21 | Unknown | 0.5 | 10 |
| 22 | Palm | 0.25 | 2 |
| 23 | Unknown | 0.5 | 12 |
| 24 | Unknown | 0.25 | 5 |
| 25 | Unknown | 0.5 | 8 |
| 26 | Umbrella | 0.5 | 8 |
| 27 | Palm | 0.5 | 5 |
| 28 | Palm | 0.7 | 6 |
| 29 | Gum | 0.1 | 2 |
| 30 | Unknown | 0.3 | 8 |
| 31 | Palm | 0.35 | 6 |
| 32 | Palm | 0.45 | 6 |
| 33 | Palm | 0.3 | 6 |
| 34 | Palm | 0.5 | 2 |
| 35 | Palm | 0.3 | 2 |
| 36 | Palm | 0.5 | 2 |
| 37 | Palm | 0.45 | 6 |
| 38 | Unknown | 0.4 | 8 |
| 39 | Unknown | 0.3 | 6 |
| 40 | Unknown | 0.4 | 10 |
| 41 | Dead | 0.25 | 0 |
| 42 | Unknown | 0.4 | 6 |
| 43 | Palm | 0.2 | 3 |
| 44 | Palm | 0.2 | 3 |
| 45 | Unknown | 0.5 | 10 |
| 46 | Palm | 0.5 | 6 |
| 47 | Palm | 0.5 | 6 |
| 48 | Palm | 0.5 | 6 |
| 49 | Palm | 0.5 | 6 |
| 50 | Unknown | 0.15 | 4 |
| 51 | Unknown | 0.3 | 5 |
| 52 | Unknown | 0.15 | 3 |
| 53 | Unknown | 0.2 | 6 |
| 54 | Unknown | 0.15 | 4 |
| 55 | Unknown | 0.3 | 5 |
| 56 | Palm | 0.25 | 4 |
| 57 | Unknown | 0.25 | 5 |
| 58 | Palm | 0.15 | 3 |
| 59 | Unknown | 0.2 | 6 |
| 60 | Unknown | 0.2 | 5 |
| 61 | Unknown | 0.15 | 4 |
| 62 | Unknown | 0.2 | 6 |
| 63 | Palm | 0.7 | 8 |
| 64 | Palm | 0.2 | 5 |
| 65 | Unknown | 0.3 | 8 |
| 66 | Unknown | 0.25 | 7 |
| 67 | Unknown | 0.7 | 15 |
| 68 | Unknown | 0.2 | 8 |
| 69 | Unknown | 0.2 | 12 |
| 70 | Unknown | 0.6 | 12 |
| 71 | Palm | 0.25 | 6 |
| 72 | Unknown | 0.1 | 3 |
| 73 | Umbrella | 0.3 | 4 |
| 74 | Unknown | 0.15 | 3 |
| 75 | Unknown | 0.2 | 4 |
| 76 | Dead | 0.3 | 1 |
| 77 | Unknown | 0.6 | 10 |
| 78 | Unknown | 0.7 | 14 |
| 79 | Unknown | 0.25 | 8 |
| 80 | Unknown | 0.25 | 10 |
| 81 | Unknown | 0.3 | 10 |
| 82 | Unknown | 0.3 | 8 |
| 83 | Unknown | 0.1 | 3 |
| 84 | Unknown | 0.1 | 4 |
| 85 | Unknown | 0.1 | 3 |
| 86 | Unknown | 0.4 | 10 |
| 87 | Unknown | 0.5 | 12 |
| 88 | Unknown | 0.5 | 10 |
| 89 | Unknown | 0.25 | 6 |
| 90 | Unknown | 0.3 | 7 |
| 91 | Dead | 0.25 | 3 |
| 92 | Unknown | 0.1 | 2 |
| 93 | Unknown | 0.3 | 6 |
| 94 | Unknown | 0.15 | 5 |
| 95 | Unknown | 0.15 | 4 |
| 96 | Unknown | 0.15 | 4 |
| 97 | Unknown | 0.2 | 5 |
| 98 | Unknown | 0.25 | 6 |
| 99 | Unknown | 0.2 | 6 |
| 100 | Unknown | 0.2 | 6 |
| 101 | Unknown | 0.15 | 4 |
| 102 | Unknown | 0.25 | 5 |
| 103 | Umbrella | 0.2 | 5 |
| 104 | Dead | 0.5 | 2 |
| 105 | Unknown | 0.25 | 4 |
| 106 | Unknown | 0.2 | 4 |
| 107 | Unknown | 0.5 | 5 |
| 108 | Unknown | 0.1 | 4 |
| 109 | Unknown | 0.5 | 7 |
| 110 | Titree | 0.35 | 8 |
| 111 | Unknown | 0.15 | 4 |
| 112 | Unknown | 0.2 | 3 |
| 113 | Unknown | 0.2 | 3 |
| 114 | Unknown | 0.2 | 3 |
| 115 | Unknown | 0.25 | 5 |
| 116 | Unknown | 0.2 | 6 |
| 117 | Gum | 0.6 | 14 |
| 118 | Gum | 0.5 | 10 |
| 119 | Unknown | 0.3 | 10 |
| 120 | Unknown | 0.2 | 3 |
| 121 | Unknown | 0.25 | 6 |
| 122 | Gum | 0.4 | 12 |
| 123 | Gum | 0.25 | 10 |
| 124 | Titree | 0.3 | 8 |
| 125 | Palm | 0.2 | 4 |
| 126 | Unknown | 0.4 | 12 |
| 127 | Unknown | 0.25 | 8 |
| 128 | Unknown | 0.2 | 4 |
| 129 | Dead | 0.4 | 2 |
| 130 | Unknown | 0.2 | 4 |
| 131 | Titree | 0.4 | 8 |
| 132 | Gum | 0.6 | 14 |
| 133 | Unknown | 0.25 | 10 |
| 134 | Unknown | 0.2 | 8 |
| 135 | Unknown | 0.3 | 10 |
| 136 | Palm | 0.2 | 4 |
| 137 | Palm | 0.2 | 4 |
| 138 | Palm | 0.4 | 6 |
| 139 | Unknown | 0.25 | 6 |
| 140 | Unknown | 0.25 | 6 |
| 141 | Titree | 0.3 | 8 |
| 142 | Gum | 0.15 | 3 |
| 143 | Titree | 0.25 | 5 |
| 144 | Titree | 0.4 | 8 |
| 145 | Titree | 0.35 | 7 |
| 146 | Titree | 0.25 | 6 |
| 147 | Titree | 0.5 | 10 |
| 148 | Titree | 0.2 | 4 |
| 149 | Unknown | 0.15 | 3 |
| 150 | Gum | 0.5 | 10 |
| 151 | Gum | 0.8 | 14 |
| 152 | Gum | 0.8 | 14 |
| 153 | Unknown | 0.25 | 6 |
| 154 | Unknown | 0.2 | 5 |
| 155 | Titree | 0.3 | 5 |
| 156 | Palm | 0.3 | 5 |
| 157 | Unknown | 0.25 | 8 |
| 158 | Gum | 0.4 | 10 |
| 159 | Unknown | 0.5 | 10 |
| 160 | Unknown | 0.6 | 12 |
| 161 | Gum | 0.5 | 10 |
| 162 | Gum | 0.5 | 10 |
| 163 | Gum | 0.2 | 6 |
| 164 | Unknown | 0.2 | 4 |
| 165 | Gum | 0.5 | 10 |
| 166 | Titree | 0.2 | 4 |
| 167 | Titree | 0.35 | 10 |
| 168 | Gum | 0.7 | 14 |
| 169 | Unknown | 0.15 | 4 |
| 170 | Unknown | 0.15 | 3 |
| 171 | Unknown | 0.1 | 3 |
| 172 | Unknown | 0.2 | 3 |
| 173 | Unknown | 0.4 | 10 |
| 174 | Gum | 0.5 | 14 |
| 175 | Unknown | 0.15 | 4 |
| 176 | Umbrella | 0.5 | 8 |
| 177 | Umbrella | 0.1 | 1 |
| 178 | Gum | 0.35 | 8 |
| 179 | Gum | 0.65 | 12 |
| 180 | Unknown | 0.2 | 4 |
| 181 | Unknown | 0.35 | 7 |
| 182 | Gum | 0.65 | 10 |
| 183 | Unknown | 0.2 | 7 |
| 184 | Umbrella | 0.4 | 6 |
| 185 | Unknown | 0.15 | 4 |
| 186 | Gum | 0.45 | 12 |
| 187 | Unknown | 0.2 | 4 |
| 188 | Unknown | 0.15 | 3 |
| 189 | Unknown | 0.2 | 4 |
| 190 | Umbrella | 0.2 | 3 |
| 191 | Unknown | 0.2 | 4 |
| 192 | Unknown | 0.25 | 5 |
| 193 | Unknown | 0.45 | 8 |
| 194 | Unknown | 0.2 | 3 |
| 195 | Unknown | 0.15 | 3 |
| 196 | Unknown | 0.1 | 3 |
| 197 | Gum | 0.6 | 10 |
| 198 | Unknown | 0.15 | 3 |
| 199 | Unknown | 0.2 | 5 |
| 200 | Unknown | 0.2 | 5 |
| 201 | Unknown | 0.5 | 9 |
| 202 | Unknown | 0.3 | 10 |
| 203 | Unknown | 0.15 | 2 |
| 204 | Unknown | 0.2 | 6 |
| 205 | Unknown | 0.15 | 5 |
| 206 | Gum | 0.7 | 14 |
| 207 | Unknown | 0.2 | 4 |
| 208 | Unknown | 0.2 | 5 |
| 209 | Unknown | 0.3 | 8 |
| 210 | Unknown | 0.5 | 9 |
| 211 | Gum | 0.9 | 16 |
| 212 | Unknown | 0.1 | 4 |
| 213 | Gum | 0.6 | 10 |
| 214 | Gum | 0.8 | 15 |
| 215 | Unknown | 0.25 | 8 |
| 216 | Gum | 0.4 | 10 |
| 217 | Ironbark | 0.9 | 15 |
| 218 | Gum | 0.4 | 12 |
| 219 | Unknown | 0.2 | 8 |
| 220 | Unknown | 0.2 | 7 |
| 221 | Unknown | 0.4 | 10 |
| 222 | Unknown | 0.25 | 6 |
| 223 | Unknown | 0.2 | 4 |
| 224 | Unknown | 0.2 | 4 |
| 225 | Unknown | 0.35 | 12 |
| 226 | Unknown | 0.2 | 6 |
| 227 | Unknown | 0.25 | 9 |
| 228 | Unknown | 0.45 | 6 |
| 229 | Unknown | 0.4 | 10 |
| 230 | Gum | 1 | 22 |
| 231 | Palm | 0.25 | 4 |
| 232 | Unknown | 0.3 | 10 |
| 233 | Unknown | 0.15 | 6 |
| 234 | Unknown | 0.2 | 7 |
| 235 | Unknown | 0.15 | 7 |
| 236 | Gum | 0.4 | 10 |
| 237 | Unknown | 0.2 | 8 |
| 238 | Unknown | 0.1 | 4 |
| 239 | Unknown | 0.2 | 6 |
| 240 | Unknown | 0.45 | 12 |
| 241 | Unknown | 0.2 | 6 |
| 242 | Unknown | 0.1 | 6 |
| 243 | Unknown | 0.35 | 5 |
| 244 | Unknown | 0.1 | 4 |
| 245 | Unknown | 0.1 | 3 |
| 246 | Unknown | 0.4 | 15 |
| 247 | Unknown | 0.1 | 4 |
| 248 | Unknown | 0.25 | 8 |
| 249 | Unknown | 0.25 | 8 |
| 250 | Unknown | 0.35 | 10 |
| 251 | Titree | 0.4 | 10 |
| 252 | Unknown | 0.15 | 6 |
| 253 | Unknown | 0.2 | 5 |
| 254 | Titree | 0.15 | 4 |
| 255 | Unknown | 0.15 | 5 |
| 256 | Unknown | 0.15 | 5 |
| 257 | Gum | 0.1 | 4 |
| 258 | Gum | 0.15 | 5 |
| 259 | Gum | 0.35 | 14 |
| 260 | Unknown | 0.15 | 4 |
| 261 | Titree | 0.2 | 5 |
| 267 | Unknown | 0.25 | 8 |
| 268 | Gum | 0.6 | 18 |
| 269 | Unknown | 0.4 | 10 |
| 270 | Unknown | 0.1 | 3 |
| 271 | Unknown | 0.1 | 3 |
| 272 | Gum | 0.25 | 10 |
| 273 | Unknown | 0.15 | 8 |
| 274 | Gum | 0.8 | 20 |
| 275 | Unknown | 0.15 | 10 |
| 276 | Unknown | 0.25 | 8 |
| 277 | Gum | 0.15 | 4 |
| 278 | Unknown | 0.1 | 4 |
| 279 | Gum | 0.5 | 14 |
| 280 | Unknown | 0.1 | 3 |
| 281 | Unknown | 0.15 | 4 |
| 282 | Titree | 0.1 | 3 |
| 283 | Dead | 0.1 | 3 |
| 284 | Unknown | 0.2 | 4 |
| 285 | Bloodwood | 0.5 | 14 |
| 286 | Unknown | 0.15 | 8 |
| 287 | Bloodwood | 0.4 | 12 |
| 288 | Unknown | 0.2 | 5 |

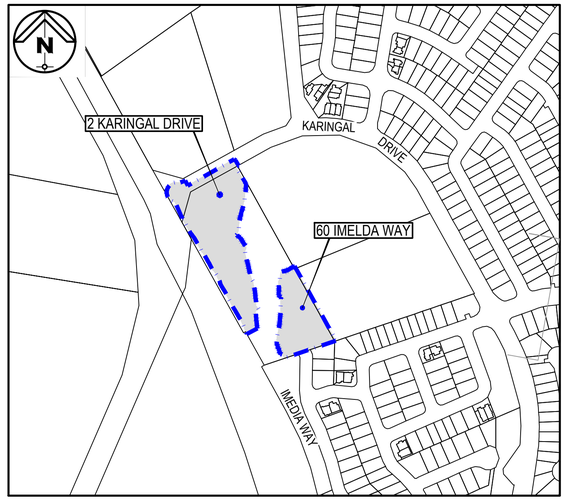
Scale 1:300 - Lengths are in Metres.

2 4 6 8 10 20 30 40 50m

# Appendix C - Burchills Engineering Solutions Drawings

# PROPOSED LOT DEVELOPMENT
# AT 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

## ROADWORKS & CIVIL SERVICES
## CONTRACT BE200223




LOCALITY PLAN

N.T.S.

| SURVEY | |
|---|---|
| PROVIDED BY: | MICHEL GROUP SERVICES |
| REPORT No: | 25218-2 Rev.A |
| DATE: | 03/02/2026 |
| SYSTEM: | PM 197770 RL 4.521 MGA 2020 |

| DRAWING INDEX | |
|---|---|
| Sheet Number | Sheet Title |
| C1000 | COVER SHEET |
| C1101 | TYPICAL SECTIONS & GENERAL NOTES |
| C2000 | OVERALL BULK EARTHWORKS LAYOUT PLAN |
| C2001 | BULK EARTHWORKS LAYOUT PLAN - SHEET 1 OF 2 |
| C2002 | BULK EARTHWORKS LAYOUT PLAN - SHEET 2 OF 2 |
| C2200 | BULK EARTHWORKS SECTIONS - SHEET 1 OF 5 |
| C2201 | BULK EARTHWORKS SECTIONS - SHEET 2 OF 5 |
| C2202 | BULK EARTHWORKS SECTIONS - SHEET 3 OF 5 |
| C2203 | BULK EARTHWORKS SECTIONS - SHEET 4 OF 5 |
| C2204 | BULK EARTHWORKS SECTIONS - SHEET 5 OF 5 |
| C3000 | OVERALL ROADWORKS AND DRAINAGE LAYOUT PLAN |
| C3001 | ROADWORKS AND DRAINAGE LAYOUT PLAN - SHEET 1 OF 2 |
| C3002 | ROADWORKS AND DRAINAGE LAYOUT PLAN - SHEET 2 OF 2 |
| C3010 | ROADWORKS SWEPT PATH PLAN |
| C3050 | STORMWATER TANK DETAILS |
| C3200 | ROAD LONGITUDINAL SECTIONS - SHEET 1 OF 3 |
| C3201 | ROAD LONGITUDINAL SECTIONS - SHEET 2 OF 3 |
| C3202 | ROAD LONGITUDINAL SECTIONS - SHEET 3 OF 3 |
| C4500 | OVERALL SEWER AND WATER RETICULATION |
| C4501 | SEWER AND WATER RETICULATION - SHEET 1 OF 2 |
| C4502 | SEWER AND WATER RETICULATION - SHEET 2 OF 2 |
| C9000 | HAZARD RISK REGISTER - DESIGN RISKS |

PREPARED FOR

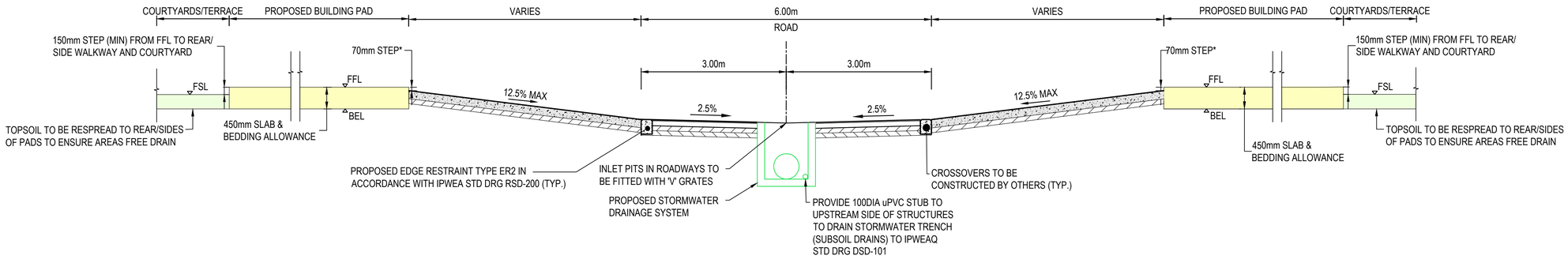
BOS

PREPARED BY

BURCHILLS
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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365

| PROJECT No.: | DRAWING No. : | VERSION: | DATE : |
|---|---|---|---|
| BE200223 | C1000 | B | 08-07-26 |




## ROAD TYPICAL SECTION

SCALE (metres)
1.0 0 1.0 2.0
1 : 50 (FULL SIZE)

## LOCAL AUTHORITY

1. THE LOCAL AUTHORITY IS MORETON BAY REGIONAL COUNCIL.

## GENERAL NOTES:

1. CONTRACT DOCUMENTATION
   ALL DRAWINGS UNDER THIS CONTRACT ARE TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATION.
2. SURVEY INFORMATION
   CONTROL SURVEY INFORMATION WILL BE ESTABLISHED ON SITE BY THE PRINCIPAL'S SURVEYOR. SETOUT INFORMATION SHALL NOT BE OBTAINED BY SCALING FROM THESE DRAWINGS.
3. DATUM
   ALL LEVELS SHOWN ON DRAWINGS ARE A.H.D. (DERIVED).
4. EXISTING SURVEY CONTROL STATIONS
   THE CONTRACTOR IS TO ENSURE THAT SURVEY CONTROL STATIONS ARE NOT DAMAGED OR DISTURBED IN ANY WAY BY CONSTRUCTION ACTIVITIES.
5. EXISTING SERVICES
   EXISTING SERVICES LOCATIONS WHERE SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY. THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES AND UNDERTAKE A DIAL-BEFORE-YOU-DIG SEARCH TO ASCERTAIN THE EXACT LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO EXISTING SERVICES.
6. SITE ACCESS
   THE CONTRACTOR SHALL GAIN ACCESS TO THE SITE AT LOCATIONS APPROVED BY THE SUPERINTENDENT. FREEDOM OF ACCESS TO OTHER WORK AREAS ON THE SITE SHALL BE MAINTAINED AT ALL TIMES.
7. PROVISION FOR TRAFFIC
   PROVISION FOR TRAFFIC ON LOCAL ROADS IS TO BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND LOCAL AUTHORITY REQUIREMENTS.
8. WORK BOUNDARIES
   THE CONTRACTOR IS TO RESTRICT ACTIVITIES TO THOSE AREAS DESIGNATED AS WORK AREAS UNDER THIS CONTRACT. AT NO TIME SHALL THE CONTRACTOR ENTER ADJOINING PROPERTIES OR CONTRACT WORK AREAS ON THE SITE WITHOUT WRITTEN AUTHORISATION FROM THE SUPERINTENDENT.
9. TOPSOIL STRIPPING
   ALL TOPSOIL STRIPPED FROM WORK AREAS SHALL BE STOCKPILED FOR LATER RE-SPREADING TO ALL FOOTPATHS, BATTERS AND ALLOTMENTS.
10. EARTHWORKS (GENERAL)
    ALL FILL MATERIAL PLACED SHALL BE COMPACTED AND TRIMMED TO FINAL EARTHWORKS LEVELS AND PROFILES SHOWN ON THE CONTRACT DRAWINGS AND TESTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION.
    ALL COMPACTION TESTING UNDER THIS CONTRACT IS TO BE CARRIED OUT TO AS3798 LEVEL 1 STANDARD BY A NATA-ACCREDITED TESTING AUTHORITY. CERTIFICATION FOR ALL EARTHWORKS CONSTRUCTION AND TESTING IS TO BE PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER QUEENSLAND (RPEQ) ENGAGED BY THE CONTRACTOR.
11. COMPACTION STANDARDSALL FILL MATERIAL PLACED UNDER THIS CONTRACT SHALL BE COMPACTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND CURRENT COUNCIL STANDARDS.
12. STORMWATER DRAINAGELOCATION AND ALIGNMENT OF ALL STORMWATER DRAINLINES IS TO BE VERIFIED ON SITE WITH THE SUPERINTENDENT PRIOR TO EXCAVATION. THE DESIGN SURFACE LEVELS OF MANHOLES AND OTHER STRUCTURES ARE TO BE VERIFIED ON SITE WITH THE SUPERINTENDENT. ALL DRAINAGE CONSTRUCTION SHALL BE IN ACCORDANCE WITH COUNCIL STANDARD DRAWINGS AND SPECIFICATION.
13. SEWERAGE RETICULATIONTHE DESIGN SURFACE LEVELS OF SEWER MANHOLES ARE TO BE VERIFIED ON SITE WITH THE SUPERINTENDENT PRIOR TO CONSTRUCTION. ALL SEWERAGE RETICULATION SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT SOUTH EAST QUEENSLAND SEWERAGE CODE (SEQ CODE) AND ASSOCIATED STANDARD DRAWINGS.
14. WATER RETICULATIONALL WATER RETICULATION SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT SOUTH EAST QUEENSLAND SEWERAGE CODE (SEQ CODE) AND ASSOCIATED STANDARD DRAWINGS.
15. ELECTRICAL RETICULATIONALIGNMENTS OF ALL CONDUIT CROSSINGS ARE TO BE VERIFIED ON SITE WITH THE SUPERINTENDENT PRIOR TO EXCAVATION. ALL TRENCHING AND CONDUIT WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE RELEVANT CONSULTANT'S DRAWINGS AND ENERGEX SPECIFICATION "UNDERGROUND DISTRIBUTION CONSTRUCTION."
16. TESTINGALL TESTING SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. TESTING AUTHORITY IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND COUNCIL STANDARDS.
17. "AS CONSTRUCTED" SURVEY"AS CONSTRUCTED" SURVEY SHALL BE CARRIED OUT BY THE PRINCIPAL'S SURVEYOR AS WORK PROCEEDS.
18. MAINTENANCE OF SITE CONDITIONAT THE COMPLETION OF WORKS THE SITE IS TO BE LEFT IN A CLEAN AND TIDY CONDITION TO THE SATISFACTION OF THE SUPERINTENDENT AND RELEVANT COUNCIL REPRESENTATIVE.
19. REFERENCED DOCUMENTSALL DRAWINGS TO BE READ IN CONJUNCTION WITH:- LANDSCAPE ARCHITECTS DRAWINGS- ELECTRICAL DRAWINGS- VEGETATION MANAGEMENT AND TREE CLEARING REQUIREMENTS
    - HYDRAULIC CONSULTANTS DRAWINGS
    - STRUCTURAL DRAWINGS

## PAVEMENT & KERB NOTES:

1. THE COMPACTED DEPTHS OF PAVEMENT SHOWN ON THE DRAWINGS ARE PRELIMINARY DESIGN DEPTHS ONLY AND MAY BE VARIED AFTER SUBGRADE TESTS ARE TAKEN.
2. PAVEMENT MATERIAL SHALL CONFORM TO THE CURRENT MORETON BAY COUNCIL LAND DEVELOPMENT GUIDELINES.
3. BATTER SLOPES AND PAVEMENT CROSSFALLS SHOWN ON THIS DRAWING ARE TYPICAL ONLY. FOR VARIATION FROM THE STANDARD PROFILES REFER RELEVANT ROADWORKS DRAWINGS.
4. PAVEMENT DEPTHS SHOWN ON THIS DRAWING ARE PRELIMINARY DESIGN DEPTHS ONLY AND MAY BE VARIED ONCE SUBGRADE TESTS ARE TAKEN. TURNOUTS ARE TO BE PAVED WITH THE SAME MATERIAL AND COMPACTED TO THE SAME STANDARD AS THE ROAD ADJACENT.
5. KERB AND CHANNEL, MEDIAN KERB AND OTHER EDGE SECTIONS SHALL BE CONCRETE CLASS N32, AND THE MIX DESIGNED SPECIFCALLY FOR EXTRUSION.
6. REFER IPWEAQ STD. DRG. RSD-200 FOR TYPICAL KERB DETAILS AND NOTES.
7. IF CLAY BACKFILL IS USED, PROVIDE A BOND BREAKER (PLASTIC MEMBRANE OR EQUIV.) TO BACK OF KERB.

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| VER. | DESCRIPTION | DATE |
|---|---|---|
| B | ISSUED FOR APPROVAL | 08-07-26 |
| A | ORIGINAL ISSUE | 06-05-26 |

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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365

CLIENT : BOS

DRAWING TITLE : TYPICAL SECTIONS & GENERAL NOTES

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

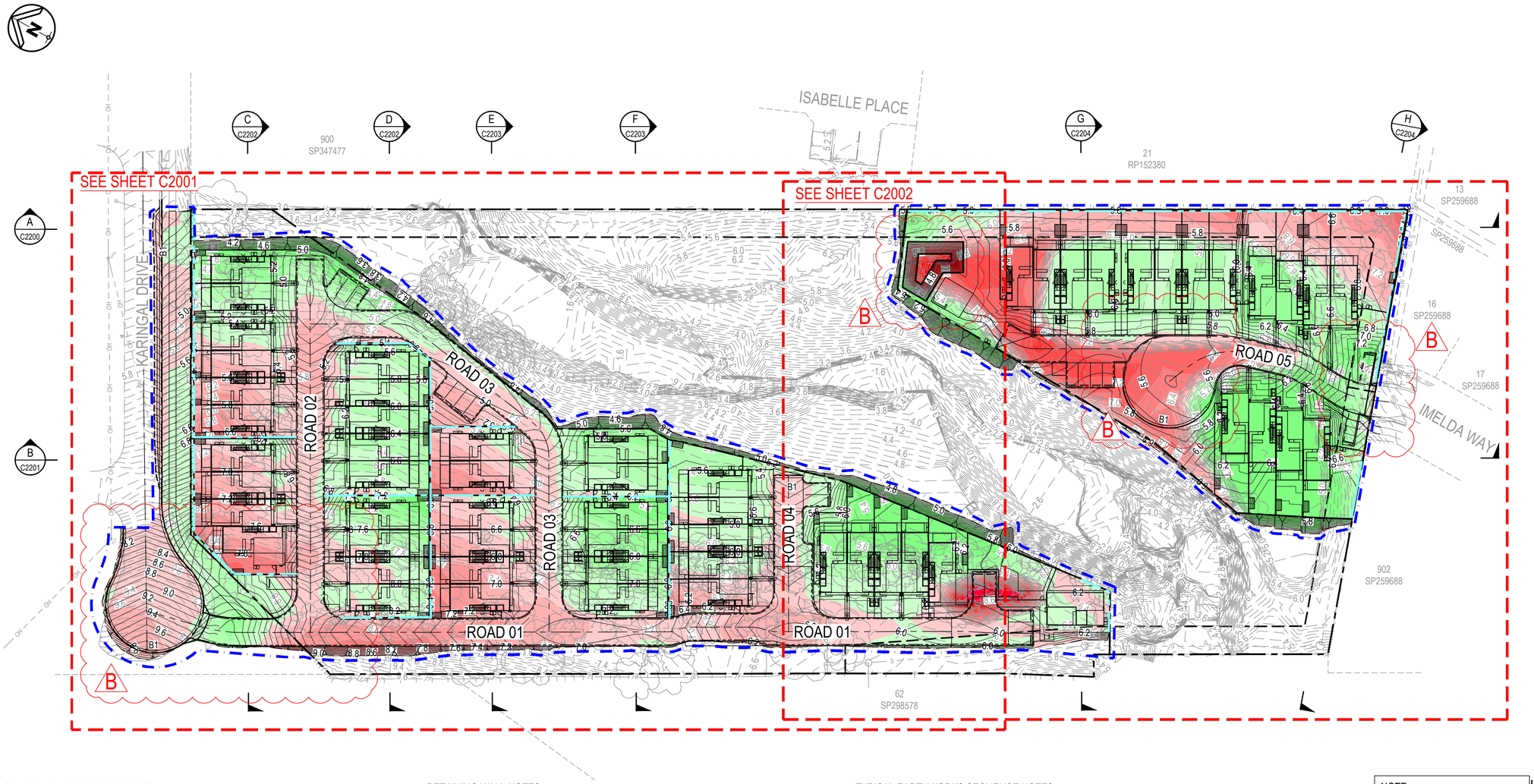
PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :
SCALE (metres)
1.0 0 1.0 2.0
1 : 50 (FULL SIZE)

DEVEL. APPLIC. No. :
DATE : 08-07-26
PROJECT LEADER : -
DESIGNER : BNB
DRAFTSPERSON : BNB
CHECKED : -

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

PROJECT No.: BE200223
DRAWING No. : C1101
VERSION: B




## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING SURFACE CONTOURS
- EXISTING ROAD CONTROL LINE
- EARTHWORK SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED BATTER
- PROPOSED CUTBACK

### EARTHWORKS DEPTH ANALYSIS LEGEND

| LOWER | | UPPER | COLOUR |
|---|---|---|---|
| -3.0m | TO | -2.75m | |
| -2.75m | TO | -2.50m | |
| -2.50m | TO | -2.25m | |
| -2.25m | TO | -2.0m | |
| -2.0m | TO | -1.75m | |
| -1.75m | TO | -1.50m | |
| -1.50m | TO | -1.25m | |
| -1.25m | TO | -1.0m | |
| -1.0m | TO | -0.75m | |
| -0.75m | TO | -0.50m | |
| -0.5m | TO | -0.25m | |
| -0.25m | TO | 0.0m | |
| 0.0m | TO | 0.25m | |
| 0.25m | TO | 0.50m | |
| 0.50m | TO | 0.75m | |
| 0.75m | TO | 1.0m | |
| 1.0m | TO | 1.25m | |
| 1.25m | TO | 1.50m | |
| 1.50m | TO | 1.75m | |
| 1.75m | TO | 2.0m | |
| 2.0m | TO | 2.25m | |
| 2.25m | TO | 2.50m | |
| 2.50m | TO | 2.75m | |
| 2.75m | TO | 3.0m | |

## GENERAL EARTHWORKS NOTES:

1. ALL EARTHWORKS CONSTRUCTION UNDER THIS CONTRACT IS TO BE PERFORMED STRICTLY IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT PREPARED BY THE PRINCIPAL'S GEOTECHNICAL CONSULTANT.
2. ALL COMPACTION TESTING UNDER THIS CONTRACT IS TO BE CARRIED OUT TO AS3798 LEVEL 1 STANDARD BY A NATA-ACCREDITED TESTING AUTHORITY. CERTIFICATION FOR ALL EARTHWORKS CONSTRUCTION AND TESTING IS TO BE PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER QUEENSLAND (RPEQ) ENGAGED BY THE CONTRACTOR.
3. ALL DESIGN LEVELS SHOWN ON THE CONTRACT DRAWINGS ARE FINISHED SURFACE LEVELS FOLLOWING TOPSOIL REPLACEMENT.
4. ALL STRUCTURAL FILL MATERIAL PLACED SHALL BE COMPACTED TO THE FOLLOWING MINIMUM DENSITY IN ACCORDANCE WITH THE SPECIFICATION AND THE GEOTECHNICAL REPORT:
   a) 95% DENSITY RATIO FOR GENERAL STRUCTURAL FILL (COHESIVE MATERIAL)
   b) 98% DENSITY RATIO FOR THE TOP 300mm DEPTH BELOW PAVEMENT SUBGRADE LEVEL (COHESIVE MATERIAL)
5. FILL MATERIAL USED IN WETLAND BATTERS IS TO BE STIFF TO HARD CLAYS OR OTHER SUITABLE MATERIAL AS DIRECTED BY GEOTECHNICAL ENGINEER.
6. ALL EARTHWORKS BATTERS STEEPER THAN 1 IN 4 ARE TO BE LANDSCAPED IN ACCORDANCE WITH LANDSCAPE ARCHITECTS PLANS.
7. EXISTING DAMS ARE TO BE DE-WATERED AND CLEANED-OUT. ALL UNSUITABLE OR SATURATED MATERIAL IS TO BE REMOVED AND REPLACED WITH SELECTED ON-SITE STRUCTURAL FILL MATERIAL AND COMPACTED AS SPECIFIED.
8. PROVIDE CONDITION SURVEY OF ADJACENT RESIDENTIAL BUILDINGS FOR ALL PROPERTIES LOCATED WITHIN NOMINAL 100m OF EARTHWORKS OPERATIONS. CONDITION SURVEY TO BE UNDERTAKEN BY QUALIFIED PERSONNEL WITH BUILDING EXPERIENCE.

## RETAINING WALL NOTES:

1. RETAINING WALLS, FOOTINGS, DRAINAGE, BACKFILL AND CONNECTION OF AGGREGATE DRAINS TO STORMWATER DRAINAGE SYSTEM TO BE DESIGNED AND CONSTRUCTED BY THE CONTRACTOR AND CERTIFIED BY AN SUITABLY QUALIFIED RPEQ.
2. THESE DRAWINGS IDENTIFY SURFACE PROFILES, RETAINING WALL LOCATIONS, AND SETOUT INFORMATION ONLY. REFER TO CONTRACTOR SUPPLIED DRAWINGS FOR RPEQ STRUCTURAL DETAILS, WALL MATERIALS AND COMPACTION SPECIFICATIONS AND CONTRACTIBILITY INFORMATION.
3. RETAINING WALL DESIGN ENGINEER TO PROVIDE RPEQ FORM 15 STRUCTURAL CERTIFICATE INCLUDING GEOTECHNICAL GLOBAL STABILITY CERTIFICATION BY GEOTECHNICAL ENGINEER. WALL DESIGN TO ASSUME SURCHARGE LOADING BEHIND WALL. DESIGN TO BE IN ACCORDANCE WITH AS4678 INCLUDING ALL REQUIRED DESIGN LOAD CASES AND COMBINATIONS.
4. RETAINING WALLS TO BE DESIGNED TO CONSIDER ALL LOADS INCLUDING CONSTRUCTION LOADS AND OPERATIONAL LOADS.
5. ANY GEOTECHINCAL INFORMATION PROVIDED BY THE PRINCIPAL OR THE SUPERINTENDENT SHALL BE FOR INFORMATION PURPOSES ONLY. THE CONTRACTOR AND THE RETAINING WALL DESIGN ENGINEER SHOULD SATISFY THEMSELVES OF THE DESIGN SOIL PARAMETERS AND UNDERTAKE AND ADDITIONAL GEOTECHNICAL INVESTIGATION DEEMED NECESSARY BY THE DESIGN ENGINEER.
6. THE CONTRACTOR SHALL ENSURE THAT ANY CONFLICT BETWEEN THESE PROJECT DRAWINGS AND THE RETAINING WALL DRAWINGS PREPARED BY THE RETAINING WALL DESIGN ENGINEER IS RESOLVED WITH THE SUPERINTENDENT PRIOR TO CONSTRUCTION COMMENCING.
7. A COPY OF THE RETAINING WALL DESIGN DRAWINGS, INCLUDING CONNECTION OF AGGREGATE DRAINS TO THE STORMWATER DRAINAGE SYSTEM, DESIGN PARAMETERS AND CERTIFICATION BE PROVIDED TO THE SUPERINTENDENT AT THE PRE-START MEETING PRIOR TO CONSTRUCTION COMMENCING.
8. ANY RETAINING WALL AND BATTER EXCEEDING THE HEIGHT OF 1.5m, THE CONTRACTOR SHALL UNDERTAKE A THIRD PARTY RPEQ REVIEW OF THE PROPOSED DESIGN.

## TYPICAL EARTHWORKS SEQUENCE NOTES:

1. CONSTRUCT DIVERSION DRAINS AS DIRECTED TO DIVERT SITE RUNOFF AWAY FROM CONSTRUCTION AREAS. ESTABLISH DE-WATERING CONTROLS TO ENSURE THAT THE CONSTRUCTION AREAS REMAIN FREE OF SURFACE WATER AND PONDING.
2. FOLLOWING COMPLETION OF CLEARING OPERATIONS AND REMOVAL OF RESIDUAL VEGETATION AND DEBRIS, STRIP TOPSOIL TO A NOMINAL 200mm DEPTH AND PLACE IN TEMPORARY STOCKPILES IN LOCATIONS APPROVED BY THE SUPERINTENDENT.
3. PROOF-ROLL AND COMPACT THE PROPOSED FILL AREAS FOLLOWING TOPSOIL STRIPPING, TO THE SATISFACTION OF THE SUPERINTENDENT.
4. ANY STRIPPED AREAS WHICH DEMONSTRATE EXCESSIVE MOVEMENT OR DO NOT IMPROVE SUFFICIENTLY UNDER PROOF-ROLLING ARE TO BE REMOVED, REPLACED WITH APPROVED SITE MATERIAL AND COMPACTED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.
5. ANY UNSUITABLE MATERIAL ENCOUNTERED, INCLUDING SILTY MATERIAL AND UN-CONTROLLED FILL IS TO BE EXCAVATED TO THE EXTENTS AND DEPTHS NOMINATED BY THE PRINCIPAL'S GEOTECHNICAL CONSULTANT, REMOVED TO NON-STRUCTURAL FILL AREAS OR TAKEN OFF-SITE AS DIRECTED AND REPLACED WITH APPROVED, COMPACTED FILL MATERIAL.
6. PLACE STRUCTURAL FILL MATERIAL FROM SITE EXCAVATIONS TO NOMINATED SITE FILL AREAS, INCLUDING BENCHING AND COMPACTION IN ACCORDANCE WITH THE GEOTECHNICAL REPORT AND TRIMMING AND FINAL PROFILING OF BATTERS.

B

### CONCEPT BULK EARTHWORKS SUMMARY

STRUCTURAL FILLING

| AREA | NETT SOLID FILL |
|---|---|
| OVERALL FILLING | 3,672 cu.m. |

EXCAVATION

| AREA | NETT CUT |
|---|---|
| OVERALL EXCAVATION | 3,049 cu.m. |

SUMMARY:
TOTAL MATERIAL ON LEADS (NETT FILL) = 3,672 cu.m.
i.e. 3,672 cu.m. - 3,049 cu.m. = 623 c.um.

- ALLOWANCE FOR 450mm FOR BUILDING SLAB THICKNESS
- ALLOWANCE FOR 325mm FOR ROAD PAVEMENT THICKNESS
- ALLOWANCE FOR 300mm TOPSOIL RESPREAD TO FOR LANDSCAPE AREAS

BULK EARTHWORKS VOLUMES INCLUDE A NOMINAL 200mm OF TOPSOIL STRIPPING VOLUME WITHIN EARTHWORKS AREA

**NOTE:**
ALL RETAINING WALL AGGREGATE PIPES TO BE CONNECTED TO THE STORMWATER DRAINAGE SYSTEM.

**NOTE:**
RETAINING WALL DESIGN, CONSTRUCTION, SUPERVISION AND CERTIFICATION TO BE PROVIDED BY SPECIALIST SUB-CONTRACTOR.

**NOTE:**
ALL DESIGN/SETOUT INFORMATION SHOWN ON THIS DRAWING IS AVAILABLE IN DIGITAL FORMAT FROM THE OFFICE OF THE SUPERINTENDENT UPON REQUEST BY THE CONTRACTOR.

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


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| VER. | DESCRIPTION | DATE |
|---|---|---|
| B | ISSUED FOR APPROVAL | 08-07-26 |
| A | ORIGINAL ISSUE | 06-05-26 |


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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : OVERALL BULK EARTHWORKS LAYOUT PLAN

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :
SCALE (metres) 2.5 0 2.5 5 7.5 10 12.5
1 : 500 (FULL SIZE)

DEVEL. APPLIC. No. :
DATE : 08-07-26
PROJECT LEADER : -
DESIGNER : BNB
DRAFTSPERSON : BNB
CHECKED : -

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

PROJECT No.: BE200223
DRAWING No. : C2000
VERSION: B

B

## CONCEPT BULK EARTHWORKS SUMMARY

### STRUCTURAL FILLING

| AREA | NETT SOLID FILL |
|---|---|
| OVERALL FILLING | 1,744 cu.m. |

### EXCAVATION

| AREA | NETT CUT |
|---|---|
| OVERALL EXCAVATION | 1,569 cu.m. |

SUMMARY:
TOTAL MATERIAL ON LEADS (NETT FILL) = 1,744cu.m.
i.e. 1,744 cu.m. - 1,569 cu.m. = 174 c.um.

- ALLOWANCE FOR 450mm FOR BUILDING SLAB THICKNESS
- ALLOWANCE FOR 325mm FOR ROAD PAVEMENT THICKNESS
- ALLOWANCE FOR 300mm TOPSOIL RESPREAD TO FOR LANDSCAPE AREAS

BULK EARTHWORKS VOLUMES INCLUDE A NOMINAL 200mm OF TOPSOIL STRIPPING VOLUME WITHIN EARTHWORKS AREA

**NOTE:**
ALL DESIGN/SETOUT INFORMATION SHOWN ON THIS DRAWING IS AVAILABLE IN DIGITAL FORMAT FROM THE OFFICE OF THE SUPERINTENDENT UPON REQUEST BY THE CONTRACTOR.

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

## EARTHWORKS DEPTH ANALYSIS LEGEND

| LOWER | | UPPER | COLOUR |
|---|---|---|---|
| -3.0m | TO | -2.75m | |
| -2.75m | TO | -2.50m | |
| -2.50m | TO | -2.25m | |
| -2.25m | TO | -2.0m | |
| -2.0m | TO | -1.75m | |
| -1.75m | TO | -1.50m | |
| -1.50m | TO | -1.25m | |
| -1.25m | TO | -1.0m | |
| -1.0m | TO | -0.75m | |
| -0.75m | TO | -0.50m | |
| -0.5m | TO | -0.25m | |
| -0.25m | TO | 0.0m | |
| 0.0m | TO | 0.25m | |
| 0.25m | TO | 0.50m | |
| 0.50m | TO | 0.75m | |
| 0.75m | TO | 1.0m | |
| 1.0m | TO | 1.25m | |
| 1.25m | TO | 1.50m | |
| 1.50m | TO | 1.75m | |
| 1.75m | TO | 2.0m | |
| 2.0m | TO | 2.25m | |
| 2.25m | TO | 2.50m | |
| 2.50m | TO | 2.75m | |
| 2.75m | TO | 3.0m | |

## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING SURFACE CONTOURS
- EXISTING ROAD CONTROL LINE
- EARTHWORK SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED BATTER
- PROPOSED CUTBACK


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ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : BULK EARTHWORKS LAYOUT PLAN - SHEET 1 OF 2

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

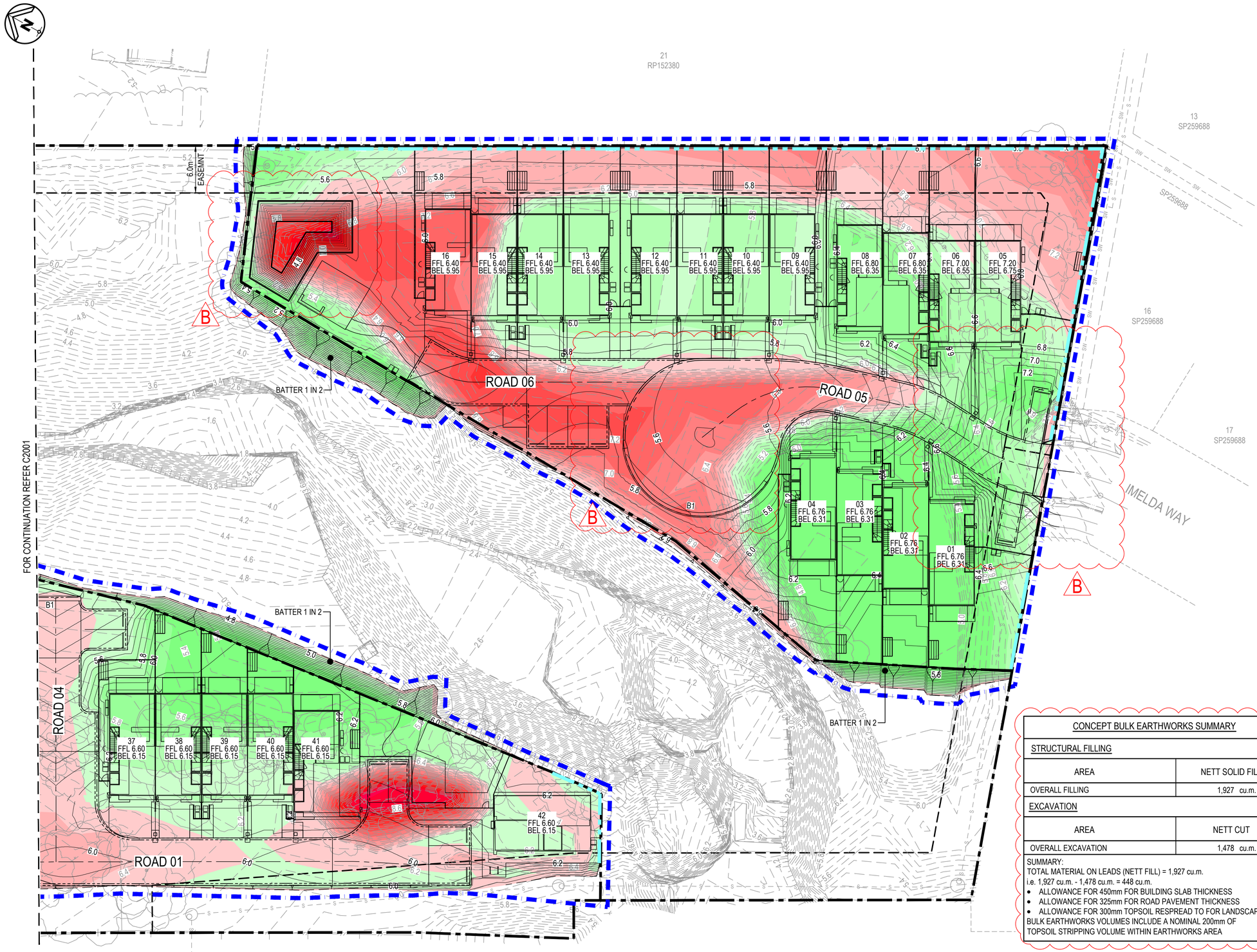
PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :
SCALE (metres) 5 0 5 10
1 : 250 (FULL SIZE)

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|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

| PROJECT No.: | DRAWING No. : | VERSION: |
|---|---|---|
| BE200223 | C2001 | B |




## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING SURFACE CONTOURS
- EXISTING ROAD CONTROL LINE
- EARTHWORK SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED BATTER

## EARTHWORKS DEPTH ANALYSIS LEGEND

| LOWER | | UPPER | COLOUR |
|---|---|---|---|
| -3.0m | TO | -2.75m | |
| -2.75m | TO | -2.50m | |
| -2.50m | TO | -2.25m | |
| -2.25m | TO | -2.0m | |
| -2.0m | TO | -1.75m | |
| -1.75m | TO | -1.50m | |
| -1.50m | TO | -1.25m | |
| -1.25m | TO | -1.0m | |
| -1.0m | TO | -0.75m | |
| -0.75m | TO | -0.50m | |
| -0.5m | TO | -0.25m | |
| -0.25m | TO | 0.0m | |
| 0.0m | TO | 0.25m | |
| 0.25m | TO | 0.50m | |
| 0.50m | TO | 0.75m | |
| 0.75m | TO | 1.0m | |
| 1.0m | TO | 1.25m | |
| 1.25m | TO | 1.50m | |
| 1.50m | TO | 1.75m | |
| 1.75m | TO | 2.0m | |
| 2.0m | TO | 2.25m | |
| 2.25m | TO | 2.50m | |
| 2.50m | TO | 2.75m | |
| 2.75m | TO | 3.0m | |

## CONCEPT BULK EARTHWORKS SUMMARY

STRUCTURAL FILLING

| AREA | NETT SOLID FILL |
|---|---|
| OVERALL FILLING | 1,927 cu.m. |

EXCAVATION

| AREA | NETT CUT |
|---|---|
| OVERALL EXCAVATION | 1,478 cu.m. |

SUMMARY:
TOTAL MATERIAL ON LEADS (NETT FILL) = 1,927 cu.m.
i.e. 1,927 cu.m. - 1,478 cu.m. = 448 cu.m.

- ALLOWANCE FOR 450mm FOR BUILDING SLAB THICKNESS
- ALLOWANCE FOR 325mm FOR ROAD PAVEMENT THICKNESS
- ALLOWANCE FOR 300mm TOPSOIL RESPREAD TO FOR LANDSCAPE AREAS

BULK EARTHWORKS VOLUMES INCLUDE A NOMINAL 200mm OF TOPSOIL STRIPPING VOLUME WITHIN EARTHWORKS AREA

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ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : BULK EARTHWORKS LAYOUT PLAN - SHEET 2 OF 2

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

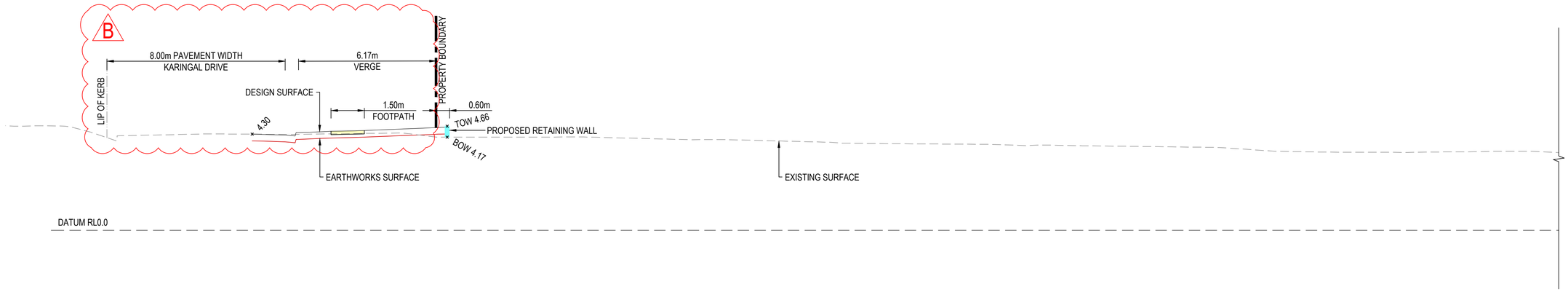
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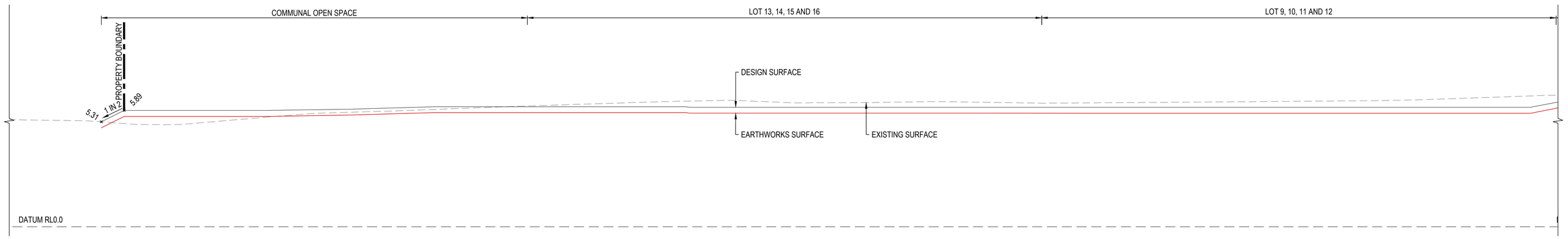
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SCALE (metres) 5 0 5 10
1 : 250 (FULL SIZE)

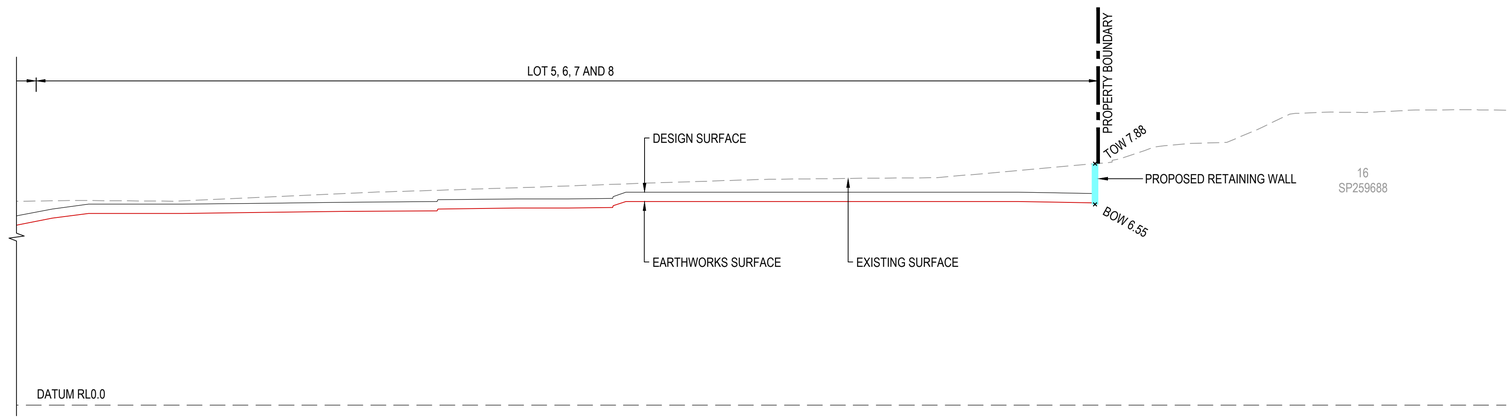
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PROJECT LEADER : - | DESIGNER : BNB
DRAFTSPERSON : BNB | CHECKED : -

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PROJECT No.: BE200223 | DRAWING No. : C2002 | VERSION: B




LEGEND

- EXISTING SURFACE
- DESIGN SURFACE
- EARTHWORKS SURFACE
- PROPOSED RETAINING WALL

A / C2000 SECTION
SCALE 1:100

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ABN 76 166 942 365

CLIENT : BOS

DRAWING TITLE : BULK EARTHWORKS SECTIONS - SHEET 1 OF 5

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

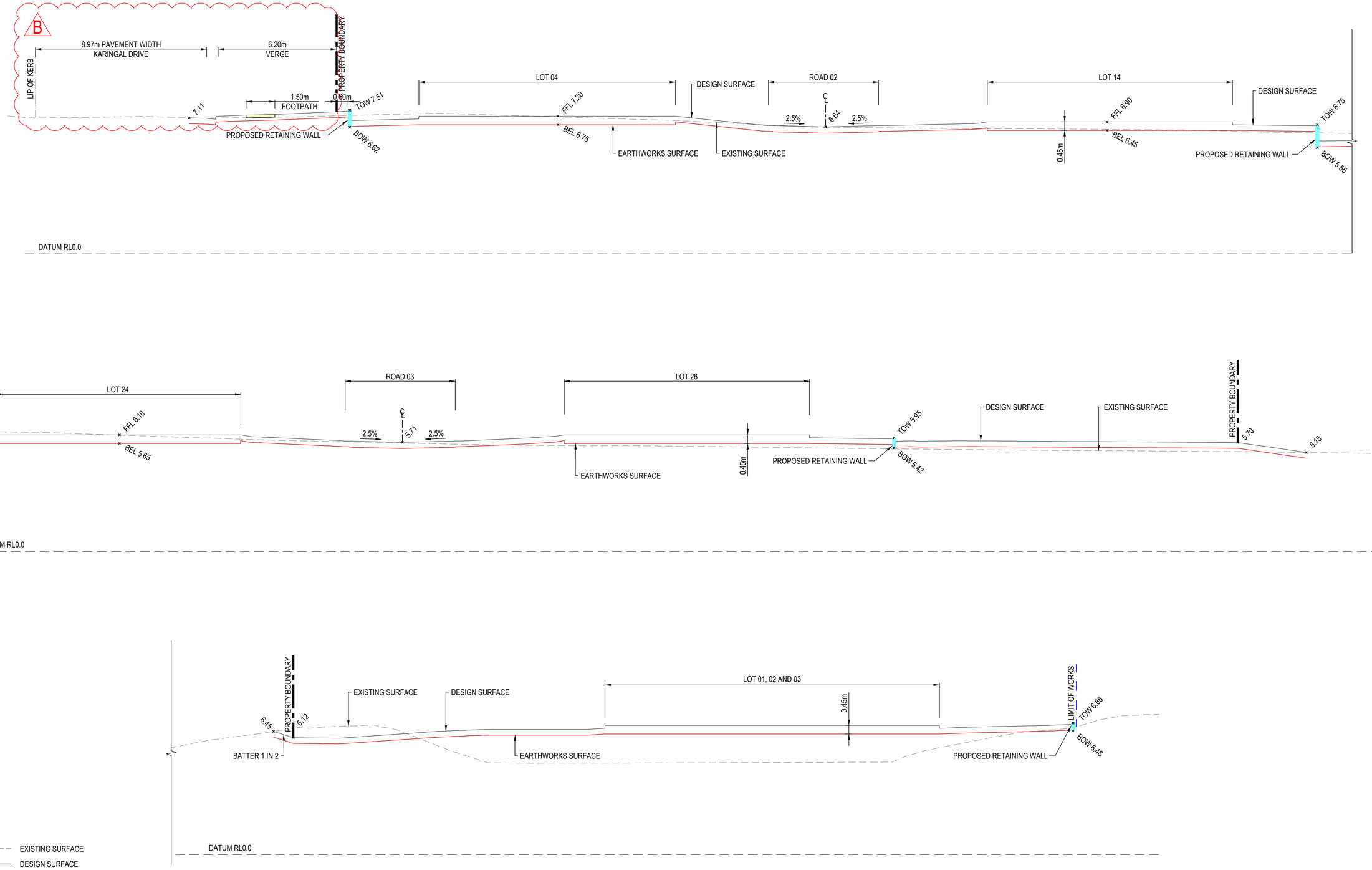
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1 : 100 (FULL SIZE)

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| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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|---|---|---|
| BE200223 | C2200 | B |




LEGEND

- EXISTING SURFACE
- DESIGN SURFACE
- EARTHWORKS SURFACE
- PROPOSED RETAINING WALL

B / C2000 SECTION
SCALE 1:100


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ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : BULK EARTHWORKS SECTIONS - SHEET 2 OF 5

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

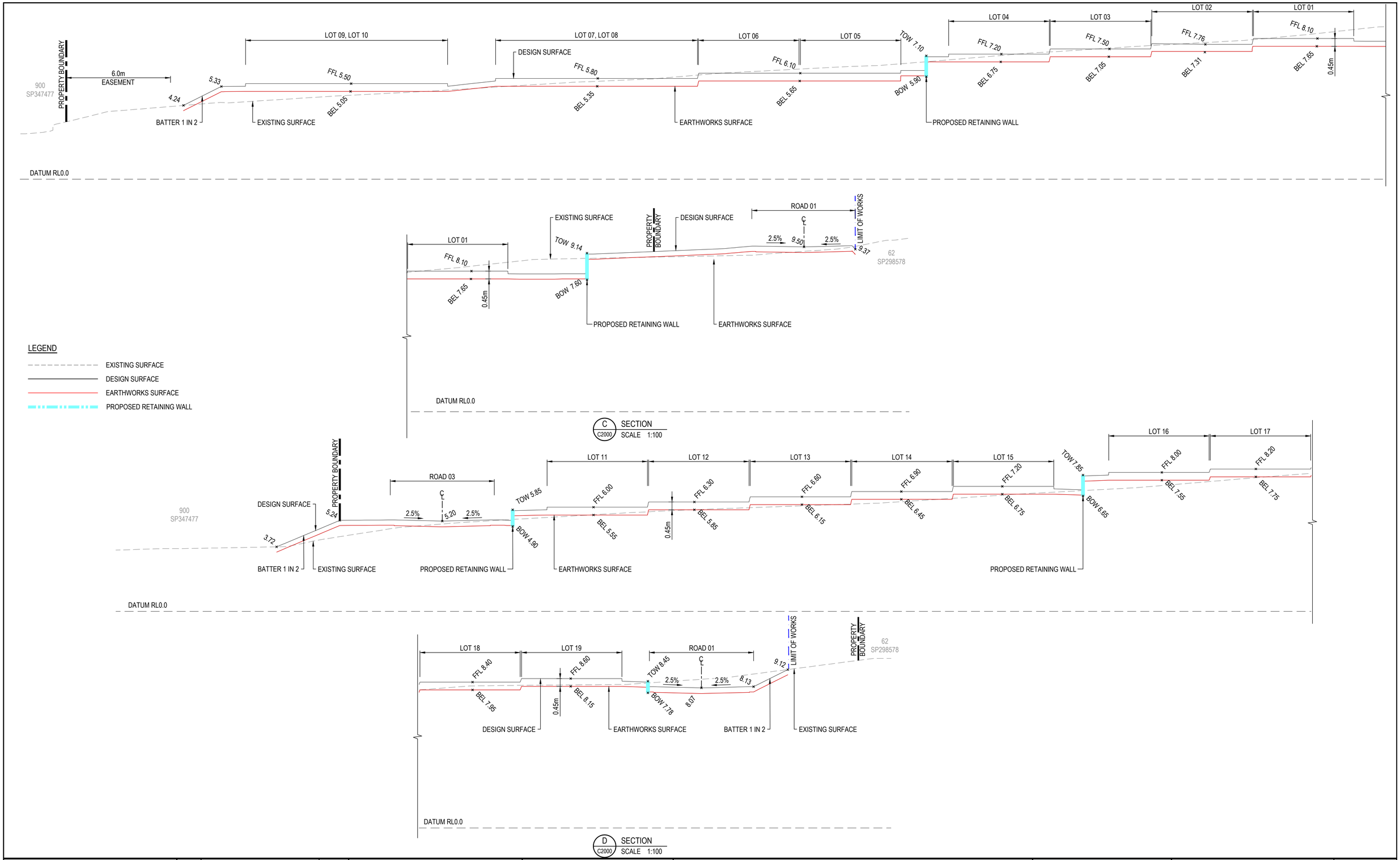
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1 : 100 (FULL SIZE)

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|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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|---|---|---|
| BE200223 | C2201 | B |




C2000 SECTION C
SCALE 1:100

C2000 SECTION D
SCALE 1:100


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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : BULK EARTHWORKS SECTIONS - SHEET 3 OF 5

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

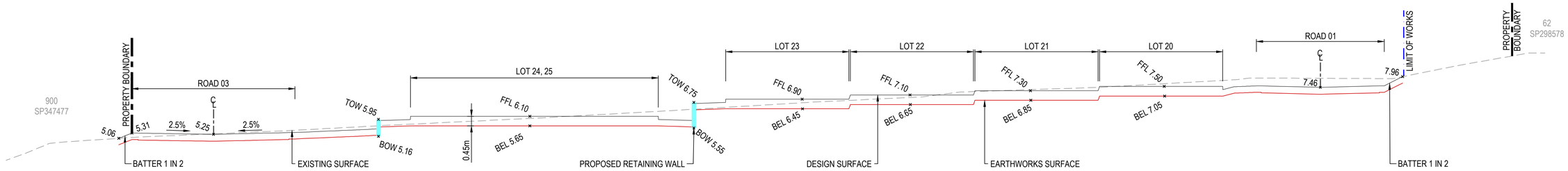
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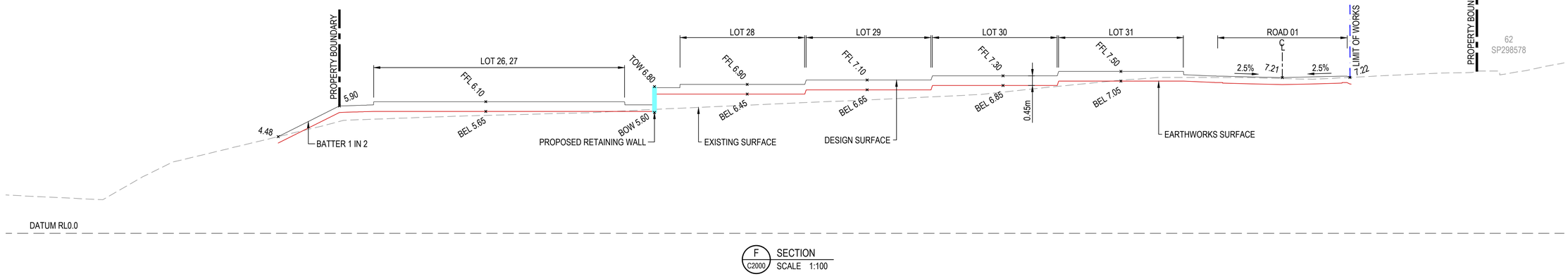
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| PROJECT LEADER : - | DESIGNER : BNB |
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|---|---|---|
| BE200223 | C2202 | B |




E SECTION
C2000 SCALE 1:100




F SECTION
C2000 SCALE 1:100

LEGEND

- EXISTING SURFACE
- DESIGN SURFACE
- EARTHWORKS SURFACE
- PROPOSED RETAINING WALL

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ABN 76 166 942 365

CLIENT : BOS

DRAWING TITLE : BULK EARTHWORKS SECTIONS - SHEET 4 OF 5

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

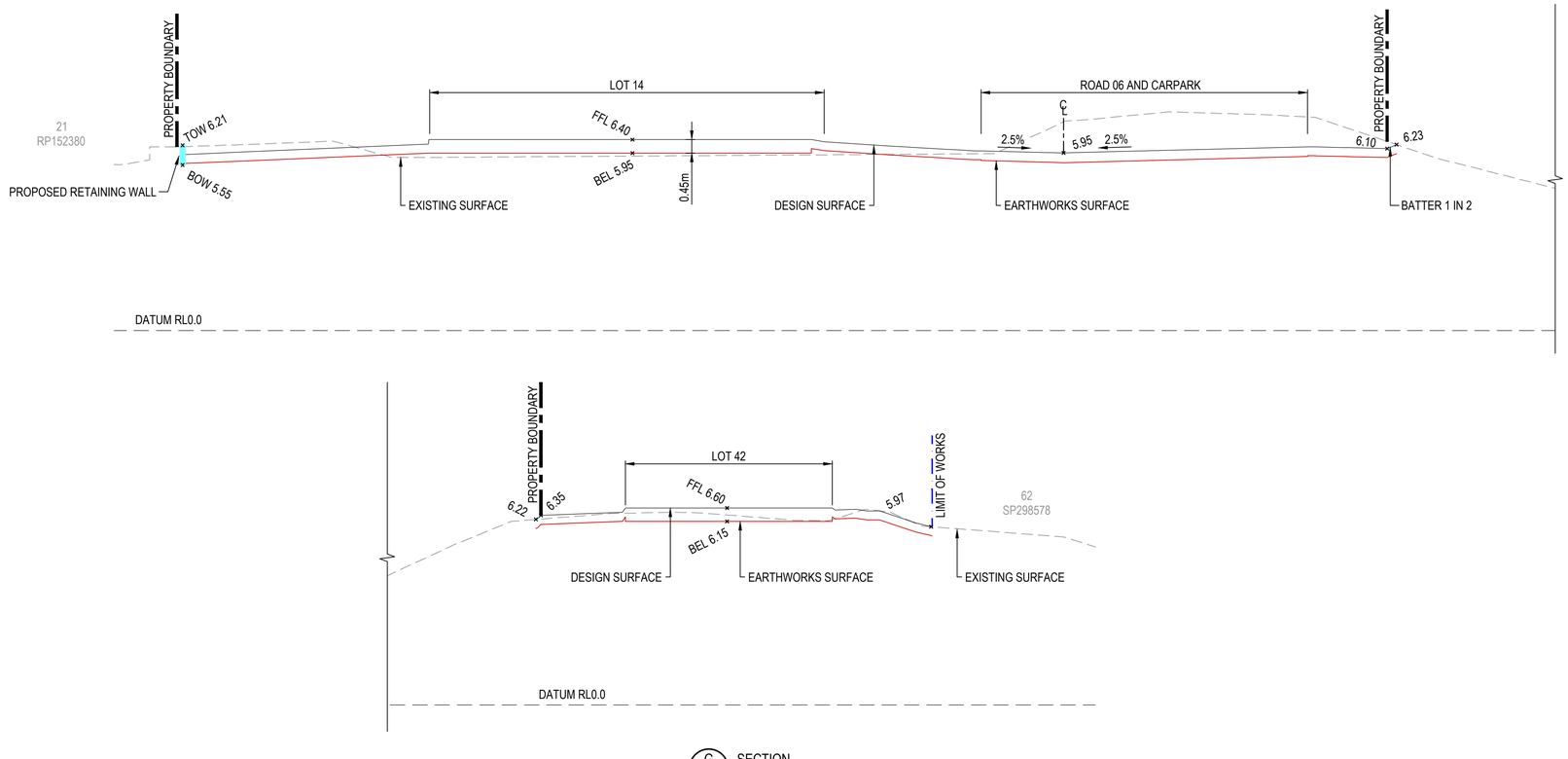
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SCALE (metres) 1 0 1 2 3 4 5
1 : 100 (FULL SIZE)

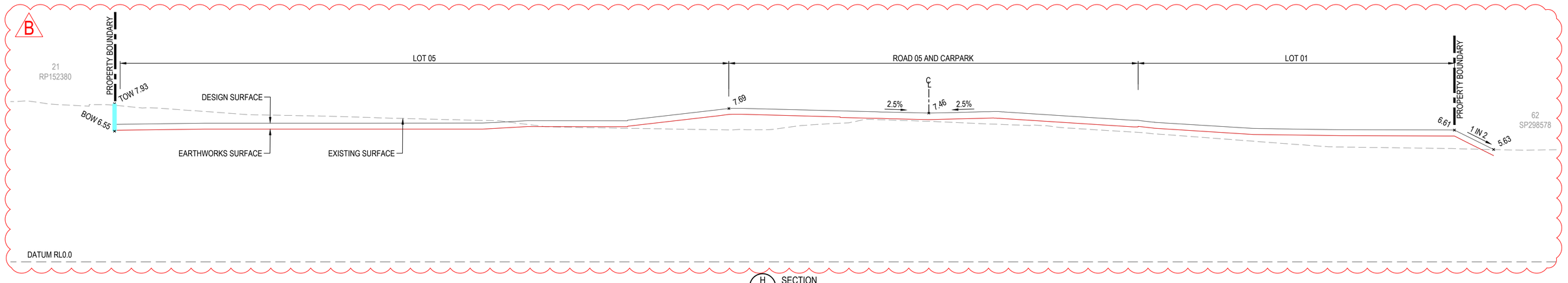
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|---|---|
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|---|---|---|
| BE200223 | C2203 | B |




G C2000 SECTION
SCALE 1:100




H C2000 SECTION
SCALE 1:100

LEGEND

- EXISTING SURFACE
- DESIGN SURFACE
- EARTHWORKS SURFACE
- PROPOSED RETAINING WALL


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ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : BULK EARTHWORKS SECTIONS - SHEET 5 OF 5

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :
SCALE (metres) 1 0 1 2 3 4 5
1 : 100 (FULL SIZE)

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|---|---|
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| DRAFTSPERSON : BNB | CHECKED : - |

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|---|---|---|
| BE200223 | C2204 | B |




## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING CONTOURS
- EXISTING ROAD CONTROL LINE
- DESIGN SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED CUTBACK
- PROPOSED RETAINING WALL
- PROPOSED BATTER
- PROPOSED STORMWATER
- PROPOSED STORMWATER PIT
- PROPOSED STORMWATER MANHOLE
- PROPOSED HEADWALL
- PROPOSED STORMSACK
- PROPOSED UNIT
- PROPOSED ASPHALT PAVEMENT
- PROPOSED ROCK PROTECTION
- PROPOSED COURTYARD
- PROPOSED 1.5m FOOTPATH
- PROPOSED BIORETENTION BASIN
- PROPOSED CONCRETE PAVEMENT

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**NOTE:**
ULTIMATE FINISHED SURFACE PROFILES AND ASSOCIATED STORMWATER CAPTURE PITS TO LANDSCAPED AREAS SUCH AS PEDESTIAN LINKS AND COURTYARDS ARE BY LANDSCAPE ARCHITECT AND HYDRAULIC CONSULTANT AT TIME OF BUILDING WORKS.

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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365

CLIENT : BOS

DRAWING TITLE : OVERALL ROADWORKS AND DRAINAGE LAYOUT PLAN

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

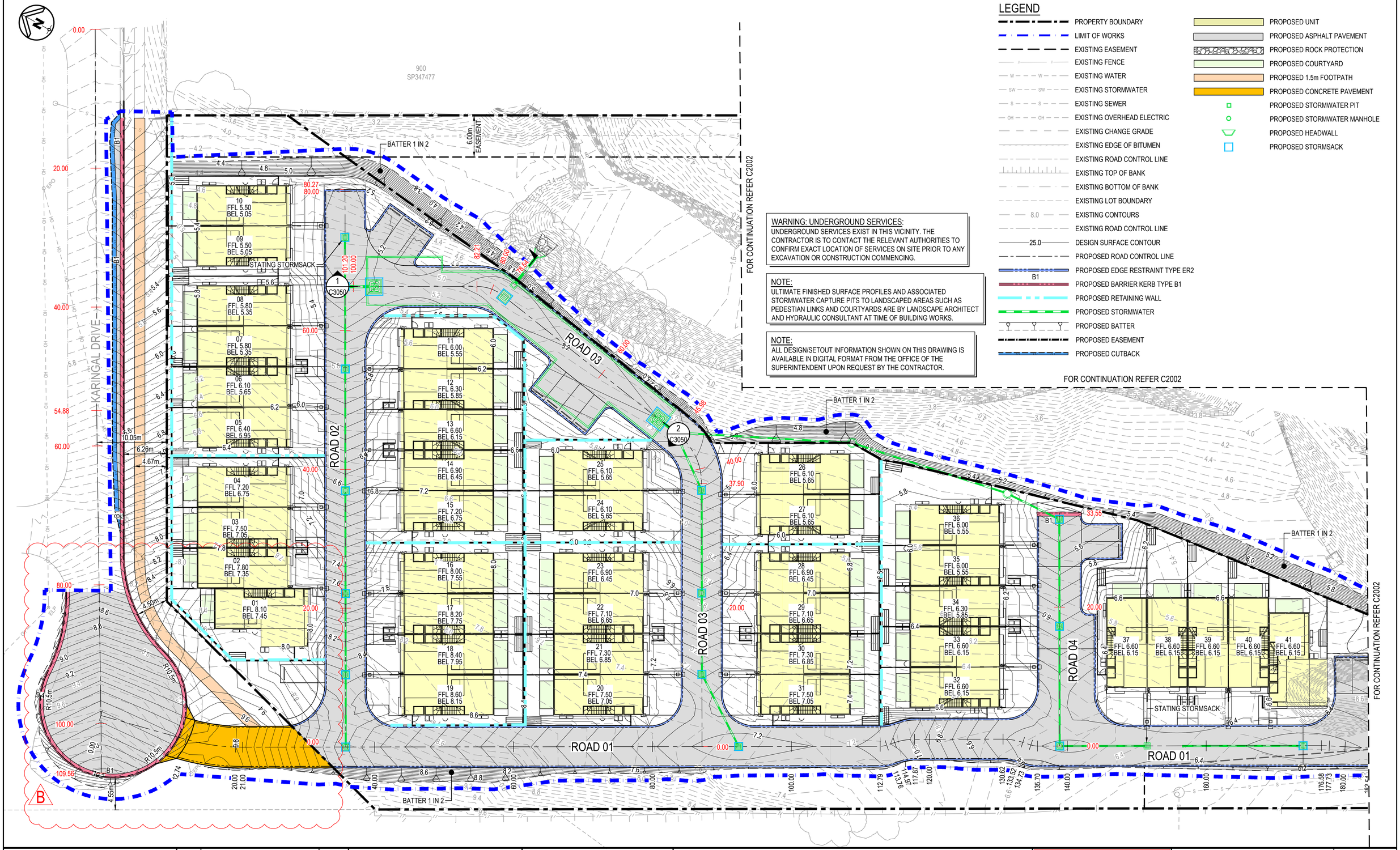
PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :
SCALE (metres)
2.5 0 2.5 5 7.5 10 12.5
1 : 500 (FULL SIZE)

| | |
|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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

| PROJECT No.: | DRAWING No. : | VERSION: |
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|---|---|---|
| B | ISSUED FOR APPROVAL | 08-07-26 |
| A | ORIGINAL ISSUE | 06-05-26 |


BURCHILLS ENGINEERING SOLUTIONS
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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : ROADWORKS AND DRAINAGE LAYOUT PLAN - SHEET 1 OF 2

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) : SCALE (metres) 5 0 5 10 — 1 : 250 (FULL SIZE)

| | |
|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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

| PROJECT No.: | DRAWING No. : | VERSION: |
|---|---|---|
| BE200223 | C3001 | B |




## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING CONTOURS
- EXISTING ROAD CONTROL LINE
- DESIGN SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED BATTER
- PROPOSED EASEMENT
- PROPOSED STORMWATER
- PROPOSED HEADWALL
- PROPOSED STORMSACK
- PROPOSED UNIT
- PROPOSED ASPHALT PAVEMENT
- PROPOSED ROCK PROTECTION
- PROPOSED COURTYARD
- PROPOSED BIORETENTION BASIN
- PROPOSED CONCRETE PAVEMENT

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

**NOTE:**
ULTIMATE FINISHED SURFACE PROFILES AND ASSOCIATED STORMWATER CAPTURE PITS TO LANDSCAPED AREAS SUCH AS PEDESTIAN LINKS AND COURTYARDS ARE BY LANDSCAPE ARCHITECT AND HYDRAULIC CONSULTANT AT TIME OF BUILDING WORKS.

**NOTE:**
ALL DESIGN/SETOUT INFORMATION SHOWN ON THIS DRAWING IS AVAILABLE IN DIGITAL FORMAT FROM THE OFFICE OF THE SUPERINTENDENT UPON REQUEST BY THE CONTRACTOR.


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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE :
ROADWORKS AND DRAINAGE LAYOUT PLAN - SHEET 2 OF 2

PROJECT :
2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

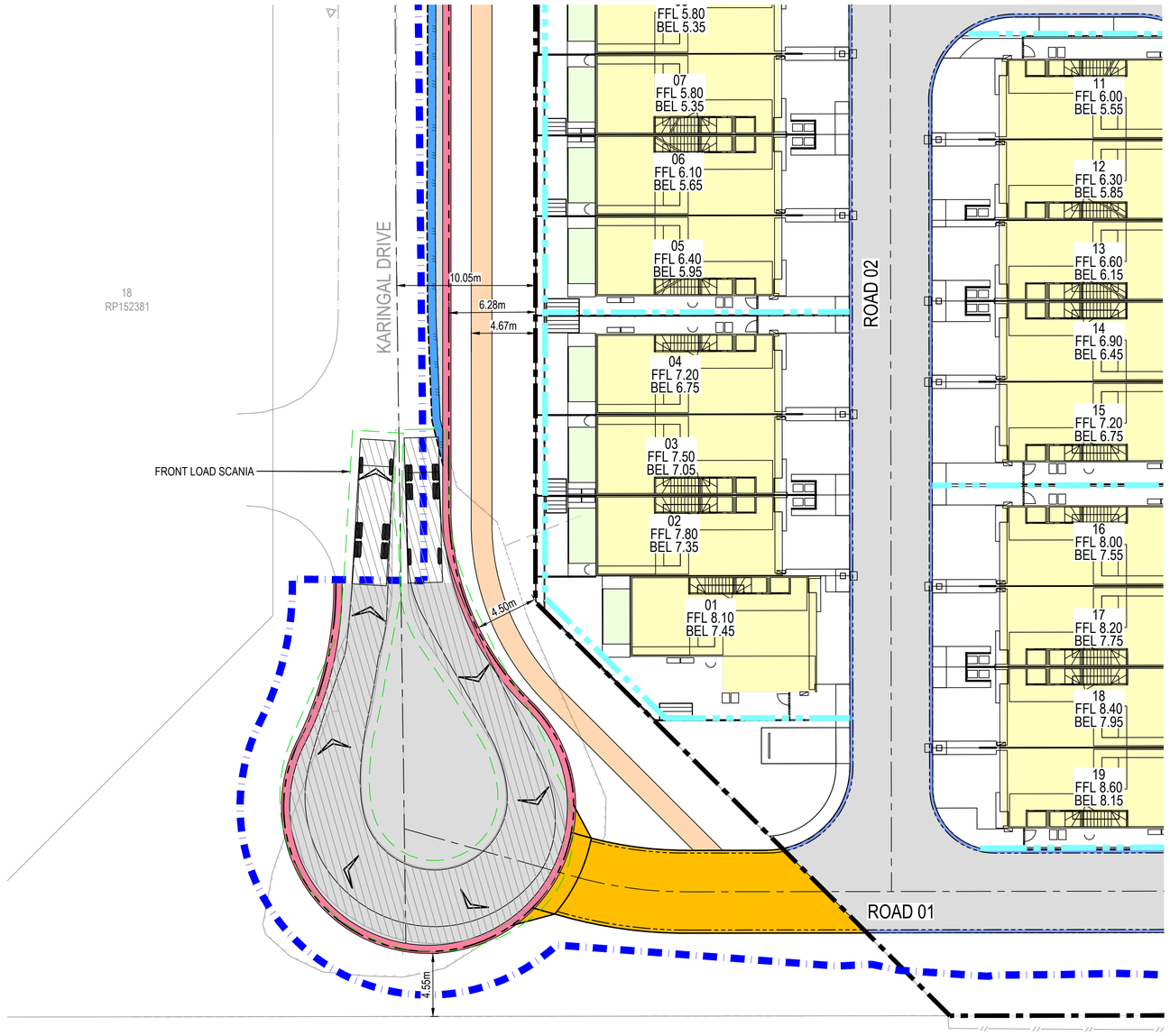
PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :
SCALE (metres)
5 0 5 10
1 : 250 (FULL SIZE)

| | |
|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

APPROVED FOR AND ON BEHALF OF
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| PROJECT No.: | DRAWING No. : | VERSION: |
|---|---|---|
| BE200223 | C3002 | B |

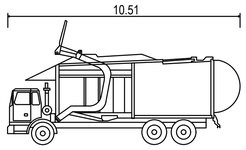



18
RP152381

1
SP135200

## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING FENCE
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED CUTBACK
- PROPOSED UNIT
- PROPOSED ASPHALT PAVEMENT
- PROPOSED ROCK PROTECTION
- PROPOSED COURTYARD
- PROPOSED 1.5m FOOTPATH
- PROPOSED CONCRETE PAVEMENT




| | |
|---|---|
| FRONT LOAD SCANIA | |
| OVERALL LENGTH | 10.510m |
| OVERALL WIDTH | 2.490m |
| OVERALL BODY HEIGHT | 3.348m |
| MIN BODY GROUND CLEARANCE | 0.438m |
| TRACK WIDTH | 2.400m |
| LOCK-TO-LOCK TIME | 6.00s |
| MAX STEERING ANGLE (VIRTUAL) | 40.00° |

SWEPT PATH PROFILE
N.T.S.


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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : ROADWORKS SWEPT PATH PLAN

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

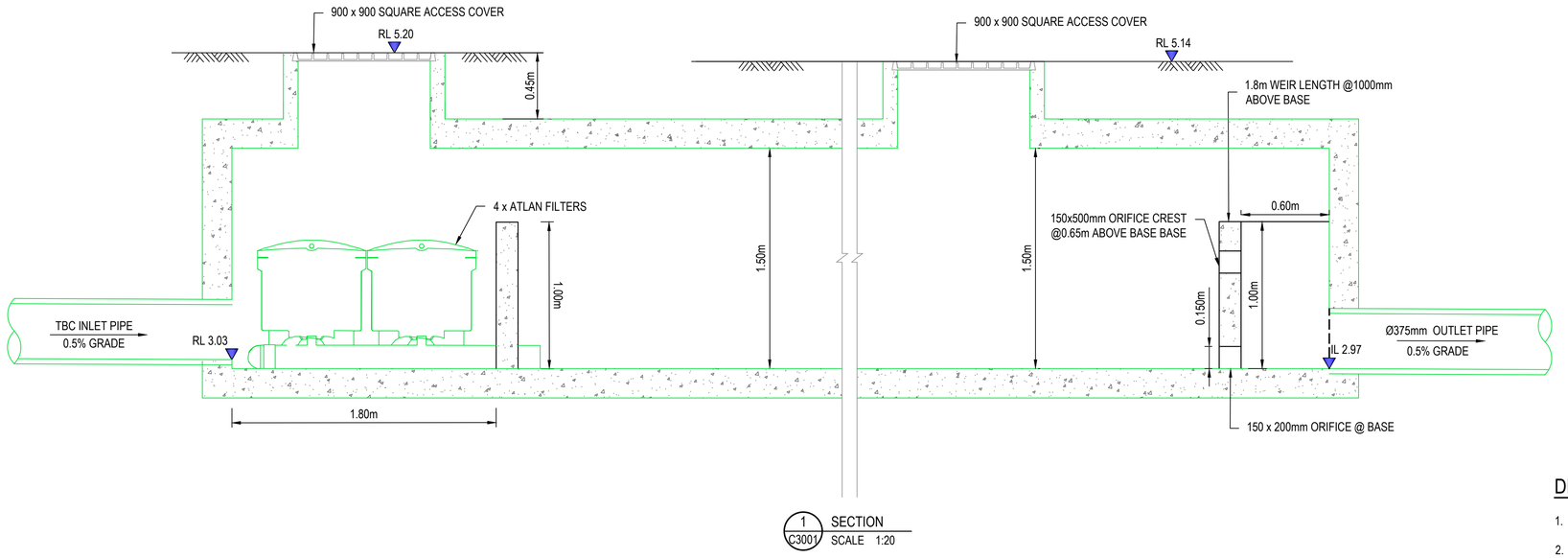
PRELIMINARY
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SCALE (metres)
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1 : 200 (FULL SIZE)

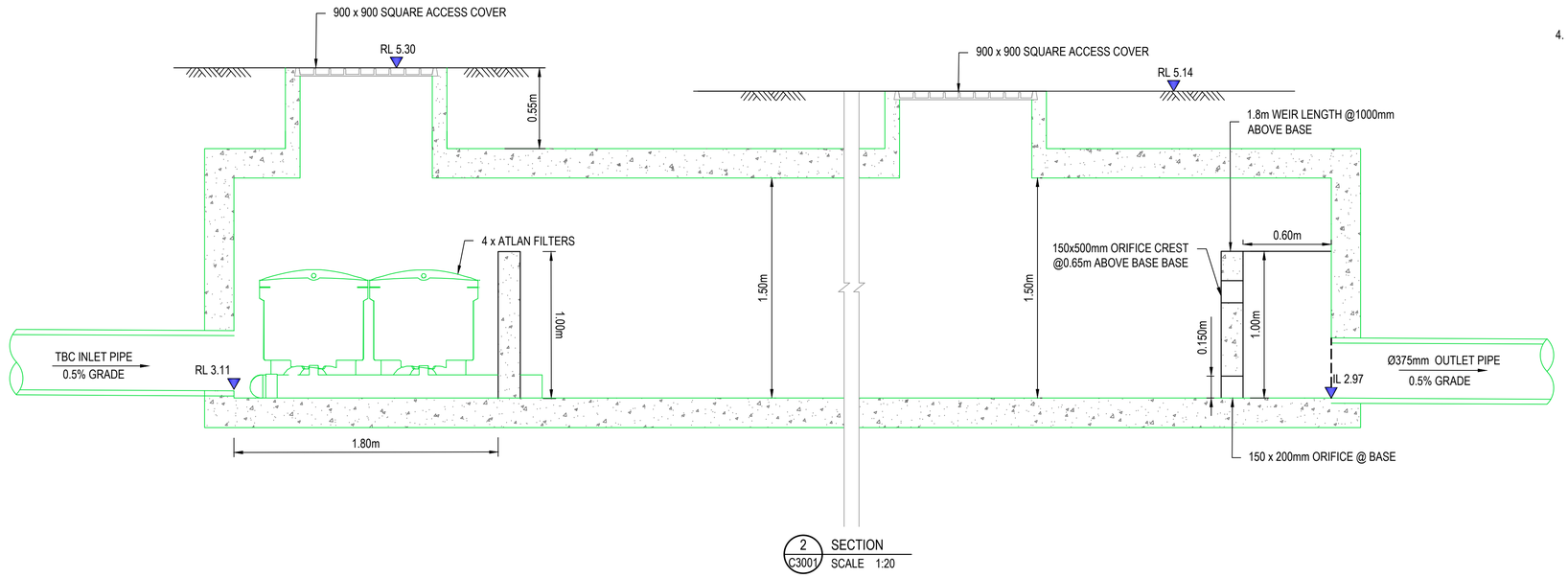
| | |
|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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|---|---|---|
| BE200223 | C3010 | A |




1 / C3001 SECTION
SCALE 1:20




2 / C3001 SECTION
SCALE 1:20

## DETENTION TANK NOTES:

1. INLET AND OUTLET PIPES TO BE IN ACCORDANCE WITH APPROVED PLANS.
2. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
3. ENTIRE STRUCTURE INCLUDING THE CARTRIDGE CHAMBER, ACCESS, AND SURROUNDING TANK TO BE DESIGNED AND CONSTRUCTED BY OTHERS. REFER TO STRUCTURAL DRAWINGS.
4. THE INVERT LEVEL AND THE INLET PIPE MUST BE GREATER THAN THE RL OF THE FINISHED FALSE FLOOR WITHIN THE CARTRIDGE CHAMBER.


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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : STORMWATER TANK DETAILS

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

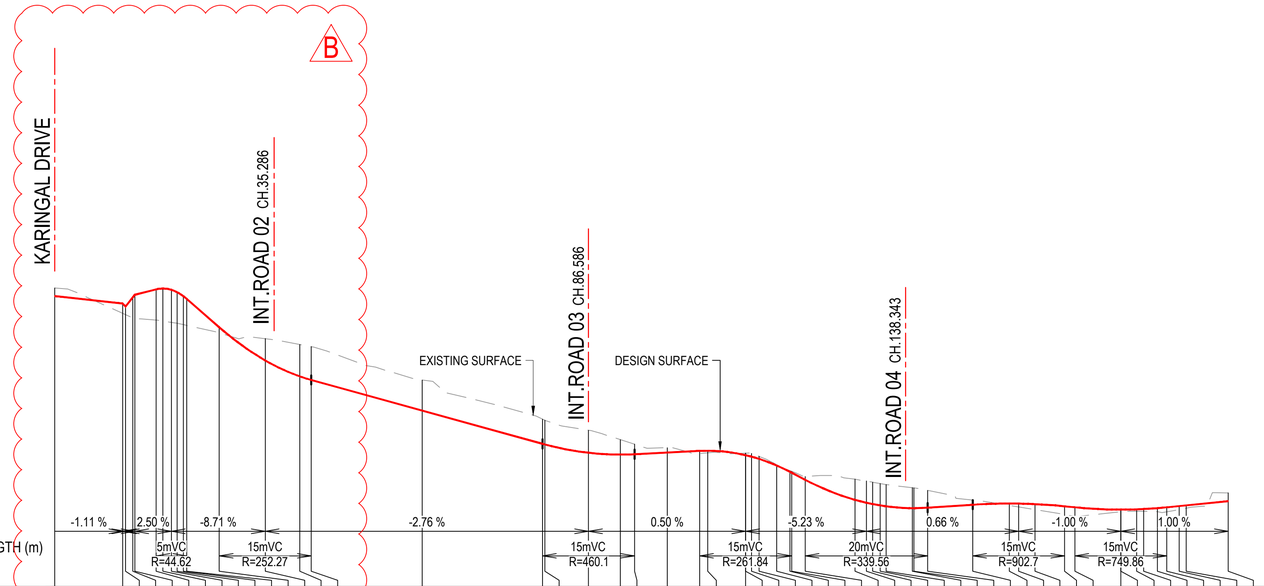
PRELIMINARY
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1 : 20 (FULL SIZE)

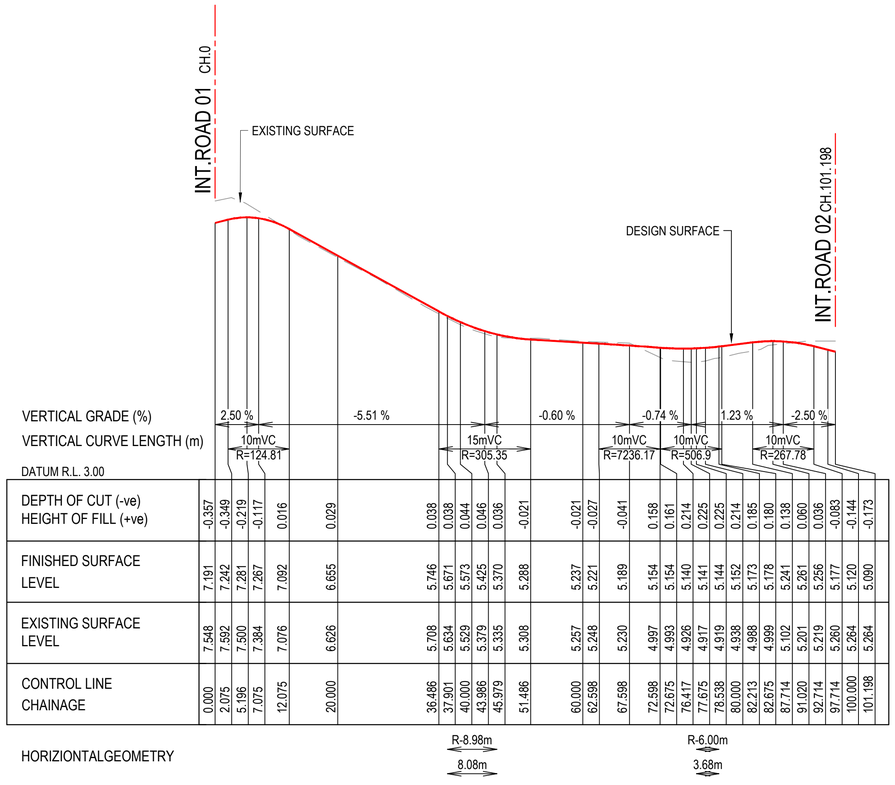
| | |
|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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| PROJECT No.: | DRAWING No. : | VERSION: |
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| BE200223 | C3050 | B |

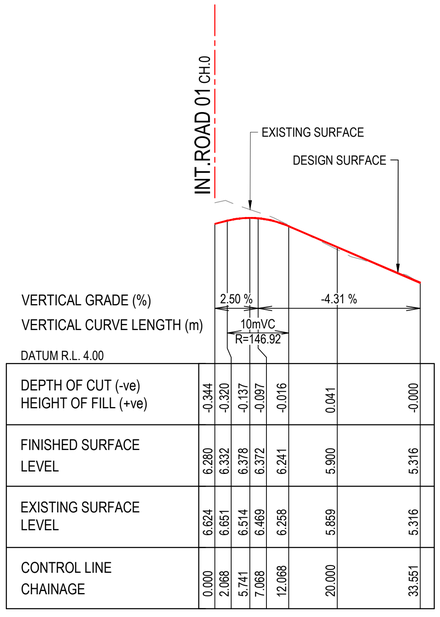

KARINGAL DRIVE
INT.ROAD 02 CH.35.286
INT.ROAD 03 CH.86.586
INT.ROAD 04 CH.138.343
EXISTING SURFACE
DESIGN SURFACE
B

| | | |



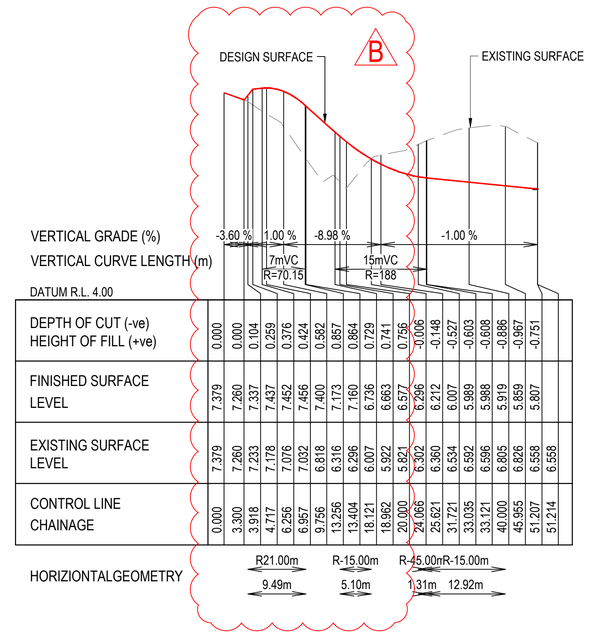

## ROAD 03 LONGITUDINAL SECTION

SCALES
5 0 5 10 15 20 25 — 1 : 500 HORIZ.
0.5 0 0.5 1.0 1.5 2.0 2.5 — 1 : 50 VERT. (FULL SIZE)
(metres)




## ROAD 04 LONGITUDINAL SECTION

SCALES
5 0 5 10 15 20 25 — 1 : 500 HORIZ.
0.5 0 0.5 1.0 1.5 2.0 2.5 — 1 : 50 VERT. (FULL SIZE)
(metres)




## ROAD 05 LONGITUDINAL SECTION

SCALES
5 0 5 10 15 20 25 — 1 : 500 HORIZ.
0.5 0 0.5 1.0 1.5 2.0 2.5 — 1 : 50 VERT. (FULL SIZE)
(metres)

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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365

CLIENT : BOS

DRAWING TITLE : ROAD LONGITUDINAL SECTIONS - SHEET 2 OF 3

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

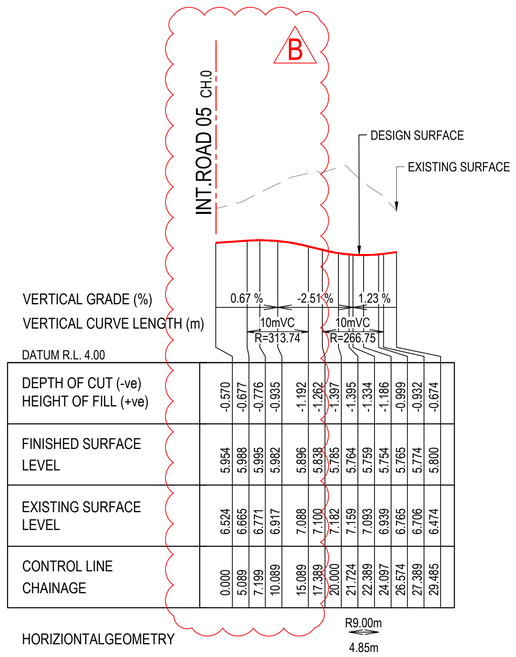
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SCALE AT FULL SIZE (A1) :

DEVEL. APPLIC. No. : — DATE : 08-07-26
PROJECT LEADER : - — DESIGNER : BNB
DRAFTSPERSON : BNB — CHECKED : -

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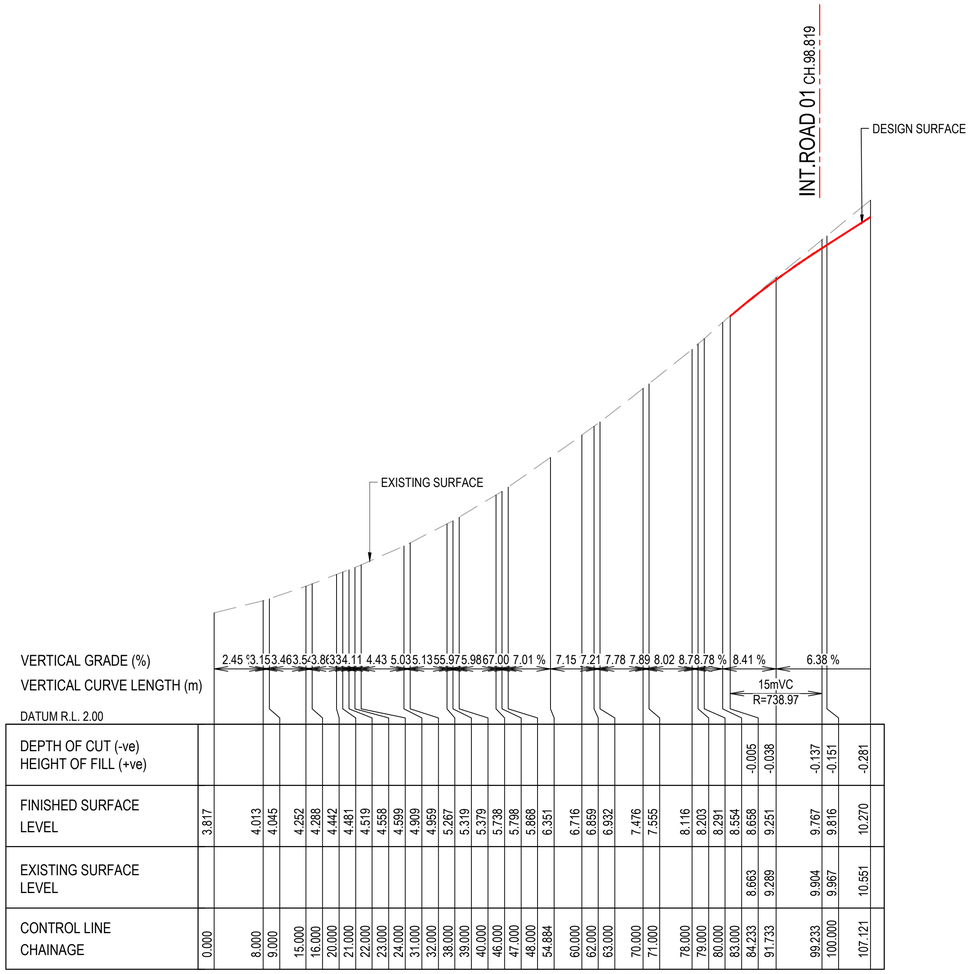
| PROJECT No.: | DRAWING No. : | VERSION: |
|---|---|---|
| BE200223 | C3201 | B |




| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VERTICAL GRADE (%) | | | 0.67 % | | | -2.51 % | | | 1.23 % | | | | | | | | | | | | | |
| VERTICAL CURVE LENGTH (m) | | | 10mVC R=313.74 | | | 10mVC R=266.75 | | | | | | | | | | | | | | | | |
| DATUM R.L. 4.00 | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve) | | -0.570 | -0.677 | -0.776 | -0.935 | -1.192 | -1.262 | -1.397 | -1.395 | -1.334 | -1.186 | -0.999 | -0.932 | -0.674 | | | | | | | | |
| FINISHED SURFACE LEVEL | | 5.954 | 5.988 | 5.995 | 5.982 | 5.896 | 5.838 | 5.765 | 5.764 | 5.759 | 5.754 | 5.765 | 5.774 | 5.800 | | | | | | | | |
| EXISTING SURFACE LEVEL | | 6.524 | 6.665 | 6.771 | 6.917 | 7.088 | 7.100 | 7.182 | 7.159 | 7.093 | 6.939 | 6.765 | 6.706 | 6.474 | | | | | | | | |
| CONTROL LINE CHAINAGE | 0.000 | 5.089 | 7.199 | 10.089 | 15.089 | 17.389 | 20.000 | 21.724 | 22.389 | 24.097 | 26.574 | 27.389 | 29.485 | | | | | | | | | |
| HORIZIONTALGEOMETRY | | | | | | | | | | | | | | | | | | | | | | |

## ROAD 06 LONGITUDINAL SECTION

SCALES
5 0 5 10 15 20 25 — 1 : 500 HORIZ.
0.5 0 0.5 1.0 1.5 2.0 2.5 — 1 : 50 VERT. (FULL SIZE)
(metres)




| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VERTICAL GRADE (%) | | 2.45 % | 3.15 | 3.46 | 3.5 | 3.8 | 3.34 | 4.11 | 4.43 | 5.03 | 5.13 | 5.97 | 5.98 | 7.00 | 7.01 % | 7.15 | 7.21 | 7.78 | 7.89 | 8.02 | 8.78 | 8.78 % | 8.41 % | 6.38 % |
| VERTICAL CURVE LENGTH (m) | | | | | | | | | | | | | | | | | | | | | | 15mVC R=738.97 | | |
| DATUM R.L. 2.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve) | | | | | | | | | | | | | | | | | | | | | | -0.005 | -0.038 | -0.137 | -0.151 | -0.281 |
| FINISHED SURFACE LEVEL | 3.817 | 4.013 | 4.045 | 4.252 | 4.288 | 4.442 | 4.481 | 4.519 | 4.558 | 4.599 | 4.909 | 4.959 | 5.267 | 5.319 | 5.379 | 5.738 | 5.798 | 5.868 | 6.351 | 6.716 | 6.859 | 6.932 | 7.476 | 7.555 | 8.116 | 8.203 | 8.291 | 8.554 | 8.658 | 9.251 | 9.767 | 9.816 | 10.270 |
| EXISTING SURFACE LEVEL | | | | | | | | | | | | | | | | | | | | | | | | | | | | 8.663 | 9.289 | 9.904 | 9.967 | 10.551 |
| CONTROL LINE CHAINAGE | 0.000 | 8.000 | 9.000 | 15.000 | 16.000 | 20.000 | 21.000 | 22.000 | 23.000 | 24.000 | 31.000 | 32.000 | 38.000 | 39.000 | 40.000 | 46.000 | 47.000 | 48.000 | 54.884 | 60.000 | 62.000 | 63.000 | 70.000 | 71.000 | 78.000 | 79.000 | 80.000 | 83.000 | 84.233 | 91.733 | 99.233 | 100.000 | 107.121 |
| HORIZIONTALGEOMETRY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## KARINGAL DRIVE LONGITUDINAL SECTION

SCALES
5 0 5 10 15 20 25 — 1 : 500 HORIZ.
0.5 0 0.5 1.0 1.5 2.0 2.5 — 1 : 50 VERT. (FULL SIZE)
(metres)


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


CLIENT : BOS

DRAWING TITLE : ROAD LONGITUDINAL SECTIONS - SHEET 3 OF 3

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :

DEVEL. APPLIC. No. : | DATE : 08-07-26
PROJECT LEADER : - | DESIGNER : BNB
DRAFTSPERSON : BNB | CHECKED : -

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| PROJECT No.: | DRAWING No. : | VERSION: |
|---|---|---|
| BE200223 | C3202 | B |




## LEGEND

- PROPERTY BOUNDARIES
- LIMIT OF WORKS
- PROPOSED EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING COMMS
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
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- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED CUTBACK
- PROPOSED RETAINING WALL
- PROPOSED BATTER
- PROPOSED STORMWATER
- PROPOSED STORMWATER PIT
- PROPOSED HEADWALL
- PROPOSED STORMSACK
- PROPOSED Ø150mm SEWER (TYP.)
- PROPOSED Ø100mm WATER MAIN
- PROPOSED WATER METER
- PROPOSED SEWER MANHOLE
- PROPOSED INSPECTION OPENINGS
- PROPOSED HYDRANT

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| A | ORIGINAL ISSUE | 06-05-26 |


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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : OVERALL SEWER AND WATER RETICULATION

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

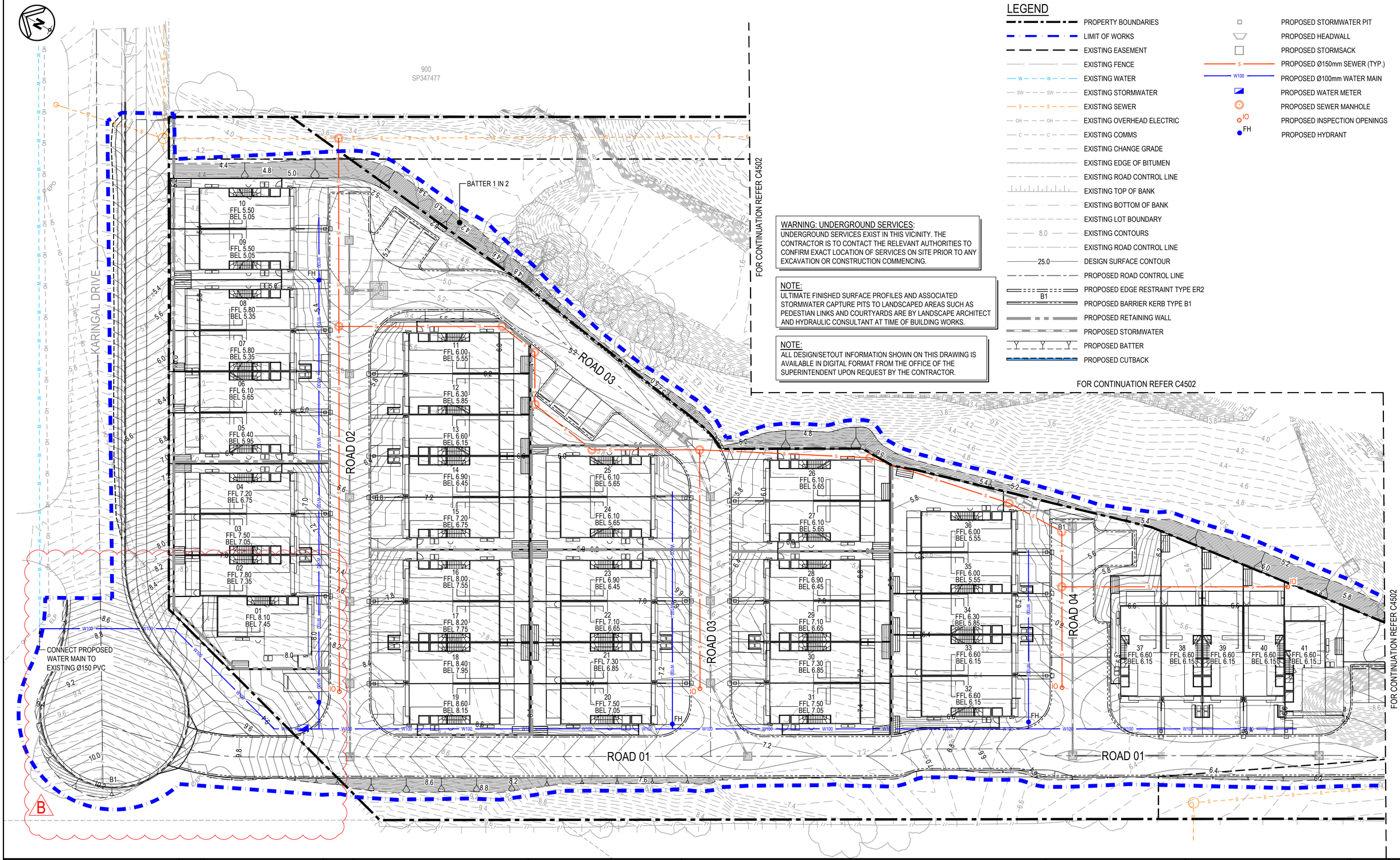
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1 : 500 (FULL SIZE)

| | |
|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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| PROJECT No.: | DRAWING No. : | VERSION: |
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| BE200223 | C4500 | B |




## LEGEND

- PROPERTY BOUNDARIES
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING COMMS
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING CONTOURS
- EXISTING ROAD CONTROL LINE
- DESIGN SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED STORMWATER
- PROPOSED BATTER
- PROPOSED CUTBACK
- PROPOSED STORMWATER PIT
- PROPOSED HEADWALL
- PROPOSED STORMSACK
- PROPOSED Ø150mm SEWER (TYP.)
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- PROPOSED SEWER MANHOLE
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ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE :
SEWER AND WATER RETICULATION - SHEET 1 OF 2

PROJECT :
2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

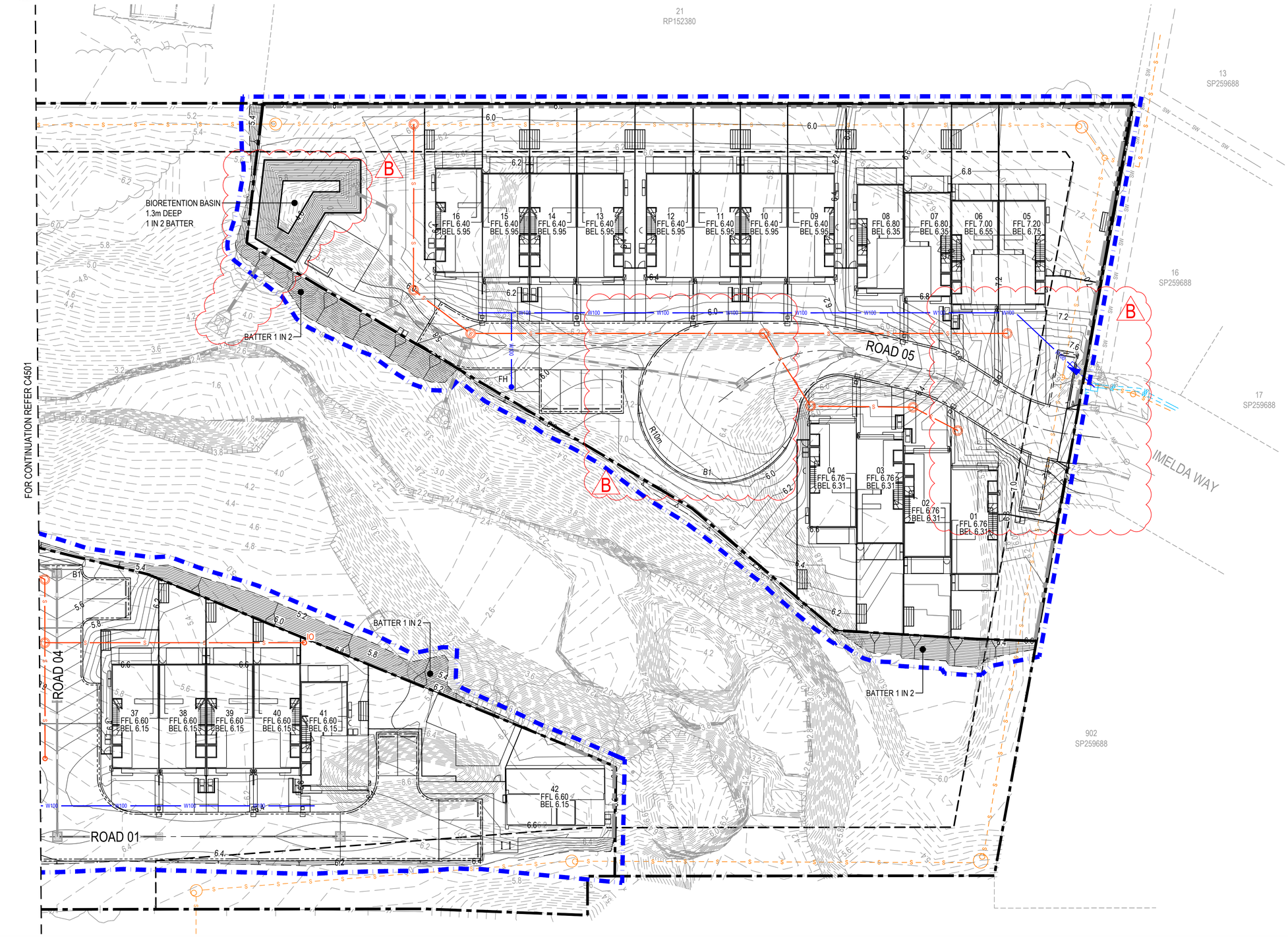
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1 : 250 (FULL SIZE)

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|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
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| PROJECT No.: | DRAWING No. : | VERSION: |
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## LEGEND

- PROPERTY BOUNDARIES
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING COMMS
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING CONTOURS
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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : SEWER AND WATER RETICULATION - SHEET 2 OF 2

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

PRELIMINARY
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SCALE AT FULL SIZE (A1) :
SCALE (metres)
5 0 5 10
1 : 250 (FULL SIZE)

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|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
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| BE200223 | C4502 | B |

# QMS RISK & OPPORTUNITIES REGISTER
# SAFETY IN DESIGN – NORMAL DESIGN RISKS - CIVIL

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


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ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : HAZARD RISK REGISTER - DESIGN RISKS

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

PRELIMINARY
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SCALE AT FULL SIZE (A1) :

DEVEL. APPLIC. No. :
DATE : 08-07-26
PROJECT LEADER : -
DESIGNER : BNB
DRAFTSPERSON : BNB
CHECKED : -

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| PROJECT No.: | DRAWING No. : | VERSION: |
|---|---|---|
| BE200223 | C9000 | B |

# Appendix D – Code Compliance Responses

# City Plan code template

This code template supports the preparation of a development application against either the acceptable outcome(s) or performance outcome(s) contained in the code. Development assessment rules are outlined in **Section 5.3.3** of the City Plan.

**Please note:**

For assessment against the overall outcomes, refer to the appropriate code.

Note: The whole of the planning scheme is identified as the assessment benchmark for impact assessable development. This specifically includes assessment of impact assessable development against this strategic framework. The strategic framework may contain intentions and requirements that are additional to and not necessarily repeated in zone, overlay or other codes. In particular, the performance outcomes in zone codes address only a limited number of aspects, predominantly related to built form. Development that is impact assessable must also be assessed against the overall outcomes of the code as well as the strategic framework.

## 9.4.1 Change to ground level and creation of new waterways code

### 9.4.1.1 Application

This code applies to assessing operational work (change to ground level) and bulk earthworks undertaken as part of an operational work (works for infrastructure) application where indicated within **Part 5 Tables of assessment**.

When using this code, reference should be made to **Section 5.3.2** and, where applicable, **Section 5.3.3**, in **Part 5**.

Supporting information is prepared by a suitably-qualified person in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 8 – Engineering drawings, documents and reports** and/or **SC6.10 City Plan policy – Geotechnical stability assessment guidelines**.

### 9.4.1.2 Purpose

(1) The purpose of the Change to ground level and creation of new waterways code is to protect the environment from impacts of earthworks and the creation or expansion of waterways.

(2) The purpose of the code will be achieved through the following overall outcomes:

(a) Ground level changes are undertaken with geotechnically and ecologically sound practices.

**Note: For guidance on how to meet this overall outcome refer to SC6.10 City Plan policy – Geotechnical stability assessment guideline.**

(b) Development does not increase the risk of flood damage to life or property.

(c) Development does not increase the rate or volume of run-off during a flood.

(d) Soil disturbance and development of land containing potential and actual acid sulfate soils does not result in environmental damage.

(e) Construction phase erosion and sediment controls are implemented to minimise erosion and ensure total suspended solids in receiving waters meet the water quality objectives (*Environmental Protection (Water) Policy 2009*).

(f) Changes to existing ground levels, including the creation of new waterways do not adversely affect the amenity and landscape values.

(g) The environment and public safety are protected from impacts arising from the creation or expansion of non-tidal artificial waterways, such as urban lakes.

(h) Development does not adversely affect the quality of stormwater discharging from the development site.

(i) The drainage capacity of the Woongoolba Flood Mitigation Scheme Area for rainfall events up to 1 in 10 year, 72 hours is maintained (contained within the Scheme drains within a 4 day period) and this capacity is not eroded due to cumulative impact of development.

### 9.4.1.3 Specific benchmarks for assessment

**PART B – ASSESSABLE DEVELOPMENT BENCHMARKS**

**Table 9.4.1-1: Change to ground level and creation of new waterways code – for assessable development**

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **Finished surface levels** | | | |
| **PO1**<br>The finished surface level is free draining and free from localised flooding. | **AO1**<br>Development is free draining and the surface gradient of the fill and/or excavated area is between 0.5% to 1.5%.<br>OR<br>For steep surface gradients, integration with the surrounding topography must be achieved so that the finished profile does not interrupt or materially change the surface water. | **COMPLIES** | |
| **Stormwater drainage** | | | |
| **PO2** | **AO2.1**<br>The change to ground level maintains flood conveyance through the site for flood events up to a 1 in 100 (Q100) year Average Recurrence | **COMPLIES** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| Development does not cause adverse stormwater drainage impacts on or off the site. | Interval (ARI) storm event using the drainage strategy in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design standards**. | | |
| | **AO2.2**<br>The change in ground level does not involve fill below the designated flood level, unless approved as part of a development approval for material change of use or reconfiguration of a lot. | **COMPLIES** | |
| | **AO2.3**<br>The change in ground level does not result in an alteration of overland flows onto other properties or create an increase in flood damage to other properties. | **COMPLIES** | |
| **Woongoolba Flood Mitigation Scheme Catchment Area** | | | |
| **PO3**<br>In the Woongoolba Flood Mitigation Scheme Catchment Area, shown on the **Water catchments and dual supply system area overlay map**, peak outflow and its timing for Q2, Q5 and Q10 for rainfall events up to 72 hours does not change as a result of development. | **AO3**<br>No acceptable outcome provided. | **COMPLIES** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **Stormwater quantity** | | | |
| **PO4**<br>Development ensures that there is no impact on local drainage systems, so that no damage is caused to any property upstream or downstream of the site. | **AO4**<br>A site stormwater quantity management plan is prepared by a suitably qualified professional and demonstrates:<br>(a) achievable stormwater quantity control measures for discharge during both the construction and operational phases of development designed in accordance with the *Queensland Urban Drainage Manual (QUDM)* unless subject to specific requirements of **SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design**; and<br>(b) on-site detention systems are designed to restrict peak outflows for Q2, Q5, Q10, Q20 Q50 and Q100 to pre-development conditions.<br>OR<br>A Site Stormwater Quantity Management Plan is consistent with that approved in a related development approval. | **COMPLIES** | |
| **Erosion and sediment control** | | | |
| **PO5**<br>All construction and operational work is designed and managed with specific regard to the density, scale, layout and staging of development. All reasonable and practicable measures are taken to protect the environmental values of waters and the functionality of | **AO5.1**<br>An assessment is undertaken in accordance with the criteria in **Table 9.4.1-2: Erosion hazard assessment**. | **COMPLIES** | |
| | **AO5.2**<br>**Where the Erosion hazard assessment has a risk score less than or equal to 10:** | **NA** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| stormwater infrastructure from the impacts of erosion, turbidity and sedimentation, on and downstream of the development site. | a deemed-to-comply report is prepared by a suitably qualified person for Council's approval, including conceptual location and design drawings of each treatment measure in plan and section views, in accordance with the criteria within the guidelines entitled: *Urban Stormwater Quality Planning Guidelines by the Department of Environment and Heritage Protection*.<br>OR<br>**Where the Erosion hazard assessment has a risk score greater than 10:**<br>an Erosion and Sediment Control Plan (ESCP) is prepared by a suitably qualified person for Council's approval in accordance with the: *Best Practice Erosion and Sediment Control International Erosion Control Association (ICEA) 2008, Australasia Chapter 2008* detailing the stormwater (quality and flow) treatment measure during the construction phase of development, demonstrating how the minimum design objectives in **Table 9.4.1-3 Summary of design objectives for management of stormwater quality – construction phase** are achieved including: | | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| | (a) measures to ensure that the release of sediment-laden stormwater for the nominated design storm are minimised when the design storm is exceeded;<br>(b) detailed design, installation, construction, monitoring and maintenance requirements of all approved proprietary products in accordance with local conditions and manufacturers recommendations;<br>(c) detailing how the ESCP accompanying the Operational work (change to ground level) aligns with the Reconfiguration of lot staging. | | |
| | **AO5.3**<br>Where development is on a lot less than 850m$^2$, provide an ESCP in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design** and **Section 8 – Engineering drawings, documents and reports**. | **NA** | |
| | **AO5.4**<br>Where development is on a lot equal to or more than 850m$^2$, provide an ESCP in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design** and **Section 8 – Engineering drawings, documents and reports**. | **COMPLIES** | |
| **Hydraulic considerations** | | | |
| **PO6** | **AO6** | **COMPLIES** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| Any change to the level of the land does not have adverse flooding and drainage impacts. | An Hydraulic report is prepared by a suitably qualified professional to accord with the Council's hydraulic requirements, demonstrating that the change to the level of the land does not:<br>(a) cause ponding on the site or nearby land;<br>(b) increase flooding which adversely affects the safety or use of any land upstream and downstream;<br>(c) adversely affect the flow of water in any overland flow path, or otherwise. | | |
| **Geotechnical fill** | | | |
| **PO7**<br>Material used as fill has the ability to adequately support future development of the land. | **AO7**<br>The fill material type, composition and source is geotechnically suitable and adequately compacted to support future development, in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 3 – Change to ground level standards**. | **COMPLIES** | |
| **Geotechnical stability** | | | |
| **PO8**<br>All earthworks are carried out in a location which is not at risk from geotechnical instability. | **AO8**<br>The site is free of compressible soils (e.g. soft clays underneath the site).<br>OR<br>Where the site is underlain by compressible soils, a Geotechnical stability assessment report is prepared by a suitably qualified professional demonstrating the treatment of compressible soils achieves a stable ground able to support future structures. | **COMPLIES** | |
| **Batters and retaining wall** | | | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **PO9**<br>Batters and retaining walls do not create a negative visual impact on the area. | **AO9**<br>Batters and retaining walls are in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 3 – Change to ground level standards**. | **COMPLIES** | |
| **Local amenity, noise and emissions** | | | |
| **PO10**<br>Change to ground level or bulk earthwork activities do not impact on the amenity of the area. | **AO10.1**<br>Development work, which has the potential to generate dust is controlled by:<br>(a) daily water spraying of exposed areas;<br>(b) sealed roads;<br>(c) protective covering of exposed areas; and<br>(d) installing wind barriers. | **COMPLIES** | |
| | **AO10.2**<br>All earthworks on the site is undertaken within the following days and hours:<br>**Day** — **Hours**<br>Monday to Friday — between 6:30am and 6:30pm<br>Saturday — between 6:30am and 6:30pm | **COMPLIES** | |
| **Managing contamination risk** | | | |
| **PO11**<br>Any filling or excavation material does not result in the contamination of land. | **AO11**<br>All fill material is solid clean earth or clean inert material, free of organic, putrescible or refuse matter. | **COMPLIES** | |
| **Haulage activity and amenity** | | | |
| **PO12** | **AO12.1** | **COMPLIES** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| Haulage activities do not impact on the amenity of the area. | Where transportation of fill material to or from the site is involved, the following applies:<br>(a) loads are covered;<br>(b) spilled or wheel-tracked material is immediately cleaned from external roads; and<br>(c) heavy vehicle traffic is controlled. | | |
| | **AO12.2**<br>All waste material, including vegetation from the site is disposed of in an approved location. | **COMPLIES** | |
| | **AO12.3**<br>All haulage routes are approved:<br>(a) for declared main roads – by the Department of Transport and Main Roads;<br>(b) for all other roads – by the Council. | **COMPLIES** | |
| | **AO12.4**<br>All haulage to and from the site is conducted within the following days and hours:<br>**Day** — **Hours**<br>Monday to Friday — between 6am and 6pm<br>Saturday — between 7am and 6pm | **COMPLIES** | |
| **Created new waterways** | | | |
| **PO13**<br>The waterway contributes to the amenity of the development and the surrounding area. | **AO13.1**<br>Created waterways within an Operational work (change to ground level) application are designed and managed for any of the following end-uses: | **NA** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| | (a) amenity, aesthetics, landscaping or recreation;<br>(b) flood management;<br>(c) stormwater harvesting within an integrated water-cycle management plan; and<br>(d) aquatic habitat. | | |
| | **AO13.2**<br>The end-use of the created waterway is designed and operated to protect water environmental values. | **NA** | |
| **PO14**<br>The created waterway location is compatible with the land-use constraints of the site protecting water environmental values in existing natural waterways. | **AO14.1**<br>The created waterway within the Operational work (change to ground level) application achieves the following:<br>(a) environmental values in downstream waterways are protected;<br>(b) groundwater recharge areas are not affected;<br>(c) the waterway location incorporates low-lying areas of a catchment connected to an existing waterway; and<br>(d) any existing areas of ponded water are included. | **NA** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| | **AO14.2**<br>Created waterways:<br>(a) are located outside natural wetlands, waterways and associated buffer areas;<br>(b) avoid soil or sediment disturbance; and<br>(c) avoid alteration of the natural hydrologic regime in acid sulfate soil and nutrient hazard areas. | **NA** | |
| **PO15**<br>The created waterway's location is compatible with existing tidal waterways. | **AO15**<br>Where the created waterway is adjacent or connected to a tidal waterway by a weir, lock, pumping system or similar:<br>(a) there is sufficient flushing or a tidal range of >0.3m;<br>OR<br>(b) any tidal flow alteration does not adversely impact on the tidal waterway;<br>OR<br>(c) there is no introduction of salt water into freshwater environments. | **NA** | |
| **PO16**<br>Created waterways are designed and managed to support the legislated environmental values and water quality objectives within *Environmental Protection (Water) Policy 2009* of connected receiving water environments. | **AO16.1**<br>The created waterway within the Operational work (change to ground level) application is designed, constructed and managed by a suitably qualified Registered Professional Engineer Queensland (RPEQ) with specific artificial waterway experience. | **NA** | |
| | **AO16.2**<br>The created waterway within the Operational work (change to ground level) application is | **NA** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| | supported by a Water Quality Management Plan, prepared by a suitably qualified professional, demonstrating the following:<br>(a) water quality of the created waterway is the same or higher standard as the existing water quality;<br>(b) long-term maintenance of the water quality standard is achieved; and<br>(c) breeding potential of biting insects is minimised. | | |
| | **AO16.3**<br>The created waterway does not have deep, isolated holes that stratify and increase the possibility of algal blooms occurring. | **NA** | |
| | **AO16.4**<br>Pumping from a created waterway to maintain water quality is avoided. | **NA** | |
| | **AO16.5**<br>The created waterway is designed with a suitable outlet to ensure that flooding is possible, if required. | **NA** | |
| | **AO16.6**<br>Stormwater is treated before any stormwater enters a created waterway. | **NA** | |
| **PO17**<br>Operational work does not cause geotechnical bank instability, erosion, bed scour or revetment wall collapse to existing or newly created waterway. | **AO17**<br>Edge treatments certified by a suitably qualified person are in place during and post-construction phase to strengthen the embankment and protect from damage. | **NA** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **PO18**<br>The waterway is managed and operated to achieve the water quality objectives *(Environmental Protection (Water) Policy 2009)* in natural waterways. | **AO18.1**<br>Monitoring and maintenance programs manage the waterway to achieve the water quality objectives downstream. | **NA** | |
| | **AO18.2**<br>Aquatic weeds are managed to achieve a low percentage (less than 10%) coverage of the water surface area. Pests and vectors are managed by avoiding stagnant water areas, providing for native fish predators, and, if necessary, other best practices for monitoring and treating pests. | **NA** | |
| | **AO18.3**<br>The created waterway is managed and operated under agreement by an appropriate entity for the life of the waterway. A Waterway Management Plan is incorporated within the Community Management Statement for the principal body corporate that: | **NA** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| | (a) identifies the waterway;<br>(b) states the period of responsibility of the entity;<br>(c) states a process for transfer of responsibility for the waterway;<br>(d) states required actions for monitoring water quality of the waterway and receiving waters;<br>(e) states required actions for maintaining the waterway to achieve the policy outcomes of the *Environmental Protection (Water) Policy 2009* and approval conditions; and<br>(f) identifies funding sources for the above matters including bonds, headworks charges or levies. | | |
| **Access to new waterways** | | | |
| **PO19**<br>Created waterways are designed to provide maintenance access to revetment walls and cleaning of the waterway. | **AO19**<br>Access is provided to the waterways by:<br>(a) dedication of land to the Crown; or<br>(b) existing access arrangements. | **NA** | |
| **PO20**<br>Created waterways to be transferred to public ownership are supported by infrastructure to ensure public safety. | **AO20**<br>Created waterways are designed to create a safe public asset by including:<br>(a) warning signs; and<br>(b) fenced areas restricting access to steep-sided embankments or large drops. | **NA** | |

**Table 9.4.1-2: Erosion hazard assessment**

| Controlling factor | Points | Score |
|---|---|---|
| **Average slope of the whole site prior to operational works** | | |
| Slope less than 2% | 0 | |
| More than or equal to 2% but less than 5% | 1 | |
| More than or equal to 5% but less than 10% | 2 | 2 |
| More than or equal to 10% but less than15% | 4 | |
| More than or equal to 15% | 5 | High Risk |
| **Soil type (to be disturbed)** | | |
| Gravels and sandy soils | 1 | |
| Sandy loam | 2 | |
| Clays on flood plains | 3 | |
| Shallow soils on slopes | 4 | 5 |
| Clays on slopes greater than 5%/imported fill or untested | 5 | High Risk |
| **Anticipated duration of site disturbance** | | |
| Duration of 2 weeks or less | 0 | |
| More than 2 weeks and up to, and including 3 months | 2 | |
| More than 3 months and up to, and including 6 months | 4 | 4 |
| More than 6 months | 5 | High Risk |
| **Anticipated erosive rainfall risk during site disturbance** | | |
| Low (monthly average rainfall less than 45 mm) | 0 | |
| Moderate (monthly average rainfall 46 - 100 mm) | 1 | |
| High (monthly average rainfall 101 - 225 mm) | 2 | 2 |
| Very high (monthly average rainfall 226 - 1500 mm) | 4 | |
| Extreme (monthly average rainfall more than 1500 mm) | 5 | High Risk |
| **Off-site sediment control (down-slope of the soil disturbance)** | | |

| Controlling factor | Points | Score |
|---|---|---|
| Score 1 point if there is no purpose-built sediment trap (e.g. sediment basin, gross pollutant trap or purpose-built wetland). | 1 | 0 |
| **Run-off entering the site** | | |
| Score 1 point if stormwater run-off is not diverted from entering the site or away from soil disturbance. | 1 | 0 |
| **Extent of site disturbance** | | |
| Score 2 points if the building works requires reshaping of the ground surface. | 2 | 2 |
| **Total Score**<br>**Note: High erosion risk - if score 11 or greater, or 5 for any factor.** | | |

This Erosion Hazard Assessment form is adapted from the Best Practice Erosion and Sediment Control, International Erosion Control Association (Australasia), IECA 2008 Appendix H - Building Sites, the Brisbane City Council Erosion Hazard Assessment Form and Attachment 2 to the QDC Draft Part 16 Erosion and Sediment Control.

**Table 9.4.1-3: Summary of design objectives for management of stormwater quality – construction phase**

| Construction phase stormwater design objectives | Notes |
|---|---|
| **Drainage control** | |
| Design life and design storm of temporary drainage works:<br>(1) Disturbed area open for less than 12 months - 1 in 2 ARI.<br>(2) Disturbed area open for 12-24 months - 1 in 5 ARI.<br>(3) Disturbed area open for more than 24 months - 1 in 10 ARI. | • ARI = Average Recurrence Interval (see Engineers Australia document Australian Rainfall and Runoff).<br>• Design capacity excludes minimum 150 mm freeboard.<br>• A higher drainage design objective may be required for temporary drainage structures upslope of occupied properties.<br>• A revised drainage design storm may be required if these design objectives are found to be impracticable (e.g. in North Queensland). |
| **Erosion control** | |
| (1) Minimise exposure of disturbed soils at any time.<br>(2) Avoid or minimise large construction activities in the 'wet season'. | • 'Wet season' means the high rainfall months, e.g. the four highest rainfall months. |

| Construction phase stormwater design objectives | Notes |
|---|---|
| (3) Divert water run-off from undisturbed areas around disturbed areas.<br>(4) Use erosion risk ratings to determine appropriate erosion control measures. | • For point 4, determine the erosion risk rating using local rainfall erosivity, rainfall depth, or soil loss rate or other acceptable method. A rating scale such as very low, low, moderate, high, extreme should be applied. Such ratings should reflect the local area. Example ratings may be shown in local council guidelines or detailed in best-practice guidelines. |
| **Sediment control** | |
| (1) Use soil loss rates to determine appropriate sediment control measures.<br>(2) Design storm for sediment control basins should be based on retaining the maximum sediment quantity for the maximum volume of water run-off.<br>(3) Site discharge during sediment basin dewatering should not exceed 50 mg/L TSS and pH between 6.5 - 8.5. | • For point 1, surrogate determinations may be used such as monthly erosion or average monthly rainfall.<br>• For point 2, a commonly used design storm for basin sizing is 80th percentile five-day event. Depending on the settling characteristics of local soils, a higher 'operational' design storm can be achieved with chemical dosing operated in flow-through mode in a large storm with rainfall-activated auto-flocculent dosing, and advanced hydraulic efficiency features such as floating off-takes, and a sediment forebay.<br>• For point 3, TSS = Total Suspended Solids. Turbidity measurements (e.g. 60 Nephelometric Turbidity Units (NTU)) could be used; however, for accuracy, a site-specific relationship should be developed between turbidity and TSS. |

# City Plan code template

This code template supports the preparation of a development application against either the acceptable outcome(s) or performance outcome(s) contained in the code. Development assessment rules are outlined in **Section 5.3.3** of the City Plan.

**Please note:**

For assessment against the overall outcomes, refer to the appropriate code.

Note: The whole of the planning scheme is identified as the assessment benchmark for impact assessable development. This specifically includes assessment of impact assessable development against this strategic framework. The strategic framework may contain intentions and requirements that are additional to and not necessarily repeated in zone, overlay or other codes. In particular, the performance outcomes in zone codes address only a limited number of aspects, predominantly related to built form. Development that is impact assessable must also be assessed against the overall outcomes of the code as well as the strategic framework.

## 9.4.2 Driveways and vehicle crossings code

### 9.4.2.1 Application

This code applies to assessing operational work for vehicle access works and material change of use for any development involving vehicle access works where indicated within **Part 5 Tables of assessment**.

When using this code, reference should be made to **Section 5.3.2** and, where applicable, **Section 5.3.3**, in **Part 5**.

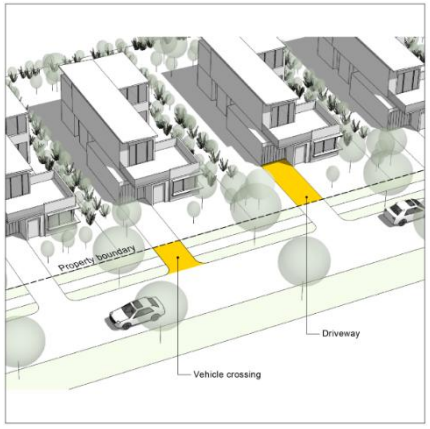



**Figure 9.4.2-1**

Illustration showing the driveway and vehicle crossing components of vehicle access works

### 9.4.2.2 Purpose

(1) The purpose of the Driveways and vehicle crossings code is to provide design standards for the construction, repair or modification to a driveway and/or a vehicle crossing.

(2) The purpose of the code will be achieved through the following overall outcomes:

(a) Vehicle crossings are designed to a standard in accordance with **SC6.12 City Plan policy – Land development guidelines** or with RPEQ certification to provide safe access for vehicles required to access the site from the edge of the road carriageway to the property boundary.

(b) Driveways provide safe access for all vehicles required to access the site from the property boundary to the on-site vehicle accommodation or standing area.

(c) Vehicle crossings avoid adverse impacts on City or utility infrastructure.

(d) Driveways and vehicle crossings are of an appropriate standard to meet the needs of the development.

(e) Vehicle crossings ensure that there is minimal loss of on-street car parking spaces.

(f) Driveways and vehicle crossings are designed and sited to maintain streetscape elements and retain space for the future planting of street trees.

(g) Vehicle crossings allow for the safety of all users of the existing and planned road and active transport networks.

(h) Driveways and vehicle crossings are designed such that vertical and horizontal alignments provide a continuous, smooth access of good rideability and clearance for all vehicles required to access the site.

(i) Driveways and vehicle crossings are designed and sited to mitigate stormwater drainage impacts.

### 9.4.2.3 Specific benchmarks for assessment

## PART B – ASSESSABLE DEVELOPMENT BENCHMARKS

### Table 9.4.2-2: Driveways and vehicle crossings code – assessable development

<table>
<tr><th>Performance outcomes</th><th>Acceptable outcomes</th><th>Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome</th><th>Internal use</th></tr>
<tr><td colspan="2">Design</td><td></td><td></td></tr>
<tr><td>PO1<br>The driveway is designed in accordance with the applicable requirements in AS2890:2009 – Parking Facilities.</td><td>AO1<br>No acceptable outcome provided.</td><td>COMPLIES</td><td></td></tr>
<tr><td>PO2<br>Design of the vehicle crossing is certified by a RPEQ confirming compliance with:<br>(a) Disability Discrimination Act 1992;<br>(b) Applicable requirements in AS2890: 2009 – Parking Facilities; and<br>(c) QUDM (Queensland Urban Drainage Manual).</td><td>AO2<br>The vehicle crossing is designed in accordance with SC6.12 City Plan policy – Land development guidelines, Section 2 – Transport network standards.</td><td>COMPLIES</td><td></td></tr>
<tr><td></td><td>AO3<br>Vehicle crossings are separated from:<table><tr><th>Instance</th><th>Minimum distance</th></tr></table></td><td>COMPLIES</td><td></td></tr>
</table>

| Performance outcomes | Acceptable outcomes | | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|---|
| **PO3**<br>The vehicle crossing avoids damage to utility services, pathways, kerbs, road pavement and seal and other city infrastructure. | Traffic management devices and transport services, stormwater management devices, power supply services and telecommunication supply services | 1m | | |
| | Water and sewerage service assets on the surface (including water meter enclosures, sewerage inspection or maintenance pits, fire hydrants and valves) | 300mm (horizontal distance) | | |

<table>
<tr><th>Performance outcomes</th><th>Acceptable outcomes</th><th>Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome</th><th>Internal use</th></tr>
<tr><td colspan="2">Maximum number of vehicle crossings</td><td></td><td></td></tr>
<tr><td rowspan="5">PO4<br>The number of vehicle crossings are minimised to avoid loss of streetscape elements and on-street car parking spaces and to prevent adverse interference with:<br>(a) the safety, capacity and operations of the existing or planned road network; and<br>(b) cycleways or pedestrian footpaths.</td><td>AO4<br>The maximum number of vehicular crossings per site, for the following land uses, is as follows:</td><td rowspan="5">COMPLIES</td><td rowspan="5"></td></tr>
<tr><td><table><tr><th>Land use</th><th>Maximum number of vehicle crossings</th></tr><tr><td>Dwelling house</td><td>1<br>OR<br>2 - when the road frontage at the kerb is at least 40m subject to achieving a minimum of 7m between the crossings</td></tr><tr><td>Dual occupancy<br>Multiple dwelling</td><td>1<br>OR<br>2 - where the road frontage at the kerb is greater than 20m subject to achieving a minimum of 7m between the crossings</td></tr><tr><td>Non–residential use</td><td>2</td></tr></table></td></tr>
<tr><td>Note: the maximum number of vehicle crossings and separation distance is shown above unless otherwise approved in a current development approval.</td></tr>
<tr><td colspan="2">Separation distances</td><td></td><td></td></tr>
<tr><td rowspan="2">PO5<br>Vehicle crossings are appropriately separated from other vehicle</td><td>AO5<br>Vehicle crossings are separated from:</td><td rowspan="2">COMPLIES</td><td rowspan="2"></td></tr>
<tr><td><table><tr><th>Instance</th><th>Minimum distance (m)</th></tr></table></td></tr>
</table>

| Performance outcomes | Acceptable outcomes | | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|---|
| crossings and side property boundaries to prevent interference with:<br>(a) the safety, capacity and operations of the existing or planned road network;<br>(b) adjoining properties; and<br>(c) cycleways or pedestrian footpaths. | Vehicle crossings on adjoining properties | 1m | | |
| | Any side property boundary: | | | |
| | • for residential development with approved built-to-boundary setback | 0.5m | | |
| | • for all other developments | 1m | | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **Location** | | | |
| **PO6**<br>Vehicle access to a public roadway is safe and does not compromise the efficiency, function, convenience of use or capacity of the road network. | **AO6.1**<br>The location of the vehicle crossing to a public roadway is consistent with the applicable requirements in *AS/NZS 2890.1:2004 Parking facilities Part 1: Off-street car parking* and *AS 2890.2–2002 Parking facilities Part 2: Off-street commercial vehicle facilities*. | **COMPLIES** | |
| | **AO6.2**<br>No new vehicle crossings are created on roads identified on the **Functional road hierarchy** as shown on the Zone maps or the **Pacific motorway service road types overlap map**. | **NA** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **PO7**<br>Driveways and vehicle crossings:<br>(a) ensure existing street trees within the verge are retained;<br>(b) provide an appropriate separation distance to existing street trees within the verge in accordance with *AS4970:2009 – Protection of trees on development site*; and<br>(c) retain space for the future planting of street trees within the verge in accordance with **SC6.13 City Plan policy – Landscape work**.<br>**Note: The location of the driveway and vehicle crossing is considered at the design stage of the development.** | **AO7**<br>No acceptable outcome provided. | **COMPLIES** | |
| **Sight distances and lines** | | | |
| **PO8**<br>Vehicle crossings are designed to provide safe travel for vehicles, cyclists and pedestrians. | **AO8**<br>Vehicle crossings are designed to provide sight distances and lines in accordance with *AS 2890.2-2002 Parking facilities Part 2: Off-street commercial vehicle facilities*. | **COMPLIES** | |

# City Plan code template

This code template supports the preparation of a development application against either the acceptable outcome(s) or performance outcome(s) contained in the code. Development assessment rules are outlined in **Section 5.3.3** of the City Plan.

**Please note:**

For assessment against the overall outcomes, refer to the appropriate code.

Note: The whole of the planning scheme is identified as the assessment benchmark for impact assessable development. This specifically includes assessment of impact assessable development against this strategic framework. The strategic framework may contain intentions and requirements that are additional to and not necessarily repeated in zone, overlay or other codes. In particular, the performance outcomes in zone codes address only a limited number of aspects, predominantly related to built form. Development that is impact assessable must also be assessed against the overall outcomes of the code as well as the strategic framework.

## 9.4.15 Works for infrastructure code

### 9.4.15.1 Application

This code applies to assessing operational work for development where indicated in **Part 5 Tables of assessment – Operational work**.

When using this code, reference should be made to **Section 5.3.2** and, where applicable, **Section 5.3.3**, in **Part 5**.

### 9.4.15.2 Purpose

(1) The purpose of the Works for infrastructure code is to ensure that all works for infrastructure is designed and constructed with the City's best land development practices.

(2) The purpose of the code will be achieved through the following overall outcomes:

- (a) The design, construction, operation and maintenance of infrastructure is cost effective over its lifecycle, whilst providing an appropriate level of service;
- (b) Environmental and property impacts are avoided along with the potential for stormwater and ground water to enter the city's wastewater system;
- (c) The integrity of existing infrastructure is not compromised;
- (d) Movement networks are designed and constructed to be functional, safe and achieve good connectivity; and
- (e) A high standard of public health and safety is maintained.

### 9.4.15.3 Specific benchmarks for assessment

**PART B – ASSESSABLE DEVELOPMENT BENCHMARKS**

**Table 9.4.15-1: Works for infrastructure code – for assessable development only**

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **Movement network design and construction** | | | |
| **PO1**<br>The movement network is designed and constructed to be functional, safe and achieve good connectivity. | **AO1**<br>The movement network is designed and constructed in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 2 – Transport network standards**. | **COMPLIES** | |
| **Stormwater drainage design and management** | | | |
| **PO2**<br>Stormwater drainage is designed and constructed to:<br>(a) integrate hydrologic and hydraulic elements;<br>(b) demonstrate a feasible and functional drainage system; and<br>(c) not cause adverse stormwater drainage impacts. | **AO2.1**<br>The stormwater drainage system is designed and constructed in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design.** | **COMPLIES** | |
| | **AO2.2**<br>The stormwater drainage system connects to a lawful point of discharge. | **COMPLIES** | |
| **Street lighting** | | | |
| **PO3**<br>Street lighting is designed and constructed to enhance pedestrian and traffic safety. | **AO3**<br>Street lighting is designed and constructed in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 2 – Transport network standards**. | **NA** | |
| **Water supply reticulation design** | | | |
| **PO4** | **AO4** | **COMPLIES** | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| Water supply reticulation is designed and constructed to convey drinking water to all properties with adequate quality, pressure and volume of flow for household and fire fighting purposes. | Water supply reticulation is designed and constructed in accordance with the *South East Queensland Water Supply and Sewerage Design and Construction Code* as applicable to the City of Gold Coast. | | |
| **Sewerage reticulation design** | | | |
| **PO5**<br>Sewerage reticulation is designed and constructed to ensure adequate quality and minimise inflow, infiltration, health and environmental risks. | **AO5**<br>Sewerage reticulation is designed and constructed in accordance with the *South East Queensland Water Supply and Sewerage Design and Construction Code* as applicable to the City of Gold Coast. | **COMPLIES** | |
| **Open space and recreational facilities design** | | | |
| **PO6**<br>Open-space areas and recreational facilities are designed and constructed to an appropriate standard, having regard to their intended recreational use and environmental values. | **AO6**<br>Open-space areas and recreation facilities are designed and constructed in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 5 – Public open space standards**. | **COMPLIES** | |
| **Underground service conduits** | | | |
| **PO7**<br>Underground service conduits are designed and constructed in accordance with State/Federal guidelines to meet service provider's requirements. | **AO7**<br>No acceptable outcome provided. | **COMPLIES** | |

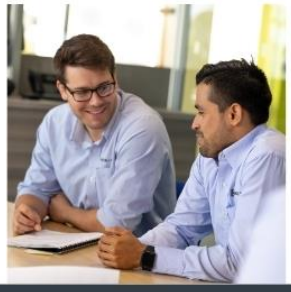
| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **Assets – general provisions** | | | |
| **PO8**<br>Asset design, construction and maintenance achieves:<br>(a) delivery of high quality assets that are not a financial or resource burden, beyond reasonable expectations, to the community or the Council as the asset custodian;<br>(b) cost effective ongoing operation and maintenance of assets;<br>(c) no unreasonable financial or economic burden in the ongoing, long-term operation of the asset;<br>(d) maintenance of public health and safety;<br>(e) maintenance of health and safety for person/s maintaining and managing assets; and<br>(f) minimise adverse impacts to the environment (including the amenity of the local area) in the short and long term needs of users. | **AO8.1**<br>Design, construction, maintenance and transfer of assets are undertaken in accordance with **SC6.12 City Plan policy – Land development guidelines**. | **COMPLIES** | |
| | **AO8.2**<br>Life-cycle cost analysis of assets is undertaken in accordance with **SC6.12 City Plan policy – Land development guidelines**. | **COMPLIES** | |
| | **AO8.3**<br>Expected asset life, maintenance activities (including frequency) and resources are estimated and included in a maintenance and management plan in accordance with **SC6.12 City Plan policy – Land development guidelines**. | **COMPLIES** | |
| **Driveways and vehicle crossings** | | | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **PO9**<br>Development does not compromise:<br>(a) existing or approved locations for driveways and vehicle crossings; or<br>(b) where (a) does not apply, the ability for a lot to achieve vehicle access that complies with **Part 9.4.2 Driveways and vehicle crossings code**.<br>**Note: Engineering plans showing indicative vehicle crossings for proposed lots is the method of demonstrating compliance with this performance outcome. Compliant offsets from services and vehicle crossings grades should be included on the plans.** | **AO9**<br>No acceptable outcome provided. | **COMPLIES** | |

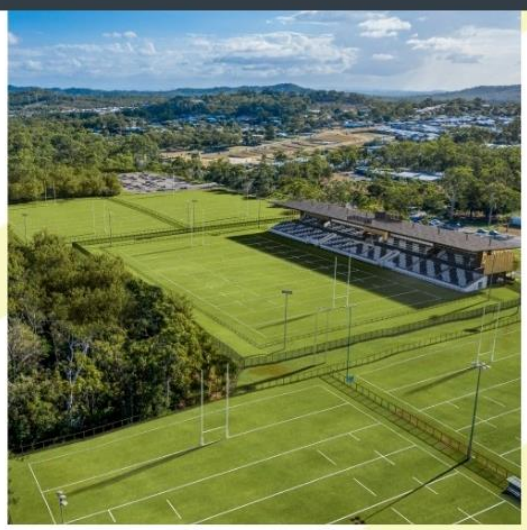
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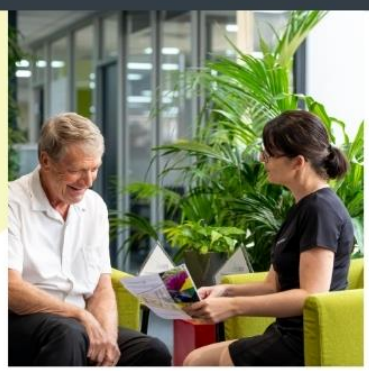


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# 2 Karingal Drive, Pimpama
# Conceptual Stormwater Management Plan

| | |
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| **Client:** | Bosform Pty Ltd |
| **Project Number:** | BE200223 |
| **Document Number:** | BE200223-RP-CSMP-02 |
| **Date of Issue:** | July 2026 |

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| Date: | 10/7/2026 |

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# Executive Summary

This Conceptual Stormwater Management Plan (CSMP) has been prepared for Bosform Pty Ltd, the proponent of this Development Application. The proponent is seeking Development Approval for a proposed 57 lot multi-unit development over 2 Karingal Drive, Pimpama properly described as Lot 19 on RP 152380 (the subject site). This CSMP has been updated to respond to a request for information received on 27/04/2026 under application COM/2026/92.

The subject site is situated within the City of Gold Coast Local Government Area (LGA) and is zoned by the City of Gold Coast City Plan Version 13 as '*Medium Density Residential*'.

**Stormwater Quantity**

- The Lawful Point of Discharge for the site has been defined as the existing waterway on the site's eastern property boundary.
- Stormwater runoff from Catchment A1 will be conveyed to a detention tank, where it will be released at the LPD in a controlled manner to ensure that there is non-worsening peak flow in the post-developed scenario. The detention tank A1 will have a 1% AEP volume of 469m$^3$.
- Bioretention basin A2 does not form part of the peak-flow mitigation scenario;
- There is a 141.69 ha external catchment which is conveyed through the site via an existing waterway, no development is proposed within this waterway;
- Peak discharge from the developed catchment will be that of or less than the pre-developed scenario.
- As the site is within the Woongoolba flood mitigation scheme catchment area, peak outflows and timings have been assessed for Q2, Q5 and Q10 for rainfall events up to 72 hours and does not change as a result of development

**Stormwater Quality**

- To achieve the City of Gold Coast's Water Quality Objectives, it is proposed to use a mix of bioretention systems and proprietary devices to treat stormwater runoff. These bioretention systems will be private infrastructure, owned and maintained by the body corporate.
- The required treatment for catchment A1 will be a minimum of 8 x ATLAN Stormsacks and 8 x ATLAN Filters.
- The bioretention device positioned within Catchment A2 will have a total filter media footprint of 40m$^2$.

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Appendix B – Time of Concentration and Rational Method Calculation
Appendix C – XP-SWMM Input Parameters
Appendix D – MUSIC Input Parameters
Appendix E – Burchills Engineering Solutions Conceptual Stormwater Management Drawings
Appendix F – Burchills Engineering Solutions Preliminary Civil Engineering Drawings

# 1. Introduction

This Conceptual Stormwater Management Plan (CSMP) has been prepared for Bosform Pty Ltd, the proponent of this Development Application. The proponent is seeking Development Approval for a proposed 57 lot multi-unit townhouse development over 2 Karingal Drive, Pimpama properly described as Lot 19 on RP 152380 (the subject site).

The subject site is situated within the City of Gold Coast Local Government Area (LGA) and is zoned by the City of Gold Coast City Plan Version 13 as '*Medium Density Residential*'.

## 1.1 Response to Information Request – 27/04/2026 - COM/2026/92

| Item | Information Requested | Response |
|---|---|---|
| **Landscape** | | |
| **Stormwater outlets** | | |
| **9.** | Engineering plans detail three (3) stormwater outlets which empty into proposed public open space for conservation purposes. The applicant is requested to review the location of these outlet points to limit the impact of private infrastructure within this area. These outlets could be moved closer to the development footprint or an alternative structure such as a level spreader could be designed at the development footprint interface. | Complies. The proposed Outlets have been moved closer to the development footprint. Please refer to Roadworks & Drainage Layout Plan on sheet C3001 & C3002 of the BE20023 plan set prepared by Burchills Engineering Solutions. |
| **Civil Engineering** | | |
| **Stormwater tank detail and maintenance** | | |
| **19.** | Council officers acknowledge the Conceptual Stormwater Management Plan (CSMP) prepared by Burchills Engineering Solutions (dated 13 March 2026), which includes a conceptual stormwater layout indicating a proposed 400 m² detention tank. However, the level of detail provided for the tank is insufficient to demonstrate compliance with the Healthy Waters Code. The applicant is requested to provide the following: | |
| | a) Provide cross-sectional and site plan details for the detention tank, clearly identifying the location of the filter cartridge bay containing 8 × ATLAN filter cartridges. Ensure the treatment area of the tank is not included in the detention volume calculations and Atlan filters are positioned before the detention component. | Complies. See section 1 & 2 on sheet C3050 of the BE20023 plan set prepared by Burchills Engineering Solutions. |
| | b) Demonstrate maintenance access to the detention tank for both quality and quantity (i.e. two maintenance access points). | As above. |
| | c) Update the Operational Control Plan showing location of Stormsacks. | Complies. See Roadworks & Drainage Layout Plan on sheet C3001 & C3002 of the BE20023 plan set prepared by Burchills Engineering Solutions. |
| | d) Provide erosion protection measures to outlets. | Complies. |
| | e) Provide long sections of the proposed stormwater drainage systems (e.g., pits, pipes, bioretention basin, tank, outlets) demonstrating invert level, grade, cover, connection and discharge | Long sections of the proposed drainage systems are to be provided during the detailed design phase of this project. |
| **Unjustified Additional Discharge Outlet for proposed Lot 192 (The Fernhurst development)** | | |

| | | |
|---|---|---|
| **20.** | The provided drawings number C3000 and C3002 of the Conceptual Stormwater Management Plan (CSMP) prepared by Burchills Engineering Solutions (dated 13 March 2026) are inconsistent with the details in the report. The drawings indicate a discharge outlet located upstream of the bioretention basin; however, this outlet is not referenced or described within the report. The applicant is required to: | |
| | a) Provide justification for the purpose and function of the additional discharge outlet; and | The additional discharge outlet forms part of the proposed splitter pit arrangement. Q3 month flows are diverted to the bioretention basin for treatment, while major flows bypass the basin via the splitter pit and discharge to the existing creek, ensuring the treatment system operates within its design capacity.<br><br>It should be noted that the proposed bioretention basin A2 does not provide any detention or quantity mitigation and is for quality treatment purposes only. |
| | b) Ensure that all modelling and reporting details are consistent with the corresponding stormwater layout drawings. | BE200233-RP-CSMP-02 has been updated to be consistent with the proposed civil engineering design. |

## 1.2 Background

## 1.3 Regulatory Requirements and Technical Guidelines

The strategies proposed in this CSMP have been developed to address the requirements of the City of Gold Coast City Plan Version 13, and have also been prepared in accordance with the following guidelines:

- SC6.9 City Plan Policy – Land Development Guidelines (CoGC, 2019);
- *State Planning Policy July 2014* (DSPIP, 2014)*;*
- Queensland Urban Drainage Manual (QUDM) Fourth Edition (IPWEAQ, 2017);
- Australian Rainfall & Runoff: A Guide to Flood Estimation (Ball J, 2016);
- Australian Government – Bureau of Meteorology (Bureau of Meteorology, n.d.);
- MUSIC Modelling Guidelines (Water By Design, 2019);
- WSUD Technical Guidelines for South East Queensland – Version 1 (Healthy Waterways, BCC, MBWCP, 2006);
- Concept Design Guidelines for Water Sensitive Urban Design - Version 1 (Water By Design, 2009);
- Urban Stormwater Quality Planning Guidelines 2010 (DERM, 2010); and

## 1.4 Purpose

The main objectives of this CSMP have been established from the criteria set out in the City of Gold Coast City Plan Version 13 and are summarised as follows:

- Avoid the creation of nuisance flow or hazard problems;
- Protect the quality of surface and ground waters during construction and operation of new development;
- Maintain the natural hydraulic behaviour of catchments;
- Protect existing natural features and ecological processes; and
- Integrate stormwater management infrastructure carefully in the urban and natural landscape.

## 1.5 Scope

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

- Site description including:
    - Topography;
    - Existing Land Use; and
    - Vegetation.
- Stormwater Quantity:
    - Assessment of the peak flow rates discharging the site to ensure no adverse external impacts (up to the 1% Average Exceedance Probability (AEP)).
- Stormwater Quality:
    - Methods to ensure quality objectives of the receiving waters are achieved.

### 1.6 Site Details

Important information about the subject site has been included in Table 1.1, and a site locality map is presented in Figure 1.1. Further detail regarding the proposed development layout, please refer to the complete and latest development plans attached within Appendix A.

**Table 1.1 Site Details**

| Subject | Description |
|---|---|
| Address | 2 Karingal Drive, Pimpama |
| Lot / Plan | Lot 19 on RP 152380 |
| Local Government Area | City of Gold Coast |
| Zoning | Medium Density Residential |
| Existing Land Use | The site is currently vacant and is vegetated with grass and tree cover. |
| Topography | There is an existing waterway traversing diagonally through the site, entering the site in the southern corner, and exiting the site in the northern corner. All portions of the site generally fall towards this central waterway that splits the site into two (2) catchments. The highest points in the site are at RL 10.0m AHD in the north-west corner, and RL 8.0m AHD in the south-east corner of the site. |

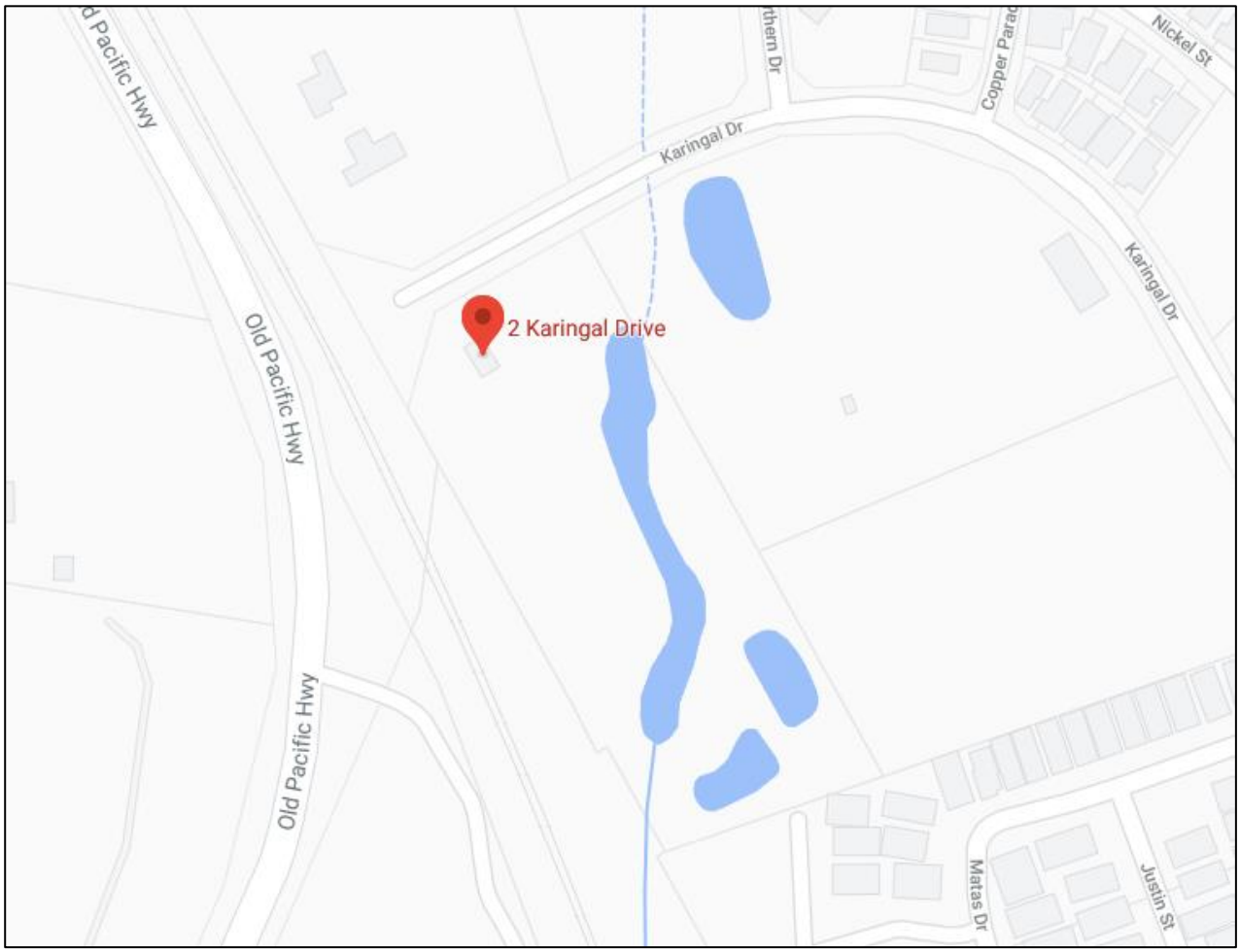



**Figure 1.1 Site Locality Map (CoGC, 2020)**

## 1.7 Proposed Development

The proposed development is seeking Council approval for Material Change of Use (multiple dwellings), Reconfiguring a Lot (2 management lots and a park Lot) and Operational Works (change to ground level and vegetation clearing). Specifically, the proposal involves a new townhouse development which comprises a complex of 16 townhouses accessing from Imelda Way and a complex of 41 townhouses accessing from Karingal Drive. The reconfiguring a lot component involves creation of management lots for these two townhouses developments and a park lot to be dedicated to Council for the drainage reserve traversing the site.

For further details, please refer design drawings prepared by MPS Architects attached in Appendix A of this report. Figure 1.2 below provides an excerpt taken from the development's site plan.

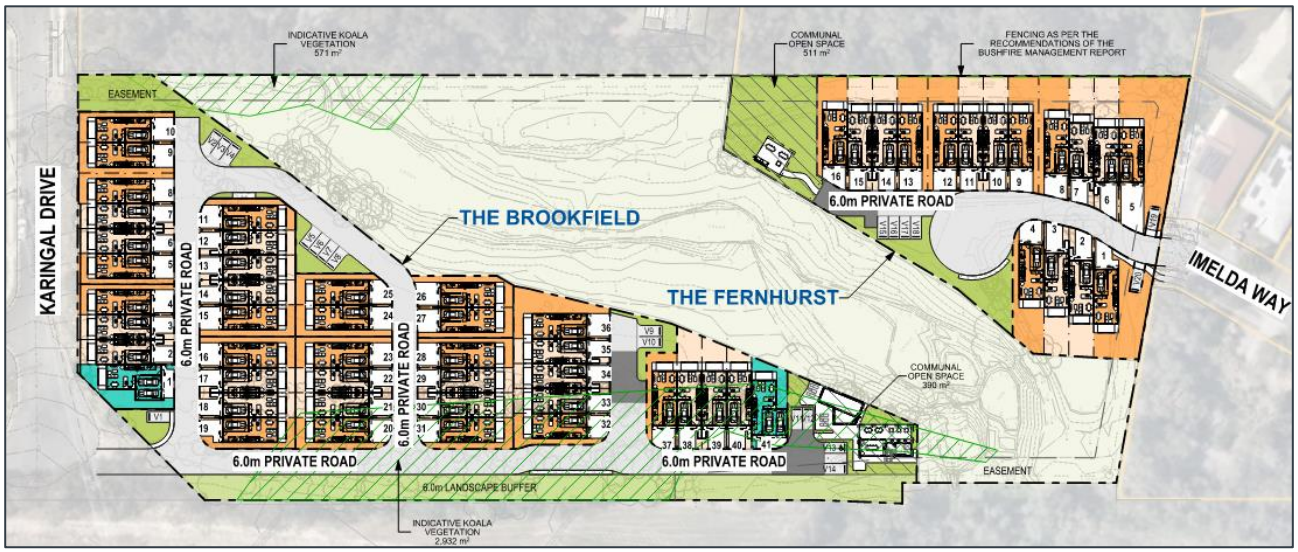



**Figure 1.2 Proposed Site Layout**

# 2. Stormwater Quantity Management Plan

## 2.1 Overview

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

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

## 2.2 Drainage Catchment Parameters

Drainage catchments have been delineated using site survey, aerial imagery and development plans in the post developed scenario. Pre and post development catchment parameters are summarised in Table 2.1. Catchment plans are provided in Appendix E.

**Table 2.1 Catchment Parameters**

| Scenario | Catchment ID | Total Area (ha) | Impervious % | Catchment Slope (%) |
|---|---|---|---|---|
| **External** | Ext A | 141.69 | 20 | 4.0 |
| **Pre-developed** | A | 2.455 | 16 | 4.8 |
| **Post-developed** | A1 | 1.081 | 70 | 4.8 |
| | A2 | 0.498 | 70 | 4.8 |
| | A3 | 0.877 | 24 | 1 |

### 2.2.1 Conveyance of Flows

Important information about the conveyance of flows for the pre-development and post-development scenarios are included in Table 2.2 below.

**Table 2.2 Conveyance of Flows**

| Subject | Description |
|---|---|
| Lawful Points of Discharge (LPD) | One (1) Lawful Point of Discharge (LPD), defined as the discharge point of the waterway that discharges to the neighboring allotment immediately east of the subject site. |
| Pre-development | The Site Catchment (A) is conveyed via overland flow to the existing waterway which forms the site's LPD.<br>Pre-development catchment plans are included in Appendix E (Drawing No. N200 and N201). |
| Post-development | Runoff over Catchment A1 is conveyed through the proposed drainage system to Detention Tank A1 (which also contains an ATLAN Filter treatment system) which then discharges to the adjacent waterway (the LPD) in a controlled manner. The stormwater piped system will be designed to convey the 1% AEP runoff into the detention tank.<br>Runoff from Catchment A2 will be conveyed through the proposed drainage system to a flow splitter, which will direct the Q3-month flows to the proposed Bioretention System A2. Flows exceeding the Q3-month design flow will discharge directly to the waterway |

| | |
|---|---|
| | via a separate outlet. This arrangement is proposed to prevent flows greater than the design flow from being directed to the bioretention basin.<br>In addition, the proposed Bioretention Basin A2 is not intended to provide detention as part of the stormwater quantity mitigation strategy. |
| External Catchments | The External Catchment (Ext A) enters the site on its western boundary via the adjacent railway culverts where it is conveyed through the site via the existing waterway. The proposed development has been designed to minimise its encroachment on the waterway. |

### 2.2.2 Lawful Points of Discharge

The site's Lawful Points of Discharge (LPD) has been identified at the site in LPD A, where the existing waterway exits the site.

In accordance with the City of Gold Coast Land Development Guidelines, stormwater discharging the site will not cause any actionable nuisance, environmental or property damage. This will be achieved by the inclusion of an onsite stormwater detention device.

## 2.3 XP-SWMM Analysis

XP-SWMM (version 2026.1) software was utilised to model the performance of the proposed stormwater quantity control measures. This modelling software is a link-node model capable of performing hydrology and hydraulics of stormwater drainage systems simultaneously.

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

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

### 2.3.1 Rational Method Comparison

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

It should be noted that although the Rational Method has been used as an initial estimate of site peak flows, it has not been used for the design of any mitigation measures nor has been used for calibration of the runoff XP-SWMM model. A comparison between the peak discharge values obtained using the Rational Method and the XP-SWMM model for the 1% AEP event at catchment discharge points is contained in Table 2.3 below.

**Table 2.3 Rational Method vs XP-SWMM Generated Peak Discharges**

| Scenario | Catchment ID | Rational ($m^3/s$) | XP-SWMM ($m^3/s$) | Difference (%) |
|---|---|---|---|---|
| **Pre-developed** | Ext A | 39.57 | 34.62 | 13 |
| | A | 0.97 | 0.96 | 1 |
| **Post-developed** | A1 | 0.62 | 0.62 | 0 |
| | A2 | 0.29 | 0.29 | 0 |
| | A3 | 0.36 | 0.28 | 22 |

The peak discharges generated by XP-SWMM and the Rational Method compare well and are considered acceptable for this assessment.

## 2.4 XP-SWMM Results

### 2.4.1 Performance of OSD

To confirm the performance of the proposed OSD system, a pre and post-development model was constructed. These models compare the discharge hydrographs for a range of storm durations at the existing Lawful Points of Discharge. A full range of events have been simulated for critical events.

A summary of the modelling results for different ARI events is contained in Table 2.4. Results of the modelling indicate the proposed system is capable of maintaining the pre-development peak discharges for all storm events up to the 1% AEP event at LPD A.

A plot of the pre-development vs post-development (mitigated) hydrographs at LPD A (including flows from Ext A) for the 1% AEP event is included as Figure 2.1. The detention sizing was optimised to achieved peak flow requirements.

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

**Table 2.4 Pre-Development vs Post-Development (Unmitigated) Peak Discharges at LPD A**

| AEP Event (%) | Pre-Development | | Post-Development | |
|---|---|---|---|---|
| | Critical Duration | Peak Discharge ($m^3/s$) | Critical Duration | Peak Discharge ($m^3/s$) |
| 1 | 120min TP9 | 35.52 | 120min TP9 | 35.54 |
| 2 | 90min TP5 | 31.22 | 90min TP5 | 31.31 |
| 5 | 120min TP7 | 28.16 | 120min TP7 | 28.39 |
| 10 | 120min TP4 | 22.32 | 120min TP4 | 22.39 |
| 18 | 120min TP9 | 16.39 | 120min TP9 | 16.44 |
| 39 | 120min TP9 | 11.11 | 120min TP9 | 11.13 |

Table 2.5 Pre-Development vs Post-Development (Mitigated) Peak Discharges at LPD A

| AEP Event (%) | Pre-Development | | Post-Development (Mitigated) | |
|---|---|---|---|---|
| | Critical Duration | Peak Discharge ($m^3/s$) | Critical Duration | Peak Discharge ($m^3/s$) |
| 1 | 120min TP9 | 35.52 | 120min TP9 | 35.48 |
| 2 | 90min TP5 | 31.22 | 90min TP5 | 31.22 |
| 5 | 120min TP7 | 28.16 | 120min TP7 | 28.09 |
| 10 | 120min TP4 | 22.32 | 120min TP4 | 22.14 |
| 18 | 120min TP9 | 16.39 | 120min TP9 | 16.39 |
| 39 | 120min TP9 | 11.11 | 120min TP9 | 11.09 |

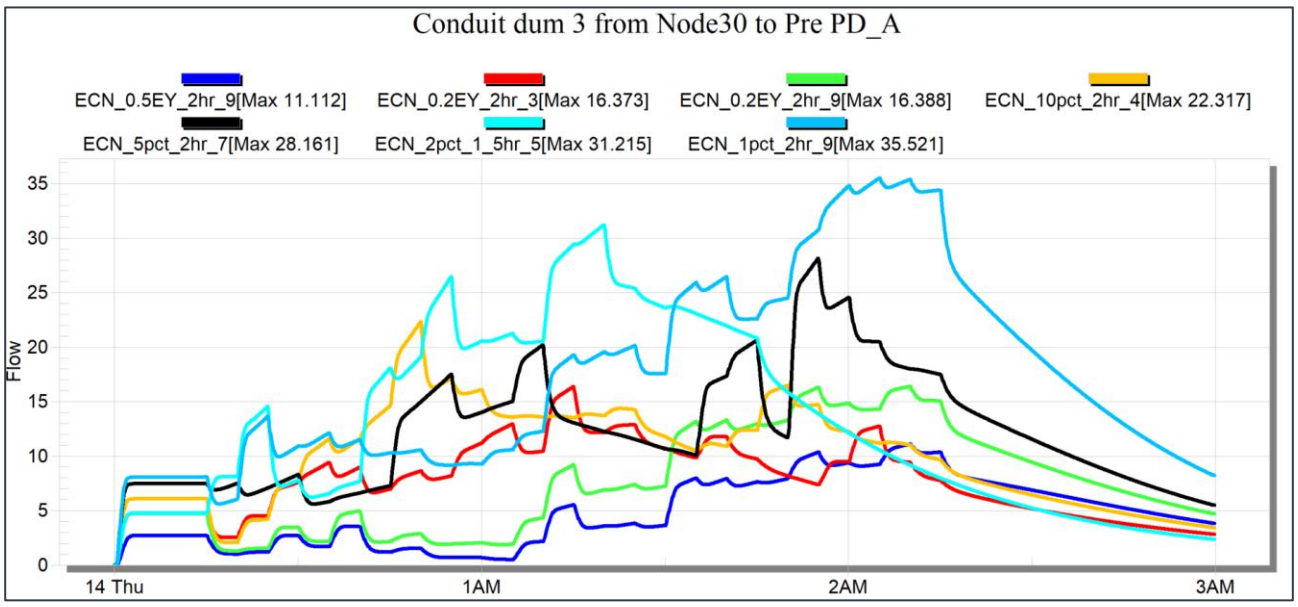



Figure 2.1 Plot of Pre-Development 1% AEP Hydrographs at LPD A

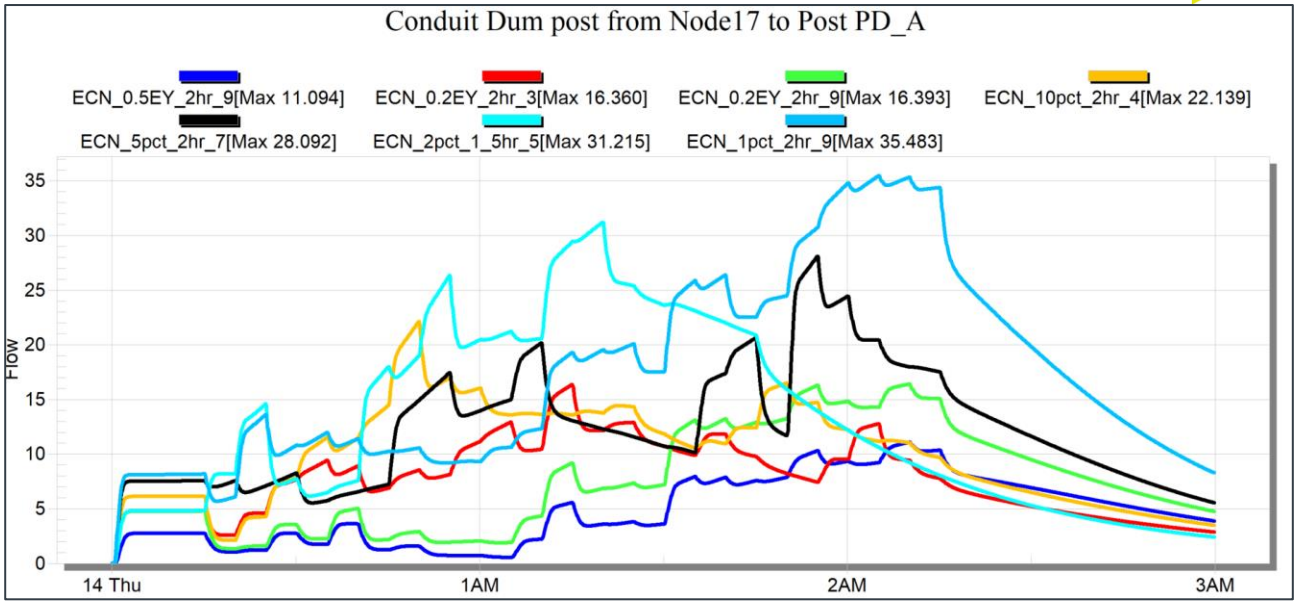



**Figure 2.2 Plot of Post-Development Mitigated 1% AEP Hydrographs at LPD A**

## 2.5 Woongoolba Flood Plain Mitigation

As the site is located within the Woongoolba flood mitigation scheme catchment area, the proposed development is required to demonstrate that peak flow rates will also be maintained in rainfall event up to that of 72 hours for 0.5EY, 0.2EY and 10% AEP events.

The results provided in Table 2.6 below indicate that the proposed detention system is capable of maintaining pre-development discharges in all durations up to the 72-hour storm event.

**Table 2.6 Pre-Development vs Post-Development Peak Discharges at LPD – Woongoolba Flood Mitigation Catchment**

| Woongoolba Flood Mitigation Catchment | | | |
|---|---|---|---|
| **AEP Event (%)** | **Critical Duration** | **Pre-Developed Peak Discharge ($m^3/s$)** | **Post-Developed (Mitigated) Peak Discharge ($m^3/s$)** |
| 39% (0.5EY) | 6hr TP4 | 8.82 | 8.81 |
| | 9hr TP5 | 9.12 | 9.11 |
| | 12hr TP4 | 6.96 | 6.94 |
| | 18hr TP1 | 5.72 | 5.72 |
| | 24hr TP5 | 6.57 | 6.56 |
| | 30hr TP10 | 5.03 | 5.03 |
| | 36hr TP5 | 4.99 | 4.99 |
| | 48hr TP9 | 6.95 | 6.94 |

| | | | |
|---|---|---|---|
| | 72hr TP1 | 3.47 | 3.47 |
| 18% (0.2EY) | 6hr TP6 | 12.51 | 12.47 |
| | 9hr TP5 | 13.04 | 13.02 |
| | 12hr TP4 | 10.16 | 10.13 |
| | 18hr TP1 | 8.76 | 8.75 |
| | 24hr TP5 | 9.53 | 9.51 |
| | 30hr TP1 | 7.31 | 7.31 |
| | 36hr TP5 | 7.13 | 7.13 |
| | 48hr TP9 | 9.83 | 9.83 |
| | 72hr TP10 | 5.12 | 5.12 |
| 10% | 6hr TP8 | 16.78 | 16.78 |
| | 9hr TP9 | 13.99 | 13.99 |
| | 12hr TP10 | 12.75 | 12.72 |
| | 18hr TP6 | 9.16 | 9.16 |
| | 24hr TP8 | 9.55 | 9.52 |
| | 30hr TP7 | 11.26 | 11.26 |
| | 36hr TP3 | 7.73 | 7.73 |
| | 48hr TP3 | 8.69 | 8.68 |
| | 72hr TP4 | 6.31 | 6.31 |

### 2.6 On Site Detention (OSD) Details

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

Table 2.7 below contains the details of the proposed OSD systems within the subject site.

Table 2.7 OSD Details

| Detention ID | Outlet Structures | | | | 1% AEP Detention Volume ($m^3$) |
|---|---|---|---|---|---|
| | Orifice 1 | Orifice 2 | Pit | Outlet Pipe | |
| Detention Tank A1 | 0.15m x 0.2m @ base | 0.15m x 0.5m @ 0.65m from base | 0.6m x 0.6m (1.8m weir length) @ 1.0m above base | 375mm dia. RCP @ base | 469 |

## 2.7 Detention Tank Configuration

Shown below in Figure 2.3 is an excerpt from Drawing BE200223-C3050-B, the detention tank section. Refer to Appendix E for more information.

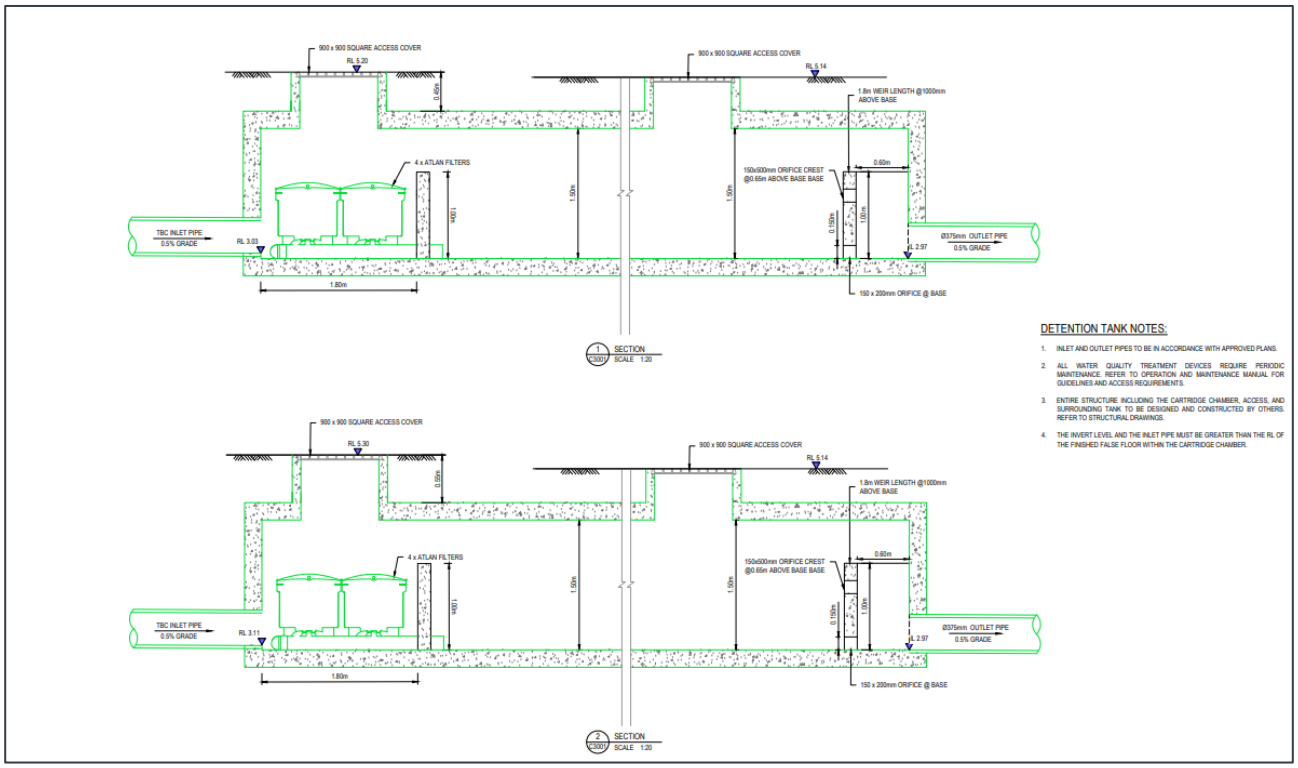



Figure 2.3 Operational Control Plan Section Details

# 3. Stormwater Quality Management

In accordance with the City of Gold Coast City Plan Version 13, the total effect of permanent water quality control measures are to achieve reductions in the mean annual load generated by the development site at a minimum of:

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

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

## 3.1 MUSIC Model

To ensure the above WQOs can be met at the site's LPD, a treatment train was proposed for the developed site and modelled using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software. The model was constructed to demonstrate that the load-based reduction targets can be achieved. Details of the MUSIC model input parameters used are included in Appendix D.

## 3.2 Treatment Train Details

A separate treatment train has been proposed for Parcel A (Catchment A1) and Parcel B (Catchment A2), shown below is a summary of the required treatment for each parcel.

### 3.2.1 Treatment Train – Parcel A

It is proposed to utilise ATLAN filters within proposed Detention Tank A1 , further detail of the input parameters used within MUSIC are included in Appendix D. The location of the proposed treatment train elements are included in the Operational Control Plan within Appendix E. The recommended filter and storm sack configuration is as follows:

- Catchment A:
  - 8 x Full Height ATLAN Filter Cartridges
  - Minimum of 8 x ATLAN Stormsacks

A typical section of an ATLAN Filter has been included in Figure 3.1. The stormwater treatment system has been designed and will be installed by ATLAN.

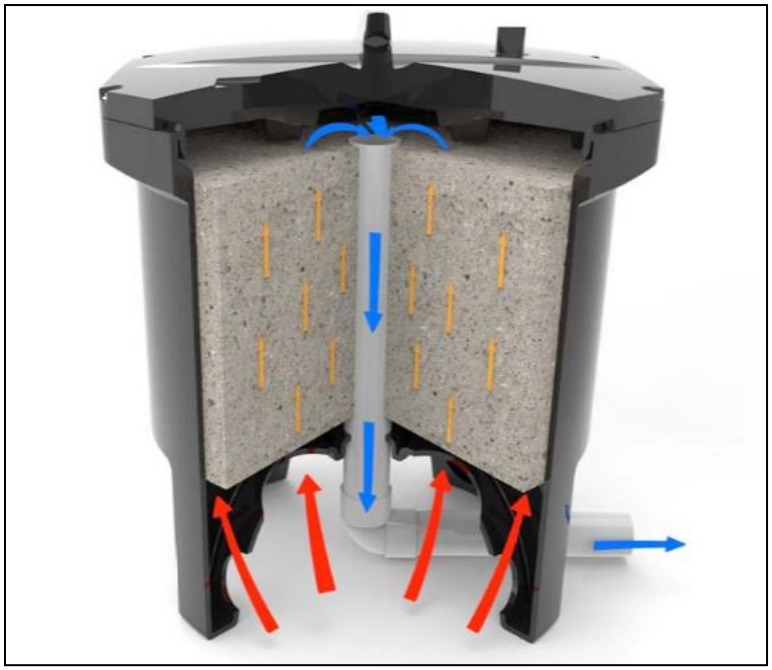


**Figure 3.1 Typical ATLAN Filter (ATLAN, 2025)**

The conceptual parameters of the proposed treatment trains are presented in Table 3.1, and further detail of the input parameters used within MUSIC are included in Appendix D.

### 3.2.2 MUSIC Results – Parcel A (Catchment A1)

Results of the MUSIC modelling for the treatment train effectiveness are summarised in Table 3.1. The results indicate the 80%, 60%, 45% & 90% reduction target for TSS, TP, TN and gross pollutants respectively are achieved for the rainfall data set simulated.

**Table 3.1 Treatment Train Effectiveness**

| Pollutant | Inflows (kg/yr) | Outflows (kg/yr) | Reduction Achieved (%) | Water Quality Objective (%) |
|---|---|---|---|---|
| TSS | 1700 | 325 | 80.8 | 80 |
| TP | 3.32 | 0.859 | 74.1 | 60 |
| TN | 17.5 | 8.05 | 53.9 | 45 |
| GP | 201 | 0 | 100 | 90 |

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

A screen capture of the MUSIC model and treatment train effectiveness results is presented in Figure 3.2

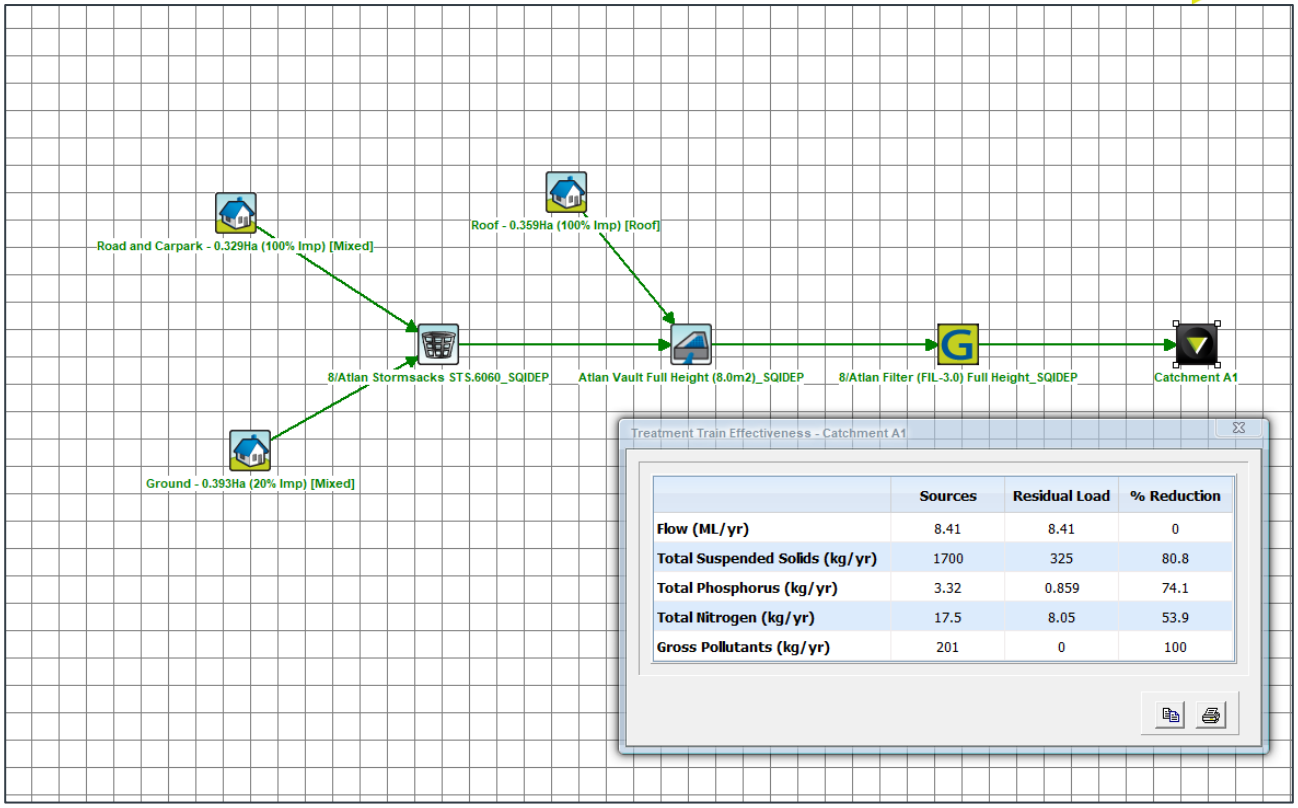



**Figure 3.2 Treatment Train Layout & MUSIC Results**

### 3.2.3 Treatment Train – Parcel B (Catchment A2)

It is proposed to utilise a bioretention basin to treat run off from Parcel B, further detail of the input parameters used within MUSIC are included in Appendix D. The location of the proposed treatment train is included in the Operational Control Plan within Appendix E. The required bioretention filter area is as follows:

Typical sections of a bioretention basin have been included in Figure 3.3, Figure 3.4. The bioretention system will be designed in accordance with the Water By Design Bioretention Technical Design Guidelines during the detailed design phase of the development (Water By Design, 2014).

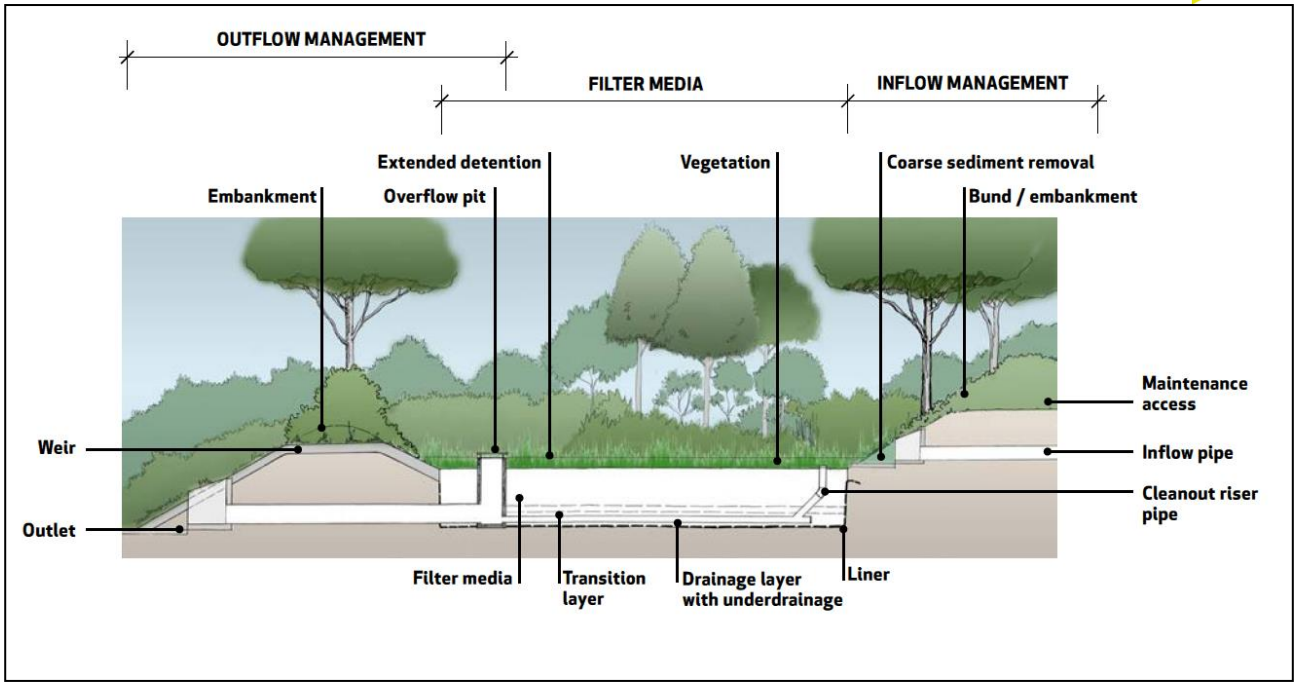



**Figure 3.3 Typical Bioretention Basin Invalid source specified.**

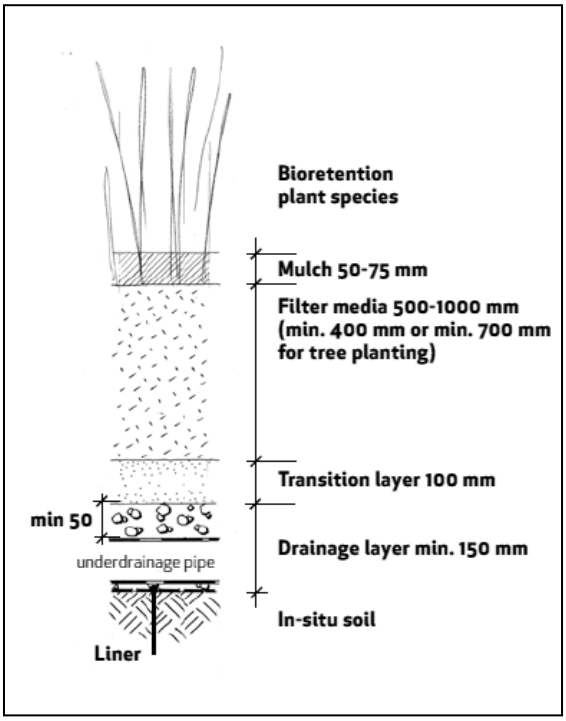



**Figure 3.4 Typical Lined Bioretention Drainage Profile (Water By Design, 2014)**

Table 3.2 Proposed Bioretention Basin Parameters

| Basin ID | Parameter | Value |
|---|---|---|
| A | Extended Detention Depth | 0.3m |
| | Filter Media Area | 40m$^2$ |
| | Filter Media Depth | 0.5m |
| | Transition Layer | 100mm |
| | Drainage Layer | 150mm |

### 3.2.4 MUSIC Results – Parcel B (Catchment A2)

Results of the MUSIC modelling for the treatment train effectiveness are summarised in Table 3.3. The results indicate the 80%, 60%, 45% & 90% reduction target for TSS, TP, TN and gross pollutants respectively are achieved for the rainfall data set simulated.

Table 3.3 Treatment Train Effectiveness

| Pollutant | Inflows (kg/yr) | Outflows (kg/yr) | Reduction Achieved (%) | Water Quality Objective (%) |
|---|---|---|---|---|
| TSS | 807 | 153 | 81 | 80 |
| TP | 1.54 | 0.407 | 73.5 | 60 |
| TN | 8.1 | 4.14 | 48.8 | 45 |
| GP | 97.4 | 0 | 100 | 90 |

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

A screen capture of the MUSIC model and treatment train effectiveness results is presented in Figure 3.5.

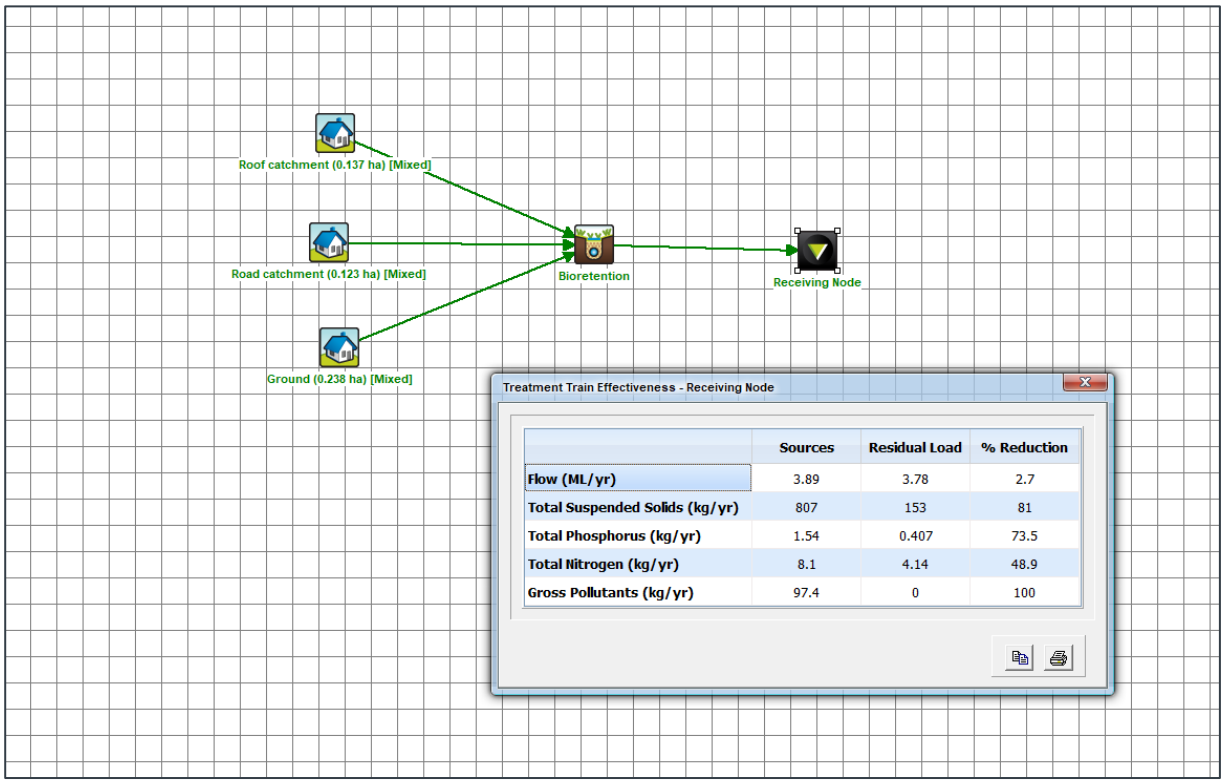



Figure 3.5 Treatment Train Layout & MUSIC Results

## 4. Conclusions

This Conceptual Stormwater Management Plan has been prepared to support the Development Application for the proposed 57-lot multi-unit townhouse development at 2 Karingal Drive, Pimpama, formally described as Lot 19 on RP152380.

The Lawful Point of Discharge for the subject site has been identified as the existing waterway located along the eastern property boundary. Stormwater runoff from the developed site will discharge to this waterway via the proposed stormwater management system.

For stormwater quantity management, runoff from Catchment A1 will be conveyed to Detention Tank A1, which has been sized to provide a 1% AEP detention volume of 469 $m^3$. Flows from the tank will be released to the Lawful Point of Discharge in a controlled manner to maintain peak discharge rates generally consistent with pre-development conditions.

Runoff from Catchment A2 will be conveyed to a proposed flow splitter, which will direct flows up to the Q3-month design flow to Bioretention Basin A2 for stormwater quality treatment. Flows exceeding the Q3-month design flow will bypass the bioretention basin and discharge directly to the existing waterway via a separate outlet. This arrangement is proposed to ensure the bioretention basin operates within its nominated treatment design capacity.

Bioretention Basin A2 has not been designed to provide detention and has not been relied upon as part of the stormwater quantity mitigation strategy. Its function is limited to stormwater quality treatment, with stormwater quantity mitigation provided by Detention Tank A1.

The existing external catchment of approximately 141.69 ha will continue to be conveyed through the site via the existing waterway. No development is proposed within this waterway, and the proposed development has been designed to minimise encroachment into the drainage reserve.

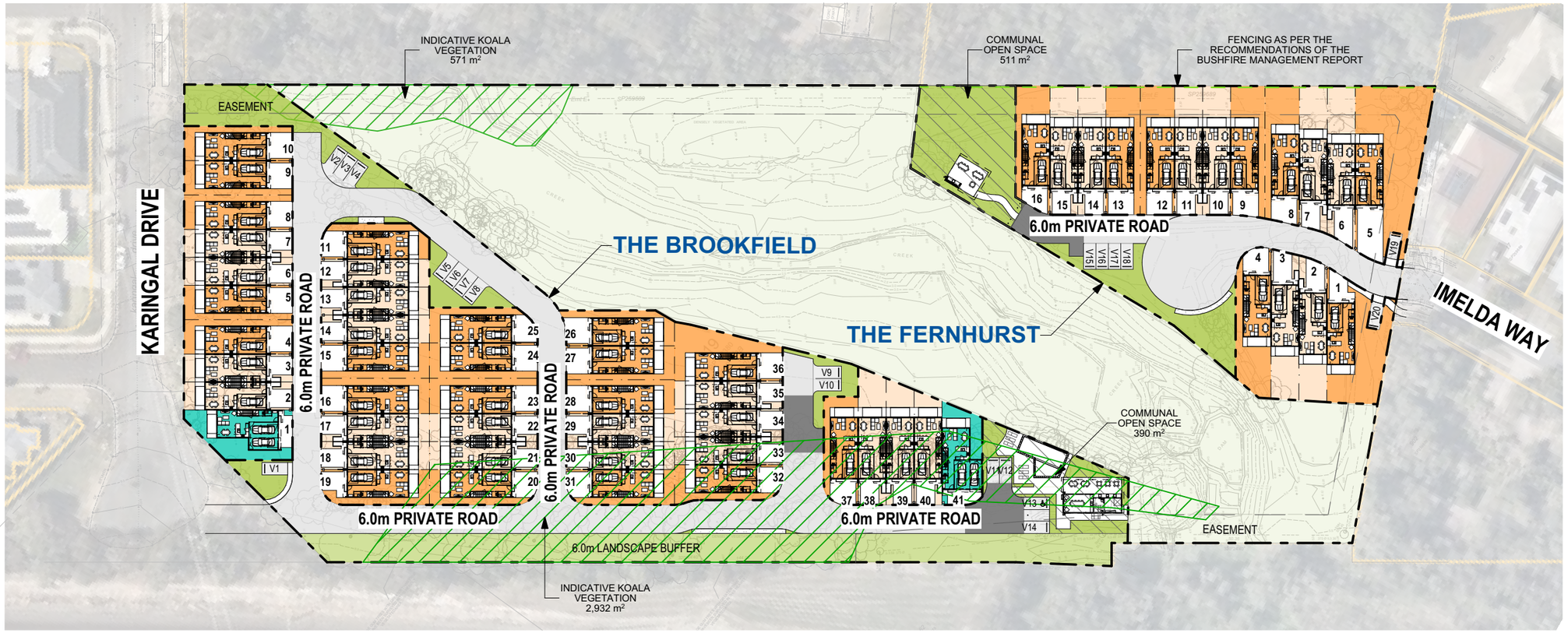
XP-SWMM modelling indicates that the proposed stormwater quantity management measures are capable of maintaining post-development peak discharges at the Lawful Point of Discharge generally consistent with pre-development conditions for the assessed storm events up to the 1% AEP event. As the site is located within the Woongoolba flood mitigation scheme catchment area, peak outflows and timing were also assessed for the 0.5EY, 0.2EY and 10% AEP events for durations up to 72 hours. The results indicate that the proposed development will not result in a material worsening of peak flow conditions within the assessed events.

For stormwater quality management, the proposed treatment train comprises a combination of proprietary treatment devices and bioretention. Catchment A1 will be treated by a minimum of 8 ATLAN Stormsacks and 8 full-height ATLAN Filter cartridges. Catchment A2 will be treated by Bioretention Basin A2, which has a proposed filter media area of 40 $m^2$.

MUSIC modelling indicates that the proposed treatment train achieves the City of Gold Coast water quality objectives for Total Suspended Solids, Total Phosphorus, Total Nitrogen and Gross Pollutants. The proposed stormwater quality treatment assets will be private infrastructure and are to be owned and maintained by the body corporate.

On this basis, the proposed stormwater management strategy is considered suitable for the development, subject to detailed design confirming the final hydraulic levels, outlet arrangements, erosion protection, maintenance access provisions and consistency between the stormwater layout drawings and the reporting documentation.

## Appendix A – Proposed Plans of Development




## PARCEL A - THE FERNHURST
**60 IMELDA WAY**

### SITE SUMMARY
APPROX. NET SITE AREA 0.491 ha
APPROX. NET DENSITY 32.59 du/ha

### DEVELOPMENT SUMMARY

| | |
|---|---|
| **TYPE C**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 8 |
| **TYPE C END**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 8 |
| **TOTAL** | 16 |

## PARCEL B - THE BROOKFIELD
**2 KARINGAL DRIVE**

### SITE SUMMARY
APPROX. NET SITE AREA 1.073 ha
APPROX. NET DENSITY 38.21 du/ha

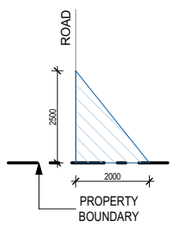
### DEVELOPMENT SUMMARY

| | |
|---|---|
| **TYPE C**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 19 |
| **TYPE C END**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 20 |
| **TYPE D**<br>3 BEDROOM<br>1+1 CAR<br>2 STOREY | 2 |
| **TOTAL** | 41 |

**NOTE:** GCCC

LOT BOUNDARIES AND AREAS ARE BASED OFF PDF PLAN AND ARE INDICATIVE ONLY SIZES TO BE CONFIRMED

INDICATIVE KOALA VEGETATION AREA




PEDESTRIAN SIGHT TRIANGLES TO BE KEPT CLEAR OF OBSTRUCTIONS TO VISIBILITY. LOW LEVEL LANDSCAPING PERMITTED TO A MAXIMUM MATURE HEIGHT OF 500mm ABOVE DRIVEWAY LEVEL.

# SITED STRUCTURE PLAN

0 10 20 30 40 50m
Scale 1:1000 @ A3

F:\Projects\4104-Karingal Drive, Pimpama\03 Drawings\02 Da\260617 KARINGAL DRIVE, PIMPAMA.pln

# 2 KARINGAL DRIVE & 60 IMELDA WAY
## PIMPAMA

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## Appendix B – Time of Concentration and Rational Method Calculation

### Pre-Development Hydrology

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

*Friend's Equation* $tc = (107nL^{0.333})/S^{0.2}$

Table C.1 presents a summary of the catchment parameters used within Friend's Equation and the calculated time of concentration for the pre-development scenario.

**Table C.1 Time of Concentration for Pre-Development Scenario**

| Catchment ID | Ext_A | Pre_A |
|---|---|---|
| **Standard Inlet Time** | - | - |
| **Overland Flow** | | |
| Estimated Sheet flow Length (Table 4.06.3) | 50 | 100 |
| Horton's Roughness Value | 0.06 | 0.06 |
| Slope (%) | 10 | 5 |
| tc (minutes) | 14.90 | 21.56 |
| **Channel/Creek Flow** | | |
| Length of Channel Flow (m) | 1350 | 75 |
| Velocity (m/s) – assumes 1.5 | 0.7 | 0.9 |
| tc (minutes) | 32.14 | 1.39 |
| **TOTAL tc (minutes)** | **47** | **23** |

### Post-Development Hydrology – Unmitigated

Table C.2 presents a summary of the catchment parameters used for the calculated time of concentration for the post-development scenario. The time of concentration for the external catchment is presented in Table C.1 above.

**Table C.2 Time of Concentration for Post-Development Scenario**

| Catchment ID | Post A1 | Post A2 | Post A3 |
|---|---|---|---|
| **Standard Inlet Time** | 15 | 15 | |
| **Overland Flow** | | | |
| Estimated Sheet flow Length (Table 4.06.3) | | | 100 |
| Horton's Roughness Value | | | 0.045 |
| Slope (%) | | | 1 |
| tc (minutes) | | | |
| **Channel/Creek Flow** | | | |
| Length of Channel Flow (m) | | | 150 |
| Velocity (m/s) - assumes 1.5 | | | 1.5 |
| tc (minutes) | | | 2.78 |
| **TOTAL tc (minutes)** | **15** | **15** | **22** |

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

- Determination of a C10 value (derived in accordance with QUDM Table 4.05.3(b) and Council guidelines). A value of 0.66 was applied to the pre-development catchment and 0.83 was applied to the post-development catchment;
- Adoption of design rainfall using BoM IFD data; and
- Calculation of design flows through the site for Q100, Q50, Q20, Q10, Q5, Q2, and $Q3_{month}$, where $Q3_{month}$ is deemed to be 50% of Q1.

Summaries of the hydrologic calculations are contained in Table C.3 and Table C.4 for pre and post-development (un-mitigated) scenarios respectively.

**Table C.3 Pre-Development Hydrology**

| Catch. | Area (ha) | tc (min) | $I_{100}$ (mm/hr) | C | $Q_{100}$ ($m^3/s$) | $I_{50}$ (mm/hr) | C | $Q_{50}$ ($m^3/s$) | $I_{20}$ (mm/hr) | C | $Q_{20}$ ($m^3/s$) | $I_{10}$ (mm/hr) | C | $Q_{10}$ ($m^3/s$) | $I_5$ (mm/hr) | C | $Q_5$ ($m^3/s$) | $I_2$ (mm/hr) | C | $Q_2$ ($m^3/s$) | $I_1$ (mm/hr) | C | $Q_{3month}$ ($m^3/s$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ext A | 141.69 | 47.00 | 118.00 | 0.85 | **39.569** | 105.00 | 0.82 | **33.743** | 88.90 | 0.75 | **26.085** | 77.00 | 0.71 | **21.517** | 66.30 | 0.67 | **17.601** | 52.80 | 0.60 | **12.541** | 42.10 | 0.57 | **9.412** |
| Pre A | 2.46 | 23.00 | 169.00 | 0.84 | **0.968** | 153.00 | 0.81 | **0.840** | 131.00 | 0.74 | **0.657** | 115.00 | 0.70 | **0.549** | 99.70 | 0.67 | **0.452** | 80.10 | 0.60 | **0.325** | 63.90 | 0.56 | **0.244** |

**Table C.4 Un-Mitigated Post-Development Hydrology**

| Catch. | Area (ha) | tc (min) | $I_{100}$ (mm/hr) | C | $Q_{100}$ ($m^3/s$) | $I_{50}$ (mm/hr) | C | $Q_{50}$ ($m^3/s$) | $I_{20}$ (mm/hr) | C | $Q_{20}$ ($m^3/s$) | $I_{10}$ (mm/hr) | C | $Q_{10}$ ($m^3/s$) | $I_5$ (mm/hr) | C | $Q_5$ ($m^3/s$) | $I_2$ (mm/hr) | C | $Q_2$ ($m^3/s$) | $I_1$ (mm/hr) | C | $Q_{3month}$ ($m^3/s$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Post A1 | 1.08 | 15.00 | 207.00 | 1.00 | **0.619** | 187.00 | 0.95 | **0.536** | 162.00 | 0.8715 | **0.424** | 142.00 | 0.83 | **0.354** | 123.00 | 0.79 | **0.291** | 98.90 | 0.71 | **0.210** | 78.90 | 0.66 | **0.157** |
| Post A2 | 0.50 | 15.00 | 207.00 | 1.00 | **0.285** | 187.00 | 0.95 | **0.247** | 162.00 | 0.8715 | **0.195** | 142.00 | 0.83 | **0.163** | 123.00 | 0.79 | **0.134** | 98.90 | 0.71 | **0.097** | 78.90 | 0.66 | **0.072** |
| Post A3 | 0.88 | 22.00 | 173.40 | 0.85 | **0.359** | 157.20 | 0.82 | **0.312** | 135.00 | 0.7455 | **0.245** | 117.80 | 0.71 | **0.204** | 100.40 | 0.67 | **0.165** | 74.16 | 0.60 | **0.109** | 65.66 | 0.57 | **0.091** |

## Appendix C – XP-SWMM Input Parameters

### Laurenson Routing Parameters

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

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

Manning Roughness coefficient (n):

- Pervious portion: 0.03; and
- Impervious portion: 0.014.

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

### Adopted Initial & Continuing Losses

| Impervious Area | | Pervious Area | |
|---|---|---|---|
| IL (mm) | CL (mm/hr) | IL (mm) | CL (mm/hr) |
| **1** | 0 | 10 | 2.5 |

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

### Pre-Development Catchment Parameters

| Catchment | Impervious Area | | | Pervious Area | | |
|---|---|---|---|---|---|---|
| | Area (ha) | Fraction Impervious (%) | Slope (%) | Area (ha) | Fraction Impervious (%) | Slope (%) |
| **Pre A** | 0.044 | 100 | 2.83 | 0.012 | 0 | 2.83 |

### Post-Development (Unmitigated) Catchment Parameters

| Catchment | Impervious Area | | | Pervious Area | | |
|---|---|---|---|---|---|---|
| | Area (ha) | Fraction Impervious (%) | Slope (%) | Area (ha) | Fraction Impervious (%) | Slope (%) |
| **Post A** | 0.046 | 100 | 2.83 | 0.01 | 0 | 2.83 |

# Appendix D – MUSIC Input Parameters

## Rainfall and Evapotranspiration Parameters

MUSIC modelling was based on 6-minute interval data obtained from the Bureau of Meteorology (BOM) for rainfall station 40406 Beenleigh, as summarised in Table D1

**Table D1 Meteorological and Rainfall Runoff Data Reporting Table**

| Input | Data Used in Modelling |
|---|---|
| Rainfall station | 40406 BEENLEIGH |
| Time step | 6 minute |
| Modelling period | 1-01-1990 to 31-12-1999 (10 years) |
| Mean annual rainfall (mm) | 1152 |
| Evapotranspiration | 1491 |
| Rainfall runoff parameters | Residential |
| Pollutant export parameters | Residential |

## Catchment Parameters

Based on the proposed land uses within the development, the subject site has been modelled as commercial land use as detailed in Table D2. The site has been divided into roof, road and ground level source nodes as per the architectural drawings included in Appendix E.

**Table D 2 Land Use Parameters**

| Catchment ID | Area (ha) | Land use | Total Impervious (%) |
|---|---|---|---|
| A1 - Roof | 0.371 | Mixed | 100 |
| A1 - Ground | 0.376 | Mixed | 30 |
| A1 - Road & Carpark | 0.334 | Mixed | 100 |
| A2 - Roof | 0.146 | Mixed | 100 |
| A2 - Ground | 0.229 | Mixed | 30 |
| A2 - Road & Carpark | 0.123 | Mixed | 100 |

The pollutant loads and runoff parameters for each source node have been based on the data from the Water by Design MUSIC Modelling Guidelines (Water By Design, 2019), as summarised in Tables below.

**Table B.5 Rainfall Runoff Parameters**

| Parameter | All Nodes |
|---|---|
| Landuse | Residential |
| Rainfall threshold (mm) | 1 |
| Soil storage capacity (mm) | 500 |
| Initial storage (% capacity) | 10 |
| Field capacity (mm) | 200 |
| Infiltration capacity coefficient a | 211 |
| Infiltration capacity exponent b | 5 |
| Initial depth (mm) | 50 |
| Daily recharge rate (%) | 28 |
| Daily baseflow rate (%) | 27 |
| Daily deep seepage rate (%) | 0 |

**Table B.6 Pollutant Load Parameters**

| Urban Residential | Total Suspended Solids (log mg/L) | | Total Phosphorous (log mg/L) | | Total Nitrogen (log mg/L) | |
|---|---|---|---|---|---|---|
| | Mean | Std Dev. | Mean | Std Dev. | Mean | Std Dev. |
| Storm Flow Concentration | 1.30(1)<br>2.43(2)<br>2.18(3) | 0.39 | -0.89(1)<br>-0.30(2)<br>-0.47(3) | 0.31 | 0.26 | 0.23 |
| Base Flow Concentration | 0(1)<br>1.0(2,3) | 0(1)<br>0.34(2,3) | 0(1)<br>-0.97(2,3) | 0(1)<br>0.31 | 0(1)<br>0.20(2,3) | 0(1)<br>0.20(2,3) |

NOTE: (1) Values applied to “Roof” areas
(2) Values applied to “Road” areas
(3) Values applied to “Ground” areas

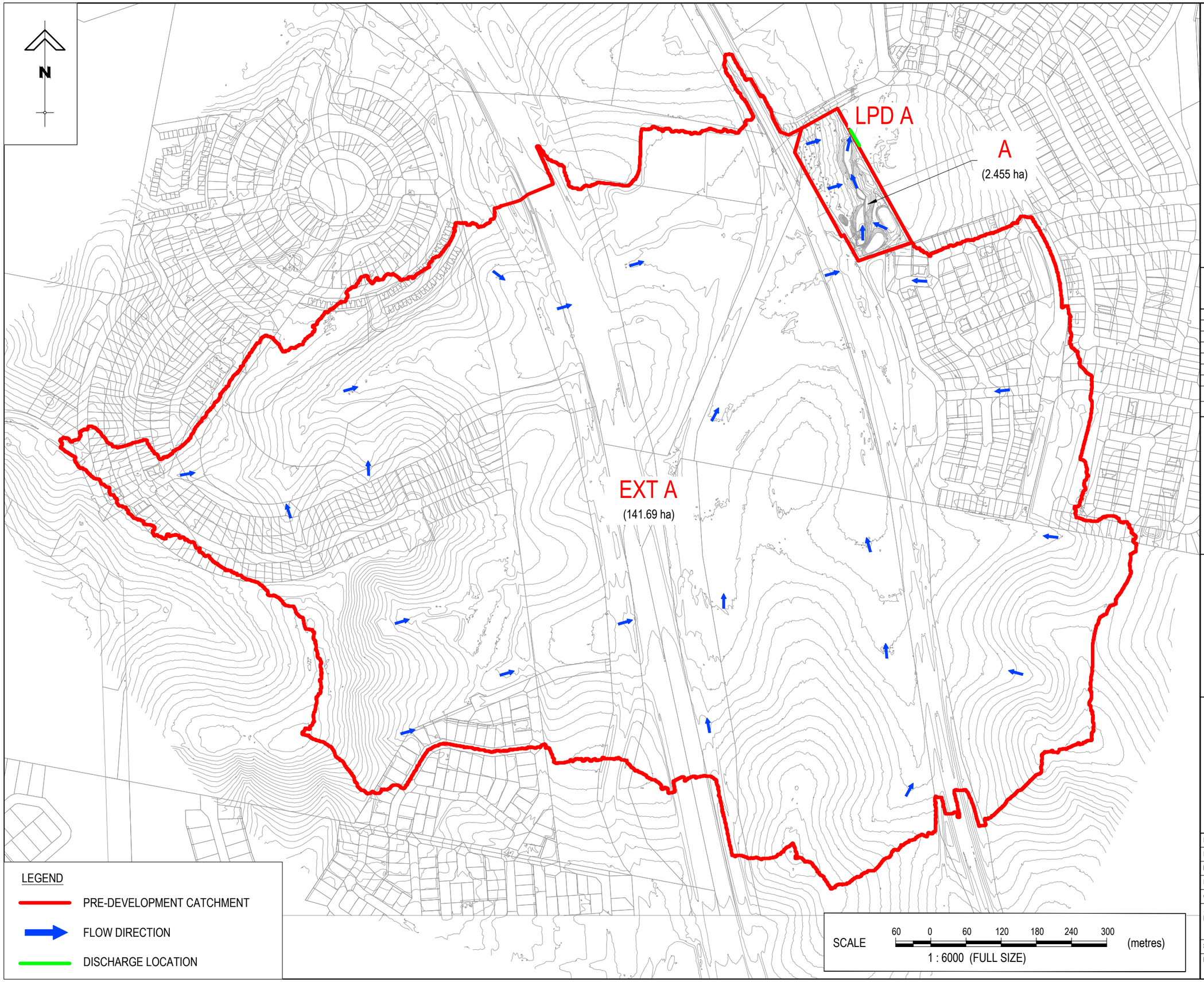
### Treatment Node Parameters

The following sections describe the modelling parameters applied to MUSIC for each of the treatment nodes included as part of the water quality assessment.

**Table B.5 Bioretention Parameters Bio A1**

| Parameter | Bio A1 |
|---|---|
| High Flow Bypass ($m^3/s$) | 100 |
| Surface area ($m^2$) | 45 |
| Extended detention depth (m) | 0.3 |
| Filter area ($m^2$) | 40 |
| Unlined filter media perimeter (m) | 0.01 |
| Filter Depth (m) | 0.50 |
| Exfiltration Rate (mm/hr) | 0.00 |
| Is the base Lined? | Yes |
| Overflow Weir Width (m) | 4 |
| Underdrain present? | Yes |
| Submerged zone with carbon present? | No |
| Confirmation that K and C* remain default? | Yes |

# Appendix E – Burchills Engineering Solutions Conceptual Stormwater Management Drawings




# 2 KARINGAL DRIVE, PIMPAMA

ORIGINAL SCALE BEFORE REDUCTION

A3 0 10 20 30 40mm.

| VER. | DESCRIPTION | APPR. | DATE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| A | ORIGINAL ISSUE | | 07.07.26 |

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ABN 76 166 942 365


DRAWING TITLE :

## PRE-DEVELOPMENT CATCHMENT PLAN

| | |
|---|---|
| DEVEL. APPLIC. No. : | DATE : 07.07.26 |
| PROJECT LEADER : JH | |
| DESIGNER : JH | |
| DRAFTSPERSON : TP / LD | |
| CHECKED : | |
| APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365 RPEQ No. : | |
| SCALE : 1:6000 | DATUM : FULL SIZE : A3 |
| PROJECT No.: BE200223 | DRAWING No. : N200 VERSION: A |

N

karingal drive

EASEMENT

6.0m PRIVATE ROAD

6.0m LANDSCAPE BUFFER

A1
(1.081 ha)

A2
(0.498ha)

A3
(0.877ha)

EXT A
(141.69 ha)

LPD A

EASEMENT

LEGEND

- POST-DEVELOPMENT CATCHMENT
- FLOW DIRECTION
- DISCHARGE LOCATION

SCALE 10 0 10 20 30 40 50 (metres)
1 : 1000 (FULL SIZE)

# 2 KARINGAL DRIVE, PIMPAMA

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

| VER. | DESCRIPTION | APPR. | DATE |
|---|---|---|---|
| A | ORIGINAL ISSUE | | 07.07.26 |

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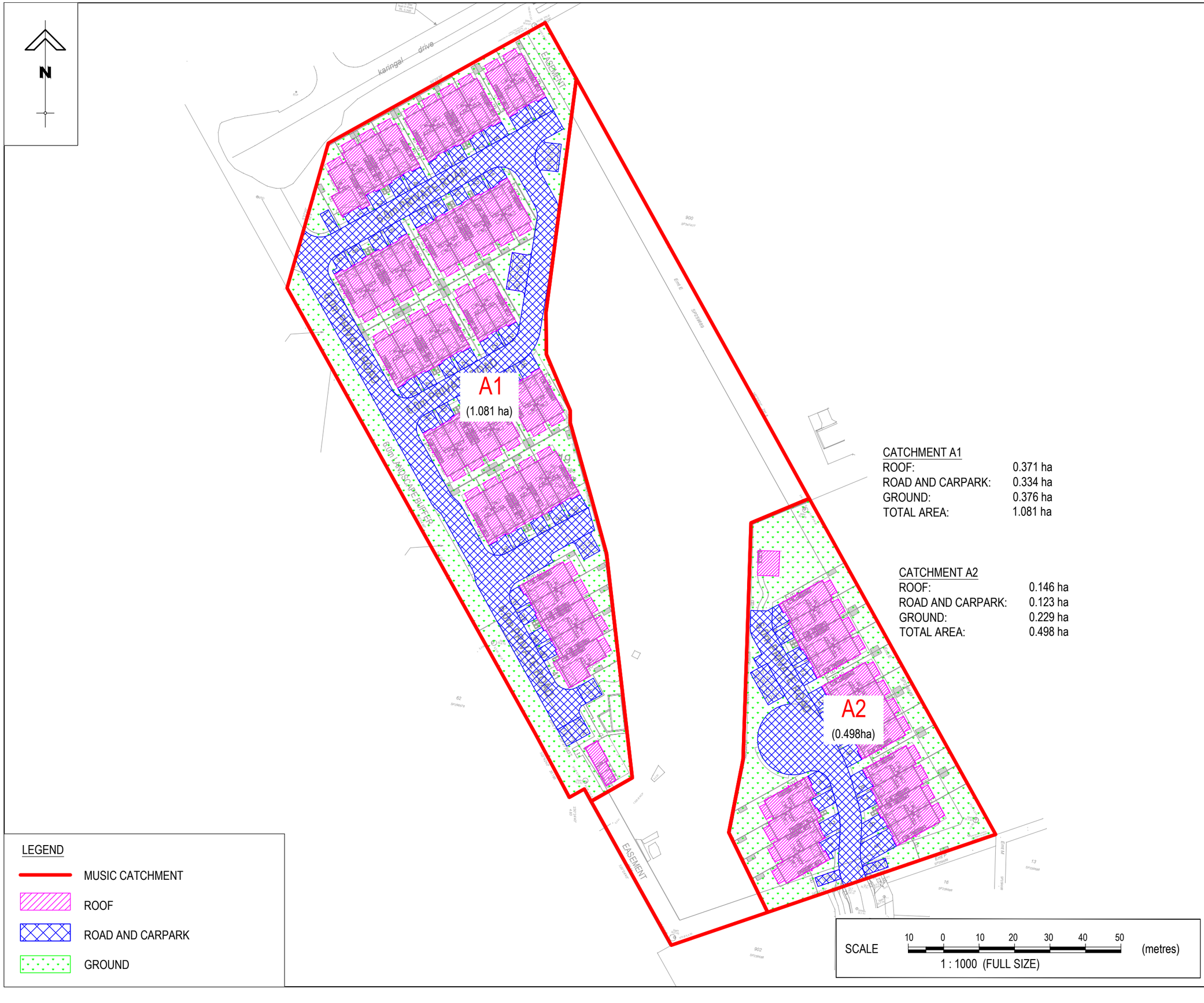
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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365

DRAWING TITLE :

## POST-DEVELOPMENT CATCHMENT PLAN

| | |
|---|---|
| DEVEL. APPLIC. No. : | DATE : 07.07.26 |
| PROJECT LEADER : JH | |
| DESIGNER : JH | |
| DRAFTSPERSON : TP / LD | |
| CHECKED : | |
| APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365 | |
| RPEQ No. : | |
| SCALE : 1:1000 | DATUM : / FULL SIZE : A3 |
| PROJECT No.: BE200223 | DRAWING No. : N201 / VERSION: A |




# 2 KARINGAL DRIVE, PIMPAMA

ORIGINAL SCALE BEFORE REDUCTION

A3 0 10 20 30 40mm.

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|---|---|---|---|
| A | ORIGINAL ISSUE | | 07.07.26 |

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BURCHILLS ENGINEERING SOLUTIONS

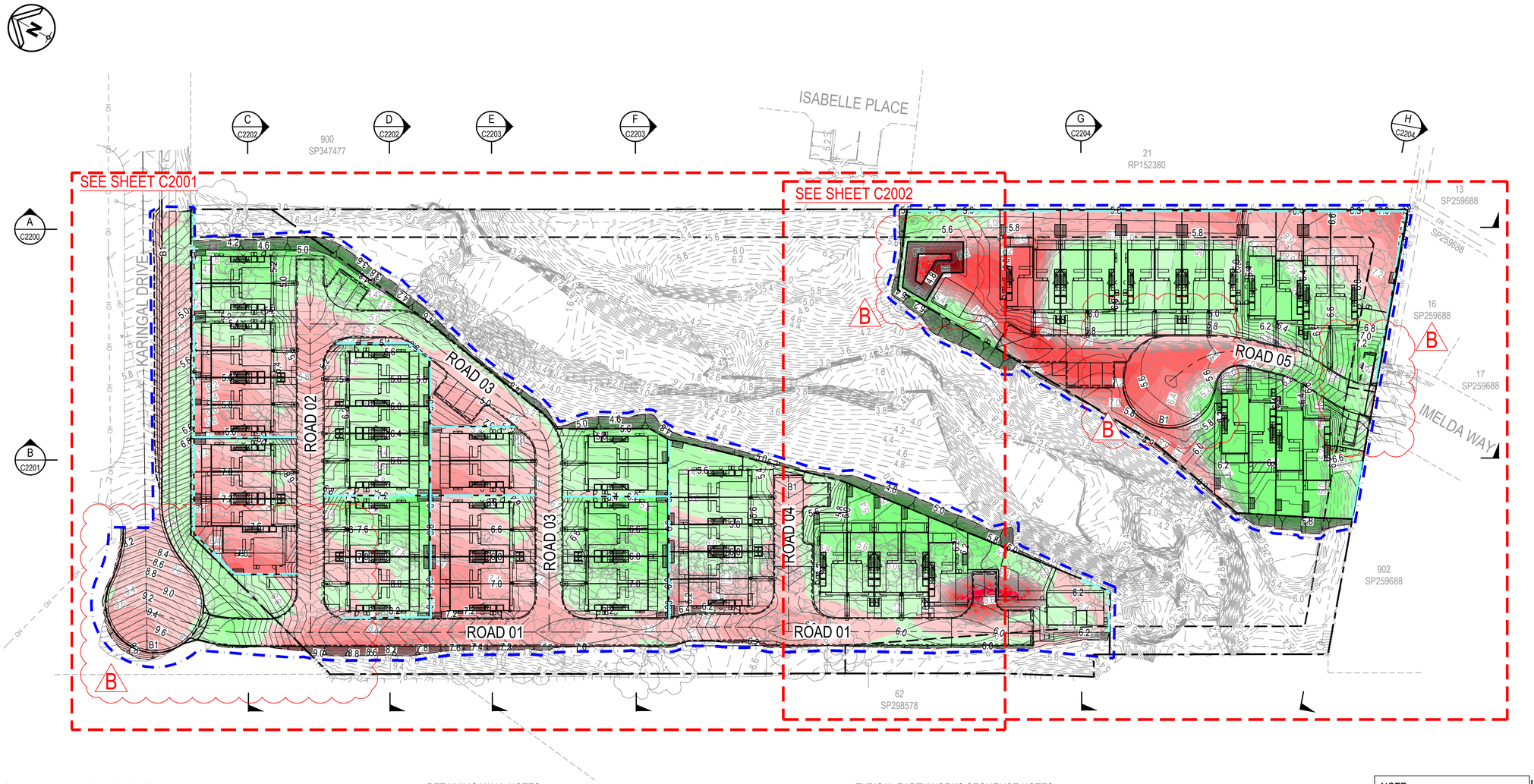
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**COOTE BURCHILLS ENGINEERING PTY LTD**
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DRAWING TITLE :

## MUSIC CATCHMENT PLAN

| | | |
|---|---|---|
| DEVEL. APPLIC. No. : | | DATE : 07.07.26 |
| PROJECT LEADER : JH | | |
| DESIGNER : JH | | |
| DRAFTSPERSON : TP / LD | | |
| CHECKED : | | |
| APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365 RPEQ No. : | | |
| SCALE : 1:1000 | DATUM : | FULL SIZE : A3 |
| PROJECT No.: BE200223 | DRAWING No. : N202 | VERSION: A |

# Appendix F – Burchills Engineering Solutions Preliminary Civil Engineering Drawings




## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING SURFACE CONTOURS
- EXISTING ROAD CONTROL LINE
- EARTHWORK SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED BATTER
- PROPOSED CUTBACK

### EARTHWORKS DEPTH ANALYSIS LEGEND

| LOWER | | UPPER | COLOUR |
|---|---|---|---|
| -3.0m | TO | -2.75m | |
| -2.75m | TO | -2.50m | |
| -2.50m | TO | -2.25m | |
| -2.25m | TO | -2.0m | |
| -2.0m | TO | -1.75m | |
| -1.75m | TO | -1.50m | |
| -1.50m | TO | -1.25m | |
| -1.25m | TO | -1.0m | |
| -1.0m | TO | -0.75m | |
| -0.75m | TO | -0.50m | |
| -0.5m | TO | -0.25m | |
| -0.25m | TO | 0.0m | |
| 0.0m | TO | 0.25m | |
| 0.25m | TO | 0.50m | |
| 0.50m | TO | 0.75m | |
| 0.75m | TO | 1.0m | |
| 1.0m | TO | 1.25m | |
| 1.25m | TO | 1.50m | |
| 1.50m | TO | 1.75m | |
| 1.75m | TO | 2.0m | |
| 2.0m | TO | 2.25m | |
| 2.25m | TO | 2.50m | |
| 2.50m | TO | 2.75m | |
| 2.75m | TO | 3.0m | |

## GENERAL EARTHWORKS NOTES:

1. ALL EARTHWORKS CONSTRUCTION UNDER THIS CONTRACT IS TO BE PERFORMED STRICTLY IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT PREPARED BY THE PRINCIPAL'S GEOTECHNICAL CONSULTANT.
2. ALL COMPACTION TESTING UNDER THIS CONTRACT IS TO BE CARRIED OUT TO AS3798 LEVEL 1 STANDARD BY A NATA-ACCREDITED TESTING AUTHORITY. CERTIFICATION FOR ALL EARTHWORKS CONSTRUCTION AND TESTING IS TO BE PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER QUEENSLAND (RPEQ) ENGAGED BY THE CONTRACTOR.
3. ALL DESIGN LEVELS SHOWN ON THE CONTRACT DRAWINGS ARE FINISHED SURFACE LEVELS FOLLOWING TOPSOIL REPLACEMENT.
4. ALL STRUCTURAL FILL MATERIAL PLACED SHALL BE COMPACTED TO THE FOLLOWING MINIMUM DENSITY IN ACCORDANCE WITH THE SPECIFICATION AND THE GEOTECHNICAL REPORT:
   a) 95% DENSITY RATIO FOR GENERAL STRUCTURAL FILL (COHESIVE MATERIAL)
   b) 98% DENSITY RATIO FOR THE TOP 300mm DEPTH BELOW PAVEMENT SUBGRADE LEVEL (COHESIVE MATERIAL)
5. FILL MATERIAL USED IN WETLAND BATTERS IS TO BE STIFF TO HARD CLAYS OR OTHER SUITABLE MATERIAL AS DIRECTED BY GEOTECHNICAL ENGINEER.
6. ALL EARTHWORKS BATTERS STEEPER THAN 1 IN 4 ARE TO BE LANDSCAPED IN ACCORDANCE WITH LANDSCAPE ARCHITECTS PLANS.
7. EXISTING DAMS ARE TO BE DE-WATERED AND CLEANED-OUT. ALL UNSUITABLE OR SATURATED MATERIAL IS TO BE REMOVED AND REPLACED WITH SELECTED ON-SITE STRUCTURAL FILL MATERIAL AND COMPACTED AS SPECIFIED.
8. PROVIDE CONDITION SURVEY OF ADJACENT RESIDENTIAL BUILDINGS FOR ALL PROPERTIES LOCATED WITHIN NOMINAL 100m OF EARTHWORKS OPERATIONS. CONDITION SURVEY TO BE UNDERTAKEN BY QUALIFIED PERSONNEL WITH BUILDING EXPERIENCE.

## RETAINING WALL NOTES:

1. RETAINING WALLS, FOOTINGS, DRAINAGE, BACKFILL AND CONNECTION OF AGGREGATE DRAINS TO STORMWATER DRAINAGE SYSTEM TO BE DESIGNED AND CONSTRUCTED BY THE CONTRACTOR AND CERTIFIED BY AN SUITABLY QUALIFIED RPEQ.
2. THESE DRAWINGS IDENTIFY SURFACE PROFILES, RETAINING WALL LOCATIONS, AND SETOUT INFORMATION ONLY. REFER TO CONTRACTOR SUPPLIED DRAWINGS FOR RPEQ STRUCTURAL DETAILS, WALL MATERIALS AND COMPACTION SPECIFICATIONS AND CONTRACTIBILITY INFORMATION.
3. RETAINING WALL DESIGN ENGINEER TO PROVIDE RPEQ FORM 15 STRUCTURAL CERTIFICATE INCLUDING GEOTECHNICAL GLOBAL STABILITY CERTIFICATION BY GEOTECHNICAL ENGINEER. WALL DESIGN TO ASSUME SURCHARGE LOADING BEHIND WALL. DESIGN TO BE IN ACCORDANCE WITH AS4678 INCLUDING ALL REQUIRED DESIGN LOAD CASES AND COMBINATIONS.
4. RETAINING WALLS TO BE DESIGNED TO CONSIDER ALL LOADS INCLUDING CONSTRUCTION LOADS AND OPERATIONAL LOADS.
5. ANY GEOTECHINCAL INFORMATION PROVIDED BY THE PRINCIPAL OR THE SUPERINTENDENT SHALL BE FOR INFORMATION PURPOSES ONLY. THE CONTRACTOR AND THE RETAINING WALL DESIGN ENGINEER SHOULD SATISFY THEMSELVES OF THE DESIGN SOIL PARAMETERS AND UNDERTAKE AND ADDITIONAL GEOTECHNICAL INVESTIGATION DEEMED NECESSARY BY THE DESIGN ENGINEER.
6. THE CONTRACTOR SHALL ENSURE THAT ANY CONFLICT BETWEEN THESE PROJECT DRAWINGS AND THE RETAINING WALL DRAWINGS PREPARED BY THE RETAINING WALL DESIGN ENGINEER IS RESOLVED WITH THE SUPERINTENDENT PRIOR TO CONSTRUCTION COMMENCING.
7. A COPY OF THE RETAINING WALL DESIGN DRAWINGS, INCLUDING CONNECTION OF AGGREGATE DRAINS TO THE STORMWATER DRAINAGE SYSTEM, DESIGN PARAMETERS AND CERTIFICATION BE PROVIDED TO THE SUPERINTENDENT AT THE PRE-START MEETING PRIOR TO CONSTRUCTION COMMENCING.
8. ANY RETAINING WALL AND BATTER EXCEEDING THE HEIGHT OF 1.5m, THE CONTRACTOR SHALL UNDERTAKE A THIRD PARTY RPEQ REVIEW OF THE PROPOSED DESIGN.

## TYPICAL EARTHWORKS SEQUENCE NOTES:

1. CONSTRUCT DIVERSION DRAINS AS DIRECTED TO DIVERT SITE RUNOFF AWAY FROM CONSTRUCTION AREAS. ESTABLISH DE-WATERING CONTROLS TO ENSURE THAT THE CONSTRUCTION AREAS REMAIN FREE OF SURFACE WATER AND PONDING.
2. FOLLOWING COMPLETION OF CLEARING OPERATIONS AND REMOVAL OF RESIDUAL VEGETATION AND DEBRIS, STRIP TOPSOIL TO A NOMINAL 200mm DEPTH AND PLACE IN TEMPORARY STOCKPILES IN LOCATIONS APPROVED BY THE SUPERINTENDENT.
3. PROOF-ROLL AND COMPACT THE PROPOSED FILL AREAS FOLLOWING TOPSOIL STRIPPING, TO THE SATISFACTION OF THE SUPERINTENDENT.
4. ANY STRIPPED AREAS WHICH DEMONSTRATE EXCESSIVE MOVEMENT OR DO NOT IMPROVE SUFFICIENTLY UNDER PROOF-ROLLING ARE TO BE REMOVED, REPLACED WITH APPROVED SITE MATERIAL AND COMPACTED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.
5. ANY UNSUITABLE MATERIAL ENCOUNTERED, INCLUDING SILTY MATERIAL AND UN-CONTROLLED FILL IS TO BE EXCAVATED TO THE EXTENTS AND DEPTHS NOMINATED BY THE PRINCIPAL'S GEOTECHNICAL CONSULTANT, REMOVED TO NON-STRUCTURAL FILL AREAS OR TAKEN OFF-SITE AS DIRECTED AND REPLACED WITH APPROVED, COMPACTED FILL MATERIAL.
6. PLACE STRUCTURAL FILL MATERIAL FROM SITE EXCAVATIONS TO NOMINATED SITE FILL AREAS, INCLUDING BENCHING AND COMPACTION IN ACCORDANCE WITH THE GEOTECHNICAL REPORT AND TRIMMING AND FINAL PROFILING OF BATTERS.

B

### CONCEPT BULK EARTHWORKS SUMMARY

STRUCTURAL FILLING

| AREA | NETT SOLID FILL |
|---|---|
| OVERALL FILLING | 3,672 cu.m. |

EXCAVATION

| AREA | NETT CUT |
|---|---|
| OVERALL EXCAVATION | 3,049 cu.m. |

SUMMARY:
TOTAL MATERIAL ON LEADS (NETT FILL) = 3,672 cu.m.
i.e. 3,672 cu.m. - 3,049 cu.m. = 623 c.um.

- ALLOWANCE FOR 450mm FOR BUILDING SLAB THICKNESS
- ALLOWANCE FOR 325mm FOR ROAD PAVEMENT THICKNESS
- ALLOWANCE FOR 300mm TOPSOIL RESPREAD TO FOR LANDSCAPE AREAS

BULK EARTHWORKS VOLUMES INCLUDE A NOMINAL 200mm OF TOPSOIL STRIPPING VOLUME WITHIN EARTHWORKS AREA

**NOTE:**
ALL RETAINING WALL AGGREGATE PIPES TO BE CONNECTED TO THE STORMWATER DRAINAGE SYSTEM.

**NOTE:**
RETAINING WALL DESIGN, CONSTRUCTION, SUPERVISION AND CERTIFICATION TO BE PROVIDED BY SPECIALIST SUB-CONTRACTOR.

**NOTE:**
ALL DESIGN/SETOUT INFORMATION SHOWN ON THIS DRAWING IS AVAILABLE IN DIGITAL FORMAT FROM THE OFFICE OF THE SUPERINTENDENT UPON REQUEST BY THE CONTRACTOR.

**WARNING: UNDERGROUND SERVICES:**
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|---|---|---|
| B | ISSUED FOR APPROVAL | 08-07-26 |
| A | ORIGINAL ISSUE | 06-05-26 |


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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : OVERALL BULK EARTHWORKS LAYOUT PLAN

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :
SCALE (metres) 2.5 0 2.5 5 7.5 10 12.5
1 : 500 (FULL SIZE)

DEVEL. APPLIC. No. :
DATE : 08-07-26
PROJECT LEADER : -
DESIGNER : BNB
DRAFTSPERSON : BNB
CHECKED : -

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

PROJECT No.: BE200223
DRAWING No. : C2000
VERSION: B

B

## CONCEPT BULK EARTHWORKS SUMMARY

### STRUCTURAL FILLING

| AREA | NETT SOLID FILL |
|---|---|
| OVERALL FILLING | 1,744 cu.m. |

### EXCAVATION

| AREA | NETT CUT |
|---|---|
| OVERALL EXCAVATION | 1,569 cu.m. |

SUMMARY:
TOTAL MATERIAL ON LEADS (NETT FILL) = 1,744cu.m.
i.e. 1,744 cu.m. - 1,569 cu.m. = 174 c.um.

- ALLOWANCE FOR 450mm FOR BUILDING SLAB THICKNESS
- ALLOWANCE FOR 325mm FOR ROAD PAVEMENT THICKNESS
- ALLOWANCE FOR 300mm TOPSOIL RESPREAD TO FOR LANDSCAPE AREAS

BULK EARTHWORKS VOLUMES INCLUDE A NOMINAL 200mm OF TOPSOIL STRIPPING VOLUME WITHIN EARTHWORKS AREA

**NOTE:**
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## EARTHWORKS DEPTH ANALYSIS LEGEND

| LOWER | | UPPER | COLOUR |
|---|---|---|---|
| -3.0m | TO | -2.75m | |
| -2.75m | TO | -2.50m | |
| -2.50m | TO | -2.25m | |
| -2.25m | TO | -2.0m | |
| -2.0m | TO | -1.75m | |
| -1.75m | TO | -1.50m | |
| -1.50m | TO | -1.25m | |
| -1.25m | TO | -1.0m | |
| -1.0m | TO | -0.75m | |
| -0.75m | TO | -0.50m | |
| -0.5m | TO | -0.25m | |
| -0.25m | TO | 0.0m | |
| 0.0m | TO | 0.25m | |
| 0.25m | TO | 0.50m | |
| 0.50m | TO | 0.75m | |
| 0.75m | TO | 1.0m | |
| 1.0m | TO | 1.25m | |
| 1.25m | TO | 1.50m | |
| 1.50m | TO | 1.75m | |
| 1.75m | TO | 2.0m | |
| 2.0m | TO | 2.25m | |
| 2.25m | TO | 2.50m | |
| 2.50m | TO | 2.75m | |
| 2.75m | TO | 3.0m | |

## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING SURFACE CONTOURS
- EXISTING ROAD CONTROL LINE
- EARTHWORK SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED BATTER
- PROPOSED CUTBACK


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| A | ORIGINAL ISSUE | 06-05-26 |


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ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : BULK EARTHWORKS LAYOUT PLAN - SHEET 1 OF 2

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

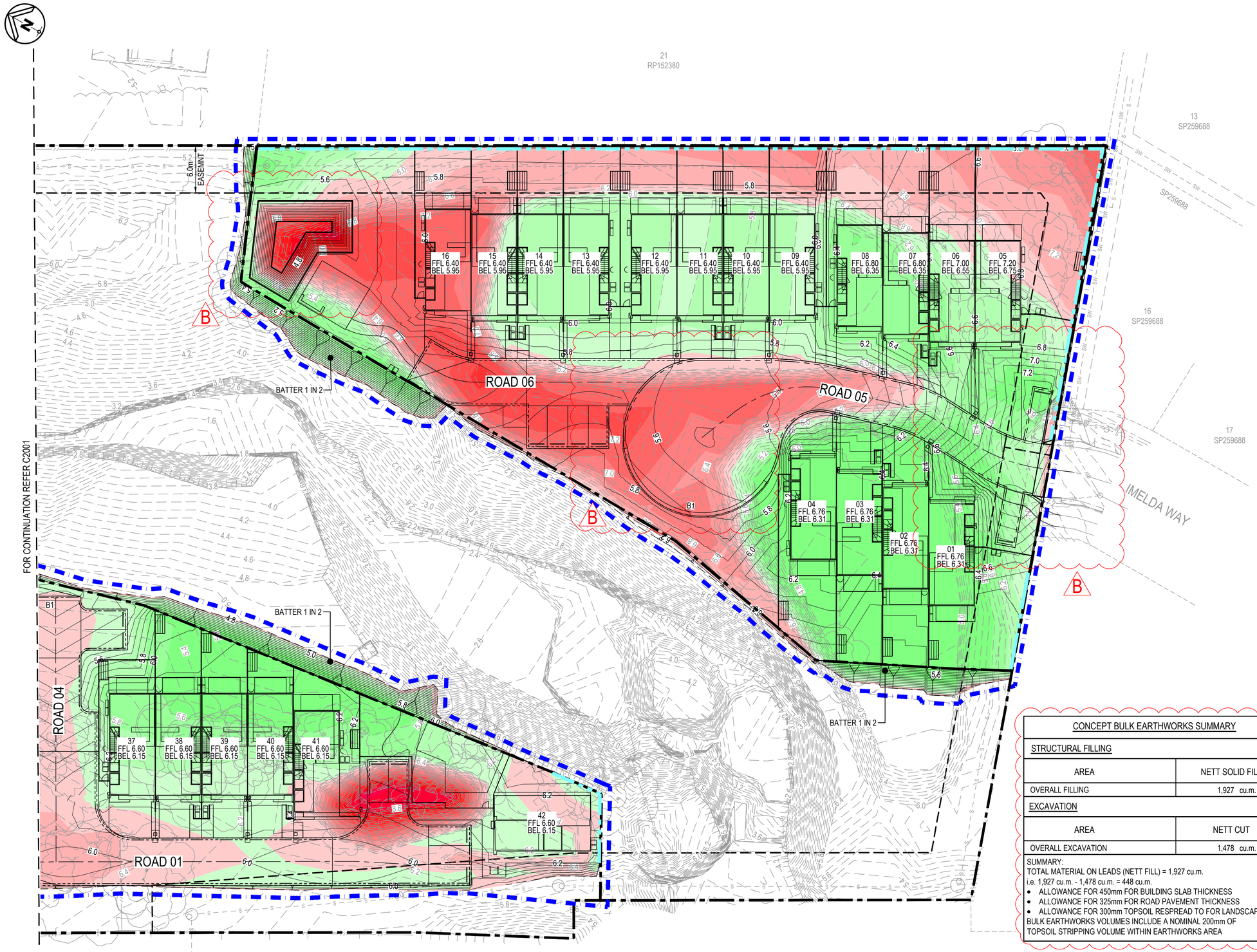
PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :
SCALE (metres) 5 0 5 10
1 : 250 (FULL SIZE)

| | |
|---|---|
| DEVEL. APPLIC. No. : | DATE : 08-07-26 |
| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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

| PROJECT No.: | DRAWING No. : | VERSION: |
|---|---|---|
| BE200223 | C2001 | B |




## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING SURFACE CONTOURS
- EXISTING ROAD CONTROL LINE
- EARTHWORK SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED BATTER

## EARTHWORKS DEPTH ANALYSIS LEGEND

| LOWER | | UPPER | COLOUR |
|---|---|---|---|
| -3.0m | TO | -2.75m | |
| -2.75m | TO | -2.50m | |
| -2.50m | TO | -2.25m | |
| -2.25m | TO | -2.0m | |
| -2.0m | TO | -1.75m | |
| -1.75m | TO | -1.50m | |
| -1.50m | TO | -1.25m | |
| -1.25m | TO | -1.0m | |
| -1.0m | TO | -0.75m | |
| -0.75m | TO | -0.50m | |
| -0.5m | TO | -0.25m | |
| -0.25m | TO | 0.0m | |
| 0.0m | TO | 0.25m | |
| 0.25m | TO | 0.50m | |
| 0.50m | TO | 0.75m | |
| 0.75m | TO | 1.0m | |
| 1.0m | TO | 1.25m | |
| 1.25m | TO | 1.50m | |
| 1.50m | TO | 1.75m | |
| 1.75m | TO | 2.0m | |
| 2.0m | TO | 2.25m | |
| 2.25m | TO | 2.50m | |
| 2.50m | TO | 2.75m | |
| 2.75m | TO | 3.0m | |

## CONCEPT BULK EARTHWORKS SUMMARY

STRUCTURAL FILLING

| AREA | NETT SOLID FILL |
|---|---|
| OVERALL FILLING | 1,927 cu.m. |

EXCAVATION

| AREA | NETT CUT |
|---|---|
| OVERALL EXCAVATION | 1,478 cu.m. |

SUMMARY:
TOTAL MATERIAL ON LEADS (NETT FILL) = 1,927 cu.m.
i.e. 1,927 cu.m. - 1,478 cu.m. = 448 cu.m.

- ALLOWANCE FOR 450mm FOR BUILDING SLAB THICKNESS
- ALLOWANCE FOR 325mm FOR ROAD PAVEMENT THICKNESS
- ALLOWANCE FOR 300mm TOPSOIL RESPREAD TO FOR LANDSCAPE AREAS

BULK EARTHWORKS VOLUMES INCLUDE A NOMINAL 200mm OF TOPSOIL STRIPPING VOLUME WITHIN EARTHWORKS AREA

**NOTE:**
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ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : BULK EARTHWORKS LAYOUT PLAN - SHEET 2 OF 2

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

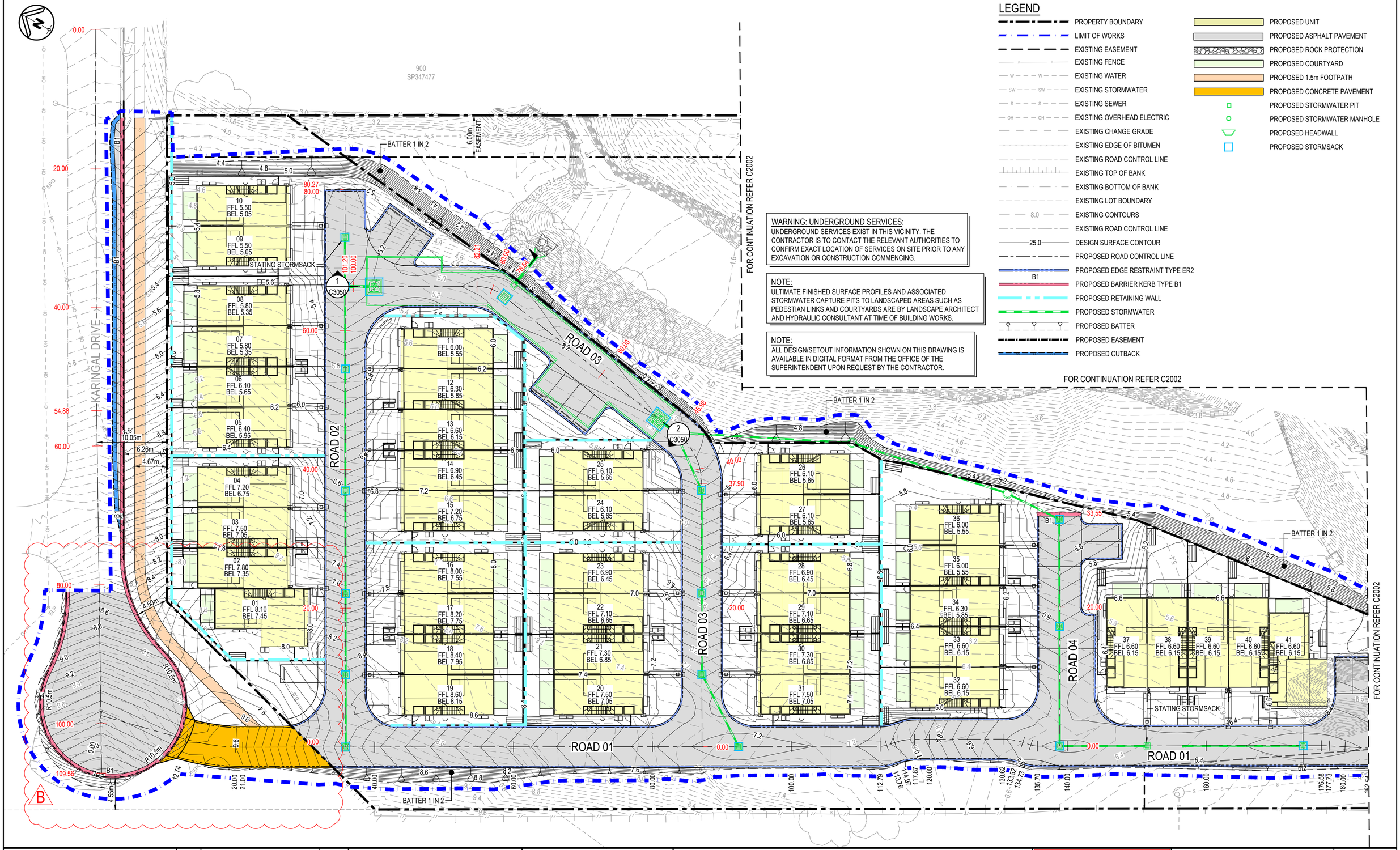
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DRAFTSPERSON : BNB | CHECKED : -

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PROJECT No.: BE200223 | DRAWING No. : C2002 | VERSION: B





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CLIENT : BOS

DRAWING TITLE : ROADWORKS AND DRAINAGE LAYOUT PLAN - SHEET 1 OF 2

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

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|---|---|---|
| BE200223 | C3001 | B |




## LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS
- EXISTING EASEMENT
- EXISTING FENCE
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING OVERHEAD ELECTRIC
- EXISTING CHANGE GRADE
- EXISTING EDGE OF BITUMEN
- EXISTING ROAD CONTROL LINE
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING LOT BOUNDARY
- EXISTING CONTOURS
- EXISTING ROAD CONTROL LINE
- DESIGN SURFACE CONTOUR
- PROPOSED ROAD CONTROL LINE
- PROPOSED EDGE RESTRAINT TYPE ER2
- PROPOSED BARRIER KERB TYPE B1
- PROPOSED RETAINING WALL
- PROPOSED BATTER
- PROPOSED EASEMENT
- PROPOSED STORMWATER
- PROPOSED HEADWALL
- PROPOSED STORMSACK
- PROPOSED UNIT
- PROPOSED ASPHALT PAVEMENT
- PROPOSED ROCK PROTECTION
- PROPOSED COURTYARD
- PROPOSED BIORETENTION BASIN
- PROPOSED CONCRETE PAVEMENT

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

**NOTE:**
ULTIMATE FINISHED SURFACE PROFILES AND ASSOCIATED STORMWATER CAPTURE PITS TO LANDSCAPED AREAS SUCH AS PEDESTIAN LINKS AND COURTYARDS ARE BY LANDSCAPE ARCHITECT AND HYDRAULIC CONSULTANT AT TIME OF BUILDING WORKS.

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CLIENT : BOS

DRAWING TITLE :
ROADWORKS AND DRAINAGE LAYOUT PLAN - SHEET 2 OF 2

PROJECT :
2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

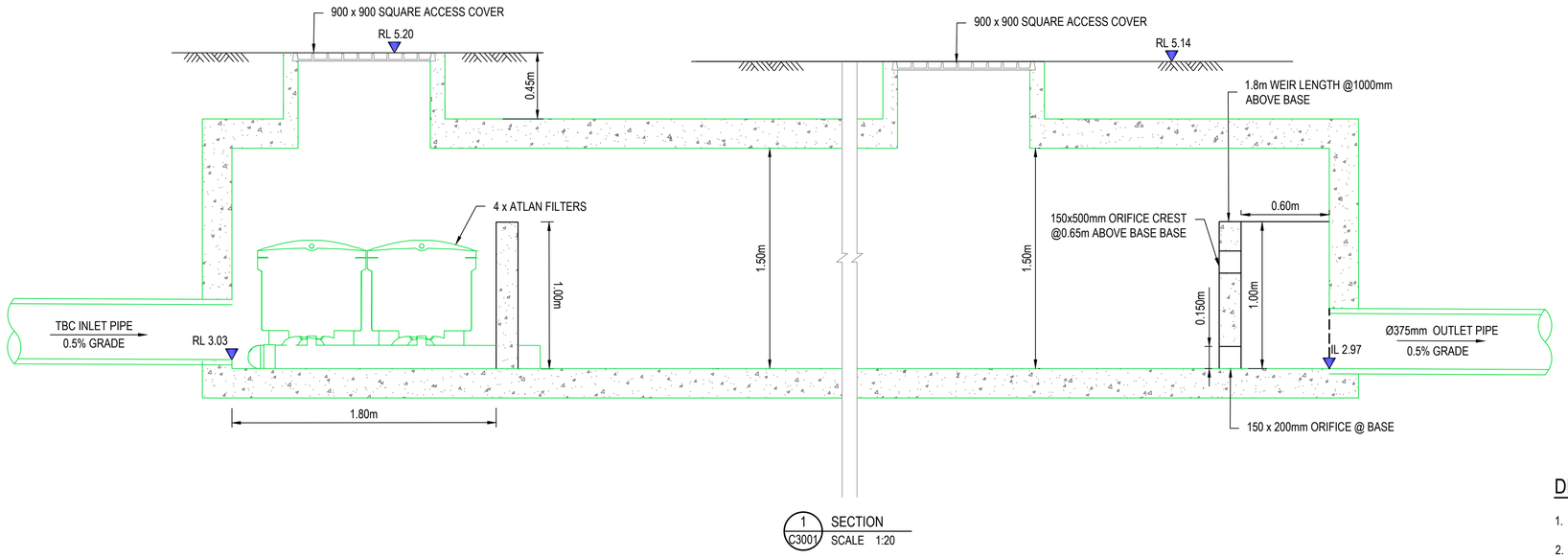
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1 : 250 (FULL SIZE)

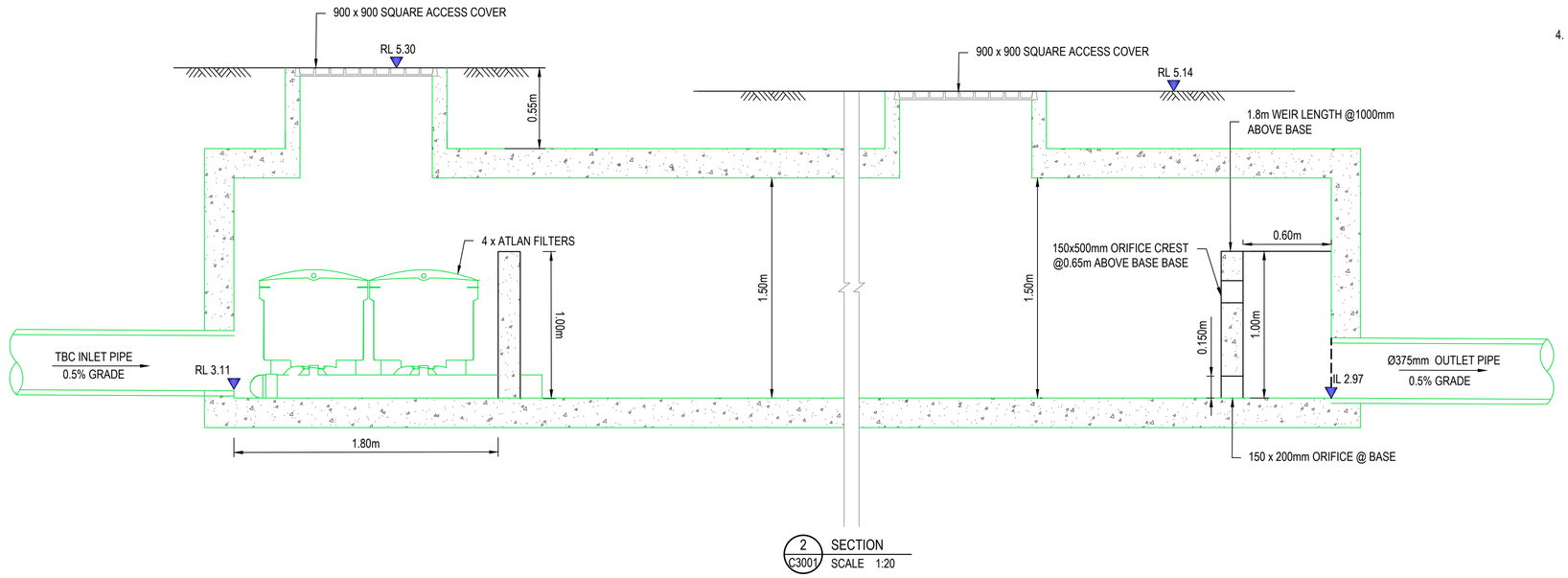
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|---|---|
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| PROJECT No.: | DRAWING No. : | VERSION: |
|---|---|---|
| BE200223 | C3002 | B |




1 / C3001 SECTION
SCALE 1:20




2 / C3001 SECTION
SCALE 1:20

## DETENTION TANK NOTES:

1. INLET AND OUTLET PIPES TO BE IN ACCORDANCE WITH APPROVED PLANS.
2. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
3. ENTIRE STRUCTURE INCLUDING THE CARTRIDGE CHAMBER, ACCESS, AND SURROUNDING TANK TO BE DESIGNED AND CONSTRUCTED BY OTHERS. REFER TO STRUCTURAL DRAWINGS.
4. THE INVERT LEVEL AND THE INLET PIPE MUST BE GREATER THAN THE RL OF THE FINISHED FALSE FLOOR WITHIN THE CARTRIDGE CHAMBER.


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**COOTE BURCHILLS ENGINEERING PTY LTD**
ABN 76 166 942 365


CLIENT : BOS

DRAWING TITLE : STORMWATER TANK DETAILS

PROJECT : 2 KARINGAL DRIVE & 60 IMELDA WAY, PIMPAMA

PRELIMINARY
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SCALE AT FULL SIZE (A1) :
SCALE (metres) 0.2 0 0.2 0.4 0.6 0.8 1.0
1 : 20 (FULL SIZE)

| | |
|---|---|
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| PROJECT LEADER : - | DESIGNER : BNB |
| DRAFTSPERSON : BNB | CHECKED : - |

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BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

| PROJECT No.: | DRAWING No. : | VERSION: |
|---|---|---|
| BE200223 | C3050 | B |

## 1.0 CITY PLAN EXTRACTS

### 1.1 SC6.15 CITY PLAN POLICY – SOLID WASTE MANAGEMENT

#### *1.1.1. Appendix A – Waste generation rates and servicing frequency*

| Type of Premises | Estimated General Waste Generation | Estimated Recycling Generation | Notes on The Use of Container Type |
|---|---|---|---|
| Multiple dwelling (residential only) – 3 bedroom and above | 120 L / dwelling / week | 80 L / dwelling / week | Bulk Bins (General Waste)<br>Wheelie Bins (Recycling Waste) |

#### *1.1.2 Appendix B – Waste Bin Types and Dimensions*

| Wheelie bins | | | |
|---|---|---|---|
| Wheelie bin Capacity (L) | Length (mm) | Width (mm) | Height (mm) |
| 140 | 615 | 505 | 915 |
| 240 | 730 | 550 | 1060 |
| 360 | 865 | 650 | 1100 |

| Bulk bins | | | | |
|---|---|---|---|---|
| Size | Bulk Bin Capacity (L) | Length (mm) (incl. pockets) | Width (mm) | Height (mm) (incl. wheels) |
| 1 | 660 – Plastic | 1510 | 780 | 1330 |
| 2 | 1000 | 1738 | 901 | 1310 |
| 3 | 1100 – Plastic | 1490 | 1100 | 1330 |
| 4 | 1500 | 2040 | 1051 | 1304 |
| 5A | 2000 | 2050 | 965 | 1553 |

### 1.2 POLICY MEASUREMENTS AND REQUIREMENTS

#### *1.2.1 Vehicle operating dimensions*

| Collection vehicle type | Travelling height (m) | Width (m) | Length (m) | Servicing Height (m) | Total Tonnage (max) | Turning Radius (m) |
|---|---|---|---|---|---|---|
| Side lift truck (Wheelie bins) | 4.1 | 2.5 | 9.8 | 4.25 | 23 | 11.5 (wall to wall)<br>10.5 (kerb to kerb) |
| Front end loader (Bulk bins) | 4.3 | 2.5 | 10.2 | 6.4 | 27.5 | 13.2 (wall to wall)<br>12.3 (kerb to kerb) |

### *1.2.2 Servicing, bin storage points, and bin wash-down facility requirements*

| Design Element | Requirement |
|---|---|
| Wheelie bin and bulk bin servicing points | • Bin-carting route must allow bins to be easily manoeuvred and be devoid of steps or steep rises.<br>• Bin-carting route must not extend through habitable parts of a building, or a food premises, and only occur through common property or publicly accessible locations.<br>• Where site has frontage to several roads, the servicing occurs on the roadway of the lowest order where possible.<br>• Positioned on a level pad.<br>• Bins to be removed from and returned to the storage point. |
| Bulk bin storage points | • Constructed hardstand area with a solid concrete base or acceptable equivalent.<br>• Roofed and designed to prevent entry to rainwater.<br>• Waste area to be level and accessible by the contractor with no lip on the vehicle crossover (zero invert).<br>• Graded to fall to a drainage point within the storage point. |

## 2.0 WASTE MANAGEMENT PROPOSAL

### 2.1 CALCULATIONS

| Use | | Waste Generation | Recycling Generation |
|---|---|---|---|
| Multiple dwelling (residential only) – 3 bedroom and above | City Plan Requirement | 120 L / dwelling / week | 80 L / dwelling / week |
| | Development Demand | 6,840 L per week | 4,560 L per week |
| | It is intended to supply individual wheelie bins to each unit in lieu of bulk bins as the site layout allows a standard side collection vehicle to manoeuvre and collect all bins and individual wheelie bins are more desirable for a complex of this nature. As individual wheelie bins are proposed, calculations of waste volumes are not considered particularly relevant. | | |

### 2.2 REQUIRED BINS

| Waste Bin | General Waste | Recyclable Waste |
|---|---|---|
| | 1 x 240 L Wheelie bin per unit and 1 bin for each communal recreation area | 1 x 240 L Wheelie bin per unit and 1 bin for each communal recreation area |
| | 59 general waste wheelie bins (57 for units and 2 for communal spaces) | |

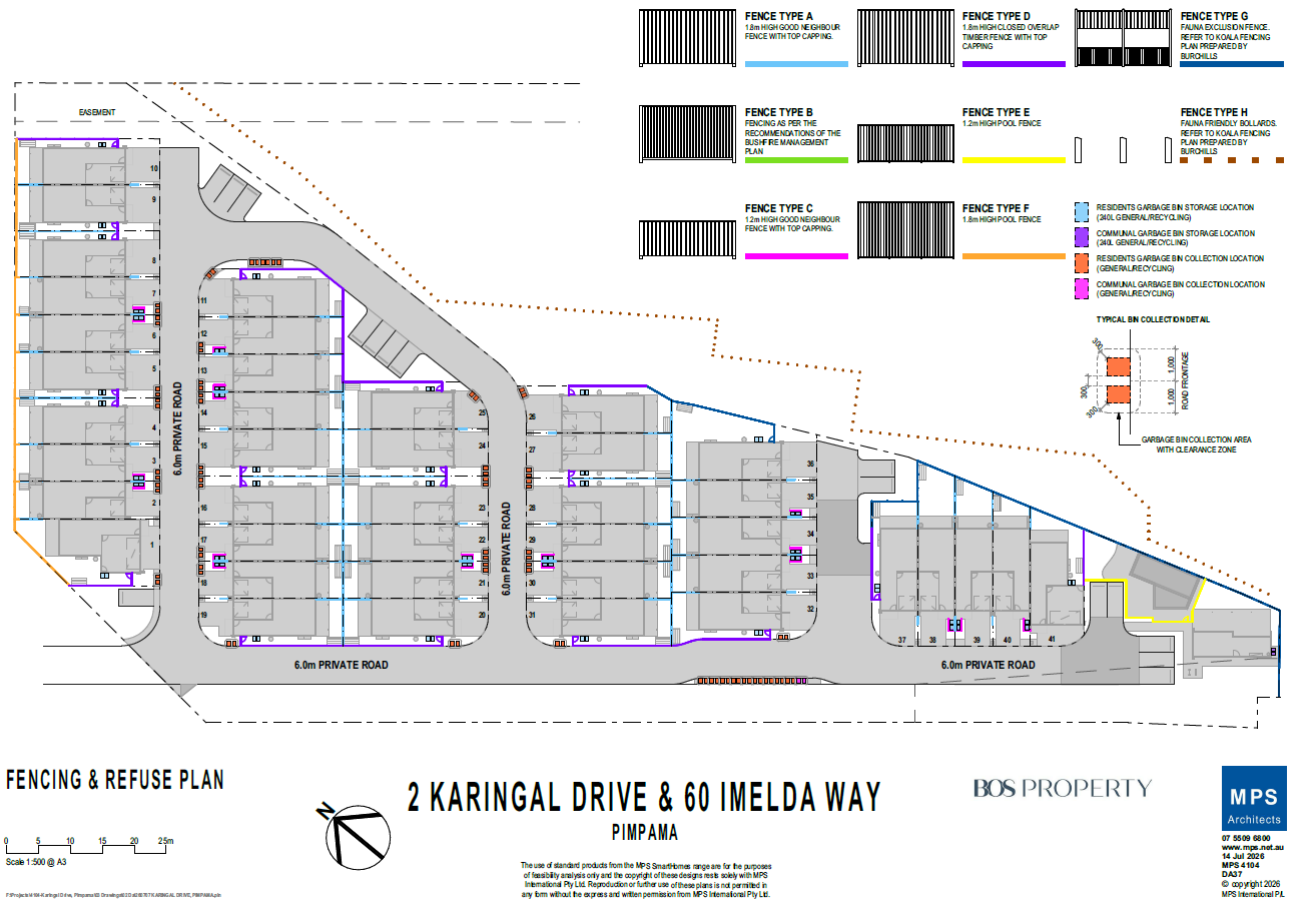
## 2.3 SUMMARY OF WASTE MANAGEMENT

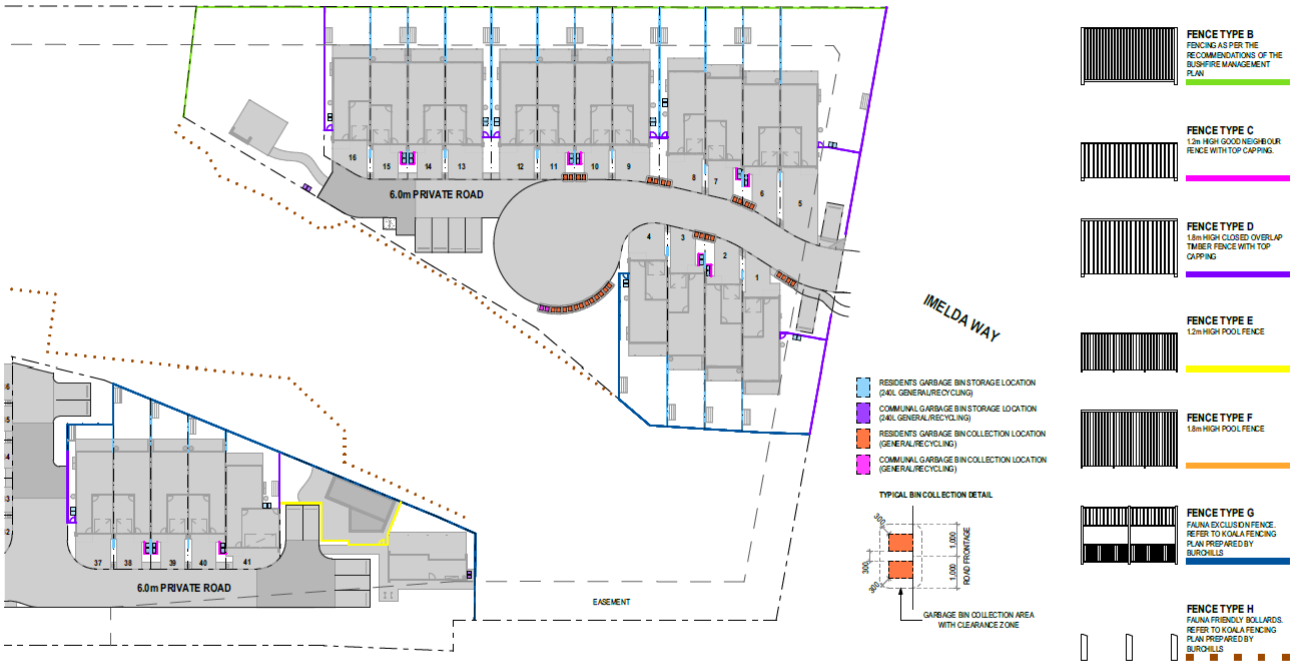
A summary of the waste management for the development is detailed below. Conditions of approval can reflect any waste management requirements if deemed necessary.

| ITEM | RESPONSE | |
|---|---|---|
| General waste generation | 240 L Wheelie Bin | |
| Recyclable waste generation | 240 L Wheelie Bin | |
| Bin location | Bins will be located within a dedicated bin areas at the side and frontage of dwellings. | |
| Collection vehicles | Side lift truck for wheelie bin. | |
| Collection location | Collection locations are provided to the frontage of most units however in several instances group collection locations are required and this is detailed on the proposal plans. Provisions can be included in the CMS if deemed necessary. | |
| Collection Frequency | General waste | Once a week |
| | Recyclable waste | Once per fortnight |

## 2.4 PROPOSAL PLAN EXTRACTS

*Figure 1: Architectural plans showing bin storage and collection.*






## FENCING & REFUSE PLAN

0 5 10 15 20 25m

Scale 1:500 @ A3

# 2 KARINGAL DRIVE & 60 IMELDA WAY

## PIMPAMA

BOS PROPERTY

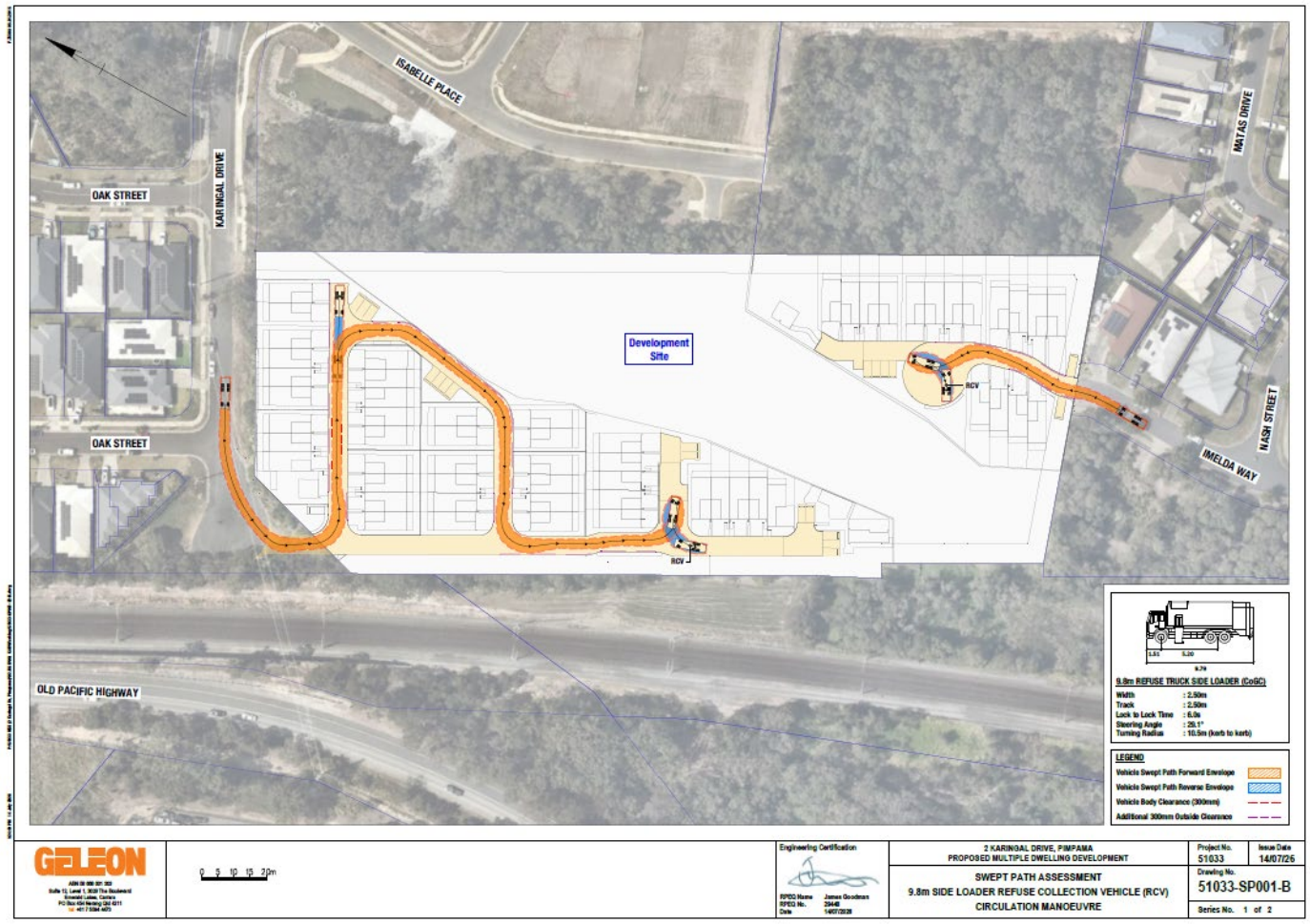
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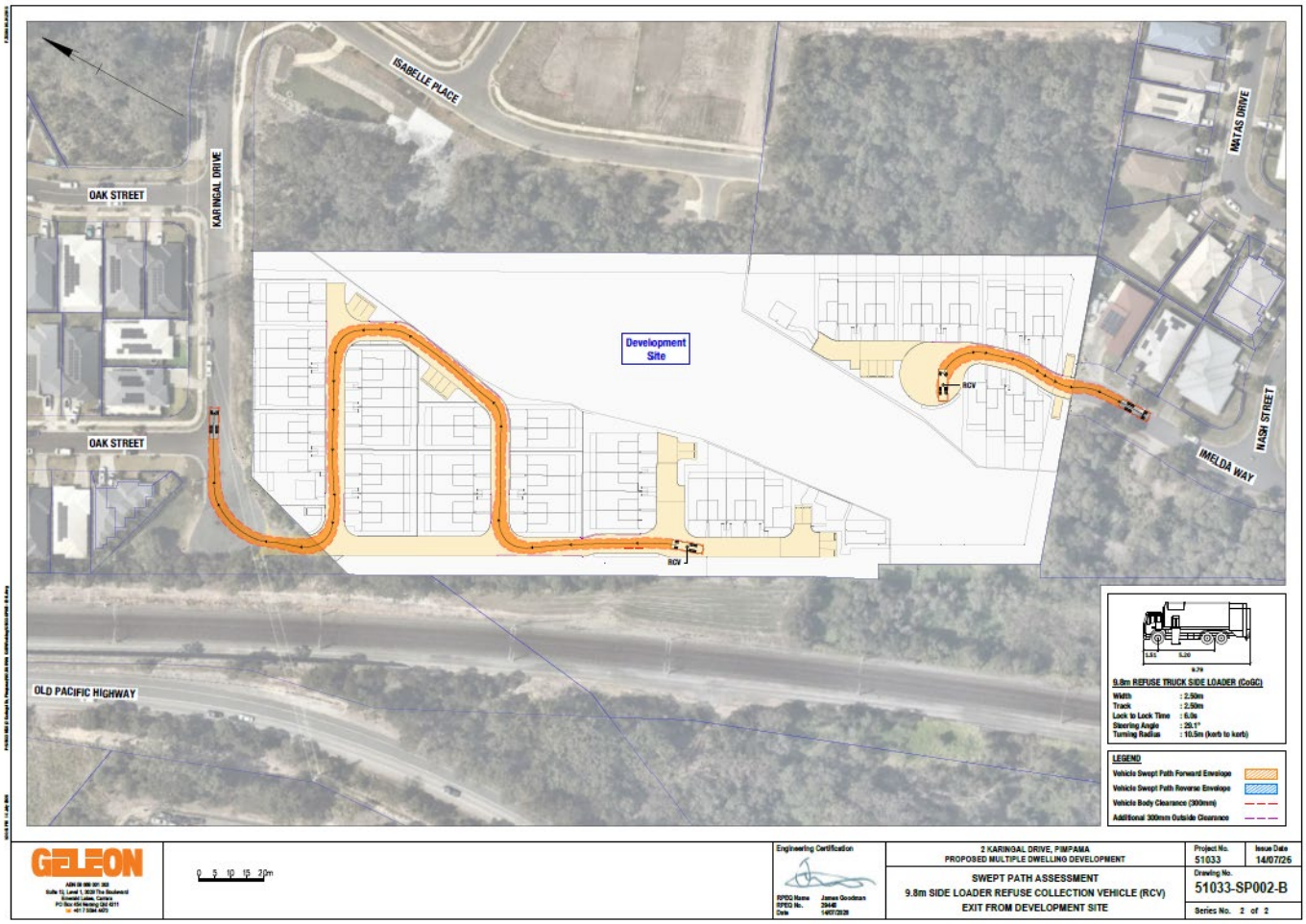
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*Figure 2: Swept path extracts.*




ISABELLE PLACE
KARINGAL DRIVE
OAK STREET
OAK STREET
MATAS DRIVE
NASH STREET
IMELDA WAY
OLD PACIFIC HIGHWAY
Development Site
RCV
RCV
9.8m REFUSE TRUCK SIDE LOADER (CoGC)
Width : 2.50m
Track : 2.50m
Lock to Lock Time : 6.0s
Steering Angle : 29.1°
Turning Radius : 10.5m (kerb to kerb)
LEGEND
Vehicle Swept Path Forward Envelope
Vehicle Swept Path Reverse Envelope
Vehicle Body Clearance (300mm)
Additional 300mm Outside Clearance
0 5 10 15 20m
Engineering Certification
RPEQ Name James Goodman
RPEQ No. 28447
Date 14/07/2026
2 KARINGAL DRIVE, PIMPAMA
PROPOSED MULTIPLE DWELLING DEVELOPMENT
Project No. 51033
Issue Date 14/07/26
SWEPT PATH ASSESSMENT
9.8m SIDE LOADER REFUSE COLLECTION VEHICLE (RCV)
EXIT FROM DEVELOPMENT SITE
Drawing No. 51033-SP002-B
Series No. 2 of 2