Integrated Water Cycle Management Strategy

Mixed use development including infill affordable housing

Prepared for

Southern Cross Community Housing

Site address

Lot 1 DP 520502
Lot 129 DP 3060
Lot 110 DP131219

25 Moss Vale Road, Bomaderry, NSW 2541

Date

30th October 2024

allen price & scarratts pty ltd
land and development consultants

Surveying

Town Planning

Civil Engineering

Project Management

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Table of Revisions

Rev	Date	Details
0	October 2024	ISSUED FOR CONCEPT APPROVAL

1.0 Introduction

Our clients seek development approval for mixed use development including 198 dwellings, of various kinds, on street parking, communal open space and public domain works on lots created under Approval SF10851 – Lot 1 DP 520502, Lot 129 DP 3060 and Lot 110 DP 131219 (25 Moss Vale Road), Bomaderry.

Allen Price and Scarratts (APS) has been engaged by Southern Cross Housing to confirm that the underlying Approved detail design (SF10851) provides suitable detention and water quality measures for the proposed development. These are to be consistent with the parameters in Shoalhaven City Councils DCP's or other acceptable standard or guidelines, for the purpose of gaining a Development Approval.

With reference to Table 5 in section 6.1 of Chapter G2 of DCP2014; as the proposal is subdivision of land greater than 3,500m2, footprint greater than 2,500m^2 and increases the impervious area by more than 1,000m2 for a commercial/residential development it is therefore determined that this is large scale development.

The development is not within the Sydney Water drinking supply catchment area. Discharge is to an existing open drainage system, which is considered a riparian corridor. A Controlled Activity approval will be required for any works required within the riparian corridor, including re-vegetation of the riparian lands.

This report references the following Shoalhaven City Council's (SCC) standards and technical advice:

- D5 Engineering Standards document and DCP2014 for storm events from the 10% AEP to 1% AEP for stormwater quantities,
- G2 of DCP2014
- Supporting document *Sustainable Stormwater Technical Guidelines*.

Under SCC DCP2014 Chapter G2; Section 5.2.4; Performance Criteria P10 table 3, the following are the pollutant load reductions:

Pollutant	post developed average Annual load reduction
Total suspended solids	80%
Total Phosphorus	45%
Total Nitrogen	45%

Table 1 Stormwater Pollutant Reduction Targets

Gross pollutants: End of stormwater network solution is to achieve the following:

- Litter: Retention of litter greater than 40mm for flows up to the 4 exceedances per year (EY) event (3-month ARI peak flow).
- Coarse sediment: Retention of sediment coarser than 0.125mm for flows up to the 4EY peak flow.

2.0 Site & Locality

The site is Lot 1 DP 520502, Lot 129 DP 3060 and Lot 110 DP 131219 (25 Moss Vale Road), Bomaderry which is approximately 8.5 hectares in area. The site is currently occupied by "Nowra Saleyards".

The site has a single site frontage to Moss Vale Road. The site has existing vehicular access from Moss Vale Road via a two-way driveway to Nowra Saleyards.

The site is currently zoned B4 – Mixed Use under the SLEP 2014.

The site is generally surrounded by low-density residential development to the north, agricultural land to the west, environmental sensitive land to the south and public recreation land to the east.

The site is an extension of the existing Bomaderry urban area. These future residential areas take advantage of developable land which is not flood affected or impacted by future Princes Highway bypass land.

The site is largely vacant and has been used for grazing. The site has a relatively gentle slope towards the west and the adjacent Bomaderry Creek and is serviced by adjacent reticulated water and sewer.

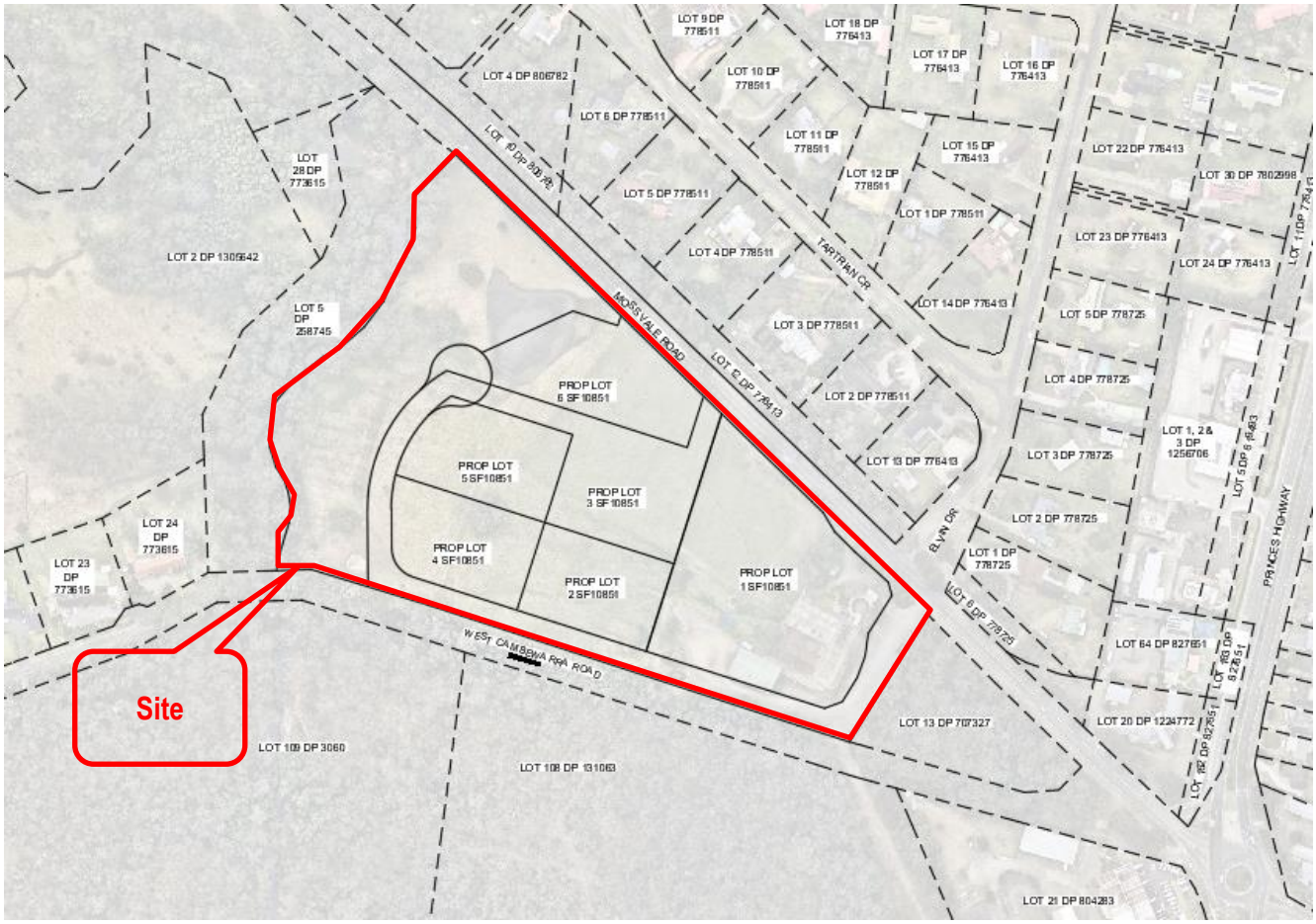


Figure 1 – Locality Plan, Source: Near Maps.

2.1 Proposed Development

The proposed development is to create 198 dwellings, comprising attached dwellings, six residential flat buildings and shop top housing, commercial tenancies, a boarding house, a childcare centre, a medical centre, at grade parking, communal open space and public domain works on lots to be created un SF10851. All building pads are proposed to be above the 1% AEP flood level RL32.2 ref (28112E (D20/36122)).

The proposal involves the construction of roads, drainage (and associated water quality devices), sewer, water, electrical and telecommunications to service the proposed development. All existing buildings be demolished, and existing hardstand areas be removed and restored in accordance with the conditions of SF10851. The development concept is presented in Appendix A.

3.0 Water Quality Modelling

Water quality modelling has been undertaken for SF10851 using MUSIC version 6.3 by a qualified practicing engineer and qualified Environmental Scientist (Pollution Control) to confirm that the concept stormwater quality measures outlined in the APS ICWMS-R2 dated Aug 2022 have been approved under SF10851.

An assessment of the land use assumptions made in the ICWMS prepared for SF10851 against the proposed land uses under this application has been undertaken in order to determine the need for additional stormwater quality modelling.

3.1 MUSIC Data Comparison

Table 2 below presents the landuse assumed under SF10851 contrasted with the proposed landuse under this application.

Source Node	IWCMS for SF10851			This IWCMS		
	Area (m^2)	Impervious Area (m^2)	% Impervious	Area (m^2)	Impervious Area (m^2)	% Impervious
Roof	24,900m^2	24,900m^2	100%	16,150m^2	16,150m^2	100%
Road	11,252m^2	10,689m^2	95%	18,040m^2	17,138m^2	95%
Mixed – Parking & Landscape	22,115m^2	17,524m^2	80%	23,660m^2	19,678m^2	83%
Total	58,267m^2	53,113 m^2	**91.2%**	57,850m^2	52,966m^2	**91.6%**

Table 2 – MUSIC Impervious fractions comparison.

The area assessed in Table 2 addresses the proposed areas of new development only. It does not address areas that are proposed to remain unchanged.

3.2 Water Quality Results

Table 2 indicates that the land use assumptions made for SF10851 remain valid for this application. The overall assessed impervious areas calculated show a minor difference of less than 0.5%. This increase provides an insignificant impact on MUSIC modelling outcomes, and therefore confirms the assessment completed under approval SF10851. No new MUSIC modelling is required.

4.0 Stormwater Quantity Modelling

The Stormwater Hydraulic calculations have been prepared by a qualified practicing engineer using DRAINS version 2023.11. As the proposed development has B4 zoning, a high-level approach to stormwater modelling at greenfield stage is required – as the proposal for on-lot layout is generally known, it was found that the original DRAINS model was consistent with this proposal, and the underlying DRAINS model has been updated to reflect more accuratley the layout proposed in this application.

4.1 Site Model

4.1.1 Model Hydrology

An ILSAX model is used to simulate post-development site. Rainfall is imported in accordance with ARR2019 from BOM and ARR data hub.

Overland Flow time of entry are calculated using the Kinematic wave equation.

The following parameters are used in the model:

- AMC = 3
- Soil type = 3
- Impervious Area initial loss = 1mm
- Supplementary Aread intial loss = 1mm
- Pervious Area Intial Loss = 1mm

The DRAINS model associated with Approval SF10851 has been modified to cater for the proposed building and additonal roads and accessways.

Retention calculations have been excluded and are to be dealt with under BASIX certification.

4.1.2 Catchment Details

A summary of the catchment details is seen Table 3 below:

	Sub-catchment	Area (m^2)	%Impervious	%Supplementary	%Pervious
Pre-Development	Cat-pre-gravel areas	7,019	0	50	50
	Cat-pre-roof	2,338	100	0	0
	Cat-pre-remainder	55,611	0	0	100
	Totals	**64,968**	**3.6**	**10.8**	**85.6**
Post-Development	Cat-post-road-imperv	20,967	95	0	5
	Cat-lots	44,001	90	0	10
	Totals	**64,968**	**91.6**	**0**	**8.4**
	CatMVR	116,600	40	0	60

Table 3 – Catchment Details

The area addressed within Table 3 accounts for the total inflowing areas affecting the hydrology of site, allowing for an appropriately sized stormwater network. The adjoining Moss Vale Road (MVR) catchment is considered solely for pipe size / bypass capacity considerations and does not form part of the pre/post modelling considerations.

Material	Retardance Coefficient (n*)	Comments
Gravel	0.02	Adopted in accordance with SCC D5 and Watercom guidelines
Predev - Grassed	0.1	Adopted in accordance with Watercom guidelines for sparse/low vegetation areas
Roads	0.013	Adopted as typical balance between asphalt pavement and concrete gutters. In accordance with SCC D5
Road Verge	0.17	Adopted as flow across well maintained grassed areas
Lot-Paved DCIA	0.012	Adopted as typical value for concrete
Lot-Supplementary-RIA	0.04	Adopted for commercial areas in accordance with SCC D5
Lot-Grassed	0.35	Adopted per Watercom range of values to consider well maintained garden/landscaping on lots etc

Table 4 – Adopted Retardance Coefficent

4.1.3 Pit Blockage and Loss Coefficients

Blockage Factors are as 50% for sag pits and 20% for on-grade pits.

4.1.4 Tailwater Levels

Tailwater levels (TWL) are set at the post-development outlets using the Flood Certificate provided for the site based on the *Bomaderry Creek Floodplain Risk Management Study* (2016). These levels are adopted for storm events ranging from 10% to 1% AEP as seen below.

FLOOD INFORMATION

Year	Existing	Projected 2050	Projected 2100
Flood Planning Level	32.7m AHD		
Hazard Category	High		
Hydraulic Category	Floodway		
Probable Maximum Flood Level	37.0m AHD		
1% AEP Flood Level	32.2m AHD		
2% AEP Flood Level	31.8m AHD		
5% AEP Flood Level	31.4m AHD		
10% AEP Flood Level	31.1m AHD		
Velocity (1% AEP flood event)	3.9m/s		

Note: The above levels and velocity refer to the highest flood level/velocity across the 3 properties.

Table 5 – SCC Flood Certification Ref: 28112E (D20/36122)

As per the note on the flood certificate, flood level applies to the highest flood elevation. Tail water levels have been applied to the 1 and 2 storm events. It was found that the 5 and 10% storm events freely discharge to the atmosphere.

4.1.5 OSD Details

The minor storm outlet is 2 x 450mm diameter pipes set at an invert level set at RL 31.9. Refer to drawing N27790-408 in Appendix A. It is noted that the proposed low-level outlet approved under SF10851 was 2 x 525 mm diameter pipes, however the 2 x 450 mm diameter pipes provide improved attenuation of peak discharge.

Individual rainwater tanks for the proposed buildings have not been included in the DRAINS model.
The required retention volume and rainwater tanks will be subject to BASIX requirements.

The ponding depth exceeds the depth suggested in section 5.1.4: A5.6 of Ch G2 of SCC DCP 2014. The Detention / Bioretention basin is intended to be part of an active or passive open space. The provision of a pool type fencing with a lockable gate and plantings will ensure accidental entry is prevented

4.1.6 Results

Table 6 presents a summary of the pre-development peak discharge against the post development peak discharge.

It is noted that the peak site discharge with detention is slightly higher than reported in the IWCMS for SF10851, however the detention basin concept design approved under SF10851 has sufficient capacity to ensure that pre-development peak discharge is not exceeded for this proposal.

The DRAINS model file will be provided under separate cover.

ARI	Pre-Development m^3/s	Post Development (without detention) Peak Discharge m^3/s	Post Development (with detention) Peak Discharge m^3/s	SF10851 Approval -Post Development (with detention) Peak Discharge m^3/s
1:10	0.687	1.74	0.681	0.682
1:20	0.975	2.23	0.795	0.772
1:50	1.41	2.89	0.897	0.896
1:100	1.79	3.36	1.05	1.03

Table 6 – Comparison of Pre-development & Post Development Peak Discharge

4.1.7 Climate Change

Climate change factors obtained from the ARR data hub were applied to assess the effect of climate change.

Interim Climate Change Factors

	RCP 4.5	RCP6	**RCP 8.5**
2030	**0.648 (3.2%)**	0.687 (3.4%)	**0.811 (4.0%)**
2040	**0.878 (4.4%)**	0.827 (4.1%)	**1.084 (5.4%)**
2050	**1.081 (5.4%)**	1.013 (5.1%)	**1.446 (7.3%)**
2060	**1.251 (6.3%)**	1.229 (6.2%)	**1.862 (9.5%)**
2070	**1.381 (7.0%)**	1.460 (7.4%)	**2.298 (11.9%)**
2080	**1.465 (7.4%)**	1.691 (8.6%)	**2.719 (14.2%)**
2090	**1.496 (7.6%)**	1.906 (9.7%)	**3.090 (16.3%)**

RCP 8.5 (16.3%) was applied to the DRAINS model. Table 7 presents a summary of the pre-development peak discharge against the post development peak discharge with RCP 8.5 (16.3%) applied to the DRAINS model.

ARI	Pre-Development m^3/s	Post Development (without detention) Peak Discharge m^3/s	Post Development (with detention) Peak Discharge m^3/s	SF10851 Approval -Post Development (with detention) Peak Discharge m^3/s
1:10	0.898	2.16	0.753	0.748
1:20	1.24	2.66	0.867	0.851
1:50	1.75	3.41	1.03	1.00
1:100	2.19	3.98	1.26	1.14

Table 7 – Comparison of Pre-Development & Post Development Peak Discharge With Climate Change Factor of 16.3% Applied

It is noted that the peak site discharge with detention is slightly higher than reported in the IWCMS for SF10851, however the detention basin concept design approved under SF10851 has sufficient capacity to ensure that pre-development peak discharge is not exceeded for this proposal with climate change factor applied.

The site is above RL28.0 and will therefore not be affected by sea level rise. It is noted that the Detailed Flood Certificate (28112E (D20/36122)) confirms the site is unaffected by sea level rise.

5.0 DCP2014 Compliance Tables

The following table is prepared to demonstrate compliance with DCP2014 Chapter G2 – Sustainable Stormwater Management.

DCP2014 Chapter G2 – Sustainable Stormwater Management – 5 Controls	
5.1 Stormwater	
5.1.1 Minor and Major Systems Design	
Acceptable Solutions	Compliance
A1.1 Runoff from impervious areas must not be concentrated or directed onto neighbouring properties	Complies. Drainage run off from all proposed and future impervious areas is to be captured in pit/pipe infrastructure.
A1.2 For residential and rural residential areas, the drainage must be designed to cater for a 5-year ARI event.	Not applicable, site is zoned B4 mixed use as such 10-year ARI is adopted.
A1.3 For mixed residential/commercial and industrial development, the drainage must be designed to cater for a 10-year ARI event.	Can comply. Minor system drainage detail design to be undertaken for construction certificate.
A1.4 Kerb and gutters are required if soil permeability is not sufficient to allow natural infiltration of stormwater runoff without causing adverse impacts onsite or to neighbouring properties.	Complies. Kerb and gutters are proposed throughout the development.
A1.5 Runoff from roof gutters and downpipes can be directed to an existing or proposed stormwater system, when it can be proved that the systems design capacity is not exceeded.	Can comply. Detail design to be undertaken for construction certificate.

A1.6 Where onsite infiltration/absorption is proposed for stormwater disposal, supporting geotechnical reports are submitted with a development application to assess the suitability of the proposal	Not applicable. Absorption is not proposed
A1.7 Stormwater inlet structures must be designed with a blockage factor provision in accordance with the latest version of Australian Rainfall and Runoff (ARR) guidelines	Can comply. Detail design to be undertaken for subdivision works certificate
A1.8 Major system drainage must be designed for a 1:100 year ARI event	Can comply. Detail design to be undertaken for construction certificate..
A1.9 Trunk stormwater systems, which include open channels, large conduits and overland flow paths are designed for storms up to 100-year ARI event.	Can comply. Detail design for MV Rd Culvert to be undertaken for construction certificate.
A1.10 The following overland flow paths shall be utilised as Major system flow routes; •Roadways including footpath; • Pathways; and • Parkland or open space.	Complies. All new overland flow paths are proposed to be within road reserves, pathways and parkland/open spaces. Where existing pipes discharge into the site, they will be piped through the site and sized so that the flow is contained within the pipework for all events up to and including the ARI 1:100 storm event.
A1.11 Flow paths must be designed to ensure a velocity depth product of less than 0.3m^2 /s for a 100-year ARI storm event.	Can comply. Detail design to be undertaken for construction certificate.
A1.12 The continuity of the overland flow paths must not be obstructed by fences, walls, footpaths and the like.	Complies. Runoff continues to drain to Bomaderry Creek via pipes and overland flow.
5.1.2 Disposal of Stormwater from Development sites	
A2.1 Roof water is to be collected by gutter and downpipe systems, or other equivalent means, and conveyed to an approved discharge point in accordance with the requirements of Part 3.1.2 of the Building Code of Australia and AS 3500.3.	Can comply. Detail design to be undertaken at Subdivision works certificate.

A2.2 Surface water from paved areas including driveways is to be directed to an approved discharge point (see A2.1) that minimises impact on adjoining land.	Complies. Impervious areas will discharge to down pipes, stormwater pits or overland flow to kerb and gutter.
A2.3 Where the area of buildings, pavement and other impervious areas exceeds 65% of the site area, the proposal is to include details of the methods to be used to harvest rainwater and minimise increased runoff to surrounding land and public stormwater infrastructure. The details are to include assessment of pre-development and post development stormwater flows.	Can comply. Dealt with as part of BASIX.
5.1.3 Climate Change Controls	
A3.1 Climate change impacts, such as changes to rainfall intensity, shall be considered in system design as per relevant policies and/or Australian Rainfall & Runoff (ARR) Guidelines.	Complies.
A4.1 Where relevant major and minor system design must consider the impact of sea level rise.	Not applicable. The site is above RL28.0 and will therefore not be affected by sea level rise. Also refer to the Detailed Flood Certificate (28112E (D20/36122)).
5.1.4 Onsite Stormwater Detention (OSD)	
A5.1 OSD is to be sized to match pre-development peak flow rates for the 5, 20 and 100 year ARI rain events for the site	Complies. End of line detention proposed, generally in accordance with approval SF10851.
A5.2 For development other than subdivision, pre- and post-development peak flow calculations must be based on the impervious percentages (as outlined below) or the actual impervious surface area (whichever is greater) as detailed on development plans.	Complies. Impervious fractions from Table 1 in CH G2 of SCC DCP2014 have been used.

A5.3 For subdivisions, pre- and post-development peak flow calculations must be based on the impervious percentages as outlined below. Area impervious: • Open Space – 25% • Low and Med density residential – 80% • Industrial areas – 80% • Commercial areas – 90% • Half width road reserve – 95%	Complies. Impervious fractions from Table 1 in CH G2 of SCC DCP2014 have been used.
A5.4 OSD design must consider downstream boundary conditions for the 100-year ARI level of the receiving water.	Complies. Tailwater levels stated Detailed Flood Certificate (28112E (D20/36122)) have been used.
A5.5 Detention storage must be located at a level above the 5-year ARI flood level	Complies. OSD is at or above the 10-year AEP flood level RL 31.1 AHD (Detailed Flood Certificate (28112E (D20/36122))
A5.6 If OSD is provided in landscaped areas, the desirable maximum depth of ponding under design conditions is 300mm.	Ponding exceeds 300mm. See A5.7.
A5.7 Despite A5.6 the desirable maximum depth of ponding can be increased to 1200mm provided that site slopes of the basin are ≥1:6, or the provided storage is fenced off.	Can comply. Basin is not in an active open space area. Batters to be 1V:4H. Fencing and plantings to be provided in order to prevent accidental entry.
A5.8 For subdivisions OSD shall be: • Designed at the subdivision stage • Constructed at the individual dwelling stage where OSD is proposed on each lot • Constructed at the subdivision stage where OSD is proposed to be provided through dedicated detention storage	Can comply. Main OSD will be designed and constructed under SF10851 and will make provision for the development under this application. OSD contribution from individual rainwater tanks can be assessed during detail design for BASIX and the construction certificate.
A5.9 50% of any retention volume can contribute towards the OSD volume required for the development, provided the systems are interconnected.	Can comply. OSD contribution from individual rainwater tanks can be assessed during detail design for BASIX and the construction certificate.

5.2 Stormwater Quality and Waterway Protection	
5.2.1 Erosion and Sediment Control	
A6.1 Where vegetation exists on the site, buffer zones of vegetation shall be retained along the boundaries of the site where practicable, particularly those adjacent to creeks and street gutters	Complies. To be indicated thus upon the detailed designs for Subdivision Works Certificate.
A6.2 Sediment and erosion control measures shall not adversely impact on stormwater management measures of the site or any existing public drainage structures of systems	Can comply. A detailed sediment and erosion management plan can be developed to mitigate potential short term construction impacts. GPT and Bioretention basin will mitigate potential operational impacts.
5.2.2 Stormwater Retention and re-use	
A7.1 The volume of retention storage provided is to be equal to or greater than: [storage depth*] X [increase in impervious surfaces compared to pre-development] *as outlined below (refer to Sustainable Stormwater Technical Guidelines for further details). • Alterations, additions, auxiliary structures & second storey additions (10mm) • Single dwelling & dual occupancy (10mm) • Medium Density (9mm) • High Density (8mm) • Industrial (6mm)	Can comply. Dealt with as part of BASIX.
A8.1 Residential development shall install rainwater tanks to meet a portion of supply such as outdoor use, toilets, laundry	Can comply. Detail design to be undertaken at Construction certificate.
A8.2 Any overflow from rainwater tanks shall be directed into an existing stormwater system where possible, alternatively the overflow will be managed so that it does not cause nuisance to neighbouring properties	Can comply. Detail design to be undertaken at Construction certificate.
5.2.3 Small/medium scale development – Not Applicable (Assessed as Large scale development)	

5.2.4 Large Scale Development	
A10.1 For development within Sydney's drinking water supply catchments, a neutral or beneficial effect must be demonstrated in accordance with the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.	Not Applicable. Development is not within Sydney Water's drinking water supply catchments.
A10.2 For development outside Sydney's drinking water supply catchments, pollutant load reduction must be a minimum reduction of the load of the post development average annual load of pollutants in accordance with Table 3 and the following as relevant:	
• For greenfield sites or sites draining to a natural stream of 3rd order or lower, the 1.5-year ARI predevelopment peak discharge must be maintained.	Complies. 1.5year ARI event flows are maintained
• For development discharging to a natural stream, the post development duration of stream forming flows must be no greater than a stream erosion index of 2	Complies. Preliminary calculations indicate a predeveloped flow period of approx. 155.3min and a post developed flow period of 307.4min for the 1.5 YR event, indicating stream erosion index of 17.9/9 or 1.99, which is below 2.
• For development discharging to a tidal area or natural watercourse, outlets must be designed to limit erosion and sedimentation at the discharge point	Complies. All outlets to be stabilised at detailed design stage
• For development discharging to St Georges Basin, Swam Lake, Lake Conjola, Burrill Lake, Lake Tabourie, Willinga Lake and Wollumboola Lake a higher Total Phosphorus reduction target of 65% must be achieved	Not applicable, development not in any of these areas
• For a development discharging into an area of significant biodiversity value, the post development residual pollutant concentrations must not exceed the ecological trigger values listed in the A & NZ guidelines for fresh and Marine Water Quality	Not applicable. Site does not discharge to an area of significant biodiversity.
• Un coated metal roofs, facades and/or downpipes are not supported	Complies. No uncoated metal roofs are to be used on the new buildings.
5.2.5 Design and Maintenance of Stormwater Treatment Measures	

A11.1 Where practicable, trunk drainage is to be provided as a natural vegetated stable channel; and	Not Applicable, no trunk drainage is proposed for the proposed development.
A11.2 Where practical due to adequate catchment area, constructed wetlands are preferred over the use of bio-retention basins and water quality ponds. The preference between a water quality pond and bioretention device will depend on site specific constraints	Wetlands not practical due to flooding, biofiltration adjacent to the public road and within proposed public land with forebays and GPT at the outlet point for ease of maintenance are consistent with performance criteria P11.
A11.3 An Operation and Maintenance Plan is submitted to Council for all stormwater treatment measures proposed, whether remain in private ownership or to be handed over to Council; and	Complies. Per Appendix B of this report. Refer to approval SF10851 Appendix B.
A11.4 System design allows for maintenance (i.e. access and room to operate safely) at all times; and	Complies. All water treatment measures are accessible from the public road/fire trail.
A11.5 Stormwater treatment measures must not be connected until the majority of catchment infrastructure is completed and landforms stabilised with impervious or fully established grassed surfaces. Bioretention devices and constructed wetlands must be established offline from inflows until they are fully established	Complies. Treatment measures to be brought on-line only once upstream road and disturbed lot areas are stabilised prior to erosion control measures being removed.
A11.6 Where the development is staged, sacrificial zones must be included in the design of the stormwater treatment measures. Sacrificial zones are to be rectified upon completion of development at the developer's cost; and	Not applicable. Staging is not proposed
A11.7 Structural stormwater treatment measures must be able to bypass flows in excess of the design discharge with negligible afflux resulting from over topping or blockage of the device; and	Not applicable. No structural stormwater treatment measures are proposed.
A11.8 Trash racks are generally preferred over proprietary GPT's by Council	Not applicable. Concurrence previously granted to permit a GPT. Forebay provided in addition to this at the request of Council.

A11.9 In the event of a stormwater discharge, structure stormwater treatment measures must not allow the release of any previously trapped material.	Complies. Sediment & gross pollutant treatment measures are offline (through the GPT) and sediment and the like are to be trapped within the GPT.
A11.10 Stormwater treatment measures must consider mosquito control in their design. Designs should consider: • Permanent water ponding; • Water depth; • Exposure to sunlight and wind; and • Proximity to residential development	Complies. No permanent ponding is proposed, water depth is nominal, the treatment areas are to be exposed to wind and sun rather than enclosed.
A11.11 All filter media used in bioretention stormwater treatment measures must meet the current specifications of the Guidelines for filter media in adoption guidelines for biofiltration systems or a demonstrated equivalent, verified by a soil laboratory registered by the National Association of Testing Authorities; and	Complies. To be managed during construction. Material to be sourced from an acceptable supplier and adequacy demonstrated prior to placement.
A11.12 Design of stormwater treatment measures is in accordance with Sustainable Stormwater Technical Guidelines.	Complies. Calculations provided through Section 3 of this report.
A11.13 Development adjacent to a watercourse or stormwater drain addresses environmental impact upon the water body.	Complies. Calculations provided through Section 3 of this report.
A11.14 Constructed wetlands and bio-retentions basins must be located in a treatment train approach immediately downstream of a sediment basin/forebay.	Complies. Biofiltration areas downstream of GPT which functions as a sediment basin. Forebay is in addition to this.
A11.15 Bioretention devices must be designed in accordance with the latest version of the Adoption Guidelines for stormwater systems (CRC for water sensitive cities) and Facility for advancing water biofiltration (FAWB) Guidelines	Complies. To be detail designed at Subdivision works Certificate stage incorporating these measures, general guide indicated on concept engineering plans and in this report
5.3 Waterfront Land	
5.3.1 Development on Waterfront land	

A12.1 The minimum width of the core riparian zone is in accordance with Table 4 or as specified by the Water Management Act 2000	Complies. Riparian buffer is provided in excess of the required minimum amount
A12.2 The core riparian zone must be maintained or restored or rehabilitated using appropriate local species with a range of canopy, understorey and ground cover species to enable a healthy and diverse ecosystem	Complies. Core riparian buffer is and proposed for re-vegetation, details to be provided with subdivision works certificate application
A12.3 Topsoil shall be reused from the development site where it contains known or potential seedbank on the development site	Not applicable due to the extensive nature of the disturbance of the existing site and land use over a long period of time for agricultural purposes.
A12.4 Transport infrastructure and services (i.e. sewer, electricity, gas and communications) shall be located outside the core riparian zone	Complies. See Concept Engineering indicating all civil works are outside the core riparian zone with the exception of minor encroachment of batters which are proposed to be revegetated as part of the riparian works for areas currently utilised as agricultural grazing.
A12.5 Despite A12.4, where services must traverse the core riparian zone, the development application must demonstrate that there will be minimal impact on the function and integrity of the core riparian zone	Not applicable. See concept Engineering indicating all civil works are outside the core riparian zone
A12.6 Pathways, cycleways and pervious recreational area shall be located outside core riparian zone unless all of the following is satisfied: • An opportunity exists for the community to connect with and explore the watercourse in a strategic location • There will be minimal impact on the riparian function • The integrity of the riparian land is maintained	Not applicable. See concept Engineering indicating all civil works are outside the core riparian zone
A12.7 Bushfire asset protection zones shall be located outside the core riparian zone or vegetated buffer and should be incorporated into the development footprint	Complies, refer to the bushfire report

A12.8 Crossings of waterways or other activities must have regard to the minimum structure requirements for fish passage in accordance with relevant NSW state government guidelines	Not applicable. No waterway crossings are proposed
A12.9 Works carried out on waterfront land comply with the Water Management Act 2000	Noted, works to comply with Controlled Activity Approval
A12.10 Stormwater disposal over/across/through public waterfront reserves should be avoided to prevent erosion and need for remedial actions	The discharge is all proposed within the site, which is in private ownership
5.3.2 Coastal areas – Section Not applicable, development not discharging to coastal cliffs or coastal dunes	

6.0 Conclusion

This report has assessed the potential stormwater quality and stormwater quantity impacts from the proposed development.

The proposed stormwater quality measures approved under SF10851 are satisfactory to mitigate the potential stormwater quality impacts from this proposed development

The proposed stormwater quantity measures will ensure that the pre-development peak site discharge is not exceeded.

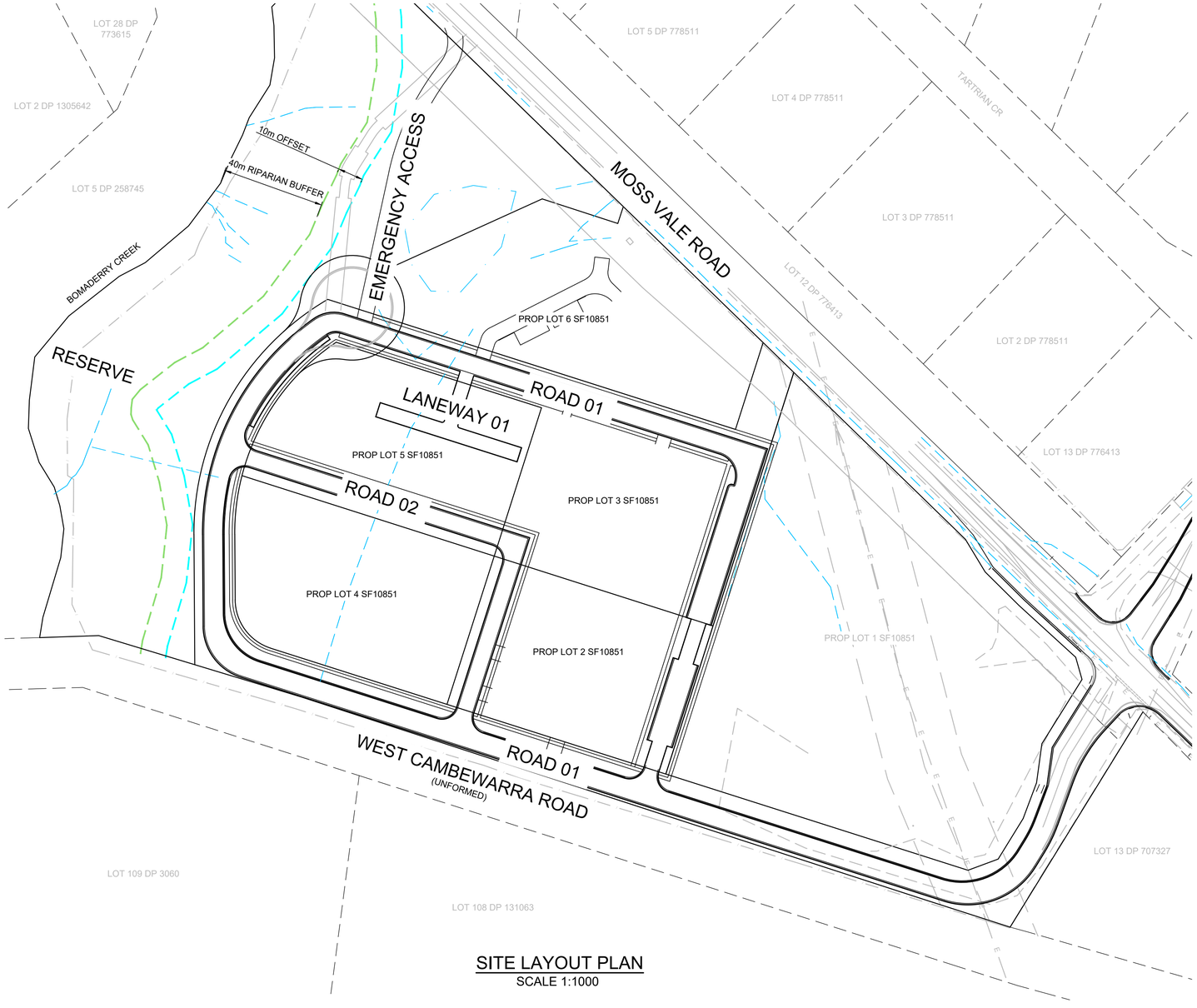
The proposal is considered adequate from a stormwater perspective and is recommended to be supported by Shoalhaven City Council

Completed by:
Benjamin Innis
Civil Engineer
October 2024

Reviewed by:
Wal Mullany
BE, GradDip LGE, ME(Hons), MCP, MIEAust, CPEng, NER
Allen, Price & Scarratts Pty Ltd
October 2024

Appendix A – APS Engineering Plans ref N27790-407 to 415

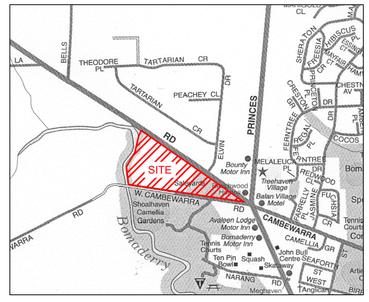
PROPOSED MIXED USE SUBDIVISION
FOR SOUTHERN CROSS COMMUNITY HOUSING



SITE LAYOUT PLAN
SCALE 1:1000

DRAWING SCHEDULE

N27790-407	COVER SHEET & DRAWING INDEX
N27790-408	GENERAL ARRANGEMENT & STORMWATER LAYOUT PLAN
N27790-409	SEWER & WATER ARRANGEMENT PLAN
N27790-410	ROAD 1 LONGSECTIONS
N27790-411	ROAD 1, 2, LANEWAY & BUSHFIRE EXIT LONGSECTIONS
N27790-412	ROAD 1 TYPICAL SECTIONS
N27790-413	ROAD 1 & 2 TYPICAL SECTIONS
N27790-414	LANEWAY 1 & BUSHFIRE EXIT TYPICAL SECTIONS
N27790-415	BULK EARTHWORKS



LOCALITY PLAN
MAP DRAWN & PUBLISHED BY CARTODRAFT AUST P/L

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SCALE:- 1:1000

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1:1000 (AT A1 ORIGINAL)	AUSTRALIAN HEIGHT DATUM	SURVEY	APS	0	ISSUED FOR CONCEPT APPROVAL	BI	25/09/2024
	ORIGIN: PM15204 RL52.718	DESIGN	BI				
		DRAWN	BI				
		CHECK'D	CEG				
	DATE OF PLAN: SEPTEMBER 2024						

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COVER SHEET & DRAWING INDEX
PROPOSED MIXED USE SUBDIVISION
OVER LOT 129 DP3060 LOT 110 DP131219 & LOT 1 DP520502
AT 25 MOSSVALE ROAD
FOR SOUTHERN CROSS COMMUNITY HOUSING

DRAWING STATUS: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

DRAWING NUMBER: N27790-407 | SHEET 1 OF 9 | REVISION P0

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NOTE: ARCHITECT LAYOUT PLAN REF SYB01 MP105 REV F DATED 12/8/2024

LEGEND:

EXISTING

- EXISTING CONTOURS
- EXISTING EASEMENTS
- EXISTING UNDERGROUND ELECTRICAL LINE
- EXISTING MAJOR AND MINOR TRANSMISSION LINES
- EXISTING WATER
- EXISTING TELEPHONE LINE
- EXISTING BATTERS
- EXISTING FENCE
- EXISTING STORMWATER PIPE
- TREES TO BE REMOVED
- TREES TO BE RETAINED

PROPOSED

- PROPOSED CONTOURS
- PROPOSED ROAD CENTRELINE
- PROPOSED KERB AND GUTTER
- PROPOSED FOOTPATH
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER PIT
- PROPOSED STORMWATER HEADWALL
- PROPOSED STORMWATER PIPE FLOWS
- RIPARIAN ZONE
- 10m RIPARIAN ZONE OFFSET
- EXISTING WATERCOURSE

LOCATE EXISTING SERVICES PRIOR TO DETAIL DESIGN. ADJUSTMENT OF EXISTING SERVICES TO BE UNDERTAKEN IN ACCORDANCE WITH THE REQUIREMENTS OF RELEVANT SERVICE AUTHORITY

BUSHFIRE EMERGENCY ACCESS TO MOSS VALE ROAD

FOR DETAILS OF OSD AND STORMWATER QUALITY MEASURES REFER TO DRAWINGS N27790-401-406 BY APS (SF10851)

PROPOSED JUNCTION PIT WITH HIGH / LOW FLOW TO PROPOSED BIO-BASIN AREA

EXISTING DAM TO BE DECOMMISSIONED

FOR OVERLAND FLOW PATH REFER TO DRAWINGS N27790-401-406 BY APS (SF10851)

OUTLET RL 31.5

PROPOSED QUICKSTONE SLEEPER RETAINING WALL (MAX 1.2m HEIGHT), INSTALLED WITH 1.2m INTEGRAL FENCE. WALL TOP RL35.0. CONTAINED WHOLLY WITHIN PROP LOT 6

BUILDING SETBACK FOR POSSIBLE FUTURE ROAD WIDENING.

LOW FLOW OUTLET RL 30.65

PROPOSED DRIVEWAY

PROPOSED ELECTRICAL SUBSTATION. DESIGN BY OTHERS

PROPOSED PARKING

PROVIDE SURFACE INLET PIT FOR FUTURE CONNECTION AND RUNOFF FROM PROPOSED LOT 1

FROM THE DETAILED FLOOD CERTIFICATE REF 2811E (D20/36122):
1% AEP = RL32.2
5% AEP = RL31.4
10% AEP = RL31.4

PROPOSED CONCRETE FOOTPATH 1.2m WIDE

PROPOSED DRIVEWAY CROSS-OVER

PROPOSED DRIVEWAY CROSS-OVER

PROPOSED CONCRETE FOOTPATH 1.2m WIDE

PROPOSED CONCRETE FOOTPATH 1.2m WIDE

PROVIDE SURFACE INLET PIT FOR FUTURE CONNECTION AND RUNOFF FROM PROPOSED LOT 1

PROVIDE SURFACE INLET PIT FOR FUTURE CONNECTION AND RUNOFF FROM PROPOSED LOT 1

PROVIDE SURFACE INLET PIT FOR FUTURE CONNECTION AND RUNOFF FROM PROPOSED LOT 1

ALL EXISTING BUILDINGS AND HARDSTAND AREAS TO BE REMOVED AND AREA RESTORED PER APS PLAN N27790-401-406 (SF10851)

REFER TO N27790-401-406 BY APS (SF10851) FOR DETAILS OF MOSS VALE ROAD AND INTERSECTION

PROPOSED CARPARK

PROPOSED ELECTRICAL SUBSTATION. DESIGN BY OTHERS

REFER TO N27790-401-406 BY APS (SF10851) FOR DETAILS OF MOSS VALE ROAD AND ROAD 1 BETWEEN CH 0 - CH135

PROPOSED FOOTPATH 1.2m WIDE

VARYING WIDTH CARRIAGEWAY

PROPOSED CONCRETE FOOTPATH 1.2m WIDE

PROPOSED ELECTRICAL SUBSTATION. DESIGN BY OTHERS

EXISTING OVERHEAD ELECTRICITY AND EASEMENT (TO REMAIN)

LOT 4 DP 778511

LOT 3 DP 778511

LOT 12 DP 776413

776413

LOT 1 DP 778722

LOT 13 DP 707327

PROP LOT 1 SF10851

LOT 108 DP 131063

TRACK

ACCESS

BUSHFIRE

MOSS VALE RD

ELVIN DRIVE

ROAD 01

ROAD 02

LANEWAY ENTRY

LANEWAY 01

SITE LAYOUT PLAN

SCALE 1:600

0 5 10 15 20 25 30

SCALE:- 1:600

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DATUM: AUSTRALIAN HEIGHT DATUM

ORIGIN: PM15204 RL52.718

DATE OF PLAN: SEPTEMBER 2024

	SURVEY	APS
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REV	DESCRIPTION	BY	DATE
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GENERAL ARRANGEMENT & STORMWATER LAYOUT PLAN
PROPOSED MIXED USE SUBDIVISION
OVER LOT 129 DP3060 LOT 110 DP131219 & LOT 1 DP520502
AT 25 MOSSVALE ROAD
FOR SOUTHERN CROSS COMMUNITY HOUSING

DRAWING STATUS: PRELIMINARY
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DRAWING NUMBER: N27790-408

SHEET 2 OF 9

REVISION: P0

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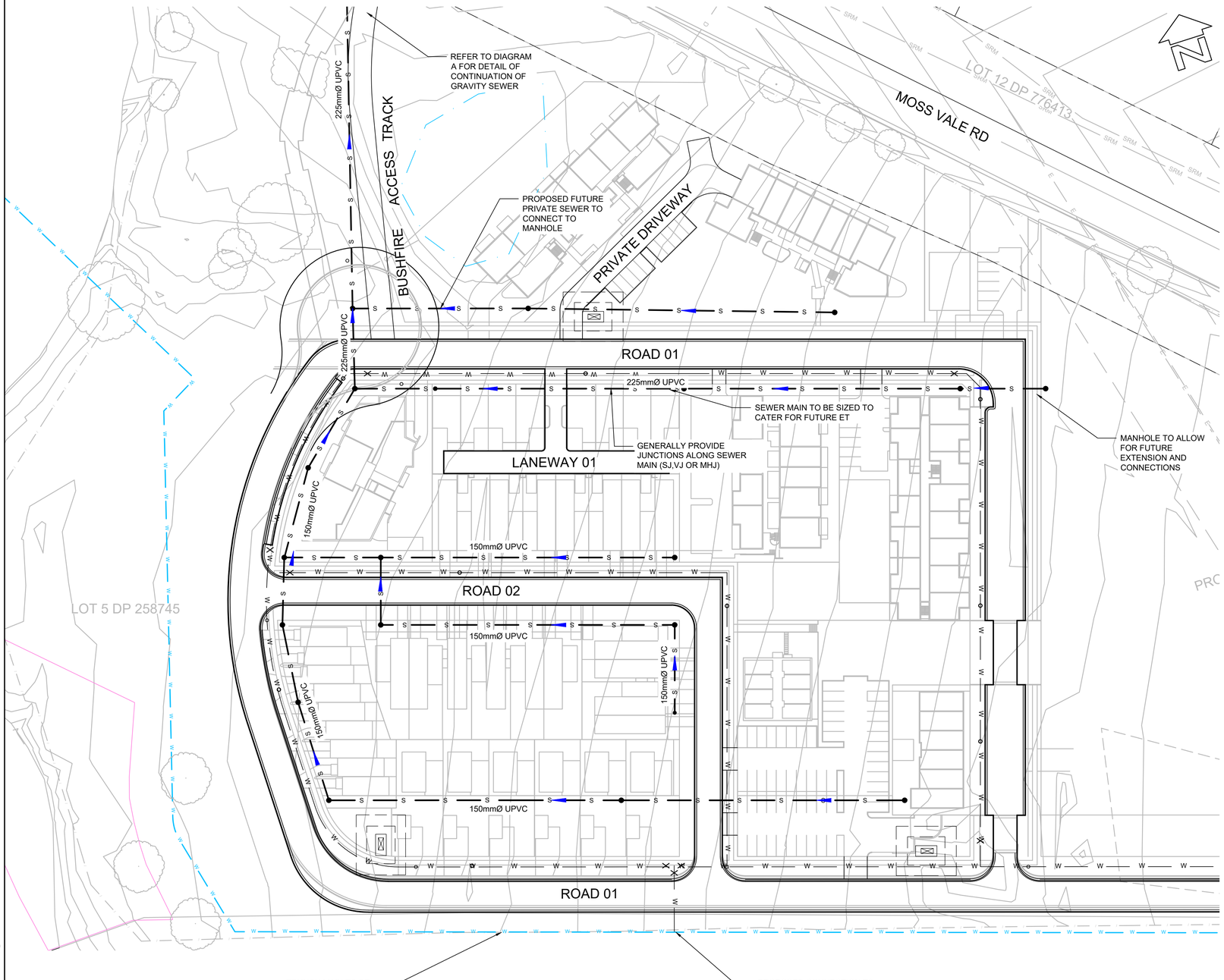
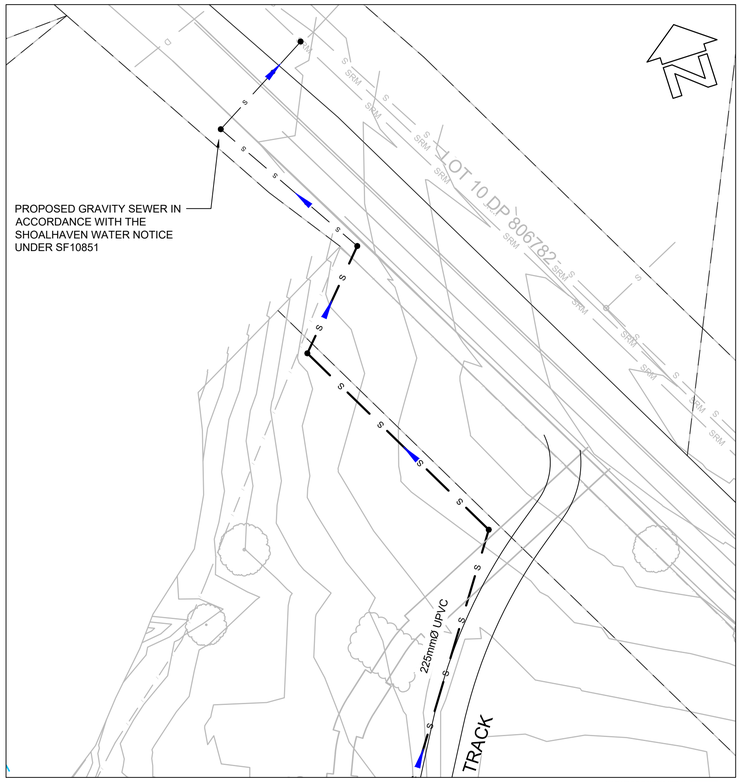
LEGEND:

PROPOSED

- PROPOSED SEWER MANHOLE
- PROPOSED SEWER LINE
- PROPOSED WATERMAIN
- PROPOSED STOP VALVE
- PROPOSED HYDRANT
- DIRECTION OF SEWER FLOW



SITE LAYOUT PLAN
SCALE 1:600



DETAIL DIAGRAM A
SCALE 1:600

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DATUM: AUSTRALIAN HEIGHT DATUM
ORIGIN: PM15204 RL52.718
DATE OF PLAN: SEPTEMBER 2024

	APS
SURVEY	
DESIGN	BI
DRAWN	BI
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REV	DESCRIPTION	BY	DATE
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SEWER & WATER ARRANGEMENT PLAN
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OVER LOT 129 DP3060 LOT 110 DP131219 & LOT 1 DP520502
AT 25 MOSSVALE ROAD
FOR SOUTHERN CROSS COMMUNITY HOUSING

DRAWING STATUS: PRELIMINARY
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DRAWING NUMBER: N27790-409
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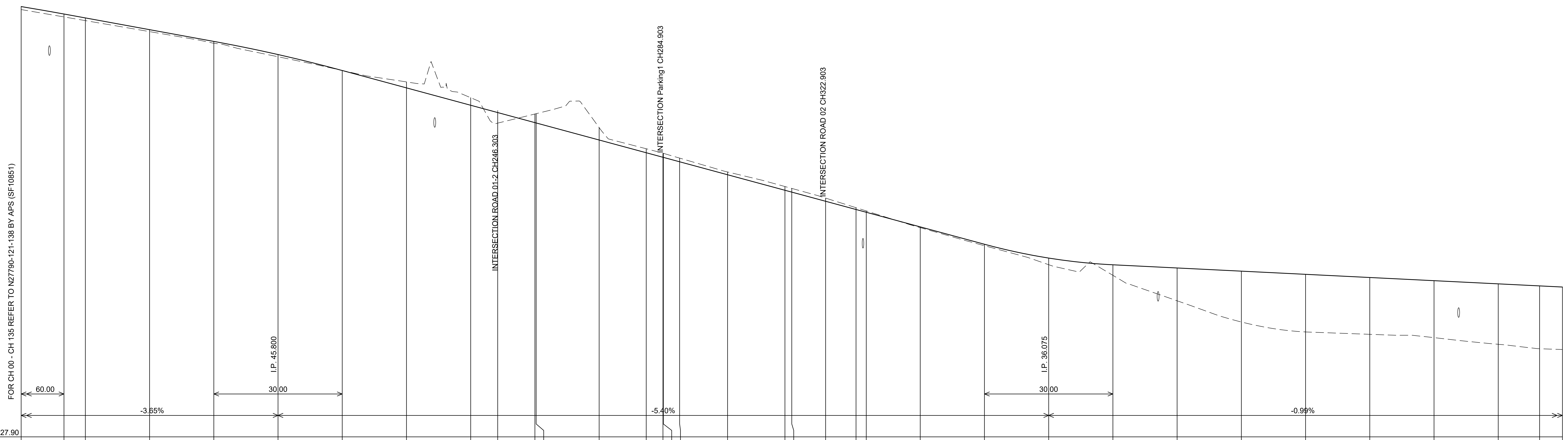
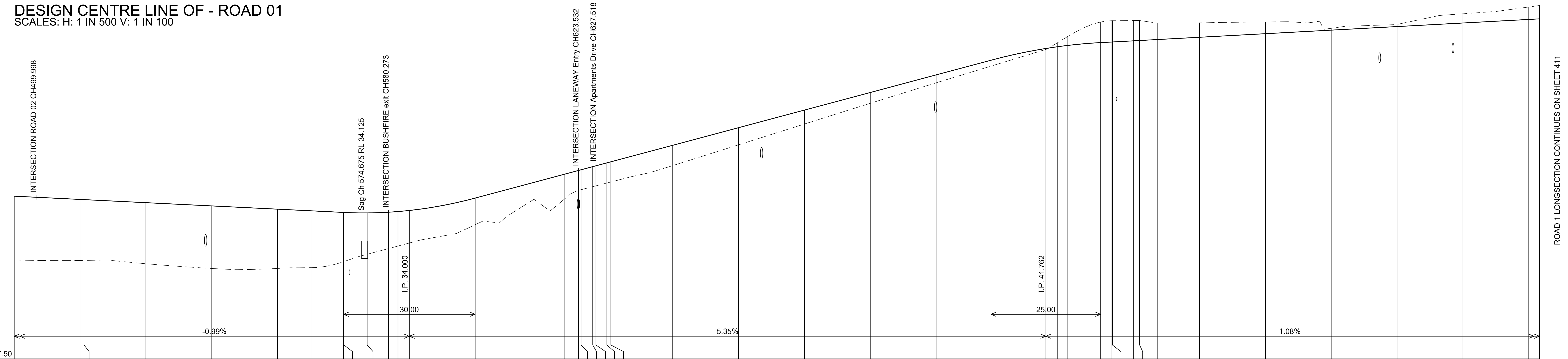


WAE																	
DESIGN CENTRE LINE	47.972	47.625	47.443	46.895	46.348	45.734	44.990	44.179	43.369	43.028	42.558	42.542	41.748	41.154	40.943	40.938	40.732
EXISTING LEVELS	47.832	47.490	47.318	46.804	46.263	45.632	44.991	44.457	43.722	42.535	42.961	42.976	42.328	41.339	41.131	41.126	40.903
CHAINAGE	135.000	145.000	150.000	165.000	180.000	195.000	210.000	225.000	240.000	246.303	255.000	255.299	270.000	281.001	284.903	285.000	288.801

WAE																		
DESIGN CENTRE LINE	40.127	39.403	39.317	38.890	38.506	38.377	37.696	36.885	36.241	35.927	35.779	35.630	35.482	35.334	35.186	35.038	34.942	34.889
EXISTING LEVELS	40.257	39.578	39.489	39.037	38.590	38.439	37.658	36.817	35.932	35.434	34.248	33.258	32.794	32.683	32.529	32.218	32.011	31.977
CHAINAGE	300.000	313.399	315.000	322.903	330.000	332.399	345.000	360.000	375.000	390.000	405.000	420.000	435.000	450.000	465.000	480.000	489.664	495.000

DESIGN CENTRE LINE OF - ROAD 01
SCALES: H: 1 IN 500 V: 1 IN 100



WAE															
DESIGN CENTRE LINE	34.889	34.741	34.732	34.593	34.445	34.296	34.219	34.148	34.147	34.125	34.126	34.158	34.189	34.238	34.803
EXISTING LEVELS	31.977	31.956	31.958	31.808	31.592	31.593	31.628	31.899	31.906	32.198	32.237	32.499	32.615	32.753	33.587
CHAINAGE	495.000	510.000	510.912	525.000	540.000	555.000	562.833	570.000	570.107	574.675	575.395	580.273	582.426	585.000	600.000

WAE															
DESIGN CENTRE LINE	35.606	35.889	36.063	36.094	36.237	36.276	36.409	36.458	37.212	38.015	38.818	39.621	40.423	41.093	41.221
EXISTING LEVELS	34.515	34.749	35.154	35.185	35.323	35.361	35.490	35.537	36.284	37.233	38.182	39.126	40.061	40.823	40.976
CHAINAGE	615.000	620.282	623.532	624.118	626.782	627.518	630.000	630.918	645.000	660.000	675.000	690.000	705.000	717.500	720.000

WAE																
DESIGN CENTRE LINE	41.628	41.706	41.768	41.897	41.925	41.926	41.978	41.993	42.038	42.141	42.303	42.466	42.629	42.791	42.954	42.980
EXISTING LEVELS	41.586	41.883	42.178	42.836	42.894	42.895	42.903	42.906	42.783	42.796	42.839	42.550	42.726	43.211	43.522	43.589
CHAINAGE	730.000	732.592	735.000	742.500	745.042	745.167	750.000	751.354	755.490	765.000	780.000	795.000	810.000	825.000	840.000	842.440

DESIGN CENTRE LINE OF - ROAD 01
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SCALE:- 1:100

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ROAD 1 LONGSECTIONS
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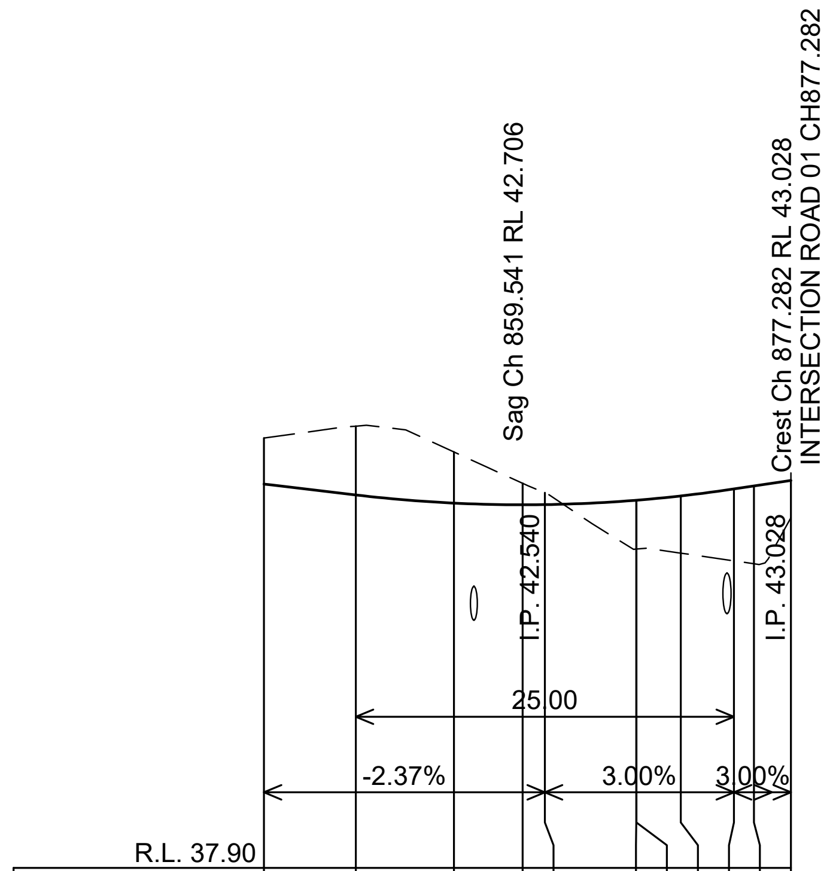


WAE											
DESIGN CENTRE LINE	42.980	42.836	42.728	42.706	42.708	42.766	42.767	42.823	42.915	42.955	43.028
EXISTING LEVELS	43.589	43.747	43.405	42.991	42.866	42.119	42.119	42.066	41.964	41.925	42.535
CHAINAGE	842.440	848.511	855.000	859.541	861.011	867.058	867.066	870.000	873.511	874.842	877.282

DESIGN CENTRE LINE OF - ROAD 1 CONT

SCALES: H: 1 IN 500 V: 1 IN 100

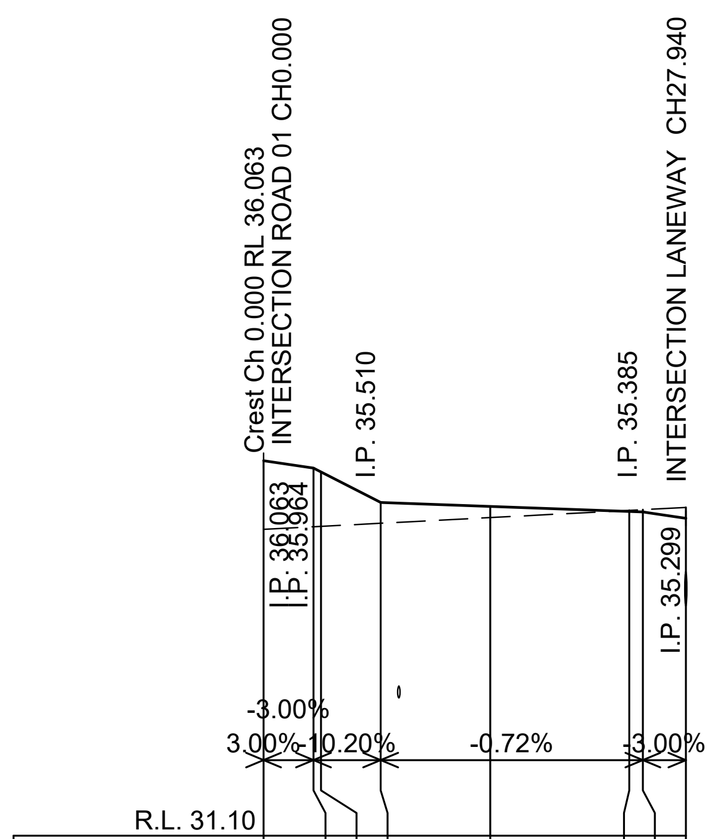
WAE															
DESIGN CENTRE LINE	34.840	34.726	34.563	34.553	34.497	34.485	34.466	34.520	34.537	34.693	34.743	34.805	35.024	35.082	35.570
EXISTING LEVELS	31.958	32.139	32.474	32.504	32.742	32.819	33.082	33.520	33.589	34.227	34.431	34.684	35.192	34.977	35.619
CHAINAGE	0.000	3.772	10.479	10.993	15.000	16.273	20.956	28.773	30.000	41.360	45.000	49.500	60.000	62.000	74.500

WAE															
DESIGN CENTRE LINE	35.593	36.305	37.016	37.135	37.333	37.638	37.774	37.960	38.006	38.285	38.314	38.362	38.394	38.394	38.396
EXISTING LEVELS	35.645	36.440	37.234	37.367	37.601	38.017	38.150	38.278	38.318	38.554	38.570	38.618	38.650	38.651	38.687
CHAINAGE	75.000	90.000	105.000	107.500	111.910	120.000	124.477	132.500	135.000	150.000	151.595	156.377	159.605	159.777	163.177

WAE														
DESIGN CENTRE LINE	38.396	38.397	38.426	38.461	38.494	38.510	38.511	38.608	38.608	38.777	38.777	38.882	38.886	38.890
EXISTING LEVELS	38.706	38.722	38.793	38.829	38.855	38.866	38.866	38.925	38.925	39.005	39.005	39.037	39.037	39.037
CHAINAGE	165.000	166.468	173.177	176.577	178.968	179.977	180.000	185.016	185.024	191.468	191.469	195.000	195.103	195.239

DESIGN CENTRE LINE OF - ROAD 2

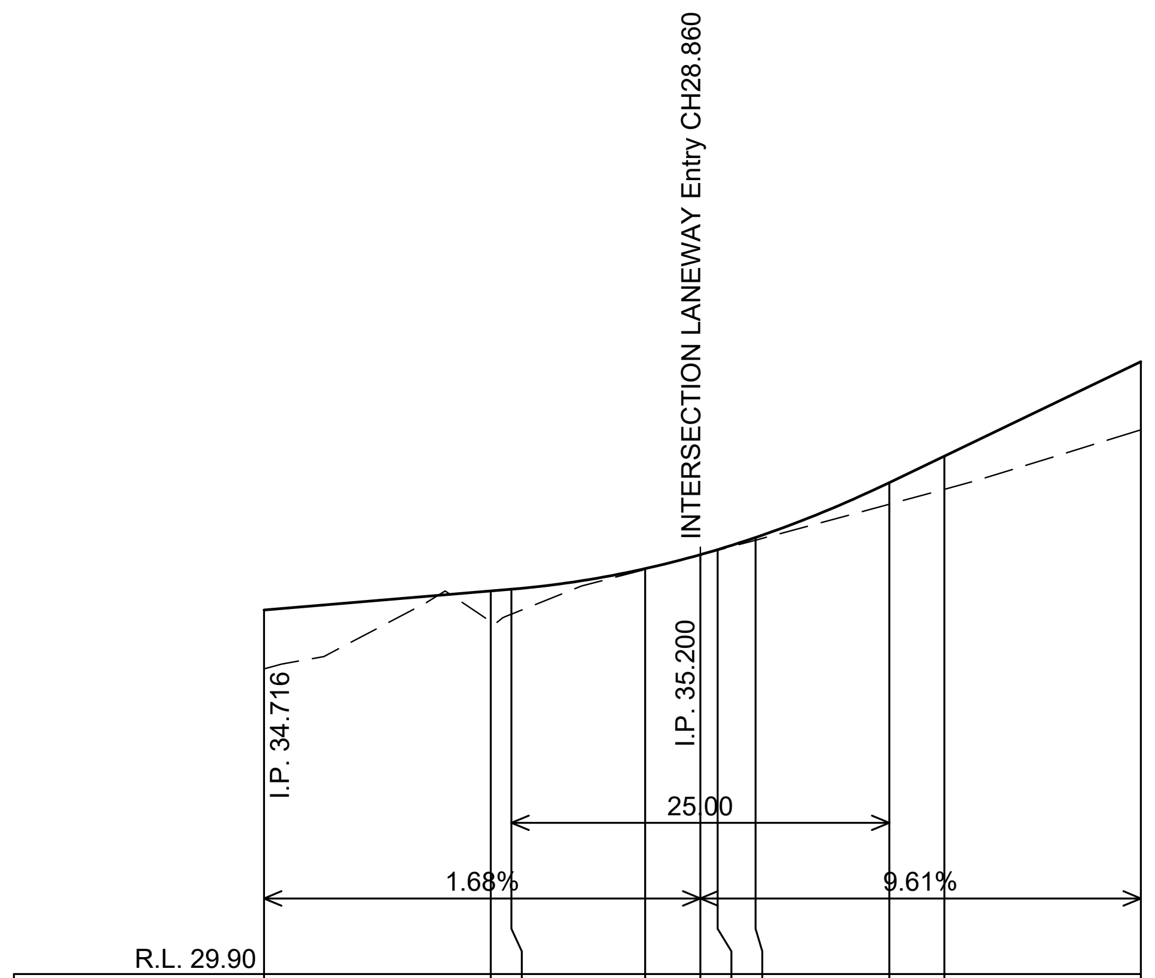
SCALES: H: 1 IN 500 V: 1 IN 100



WAE								
DESIGN CENTRE LINE	36.063	35.964	35.913	35.510	35.457	35.391	35.385	35.299
EXISTING LEVELS	35.154	35.188	35.193	35.234	35.309	35.404	35.414	35.444
CHAINAGE	0.000	3.300	3.800	7.750	15.000	24.190	25.090	27.940

DESIGN CENTRE LINE OF - LANEWAY ENTRY

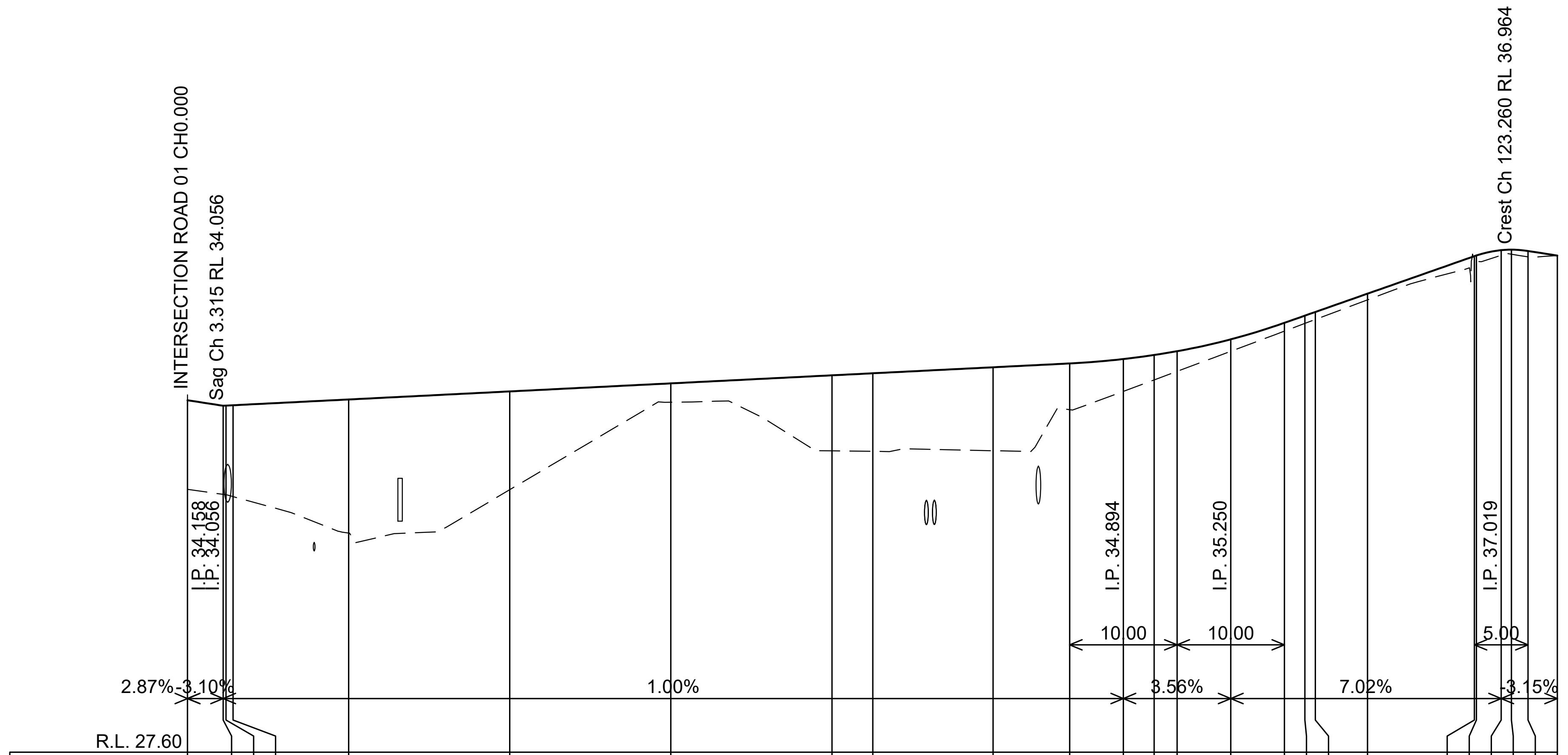
SCALES: H: 1 IN 500 V: 1 IN 100



WAE										
DESIGN CENTRE LINE	34.716	34.968	34.990	35.263	35.448	35.514	35.675	36.401	36.751	38.000
EXISTING LEVELS	33.937	34.561	34.661	35.253	35.444	35.505	35.639	36.114	36.312	37.098
CHAINAGE	0.000	15.000	16.360	25.210	28.860	30.000	32.510	41.360	45.000	57.995

DESIGN CENTRE LINE OF - LANEWAY 1

SCALES: H: 1 IN 500 V: 1 IN 100



WAE													
DESIGN CENTRE LINE	34.158	34.056	34.058	34.065	34.173	34.323	34.473	34.623	34.661	34.773	34.844	34.926	35.002
EXISTING LEVELS	32.499	32.404	32.396	32.363	31.684	32.491	34.121	33.215	33.206	33.218	33.982	34.324	34.537
CHAINAGE	0.000	3.315	3.581	4.241	15.000	30.000	45.000	60.000	63.802	75.000	82.130	87.130	90.000

WAE												
DESIGN CENTRE LINE	35.072	35.293	35.601	35.735	35.803	36.144	36.843	36.856	36.955	36.964	36.940	36.854
EXISTING LEVELS	34.696	35.070	35.446	35.590	35.663	36.029	36.745	36.743	36.860	36.879	36.830	36.854
CHAINAGE	92.130	97.130	102.130	104.034	105.000	109.863	119.810	120.000	122.310	123.260	124.810	127.532

DESIGN CENTRE LINE OF - BUSHFIRE EXIT

SCALES: H: 1 IN 500 V: 1 IN 100

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0 5 10 15 20 25
SCALE:- 1:500

0 0.5 1 1.5 2 2.5 5
SCALE:- 1:100

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RATIO:
AS SHOWN
(AT A1 ORIGINAL)

DATUM:
AUSTRALIAN HEIGHT DATUM
ORIGIN: PM15204
RL52.718
DATE OF PLAN: SEPTEMBER 2024

SURVEY	APS
DESIGN	BI
DRAWN	BI
CHECK'D	CEG

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONCEPT APPROVAL	BI	25/09/2024

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land and development consultants
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Kiama Office: 1/28 Bong Bong Street, Kiama NSW 2533
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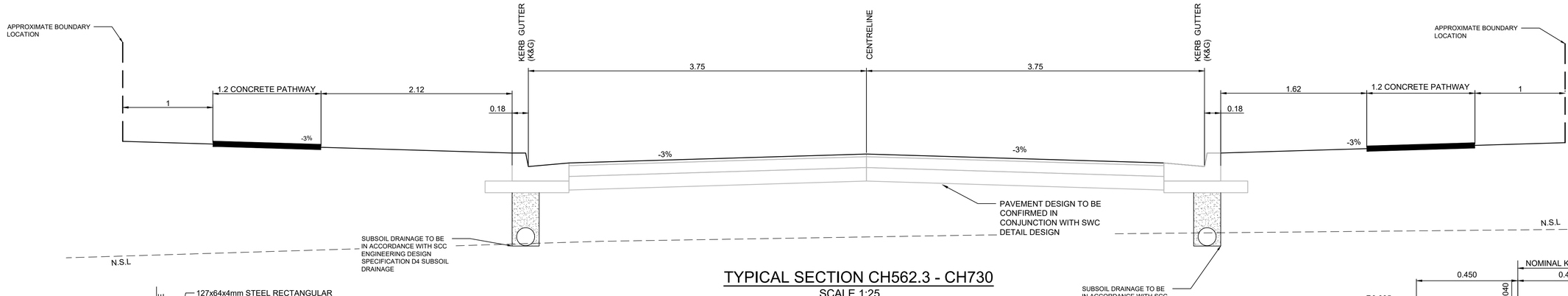
consultants@allenprice.com.au www.allenprice.com.au

ROAD 1, 2, LANEWAY & BUSHFIRE EXIT LONGSECTIONS
PROPOSED MIXED USE SUBDIVISION
OVER LOT 129 DP3060 LOT 110 DP131219 & LOT 1 DP520502
AT 25 MOSSVALE ROAD
FOR SOUTHERN CROSS COMMUNITY HOUSING

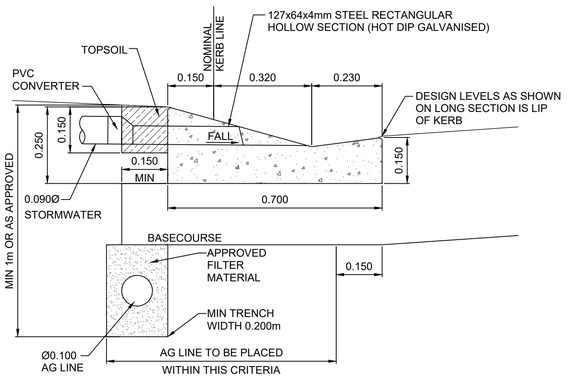
DRAWING STATUS
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

DRAWING NUMBER
N27790-411
SHEET 5 OF 9
REVISION P0



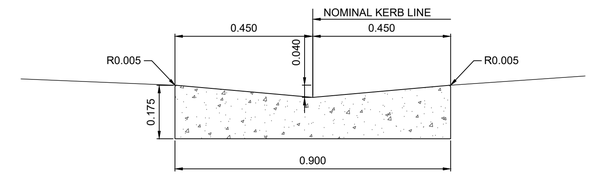
TYPICAL SECTION CH562.3 - CH730

SCALE 1:25



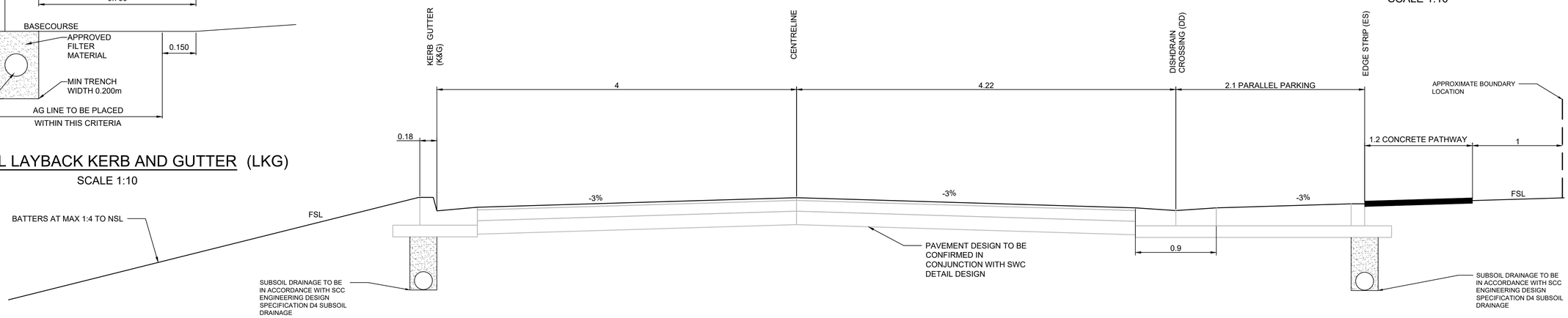
TYPICAL LAYBACK KERB AND GUTTER (LKG)

SCALE 1:10



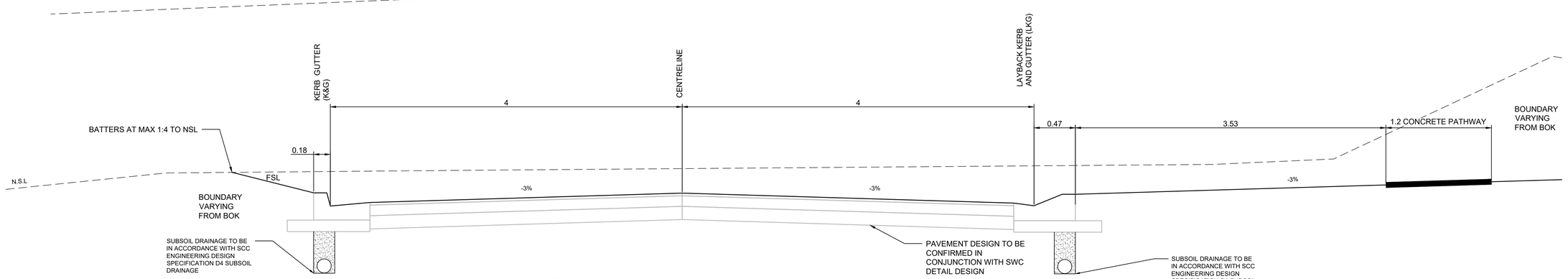
TYPICAL DISH DRAIN CROSSING (DD)

SCALE 1:10



TYPICAL SECTION PARALLEL PARKING CH512.8-562.3

SCALE 1:25



TYPICAL SECTION CH135 - CH512.8

SCALE 1:25

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0 0.25 0.5 0.75 1.0 1.25

SCALE:- 1:25

RATIO: AS NOTED (AT A1 ORIGINAL)	DATUM: AUSTRALIAN HEIGHT DATUM ORIGIN: PM15204 RL52.718 DATE OF PLAN: SEPTEMBER 2024	SURVEY	APS				
		DESIGN	BI	REV	DESCRIPTION	BY	DATE
		DRAWN	BI	0	ISSUED FOR CONCEPT APPROVAL	BI	25/092024
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ROAD 1 TYPICAL SECTIONS
PROPOSED MIXED USE SUBDIVISION
OVER LOT 129 DP3060 LOT 110 DP131219 & LOT 1 DP520502
AT 25 MOSSVALE ROAD
FOR SOUTHERN CROSS COMMUNITY HOUSING

DRAWING STATUS: PRELIMINARY
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DRAWING NUMBER: N27790-412 | SHEET 6 OF 9 | REVISION P0

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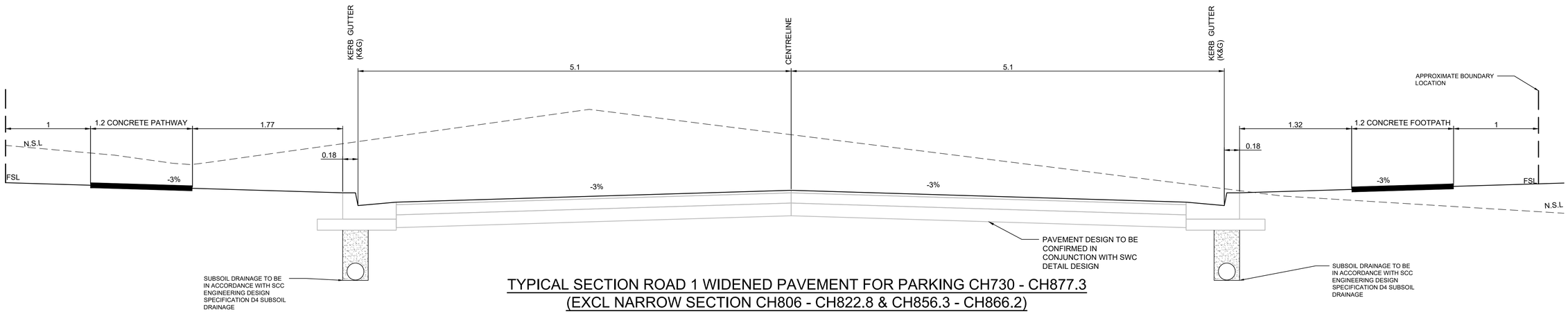
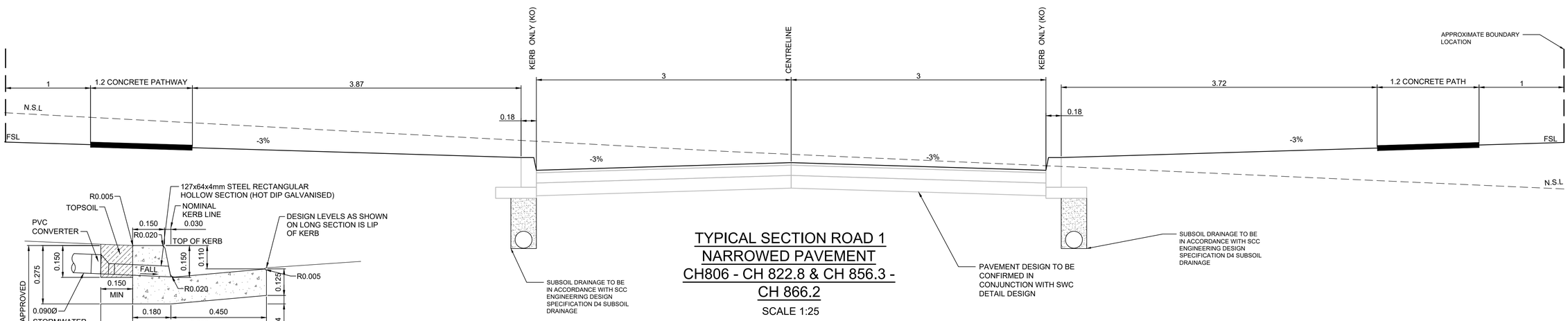


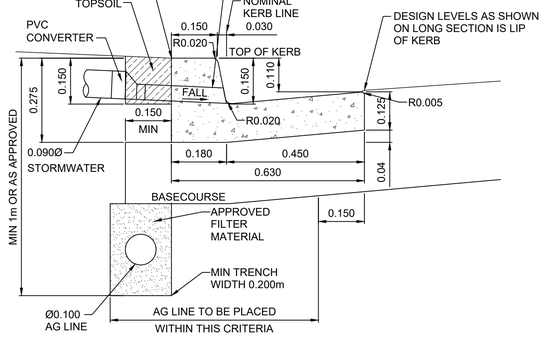
TYPICAL SECTION ROAD 1 WIDENED PAVEMENT FOR PARKING CH730 - CH877.3 (EXCL NARROW SECTION CH806 - CH822.8 & CH856.3 - CH866.2)

SCALE 1:25



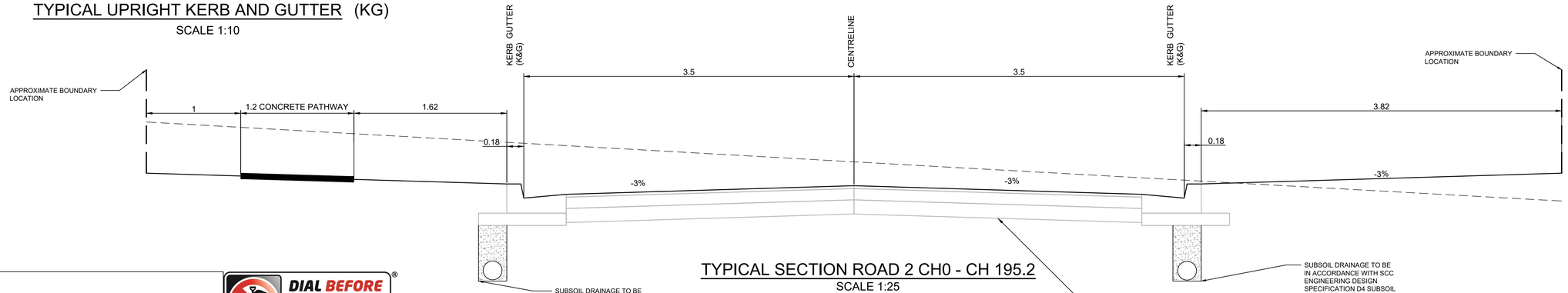
TYPICAL SECTION ROAD 1 NARROWED PAVEMENT CH806 - CH 822.8 & CH 856.3 - CH 866.2

SCALE 1:25



TYPICAL UPRIGHT KERB AND GUTTER (KG)

SCALE 1:10



TYPICAL SECTION ROAD 2 CH0 - CH 195.2

SCALE 1:25

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0 0.25 0.5 0.75 1.0 1.25

SCALE:- 1:25

RATIO: AS NOTED (AT A1 ORIGINAL)

DATUM: AUSTRALIAN HEIGHT DATUM

ORIGIN: PM15204 RL52.718

DATE OF PLAN: SEPTEMBER 2024

	APS
SURVEY	
DESIGN	BI
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ROAD 1 & 2 TYPICAL SECTIONS
PROPOSED MIXED USE SUBDIVISION
OVER LOT 129 DP3060 LOT 110 DP131219 & LOT 1 DP520502
AT 25 MOSSVALE ROAD
FOR SOUTHERN CROSS COMMUNITY HOUSING

DRAWING STATUS: PRELIMINARY
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DRAWING NUMBER: N27790-413

SHEET 7 OF 9

REVISION: P0

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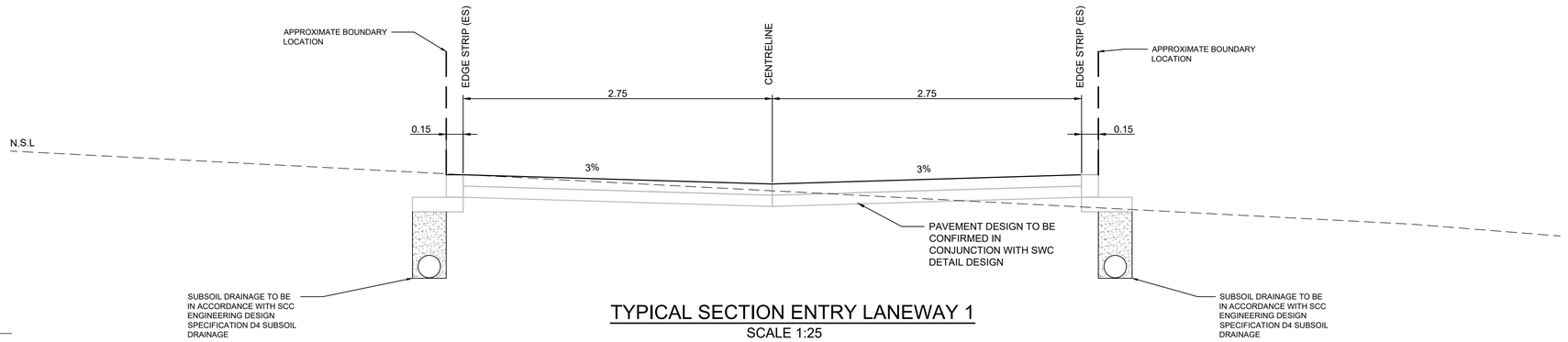
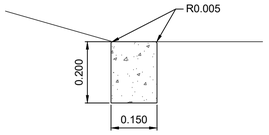
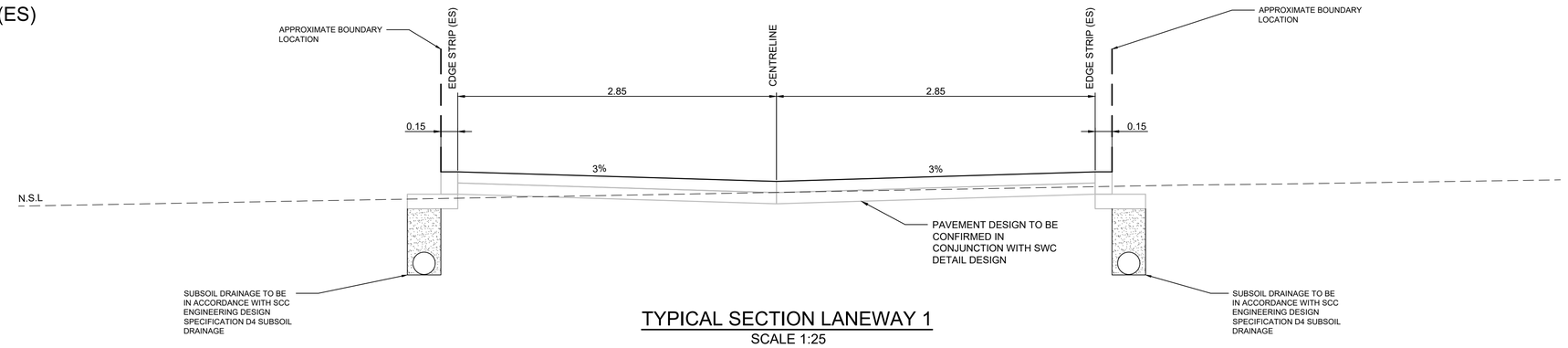


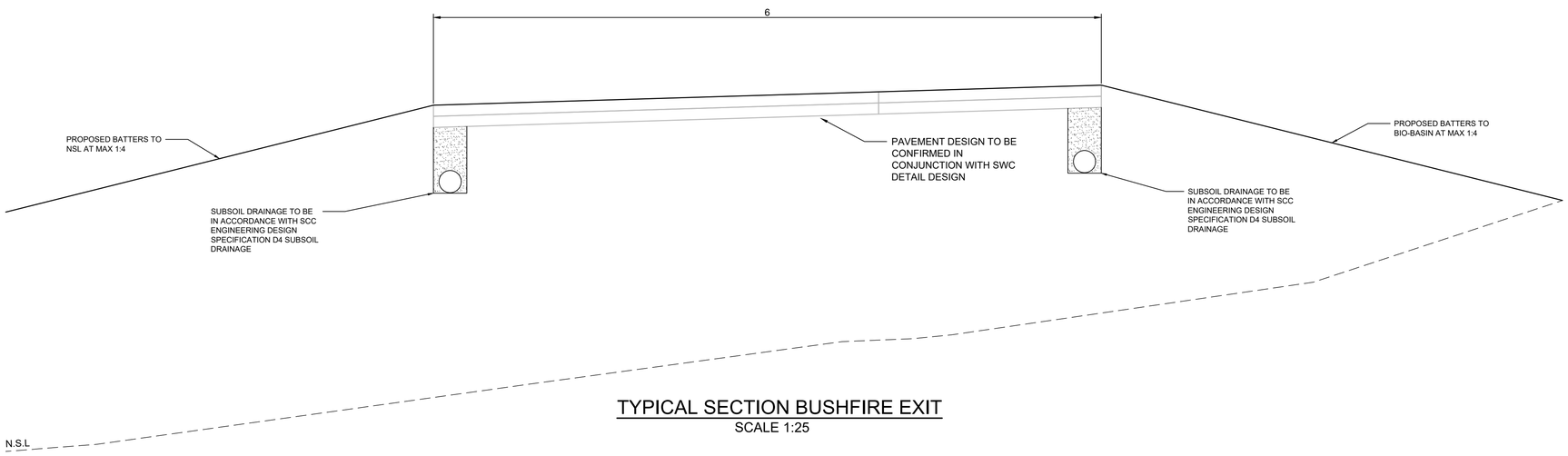
TYPICAL SECTION ENTRY LANEWAY 1
SCALE 1:25



TYPICAL EDGE STRIP (ES)
SCALE 1:10



TYPICAL SECTION LANEWAY 1
SCALE 1:25



TYPICAL SECTION BUSHFIRE EXIT
SCALE 1:25

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0 0.25 0.5 0.75 1.0 1.25
SCALE:- 1:25

RATIO: AS NOTED (AT A1 ORIGINAL)

DATUM: AUSTRALIAN HEIGHT DATUM
ORIGIN: PM15204 RL52.718
DATE OF PLAN: SEPTEMBER 2024

	APS
SURVEY	
DESIGN	BI
DRAWN	BI
CHECK'D	CEG

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONCEPT APPROVAL	BI	25/09/2024

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LANEWAY 1 & BUSHFIRE EXIT TYPICAL SECTIONS
PROPOSED MIXED USE SUBDIVISION
OVER LOT 129 DP3060 LOT 110 DP131219 & LOT 1 DP520502
AT 25 MOSSVALE ROAD
FOR SOUTHERN CROSS COMMUNITY HOUSING

DRAWING STATUS: PRELIMINARY
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DRAWING NUMBER: N27790-414
SHEET 8 OF 9
REVISION: P0

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LOT 5 DP 778511

LOT 4 DP 778511

LOT 3 DP 778511

LOT 12 DP 776413

LOT 13 DP 776413

LOT 5 DP 258745

LOT 1 DP 778725

LOT 13 DP 707327

PROP LOT 1 SF10851

MOSS VALE RD

TRACK

ACCESS

BUSHFIRE

PROPOSED RETAINING WALL

EXISTING DAM TO BE DEWATERED AND FILLED

ROAD 01

BASEMENT SLAB LEVEL

LANEWAY ENTRY

LANEWAY 01

ROAD 02

ELVIN DRIVE

PROPOSED LEVELS TO GENERALLY MATCH EXISTING SURFACE

REFER TO N27790-401-406 BY APS (SF10851) FOR DETAILS OF MOSS VALE ROAD AND ROAD #1 BETWEEN CH0 - CH135

PROPOSED LEVELS TO GENERALLY MATCH EXISTING SURFACE

ELEVATIONS LEGEND:

NUMBER	MINIMUM ELEVATION (m)	MAXIMUM ELEVATION (m)	COLOUR
1	-2.096	-1.500	
2	-1.500	-1.000	
3	-1.000	-0.500	
4	-0.500	0.000	
5	0.000	0.500	
6	0.500	1.000	
7	1.000	1.500	
8	1.500	2.000	
9	2.000	2.500	
10	2.500	3.000	
11	3.000	3.500	
12	3.500	4.000	
13	4.000	4.500	
14	4.500	5.000	
15	5.000	5.551	

NOTE:
- BULK EARTH WORKS SURFACE DEPICTS FINISHED SURFACE OF ROADS AND SLABS UNLESS OTHERWISE STATED.
- +VE = FILL
- -VE = CUT

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LAYOUT PLAN
SCALE 1:600

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0 5 10 15 20 25 30
SCALE:- 1:600

RATIO: 1:600 (AT A1 ORIGINAL)

DATUM: AUSTRALIAN HEIGHT DATUM
ORIGIN: PM15204 RL52.718
DATE OF PLAN: SEPTEMBER 2024

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BULK EARTHWORKS
PROPOSED MIXED USE SUBDIVISION
OVER LOT 129 DP3060 LOT 110 DP131219 & LOT 1 DP520502
AT 25 MOSSVALE ROAD
FOR SOUTHERN CROSS COMMUNITY HOUSING

DRAWING STATUS: PRELIMINARY
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DRAWING NUMBER: N27790-415
SHEET 9 OF 9
REVISION P0

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Appendix B – ROCLA CDS Product Details

PRODUCT
BROCHURE

CDS® SEPARATOR

Rocla®

131 004
rocla.com.au

CDS® SEPARATOR

CDS® Separator are designed to capture and retain gross pollutants, litter, grit, sediments and associated oils, utilising patented CDS® indirect screening technology.

Rocla offers a complete design service for CDS® products that takes into account the catchment's characteristics, pollution load, hydraulic site constraints and opportunities, system capacities, velocity, backwater, as well as the location of services and access for cleaning.

Hydraulic reports are available on request and are automatically carried out for larger units.

CHARACTERISTICS

- Non-blocking functionality
- 95% capture of gross pollutants >1mm
- 95% sediment capture >200µm
- Captures organics and oils
- Captures adsorbed toxics and nutrients
- Can treat any pipe or multiple pipes
- Various sump sizes available
- Customised bypass requirements
- Underground - small footprint
- Easy installation
- No moving parts
- Lowest life cycle costs
- More water treated than comparable treatment designs
- Pollutants stored in the sump, not the screens

BENEFITS

- Subdivisions and roads
- Residential, commercial and industrial developments
- Car parks and shopping centres
- Pre-treatment for wetlands
- Pre-treatment for reuse applications
- Pipes, channels, culverts and creeks

Other CDS® models are available for non-stormwater applications involving high flow solids/ liquids separation, such as industrial processes and sewer overflows.

CDS® CONTINUOUS DEFLECTIVE SEPARATION

The CDS® Separator utilises the energy of the inflow to create a vortex flow regime within the CDS® screening chamber.

The CDS® Separator simply creates a whirlpool that draws all the deflected and settling pollutants to the centre of the screening chamber where they fall out into the storage sump below.

The pollutant storage sump located below the screening chamber allows pollutants to be removed from the flow path and away from the screens, thus maintaining a reliable treatment efficiency.

The unique CDS® technology is the most reliable way to effectively and efficiently treat gross pollutants in stormwater drainage systems.

One of the leading storm water traps

CDS® UNIT MODELS

The size and type of CDS® separator required depends on catchment area, flows, pollution loads, performance requirements, maintenance method, hydraulic limitations and site constraints.

Visit the Rocla website for a sizing request form. Details submitted with this form provide all the information needed to calculate the size of device most applicable for the site.

CDS® Separator Model No.[4]	Overall Dia[1] (mm)	Treatment[3] Flow (L/s)	Weir Height[2] (mm)	Minimum DTI[5] (mm)
Nipper 0506	1300	20-22	300	1035
CDS 0708	1750	50-55	400	1105
CDS 0708Maxi	2600	50-55	400	1185
CDS 1009	1950	100-110	500	1610
CDS 1012	1950	140-150	600	1610
CDS 1015	1950	180-200	700	1610
CDS 1512	2600	220-250	650	1610
CDS 1518	2600	350-400	800	1610
CDS 2018	3400	500-600	900	1610
CDS 2028	3400	800-900	1100	1610
CDS 3018	5000	800-900	900	1610
CDS 3024	5000	1250-1400	1000	1610
CDS 3030	5000	1750-1900	1200	1800

1: Excludes Diversion Chamber except for models 0506, 0708 & 0708M
2: Measured from outlet invert with no tailwater
3: CDS treatment flows are indicative only
4: Model sizing is undertaken independently from the bypass hydraulics of the diversion chamber
5: In most cases minimum DTI is determined by diversion chamber depth

CDS® SEPARATOR PERFORMANCE

Gross Pollutant Removal	98% (>3mm)
Sediments Capture	>80% (>75µm)
TSS Removal	>70% (d_{50} = 106µm)
Total Phosphorous (TP) Removal	>30% (at 70% TSS removal)
Hydrocarbon Capture	80-90% 'at typical stormwater concentrations for free oil

MAINTAINING CDS® SEPARATOR

The CDS® Separator has the lowest life-cycle costs due to its non-blocking functionality, large off-line storage and multiple cleaning options. There are 3 methods of emptying CDS® Separators:

- Removable basket
- Material grab
- Suction method

With no requirement to unblock screens, confined space entry is minimised. Large off-line sump volumes (up to 10m3 available) also minimise cleaning frequency.

CDS® CONTINUOUS DEFLECTIVE SEPARATION

It has long been acknowledged that best management practice for stormwater pollutant traps involves locating the devices off-line.

- GPTs located on-line suffer badly from turbulence and eddies, often resulting in the re-suspension and loss of previously captured pollutants.
- GPTs which store pollution in the screening area suffer decreasing screen area and therefore decreasing flow rates, as they fill up.
- GPTs which function by direct filtration have a treatable flow rate decay that is proportional to the percentage of screen blockage.
- GPTs that utilise a vortex only, without a screen, cannot guarantee neutrally buoyant pollution removal.

Only CDS® Separators combine the advantages of being off-line, having non-blocking functionality, vortex forces and storing pollution outside the screening area. For these reasons, no other device is “equivalent” to a CDS® Separator.

DIVERSION CHAMBER

Precast diversion chambers can be manufactured to suit most typical installations, or chambers can be tailored to meet the hydraulic limitations of the site.

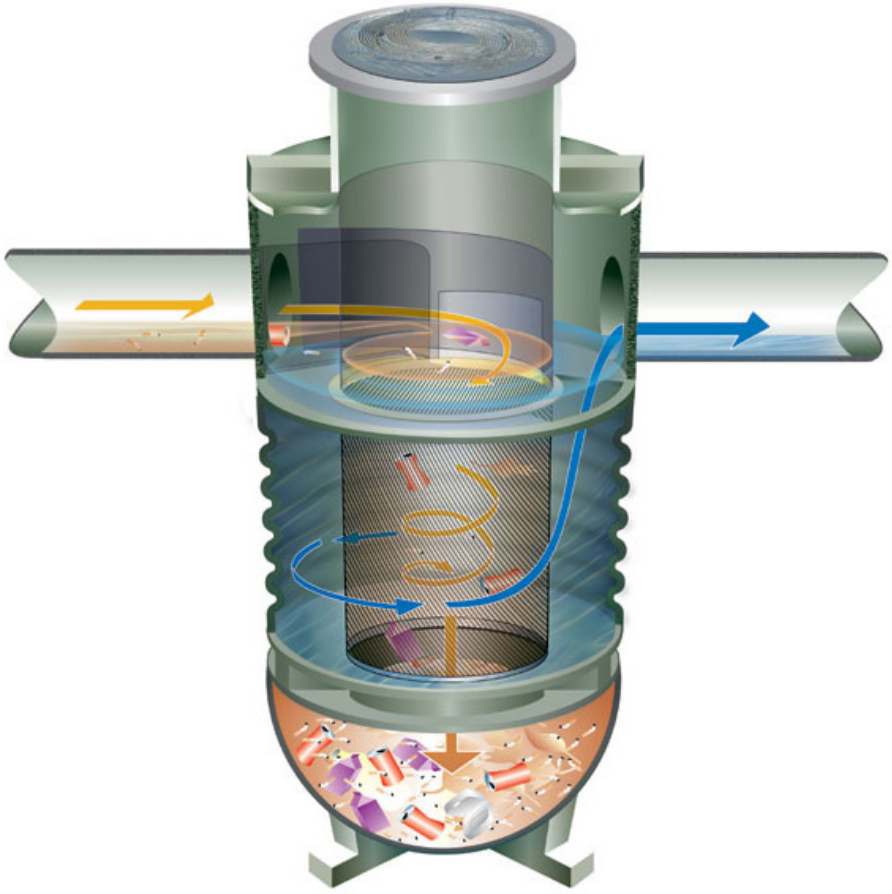
The diversion chamber has the capacity to cater for the highest possible flow in the stormwater system. The chamber is configured on the assumption that the CDS® Separator has not been maintained and there is no flow passing through the unit.

A weir is located within the diversion chamber to create a driving head and direct the majority of flows into the CDS® GPT.

CHAMBER OPTIONS

The CDS® Separator and diversion chamber design depends on the system capacity and site constraints. Rocla will design the most suitable CDS® Separator configuration to meet project requirements.

- Precast diversion chambers
- Semi-precast diversion chambers
- Customised designs for multiple pipes, drops and bends
- In-situ channel designs
- Fixed or collapsible weirs
- Any flow capacity
- No flooding



CDS® 0506 Separator

The PL0506 in-line CDS® Unit, known as the Nipper, is the smallest in the CDS® range of gross pollutant traps. It provides the fully proven performance of CDS® Separators in a pint-sized polymer unit.

The Nipper is ideally suited for installation at the collection source in small catchment areas of less than a hectare and is designed to remove gross pollutants, organic waste, silt, sediment and oils.

Manufactured from strong, lightweight polymer material, the CDS® 0506 is delivered to site in one piece, making it easy to install and cost-effective.

CDS® 0506 PERFORMANCE

Pipe Flows	Treatment 25 L/s Max 150 L/S
Gross Pollutant Removal	98% (>3mm)
Sediments Capture	>80% (>75µm)
TSS Removal	>70% (d_{50} = 106µm)
Total Phosphorous (TP) Removal	>30% (at 70% TSS removal)
Hydrocarbon Capture	80-90% 'at typical stormwater concentrations for free oil
Free Oil Storage Capacity	150 litres

PRODUCT APPLICATION DESIGN (PAD) SERVICES

Rocla offers a full design and drafting service in support of its water quality products, including the CDS® separator.

These service are available to all customers. To see how Rocla can assist you with your water sensitive urban design (WSUD) solutions please visit the Rocla website or call your local sales represenative on 131 004.

SPECIFICATIONS

Storage
- 0.72 cubic metres

Weight
- 140 kilograms

Footprint
- 1050mm diameter

Material
- High density polyethylene

Treatment
- Self-cleaning screens, vortex and gravity

Screens
- 2.4mm stainless steel

Inlet Size
- Up to 375mm diameter

APPLICATIONS

- Small subdivisions
- Bus and train stations
- Pre-screening bio- retention systems
- Pre-screening construction wetlands
- Packaging warehouses
- Roadside drains
- Car parks

For more information call Rocla on **131 004** or visit **rocla.com.au**

CONCRETE PRODUCTS | PIPE | ENGINEERING CAPABILITY

Rocla®

Certified System™
Quality
ISO 9001