

Ordinary Meeting

Meeting Date: Tuesday, 23 September, 2025

Location: Council Chambers, City Administrative Building, Bridge Road, Nowra

Attachments (Under Separate Cover)

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a. Audit, Risk and Improvement Committee

Meetings per year – Minimum of 4 & others as required.	Quorum: Majority of independent voting members.
Commencement time – 4pm	Terms of Reference: D25/280752 (39763E) Amended 17 June 2025
Objective The objective of Council's ARIC is to provide independent advice to Council by monitoring, reviewing and providing feedback about the Council's governance processes, compliance, risk management and control frameworks, external accountability obligations and overall performance.	
Authority Council authorises the committee, for the purposes of exercising its responsibilities, to: 1. access any information it needs from the Council 2. use any Council resources it needs 3. have direct and unrestricted access to the Chief Executive Officer and senior management of the Council 4. seek the Chief Executive Officer's permission to meet with any other Council staff member or contractor 5. discuss any matters with the external auditor or other external parties 6. request the attendance of any employee at committee meetings, 7. receive information from Councillors in accordance with clause 7.3 of Council's Code of Conduct and 8. with the approval of the Chief Executive Officer and/or the Mayor, obtain external legal or other professional advice in line with councils' procurement policies. Details of any costs incurred shall be included in the ARIC annual report to Council.	
Chairperson - Independent Member appointed by Committee	
Previous Councillor / Staff Membership Clr Boyd – non voting Clr Johnston (alternate) – non voting Mayor Clr White (observer)	2025-2026 Councillor / Staff Membership (one Councillor & one alternate) Clr – non voting Clr (Alternate) – non voting Mayor Clr White (observer)
Independent Community Representatives 3 Independent community representatives	
Sitting Fee for Community Members \$16,213 per annum for the chairperson and \$1,621 per meeting for other independent members. A travel per kilometre allowance based on the Councillor rates is also paid.	

The membership, structure and delegation of the Audit, Risk & Improvement Committee is set under the Local Government Regulations (refer below) and as outlined in [the Office of Local Government's Guidelines for Risk Management and Internal Audit](#).

Regulation

Division 6A Auditing and Audit, Risk and Improvement Committees		
<u>Regulation Requirement</u>		<u>Status/ Comments</u>
216C – 216F	Independent ARIC Committee comprising: (1) An independent Chairperson (2) At least 2 independent members (3) One non-voting Councillor member	<u>Independent ARIC members</u>

Division 6A Auditing and Audit, Risk and Improvement Committees	
<u>Regulation Requirement</u>	<u>Status/ Comments</u>
	The independent members' terms were confirmed by Council earlier this year as follows: • Donna Rygate Chairperson – until 31 December 2026 (MIN24.303) • John Gordon – until 30 April 2028 (MIN240.153) • Deborah Goodyer until 30 June 2028 (MIN24.303) <u>One non-voting Councillor Member</u> On 25 March 2024, Council resolved to appoint (effective 1 July 2024): • Cllr Patricia White as the non-voting Councillor member to ARIC; and • Cllr Gillian Boyd as an alternate non-voting Councillor member to ARIC

Note in compliance with section 428A of the Local Government Act 1993, the Local Government (General) Regulation 2021 and the Office of Local Government's Guidelines for Risk management and Internal Audit for Local Government in NSW, information and documents pertaining to the committee are confidential and are not to be made publicly available. The committee may only release Council information to external parties that are assisting the committee to fulfil its responsibilities with the approval of the Chief Executive Officer, except where it is being provided to an external investigative or oversight agency for the purpose of informing that agency of a matter that may warrant its attention

b. Aboriginal Advisory Committee

Meetings per year – Four (4) & others as required Commencement time – 4pm	Quorum – Five (5) local Aboriginal community members Terms of Reference: POL23/35 (1209E) Amended: 17 July 2023
Purpose The purpose of the Aboriginal Advisory Committee, hereby known as the Committee, is to provide cultural advice to Council on its Strategies and Plans. The Committee will also seek to gain Council's support in achieving the objectives for the current Statement of Commitment 2010 (SoC), the Shoalhaven City Council (SCC) Community Strategic Plan 2027 (SCCSP) and endorsement of the Uluru Statement of the Heart June 2020.	
Role of the Committee The role of the Committee is to: • Advise SCC on matters relating to Aboriginal communities in the LGA. • Promote and increase knowledge and understanding of Aboriginal society, history and culture throughout SCC and in the Community. • Advocate and support Council's plan to promote inclusive and accessible services and facilities for Aboriginal people. • Provide advice towards and monitor the implementation of relevant Council plans and strategies with respect to the needs, issues and interests of Aboriginal people and communities. • To support and work with Aboriginal and other organisations committed to increasing respect for Aboriginal culture and history, past and present. • Foster and safeguard a spirit of mutual trust and respect which allows the Aboriginal Advisory Committee (AAC) and SCC to work together in their commitment towards well-informed decision-making processes that are culturally respectful. • Support the recognition and preservation of past and present local cultural heritage and its place in future Council planning and strategies. • Offers a reciprocal platform for the communication of information from Aboriginal community voices and others that identify local needs for services, facilities and activities. • Work together with Council to develop and promote appropriate commemorations and celebrations of Aboriginal culture including, but not limited to Sorry Day and NAIDOC Week. • Provide relevant information to other Committees of Council when needed or requested.	
Delegation – NIL	
Chairperson & Co-Chairperson – Appointed by Committee	
2024-2025 Councillor / Staff Membership All Councillors CEO or nominee	2025-2026 Councillor / Staff Membership All Councillors CEO or Nominee
Note: Any non-voting Councillor in attendance at any of the above Committees may act as an alternate voting member in circumstances where achievement of a quorum is required, noting that this doesn't apply when quorum specifies the quorum to require community member attendance.	
Community / Organisational Representatives Up to thirteen (13) local Aboriginal community representatives including Elders, Youth (including 2 Youth, aged 18 – 25 years, members). Nowra LALC Jerrinja LALC Ulladulla LALC	

c. Affordable Housing Advisory Taskforce

Meetings per year – Four (4) & others as required Commencement time – 4pm	Quorum – Seven (7) provided that a minimum of one (1) Councillor, two (2) community representatives, and two (2) voting agency representatives are in attendance Terms of Reference: POL25/83 (77566E) Amended: 29 July 2025
Purpose The purpose of the Affordable Housing Action Taskforce (the Taskforce) is to support Shoalhaven City Council's implementation of its Affordable Housing Strategy 2024. Council recognises the benefits of working with others to implement its Strategy. The Taskforce will lead work to execute the actions set in the Strategy by leveraging the knowledge, skills, and connections of its members in the planning and delivery of affordable housing (for rent or purchase) and related industries. The purpose of the Taskforce aligns with Council's: - Community Strategic Plan, supporting Key Priority 1.1 Support inclusive, safe, and connected communities - Local Strategic Planning Statement, supporting Planning Priority 1 Providing homes to meet all needs and lifestyles	
Role of the Committee The role of the Committee is to: - Provide Council with advice on the implementation of the Strategy, guided by its members skills, expertise, and experience. - Use network, government, and industry connections to inform and drive the implementation of actions set in the Strategy. - Utilise networks and connections to promote the Taskforces awareness raising, education, and advocacy campaigns. - Advise on the development, review and implementation of the Strategy. - Monitoring and evaluation of the effectiveness of the Strategy.	
Delegation The Taskforce may make recommendations to Council on all matters within the role outlined above. These recommendations may be submitted via the minutes of each meeting to Council for consideration. This does not include substantial issues and recommendations (possibly including expenditure) which will be reported to Council by a separate report prepared by Manager – Strategic Planning. The Committee does not have the power to incur expenditure (directly or indirectly), or the power to bind Council	
Chairperson – Councillor Appointed by Council	
2025 Councillor / Staff Membership Clr White - Chairperson Clr White - Mayor Clr Casmiri Clr Tribe Clr Dunn All other Councillors (non voting) CEO or nominee (non voting)	2025-2026 Councillor / Staff Membership Clr - Chairperson Clr White - Mayor Clr Clr Clr All other Councillors (non voting) CEO or nominee (non voting)
Note: Any non-voting Councillor in attendance at any of the above Committees may act as an alternate voting member in circumstances where achievement of a quorum is required, noting that this doesn't apply when quorum specifies the quorum to require community member attendance.	
Community / Organisational Representatives Voting members Indigenous representative	

Youth representative (18-25 years)

Five (5) Community representatives with an interest in supporting Council's implementation of the Strategy, with desired representation from North, Central, and South of Shoalhaven Local Government Area.

Five (5) representatives of relevant Government Agencies, Community Housing Providers, Service Providers, and the Development Industry.

One (1) representative from a community organisation in the crisis and emergency accommodation sector to be selected at each meeting

Non-Voting Members

Additional representatives of relevant Government Agencies, Community Organisations, Community Housing Providers, Service Providers, and the development industry.

State and Federal Members

Relevant Shoalhaven City Council staff required to support or inform the Taskforce's considerations, for example representatives of Strategic Planning, Development Assessment, Strategic Property, and Community Connections.

d. Financial Review Panel

Meetings per year – Four (4) & others as required Commence time – usually 3.00pm	Quorum – Seven (7) provided that a minimum of one (1) Councillor with voting rights and three (3) community representatives are present Terms of Reference: POL24/145 (74866E) Amended: 28 October 2024																		
Purpose: The Committee provides advice to Council on financial matters regarding the following aspects of Council's operations: - financial management and reporting to facilitate sound decision making. - the financial sustainability of Council - efficacy of long-term financial plans and strategies - adequate financial information for Council to decide on service delivery to the community. - collection of performance measurement data by the Council - identification of specific financial concerns and matters - consideration of advice and direction from the Audit Risk and Improvement Committee																			
Objectives: The Committee has the following objectives: - Identify issues and drivers impacting Council's financial sustainability and stability. - Recommend financial performance measures and targets to improve long term financial sustainability. - Explore opportunities for cost savings, efficiencies and synergies. - Review the processes for annual budget preparation, quarterly reporting and development of the resourcing strategy. - Review the efficacy of Council's long term financial plans and strategies. - Review the business cases associated with major projects.																			
Delegation The Committee does not have delegations or the power to incur expenditure (directly or indirectly). The Committee may form working parties. For exercising its role, Council authorises the Committee to: - Request any information it needs from Council via the finance portal. - Have direct access to the Executive Management Team of the Council - Where authorised by the CEO, to meet with Council staff members or contractors - Discuss any financial matters with the ARIC or external oversight agencies - Request that the CEO engage external legal or other professional advice in line with Council's procurement policies																			
Chairperson – Appointed by the Council <table border="1"> <thead> <tr> <th>2024-2025 Councillor / Staff Membership</th> <th>2025-2026 Councillor / Staff Membership</th> </tr> </thead> <tbody> <tr> <td>Clr White - Chairperson</td> <td>Clr White - Chairperson</td> </tr> <tr> <td>Clr Cox</td> <td>Deputy Mayor</td> </tr> <tr> <td>Clr Tribe</td> <td>Clr (Ward 1)</td> </tr> <tr> <td>Clr Dunn</td> <td>Clr (Ward 2)</td> </tr> <tr> <td>CEO (or nominee) (non voting)</td> <td>Clr (Ward 3)</td> </tr> <tr> <td>Director City Performance (non voting)</td> <td>CEO (or nominee) (non voting)</td> </tr> <tr> <td>Chief Financial Officer (non voting)</td> <td>Director City Performance (non voting)</td> </tr> <tr> <td></td> <td>Chief Financial Officer (non voting)</td> </tr> </tbody> </table>		2024-2025 Councillor / Staff Membership	2025-2026 Councillor / Staff Membership	Clr White - Chairperson	Clr White - Chairperson	Clr Cox	Deputy Mayor	Clr Tribe	Clr (Ward 1)	Clr Dunn	Clr (Ward 2)	CEO (or nominee) (non voting)	Clr (Ward 3)	Director City Performance (non voting)	CEO (or nominee) (non voting)	Chief Financial Officer (non voting)	Director City Performance (non voting)		Chief Financial Officer (non voting)
2024-2025 Councillor / Staff Membership	2025-2026 Councillor / Staff Membership																		
Clr White - Chairperson	Clr White - Chairperson																		
Clr Cox	Deputy Mayor																		
Clr Tribe	Clr (Ward 1)																		
Clr Dunn	Clr (Ward 2)																		
CEO (or nominee) (non voting)	Clr (Ward 3)																		
Director City Performance (non voting)	CEO (or nominee) (non voting)																		
Chief Financial Officer (non voting)	Director City Performance (non voting)																		
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Note: Any non-voting Councillor in attendance at any of the above Committees may act as an alternate voting member in circumstances where achievement of a quorum is required, noting that this doesn't apply when quorum specifies the quorum to require community member attendance.																			
Community/ Organisational Representatives Five (5) community members with demonstrated financial experience and acumen (each with voting rights)																			

e. Inclusion and Access Advisory Committee

Meetings per year – Four (4) Commencement time – 11.00 am	Quorum – Seven (one (1) Councillor with voting rights and six (6) community representatives are present. Terms of Reference: POL23/42 (1228E) Amended: 14 August 2023
Purpose: Guided by lived experience and expertise, provide advice and guidance to Shoalhaven City Council to promote an accessible, inclusive and welcoming community that respects independence and human dignity by: - Ensuring that all residents can participate actively in all aspects of community and civic life and ensure that Council recognises and values the diversity of its community. - Identifying and addressing barriers preventing people from participating in programs, services and facilities across the City. And advocate for: - Adherence to the principles of the Disability Discrimination Act 1992 and the NSW Disability Inclusion Act 2014 which will benefit the community. - Inclusion in our community through recommendations to improve the built environment, changes in community attitudes and behaviours, and creating better systems and processes for meaningful participation of people of all abilities. Strategic Plan Alignment <u>Disability Inclusion Action Plan (2022-26)</u> Create positive attitudes and behaviours within community Create accessible and liveable communities Improve access to our systems and processes Support access to meaningful employment. <u>Community Strategic Plan 2032</u> Resilient, Safe, Accessible and Inclusive Communities 1.1 - Support inclusive, safe and connected communities 1.2 - Preserve, support and develop cultural and creative vitality across our communities 1.3 - Support community wellbeing through fostering active and healthy communities Role To receive and disseminate information and updates to and from the community about regarding issues of accessibility and inclusion in the Shoalhaven. To provide and receive information to Council staff and Councillors regarding the reports and presentations made to the Committee.	
Delegation – NIL	
Chairperson – Appointed by Committee for each meeting	
2024-2025 Councillor / Staff Membership Clr Boyd Clr Krikstolaitis (Alternate) All other Councillors may attend as observers CEO or Nominee	2025-2026 Councillor / Staff Membership 1 Nominated Councillor Clr – Clr – (Alternate) All other Councillors may attend as observers CEO or Nominee
Note: Any non-voting Councillor in attendance at any of the above Committees may act as an alternate voting member in circumstances where achievement of a quorum is required, noting that this doesn't apply when quorum specifies the quorum to require community member attendance.	
Community / Organisational Representatives	

A maximum of twelve (12) community members which includes:

- Five (5) community members who live with disability (with representation from across the Shoalhaven).
- A maximum of five (5) family, friends and/or carers of people living with disability who have an interest in advocating for improved access and inclusion for all.
- An Aboriginal representative living with disability or their family, friends and/or carer of a person living with disability
- A Youth representative (18 – 25 years) living with disability

A maximum of thirteen (13) non-voting Government and Non-Government Organisations which includes:

- Relevant Government Agencies ((e.g., DCJ, NSW Health, NDIA, Service NSW)
- Service providers/community organisations that support a broad range of people with disabilities (e.g., Flagstaff, Autism NSW, First Peoples Disability Network Australia and Multicultural Disability Advocacy Association).
- One representative for each of the Federal Member for Gilmore and the State Members for South Coast and Kiama

f. Natural Area Volunteers Group

Meetings per year – As required Commence time – 4.00pm	Quorum – Five (5) – One (1) Councillor acting as chair and four (4) community representatives Terms of Reference: POL23/67 (42643E) Amended: 27 November 2023
Purpose: The purpose of the Natural Area Volunteers Group is to act as an advisory and representative group on all matters relating to the future directions of the Bushcare Policy and program (refer MIN10.1461).	
Role: To meet the 'Purpose' above, the Group will advise Council on strategic matters pertaining to the Bushcare Program. This will include policies, procedures, resourcing, natural resources management, environmental restoration and preservation techniques and plans, and community and volunteer stakeholder engagement. Natural Area volunteer groups include those managed under Council's Bushcare program that predominantly work on Community Land categorised as 'Natural Area' (<i>Local Government Act 1993</i>). These include Bushcare, Dunecare and similar groups.	
Delegation – Nil	
Chairperson – Appointed by the Council	
2024-2025 Councillor / Staff Membership Clr Johnston - Chairperson All available Councillors (observers) CEO (or nominee) (non voting)	2025-2026 Councillor / Staff Membership Clr - Chairperson All available Councillors (observers) CEO (or nominee) (non voting)
Note: Any non-voting Councillor in attendance at any of the above Committees may act as an alternate voting member in circumstances where achievement of a quorum is required, noting that this doesn't apply when quorum specifies the quorum to require community member attendance.	
Community/ Organisational Representatives Up to ten (10) Natural Area volunteer representatives (e.g., Bushcare, Dunecare volunteers) South-east Local Land Services representative (optional) NSW Department of Planning and Environment representative (optional) Other relevant government agency representatives	

g. Rural Fire Service Strategic Planning Committee

Meetings per year – Two (2) – others as required	Quorum – Five (5)
Commencement time – 5.30 pm	Terms of Reference: Nil (1227E)
Objectives: To advise Council on issues of a strategic and policy nature relating to the operation of the Rural Fire Services having regard to the following: • That the core communication between brigades and Fire Control Officer on operational issues be raised through the Group Officers utilising the committee structure. • All issues be raised through Fire Control so that statutory matters can be resolved immediately. • Policy matters raised can be referred to the Ordinary Council Meeting through the CEO so that statutory matters can be resolved. • That the Strategic Planning Committee be developed as the body advising Council on Rural Fire Service policy issues	
Delegation – NIL	
Chairperson – Appointed by the Council	
2024-2025 Councillor / Staff Membership Clr Clancy - Chairperson Clr Johnston Clr White (Alternate) CEO or Nominee	2025-2026 Councillor / Staff Membership Clr - Chairperson Clr Clr (Alternate) CEO or Nominee
Community / Organisational Representatives RFS Executive Representative RFS Staff Representative Primary Representative RFSA (and alternate) Group 1 Area Representative (and alternate) Group 2 Area Representative (and alternate) Group 3 Area Representative (and alternate) Group 4 Area Representative (and alternate) Group 5 Area Representative (and alternate) Group 6 Support Brigades Representative (and alternate)) Operations Manager – Jervis Bay Territory Administration or nominee	

h. Shoalhaven City Mayor's Relief Fund

Meetings per year – One (1) & others as required	Quorum – Three (3)
No determined commencement time	Rules: POL16/190 (3296E)
Purpose: The fund has been established and maintained as a public fund for the relief of persons in Australia who are in necessitous circumstances and it is intended that the public be invited to contribute to the fund. A person will be in necessitous circumstances where his or her financial resources are insufficient to obtain all that is necessary, not only for a bare existence, but for a modest standard of living in the Australian community. Necessitous circumstances may result from a disaster caused by flood, fire, drought, tempest or other calamity.	
Delegations: The management of the fund is vested in the Shoalhaven City Mayor's Relief Fund Committee. Rules have been adopted by Council.	
Chairperson – Appointed by Council	
2024-2025 Councillor/ Staff Membership Mayor – Cllr White - Chairperson All Councillors CEO or nominee Director City Performance	2025-2026 Councillor/ Staff Membership Mayor – Cllr White - Chairperson All Councillors CEO or nominee Director City Performance
Organisational Representatives Representative of Salt Care Shoalhaven Shoalhaven City Council Fire Control Officer or nominee; Shoalhaven City Council State Emergency Services Coordinator or nominee;	

i. Shoalhaven Heads Estuary Taskforce

Meetings per year – Quarterly Commencement time – 4.00pm	Quorum – Five (5) – One (1) Councillor as Chair or acting Chair and Four (4) Community Members Terms of Reference: POL22/173 (45866E) Amended: 5 December 2022
Purpose The purpose of the Shoalhaven Heads Estuary Taskforce (SHET) is to act as an advisory and representative group on matters relating to the Shoalhaven River, it's estuary and entrance at Shoalhaven Heads.	
Role - To receive and disseminate information and updates to and from the Shoalhaven Heads community about the management of the Shoalhaven Heads estuary. - To provide and receive information to the Northern CMP Advisory Committee in the preparation of the Lower Shoalhaven River CMP. - To provide and receive information to the Northern Floodplain Risk Management Committee in the development and preparation of the Lower Shoalhaven Flood Risk Management Study/Plan. - When the Lower Shoalhaven River CMP is adopted by Council on behalf of the community, the SHET will be disestablished.	
Delegation – NIL	
Chairperson – Councillor Appointed by the Council	
2024-2025 Councillor / Staff Membership Clr Clancy - Chairperson All Councillors (observers)	2025-2026 Councillor / Staff Membership Clr - Chairperson All Councillors (observers)
Note: Any non-voting Councillor in attendance at any of the above Committees may act as an alternate voting member in circumstances where achievement of a quorum is required, noting that this doesn't apply when quorum specifies the quorum to require community member attendance.	
Community / Organisational Representatives Member for Kiama or nominee Indigenous representative Youth representative Five (5) Community representatives Shoalhaven Heads Community Forum representative Greenwell Point Community representative Department of Planning and Environment (DPE) representatives Transport for NSW (TfNSW) representatives New South Wales State Emergency Services (NSW SES) representative Local Aboriginal Land Council representative Other relevant government agency representatives Other such persons as the Chairperson of SHET may deem necessary from time to time.	

j. Shoalhaven Motor Sports Working Group

Meetings per year – Quarterly Commencement time – 5.00pm	Quorum – Four (4) – consisting of at least one Councillor and one Community Member Terms of Reference: POL25/59 (69319E) Amended: 10 June 2025
Role and Purpose - Advocate for the development of a Motor Sports Complex (MSC) in the Shoalhaven - Seek to identify current and future potential sites for the establishment of a MSC in the Shoalhaven. - Upon identification of a potentially suitable site, advocate for funding for the establishment phase of this project from Federal and State Governments as part of their programs for rural and regional economic development.	
Delegation – - Make recommendations to Council that facilitate the development of a MSC in Shoalhaven regarding; - Ongoing project advocacy opportunities; - Requests for any joint facilitation opportunities identified for the development of a MSC in Shoalhaven; - Seeking approval to actively seek funding for the establishment phase of the project. - Provide feedback to staff and Council on matters regarding the development of a MSC in Shoalhaven.	
Chairperson – Councillor Appointed by the Council	
2025 Councillor / Staff Membership Cllr Norris - Chairperson All Councillors CEO or Nominee Director – City Development and/or Nominee	2025-2026 Councillor / Staff Membership Cllr- Chairperson All Councillors CEO or Nominee Director – City Development and/or Nominee
Note: Any non-voting Councillor in attendance at any of the above Committees may act as an alternate voting member in circumstances where achievement of a quorum is required, noting that this doesn't apply when quorum specifies the quorum to require community member attendance.	
Community / Organisational Representatives <i>Eight (8) Community representatives (including two (2) representatives Nowra & District Motorcycle Club)</i> Member for South Coast or nominee Member for Kiama or nominee Member for Gilmore or nominee	

k. Youth Advisory Committee

Meetings per year – Four (4) and others as required	Quorum – Six (6)
Commencement time – 10am or 2pm	Terms of Reference: POL23/14 (1506E) Amended: 27 March 2023
Purpose: The purpose of the committee is to represent the interests and views of young people to Council and the Community. The Committee will also seek to influence Council's support and intent in achieving their objectives for the current Shoalhaven City Council Community Strategic Plan 2032 (SCC CSP).	
Role: - To represent the interests and views of young people to Council and the Community - To provide an opportunity for young people to discuss issues of concern to young people - To provide a mechanism for young people to make representations to organisations and various spheres of Government requesting appropriate action to improve facilities and services available to young people - To give young people experience in Local Government and community affairs - To create greater awareness and appreciation within the general community of the needs and talents of young people - To provide a mechanism for young people to address youth issues themselves	
Delegation: Nil	
Chairperson – Appointed by Committee for each meeting	
2024-2025 Councillor / Staff Membership All Councillors (as observers only)	2025-2026 Councillor / Staff Membership All Councillors (as observers only)
Community / Organisational Representatives Voting Members: - A maximum of eighteen (18) Secondary School Student Representatives - A maximum of five (5) Tertiary Education Student Representatives - A maximum of six (6) community youth representatives Non-Voting Members - Representatives from other relevant Government Agencies, Community Organisations and Service Providers, with preference for youth representatives - One representative for each of the Federal Member for Gilmore and the State Members for South Coast and Kiama, with preference for youth representatives - All available Councillors - Council's Chief Executive Officer (CEO) or nominee	



Monthly Investment Review



August 2025

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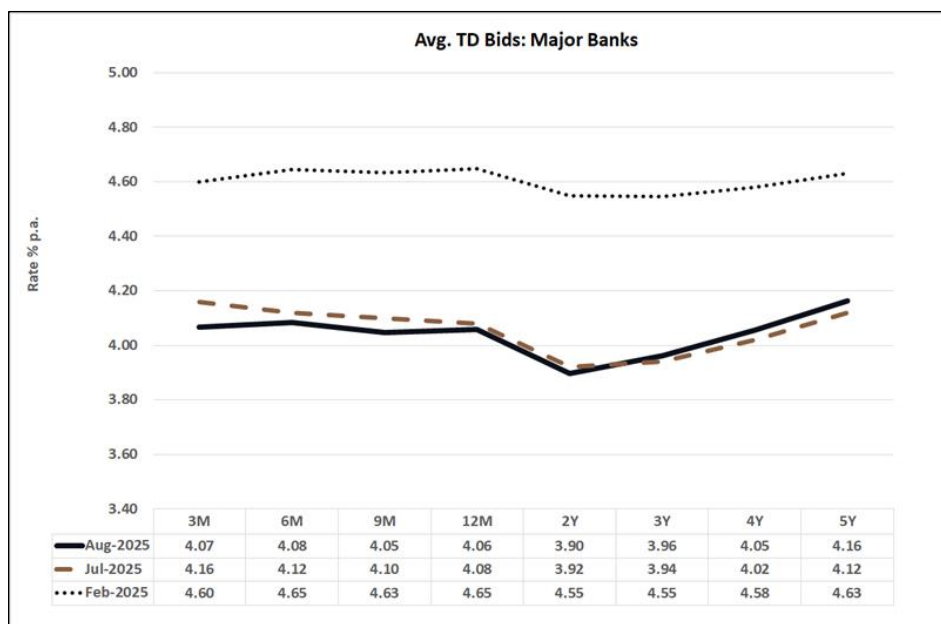
CL25.306 - Attachment 1



Market Update Summary

Global equity markets continued to reach new highs over August, despite the ongoing uncertainty with regards to global tariffs and geopolitics. Markets appear to be buoyed by further central bank rate cuts, or expectations of additional cuts in the short-term. Although the risks to growth remain material, the prospect of further policy support (both monetary and fiscal) is likely to provide support to the medium-term growth outlook and valuations.

In the deposit market, over August, at the short-end of the curve (under 9 months), the average deposit rates offered by the domestic major banks fell ~5bp compared to the previous month (July) after the RBA cut official interest rates. At the longer-end of the curve (1-5 years), the average deposit rates remained relatively flat with the market already largely pricing in additional two rate cuts over the next 6-12 months.



Source: Imperium Markets

With additional rate cuts and a global economic downturn priced in over the next 6-12 months, investors should consider diversifying and taking an 'insurance policy' against a potentially lower rate environment by investing across 1-5 year fixed deposits and locking in rates close to or above 4% p.a. (small allocation only).



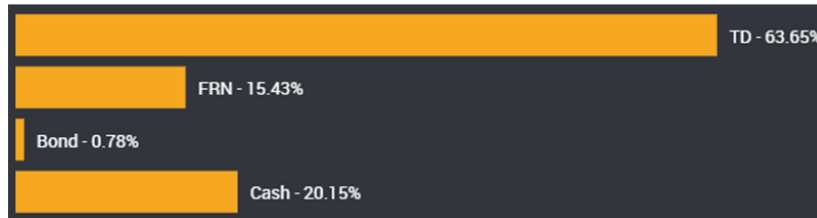
Shoalhaven City Council 's Portfolio & Compliance

Asset Allocation

The majority of the portfolio is directed to fixed term deposits and cash or cash notice accounts. The remainder of the portfolio is directed to liquid senior FRNs and fixed bonds.

Senior FRNs are currently considered 'expensive' on a historical basis but new issuances should continue to be considered on a case by case scenario. In the interim, staggering a mix of fixed deposits between 12 months to 5 years remains a more optimal strategy to maximise returns over a longer-term cycle.

With additional interest rate cuts and a global economic downturn being priced in 2025, investors can choose to allocate a small proportion of longer-term funds and undertake an insurance policy against additional rate cuts by investing across 1-5 year fixed assets, locking in and targeting yields above 4% p.a. Should inflation be within the RBA's target band of 2-3% over the longer-term, returns around 4% p.a. or higher should outperform benchmark.





Term to Maturity

All maturity limits (minimum and maximum) comply with the Investment Policy. Short-Medium Term (1-2 years) assets account for around 2% of the total investment portfolio, with capacity of ~\$174m remaining.

Any funds excess to surplus requirements should be placed in longer-dated tenors between 1-5 years across fixed assets along with any attractive new FRNs (3-5 years) as they come to market (refer to respective sections below).

Compliant	Horizon	Invested (\$)	Invested (%)	Min. Limit (%)	Max. Limit (%)	Available (\$)
✓	0 - 90 days	\$83,913,723	32.57%	0%	100%	\$173,757,078
✓	91 - 365 days	\$137,100,048	53.21%	0%	100%	\$120,570,753
✓	1 - 2 years	\$5,721,151	2.22%	0%	70%	\$174,648,410
✓	2 - 5 years	\$30,935,878	12.01%	0%	50%	\$97,899,522
✓	5 - 10 years	\$0	0.00%	0%	25%	\$64,417,700
		\$257,670,801	100.00%			

CL25.306 - Attachment 1



Counterparty

As at the end of August 2025, all counterparty exposures comply within the Policy limits. Capacity limits are also dependent on the movement in the cash balances. Overall, the portfolio is well diversified across the entire credit spectrum, including some exposure to the regional bank (lower rated) ADIs.

Compliant	Issuer	Rating	Invested (\$)	Invested (%)	Max. Limit (%)	Available (\$)
✓	DBS Cov	AAA	\$1,005,070	0.39%	100.00%	\$256,665,731
✓	ING Cov	AAA	\$2,005,154	0.78%	100.00%	\$255,665,647
✓	Suncorp Cov	AAA	\$2,022,326	0.78%	100.00%	\$255,648,475
✓	NSW (SIRA)	AA+	\$6,675,000	2.59%	100.00%	\$250,995,801
✓	ANZ	AA-	\$39,003,059	15.14%	100.00%	\$218,667,742
✓	CBA	AA-	\$48,740,037	18.92%	100.00%	\$208,930,764
✓	HSBC Bank	AA-	\$2,019,380	0.78%	100.00%	\$255,651,421
✓	NAB	AA-	\$56,506,699	21.93%	100.00%	\$201,164,102
✓	Northern Terr.	AA-	\$2,000,000	0.78%	100.00%	\$255,670,801
✓	Westpac	AA-	\$39,017,608	15.14%	100.00%	\$218,653,193
✓	Macquarie Bank	A+	\$3,999,960	1.55%	100.00%	\$253,670,841
✓	Rabobank	A+	\$5,331,668	2.07%	100.00%	\$252,339,133
✓	ING Bank	A	\$28,721,452	11.15%	100.00%	\$228,949,350
✓	Bendigo	A-	\$10,602,833	4.11%	20.00%	\$40,931,327
✓	BoQ	A-	\$10,000,000	3.88%	20.00%	\$41,534,160
✓	AMP Bank	BBB+	\$20,555	0.01%	5.00%	\$12,862,985
			\$257,670,801	100.00%		

On 31st July 2024, ANZ's takeover of Suncorp Bank was formalised, and ratings agency S&P upgraded Suncorp's long-term credit rating to that of its parent company immediately (now rated AA-). Investor's exposure to Suncorp is now reflected under the parent company being ANZ.



Credit Quality

The portfolio is well diversified from a credit ratings perspective. The portfolio is entirely invested amongst the investment grade ADIs (BBB+ or higher). All ratings categories are within the Policy limits:

Compliant	Credit Rating	Invested (\$)	Invested (%)	Max. Limit (%)	Available (\$)
✓	AAA Category	\$5,032,550	2%	100%	\$252,638,251
✓	AA Category	\$193,961,783	75%	100%	\$63,709,018
✓	A+ to A Category	\$38,053,080	15%	100%	\$219,617,721
✓	A- Category	\$20,602,833	8%	40%	\$82,465,487
✓	BBB+ to BBB Category	\$20,555	0%	30%	\$77,280,685
✓	BBB- & NR ADIs	\$0	0%	5%	\$12,883,540
✓	TCorp LTGF	\$0	0%	100%	\$257,670,801
		\$257,670,801	100.00%		



Performance

Council's performance for the month ending August 2025 (excluding cash) is summarised as follows:

Performance (Actual)	1 month	3 months	6 months	FYTD	1 year
Official Cash Rate	0.30%	0.94%	1.94%	0.62%	4.10%
AusBond Bank Bill Index	0.32%	0.94%	2.00%	0.62%	4.25%
T/D Portfolio	0.39%	1.17%	2.40%	0.78%	4.93%
FRN Portfolio	0.39%	1.16%	2.30%	0.76%	4.56%
Bond Portfolio	0.10%	0.30%	0.61%	0.21%	1.16%
Council's Total Portfolio[^]	0.39%	1.16%	2.36%	0.77%	4.76%
Relative (to Bank Bills)	0.07%	0.22%	0.36%	0.15%	0.50%

[^]Council's total portfolio returns excludes Council's cash account holdings.

Performance (Annualised)	1 month	3 months	6 months	FYTD	1 year
Official Cash Rate	3.60%	3.77%	3.89%	3.72%	4.10%
AusBond Bank Bill Index	3.84%	3.79%	4.00%	3.72%	4.25%
T/D Portfolio	4.71%	4.72%	4.82%	4.70%	4.93%
FRN Portfolio	4.65%	4.68%	4.62%	4.57%	4.56%
Bond Portfolio	1.24%	1.21%	1.21%	1.22%	1.16%
Council's Total Portfolio[^]	4.66%	4.67%	4.73%	4.63%	4.76%
Relative (to Bank Bills)	0.82%	0.88%	0.72%	0.91%	0.50%

[^]Council's total portfolio returns excludes Council's cash account holdings.

For the month of August, the total portfolio (excluding cash) provided a return of +0.39% (actual) or +4.66% p.a. (annualised), outperforming the benchmark AusBond Bank Bill Index return of +0.32% (actual) or +3.84% p.a. (annualised). The longer-term positive performance continues to be anchored by the handful of deposits that were originally placed for terms greater than 12 months.



Recommendations for Council

AMP Business Saver & Notice Account

We note the AMP Business Saver and AMP 31 Day Notice Account are now sub optimal investments given the rise in deposit yields in recent months. We recommend switching into short-dated fixed deposits with the major banks yielding a considerably higher rate of return, or simply just redeem to replenish capital reserves.

Term Deposits

As at the end of August 2025, Council's **deposit** portfolio was yielding 4.50% p.a. (down 11bp from the previous month), with a weighted average duration of ~207 days (~7 months). We recommend extending the weighted average duration closer to 9-12 months to optimise returns in the long-run.

Going forward, a more optimal strategy would be staggering deposits across 1-5 year terms – this is likely to earn up to ¼-½% p.a. higher compared to shorter tenors in a normal market environment. There is growing belief that additional rate cuts and a global economic downturn is imminent and so locking in rates above 4% p.a. across 1-5 year tenors may provide some income protection against a lower rate environment.

Please refer to the section below for further details on the Term Deposit market.

Securities

Primary (new) **FRNs** (with maturities between 3-5 years) are expensive on a historical basis but remains an option (particularly for those investors with portfolios skewed towards fixed assets) and should be considered on a case by case scenario. **Fixed Bonds** may also provide attractive opportunities from new (primary) issuances.



Council's FRN Portfolio

We recommend that Council retains most its FRNs at this stage. We will continue to monitor them individually and will advise when it is appropriate to sell to boost the overall returns of the portfolio in future. (We also remind Council that FRNs can also be sold in the case of an emergency for cash flow purposes).

The following FRNs (unrealised gains of ~\$72k) are up for consideration to be sold over the next few months. We recommend switching into a new attractive FRN when available or otherwise, medium-term fixed deposits (1-5 years) or fixed bonds yielding above 4% p.a.

Issuer	Rating	Maturity Date	ISIN	Face Value	Trading Margin	~Capital Price (\$)	~Unrealised Gain (\$)
Sunc	AA-	24/02/2026	AU3FN0058343	\$2,100,000	+35.5bp	\$100.004	\$88
Rabo	A+	27/01/2027	AU3FN0065710	\$2,000,000	+48.0bp	\$100.311	\$6,210
Sunc	AA-	25/01/2027	AU3FN0065994	\$2,700,000	+49.5bp	\$100.366	\$9,871
DBS	AAA	16/08/2027	AU3FN0080313	\$1,000,000	+51.0bp	\$100.507	\$5,070
CBA	AA-	17/08/2028	AU3FN0080396	\$1,000,000	+61.0bp	\$100.906	\$9,056
HSBC	AA-	03/03/2028	AU3FN0075792	\$2,000,000	+62.5bp	\$100.969	\$19,380
Sunc	AA-	12/07/2028	AU3FN0079406	\$2,000,000	+62.5bp	\$101.116	\$22,326

Council's Senior Fixed Bonds

In August 2021, Council invested into the following NTTC (AA-) fixed bond:

Investment Date	Maturity Date	Principal	Rate % p.a.	Interest Paid
27/08/2021	15/12/2025	\$2,000,000	1.20%	Annually

We believe this was prudent at the time of investment given the low rate environment and particularly after the RBA's easing decision in early November 2020 to 0.10% and their forward guidance towards official interest rates (no rate rises "until at least 2024").

The NTTC bond is a 'retail' offering and not a 'wholesale' issuance. Given the lack of liquidity and high penalty costs if they were to be sold/redeemed prior to the maturity date, it is considered to be a hold-to-maturity investment and will be marked at par value (\$100.00) throughout the term of investment.



Term Deposit Market Review

Current Term Deposits Rates

As at the end of August, we see value in the following:

ADI	LT Credit Rating	Term	Rate % p.a.
ING Bank	A	5 years	4.25%
NAB	AA-	5 years	4.20%
Westpac	AA-	5 years	4.15%
BoQ	A-	5 years	4.14%
NAB	AA-	4 years	4.10%
ING Bank	A	4 years	4.10%
BoQ	A-	4 years	4.04%
Westpac	AA-	4 years	4.03%
Australian Military	BBB+	3 years	4.07%
NAB	AA-	3 years	4.00%
ING Bank	A	3 years	3.96%
Police CU	Unrated	3 years	3.96%
Australian Military	BBB+	2 years	4.05%
Police CU	Unrated	2 years	3.96%
NAB	AA-	2 years	3.95%
Arab Bank Australia	Unrated	2 years	3.95%

The above deposits are suitable for investors looking to maintain diversification and lock-in a slight premium compared to purely investing short-term.

For terms under 12 months, we believe the strongest value is currently being offered by the following ADIs (we stress that rates are indicative, dependent on daily funding requirements and different for industry segments):



ADI	LT Credit Rating	Term	Rate % p.a.
Police CU	Unrated	12 months	4.15%
Westpac	AA-	12 months	4.12%
ICBC Sydney Branch	A	12 months	4.12%
Bank of Sydney	Unrated	12 months	4.12%
NAB	AA-	12 months	4.10%
ICBC Sydney Branch	A	9 months	4.14%
Westpac	AA-	9 months	4.11%
NAB	AA-	9 months	4.10%
Police CU	Unrated	9 months	4.10%
ICBC Sydney Branch	A	6 months	4.20%
Police CU	Unrated	6 months	4.20%
Bank of China Sydney	A	6 months	4.17%
Westpac	AA-	6 months	4.14%
NAB	AA-	6 months	4.10%
Police CU	Unrated	3 months	4.16%
ANZ	AA-	3 months	4.14%
Bank of Sydney	Unrated	3 months	4.14%
NAB	AA-	3 months	4.11%

For those investors that do not require high levels of liquidity and can stagger their investments longer term, they will be rewarded over a longer-term cycle if they roll for an average min. term of 12 months, with a spread of investments out to 5 years (this is where we see current value). In a normal market environment (upward sloping yield curve), investors could earn over a cycle, on average, up to ¼–½% p.a. higher compared to those investors that entirely invest in short-dated deposits.

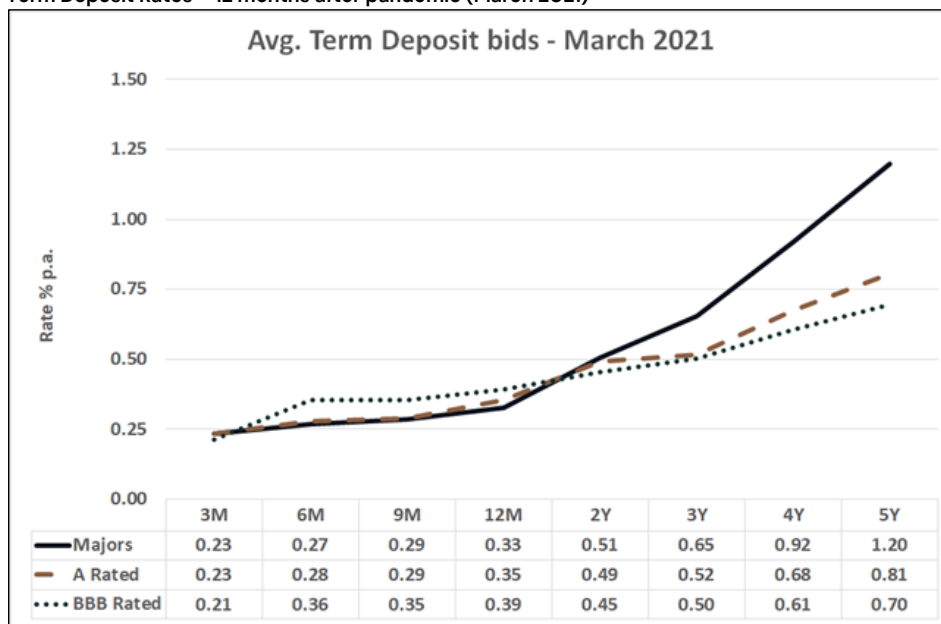
With additional rate cuts and a global economic downturn priced in over the next 6–12 months, investors should consider allocating some longer-term surplus funds and undertake an insurance policy by investing across 1–5 year fixed deposits and locking in rates close to or above 4% p.a. This will provide some income protection if the RBA decides to continue cutting rates over 2025 and into 2026.



Term Deposits Analysis

Pre-pandemic (March 2020), a 'normal' marketplace meant the lower rated ADIs (i.e. BBB category) were offering higher rates on term deposits compared to the higher rated ADIs (i.e. A or AA rated). But due to the cheap funding available provided by the RBA via their Term Funding Facility (TFF) during mid-2020, allowing the ADIs to borrow as low as 0.10% p.a. fixed for 3 years, those lower rated ADIs (BBB rated) did not require deposit funding from the wholesale deposit. Given the higher rated banks had more capacity to lend (as they have a greater pool of mortgage borrowers), they subsequently were offering higher deposit rates. In fact, some of the lower rated banks were not even offering deposit rates at all. As a result, most investors placed a higher proportion of their deposit investments with the higher rated (A or AA) ADIs over the past three years.

Term Deposit Rates – 12 months after pandemic (March 2021)



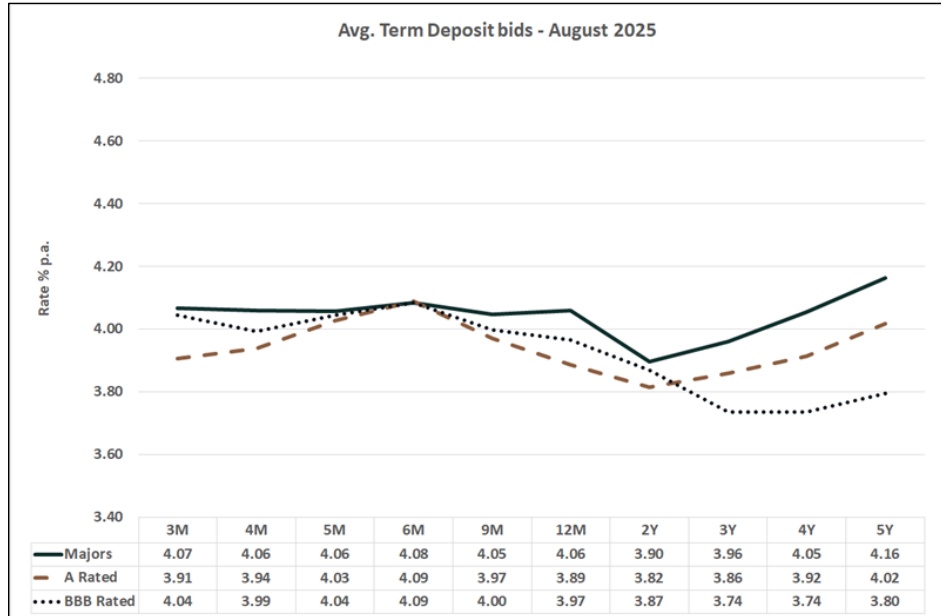
Source: Imperium Markets

The abnormal marketplace experienced during the pandemic is starting to reverse as the competition for deposits slowly increases, partially driven by the RBA's term funding facility coming to an end. In recent months, we have started to periodically see some of the lower rated ADIs ("A" and "BBB" rated) offering slightly higher rates compared to the domestic major banks ("AA" rated) on different parts of the curve (i.e. pre-pandemic environment). Some of this has been attributed to lags in adjusting their deposit rates as some banks (mainly the lower rated ADIs) simply set their rates for the week.



Going forward, investors should have a larger opportunity to invest a higher proportion of its funds with the lower rated institutions (up to Policy limits), from which the majority are not lending to the Fossil Fuel industry or considered 'ethical'. We are slowly seeing this trend emerge, although the major banks always seem to react more quickly than the rest of the market during periods of volatility:

Term Deposit Rates – Currently (August 2025)



Source: Imperium Markets

Financial Stability of the Banking (ADI) Sector

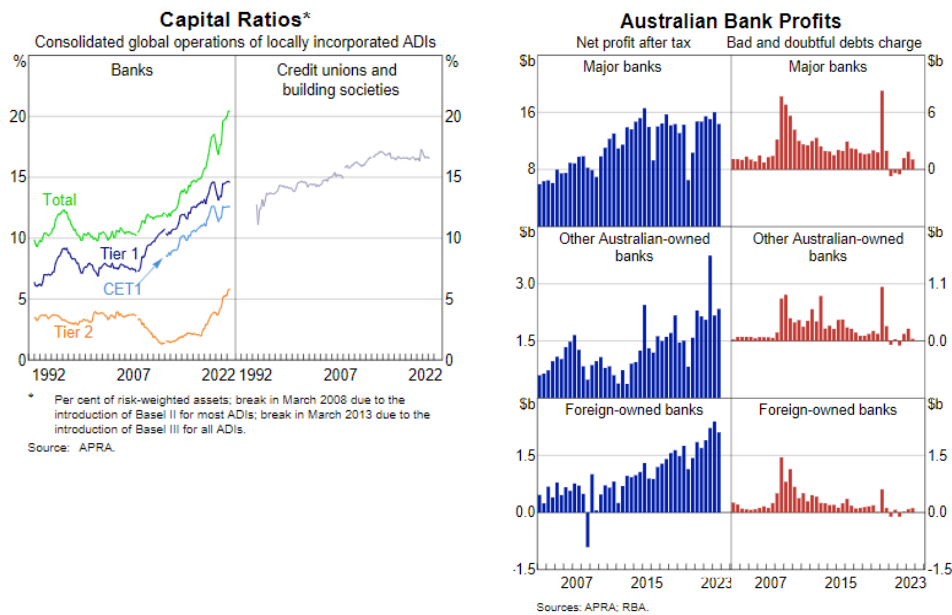
The RBA's latest Financial Stability report of 2024 reaffirms the strong balance sheet across the ADI sector. They noted that the risk of widespread financial stress remains limited due to the generally strong financial positions of most (individual) borrowers. Very few mortgage borrowers are in negative equity, limiting the impact on lenders (ADIs) in the event of default and supporting their ability to continue providing credit to the economy. Most businesses that have entered insolvency are small and have little debt, limiting the broader impact on the labour market and thus household incomes, and on the capital position of lenders (ADIs).

Australian banks (collectively the APRA regulated ADIs) have maintained prudent lending standards and are well positioned to continue supplying credit to the economy. A deterioration in economic conditions or temporary disruption to funding markets is unlikely to halt lending activity. Banks have anticipated an



increase in loan arrears and have capital and liquidity buffers well above regulatory requirements (see *Capital Ratios* chart below). APRA's mandate is to "protect depositors" and provide "financial stability".

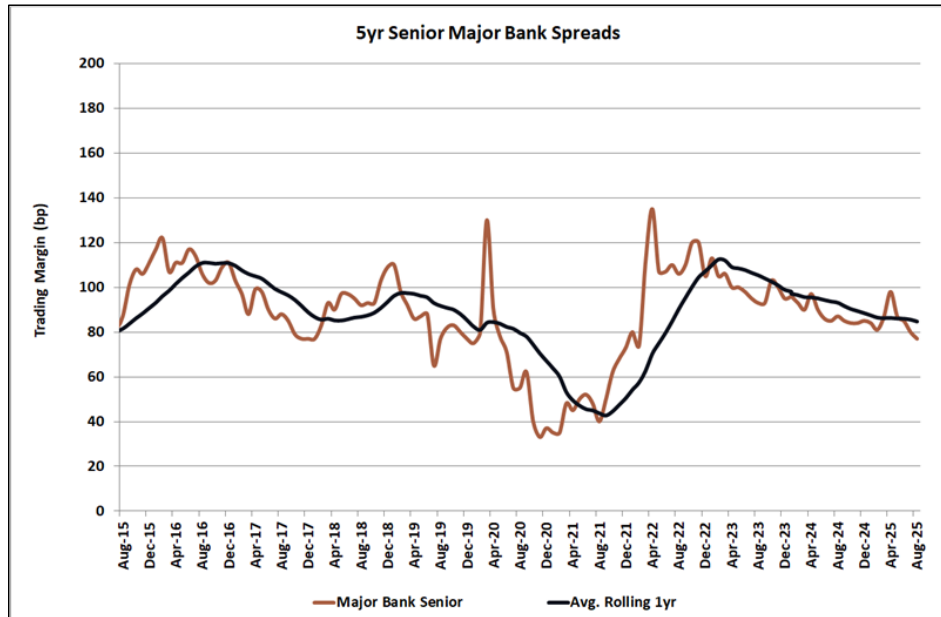
Over the past two decades, both domestic and international banks continue to operate and demonstrate high levels of profitability (see *Australian Bank Profits* chart below), which also includes two stress-test environments being the GFC (September 2008) and the COVID pandemic (March 2020):





Senior FRNs Market Review

Over August, amongst the senior major bank FRNs, physical credit securities tightened up to 3bp at the long-end of the curve. During the month, CBA (AA-) issued a dual 3% and 5 year senior security at +67bp and +77bp respectively. Long-term major bank senior securities are looking slightly expensive on a historical basis, noting the 5yr margin has averaged around the +87-90bp level over a cycle (currently around +77bp).



Source: IBS Capital

During the month, outside of CBA, only ING Bank Australia issued a new covered 5yr security (AAA) at +78bp. Amongst the "A" and "BBB" rated sectors, the securities tightened between 3-5bp at the longer-end of the curve.



Overall, credit securities are slightly expensive on a historical basis but remain a good option for diversification purposes. FRNs will continue to play a role in investors' portfolios mainly based on their liquidity and the ability to roll down the curve and gross up returns over ensuing years (in a relatively stable credit environment), whilst also providing some diversification to those investors skewed towards fixed assets.

Senior FRNs (ADIs)	31/08/2025	31/07/2025
"AA" rated – 5yrs	+77bp	+80bp
"AA" rated – 3yrs	+62bp	+65bp
"A" rated – 5yrs	+85bp	+90bp
"A" rated – 3yrs	+72bp	+75bp
"BBB" rated – 3yrs	+120bp	+125bp

Source: IBS Capital

We now generally recommend switches ('benchmark' issues only) into new primary issues, out of the following senior FRNs that are maturing:

- On or before mid-2028 for the "AA" rated ADIs (domestic major banks);
- On or before 2026 for the "A" rated ADIs; and
- Within 6–9 months for the "BBB" rated ADIs (consider case by case).

Investors holding onto the above senior FRNs ('benchmark' issues only) in their last few years are now generally holding sub optimal investments and are not maximising returns by foregoing realised capital gains. In the current challenging economic environment, any boost in overall returns should be locked in when it is advantageous to do so, particularly as switch opportunities become available.



Senior Fixed Bonds – ADIs (Secondary Market)

With global inflation softening and official interest rates starting to drop progressively, investors may look at some opportunities in the secondary market. We currently see value in the following fixed bond lines (please note supply in the secondary market may be limited on any day):

ISIN	Issuer	Rating	Capital Structure	Maturity Date	~Remain. Term (yrs)	Fixed Coupon	Indicative Yield
AU3CB0314763	Bendigo	A-	Senior	24/10/2028	3.16	4.79%	4.23%
AU3CB0308955	BoQ	A-	Senior	30/04/2029	3.68	5.30%	4.36%
AU3CB0319879	Nova Sco.	A-	Senior	21/03/2030	4.57	5.23%	4.80%



Economic Commentary

International Market

Global equity markets continued to reach new highs over August, despite the ongoing uncertainty with regards to global tariffs and geopolitics. Markets appear to be buoyed by further central bank rate cuts, or expectations of additional cuts in the short-term. Although the risks to growth remain material, the prospect of further policy support (both monetary and fiscal) is likely to provide support to the medium-term growth outlook and valuations.

Across equity markets, the US S&P 500 Index rose +1.91%, whilst the NASDAQ gained +1.58%. Europe's main indices were mixed, with gains in UK's FTSE (+0.60%), whilst France's CAC (-0.88%) and Germany's DAX (-0.68%) both fell.

The July US FOMC minutes showed most officials still prioritising inflation risks over labour market softness. US core CPI came in at consensus at +0.32% m/m in July, to be +3.1% y/y annually. US unemployment rate rose to 4.2% from 4.1% in line with consensus, whilst there was a 0.1% drop in the participation rate from 62.3% to 62.2%.

Canada's July labour market data showed an unexpectedly sharp fall in employment (-40.8k), but there was no change to the unemployment rate at 6.9%, thanks in large part to a 0.2% drop in the participation rate to 65.2%.

As expected, the Bank of England (BoE) cut rates by 25bp at its early August meeting, taking Bank Rate down to 4.00%, the fifth cut in the easing cycle that started a year ago. UK wages growth came in as expected with the key private excluding bonuses at +4.8% y/y vs. +4.8% consensus and +4.9% previously.

The RBNZ cut rates by 25bp to 3.00% as expected, but the dovish tone surprised, with two members voted for a 50bp cut, with the market forecasting a terminal rate of 2.50%.

China published its July inflation data, showing CPI avoiding a return to outright deflation, printing at 0.0% down from 0.1% against an expected -0.1%. In contrast PPI deflation held at its -3.6% June rates - the weakest in two years. Retail sales slowed to +3.7% y/y, industrial production decelerated to +5.7%, whilst new home prices fell -0.31% m/m - the sharpest drop since October.

The MSCI World ex-Aus Index rose +2.60% for the month of August:

Index	1m	3m	1yr	3yr	5yr	10yr
S&P 500 Index	+1.91%	+9.28%	+14.37%	+17.77%	+13.04%	+12.60%
MSCI World ex-AUS	+2.60%	+8.60%	+16.30%	+19.20%	+13.50%	+12.30%
S&P ASX 200 Accum. Index	+3.10%	+7.03%	+14.74%	+13.04%	+12.32%	+9.87%

Source: S&P, MSCI



Domestic Market

The RBA cut the official cash rate by 25bp as expected to 3.60% in its meeting in August, encouraged by a further decline in core inflation and a slight easing in labour market conditions. There were no changes to the unemployment rate or inflation forecasts in the August Statement on Monetary Policy. The RBA has downgraded their longer-term productivity assumptions and now see Australian trend GDP growth at around 2%.

The Q2 wage price index (WPI) printed broadly as expected at +0.8% q/q vs. +0.8% consensus. The annual rate though was slightly stronger at +3.4% y/y vs. +3.3% consensus.

Monthly CPI indicator jumped to +2.8% in July from +1.9% in June, above expectations. The annual trimmed mean also jumped to +2.7% from +2.1%. The outcome of the July indicator was always going to come down to measurement of electricity subsidies and travel prices. Those components drove the surprise.

Employment rose +24.5k in July, with the unemployment rate ticking down 0.1% to 4.2%.

APRA formalised a three-tiered approach for prudential regulation for 'large', 'medium' and 'small' banks. This could allow a more nuanced regulatory approach and see reduced regulatory costs for medium banks.

The Australian dollar gained around +1.07%, finishing the month at US65.38 cents (from US64.69 cents the previous month).

Credit Market

The global credit indices remained relatively flat this month. They remain near the levels seen in early-mid 2022 (prior to the rate hike cycle from most central banks):

Index	August 2025	July 2025
CDX North American 5yr CDS	50bp	51bp
iTraxx Europe 5yr CDS	54bp	53bp
iTraxx Australia 5yr CDS	67bp	69bp

Source: Markit



Fixed Interest Review

Benchmark Index Returns

Index	August 2025	July 2025
Bloomberg AusBond Bank Bill Index (0+YR)	+0.32%	+0.30%
Bloomberg AusBond Composite Bond Index (0+YR)	+0.28%	-0.04%
Bloomberg AusBond Credit FRN Index (0+YR)	+0.46%	+0.43%
Bloomberg AusBond Credit Index (0+YR)	+0.60%	+0.26%
Bloomberg AusBond Treasury Index (0+YR)	+0.24%	-0.23%
Bloomberg AusBond Inflation Gov't Index (0+YR)	+0.83%	+0.03%

Source: Bloomberg

Other Key Rates

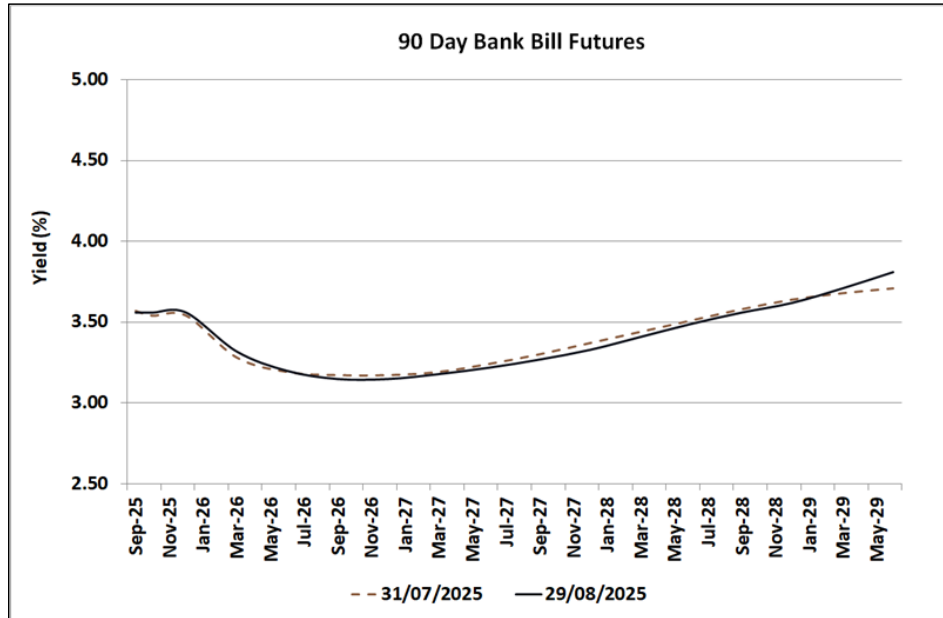
Index	August 2025	July 2025
RBA Official Cash Rate	3.60%	3.85%
90 Day (3 month) BBSW Rate	3.57%	3.68%
3yr Australian Government Bonds	3.37%	3.39%
10yr Australian Government Bonds	4.26%	4.26%
US Fed Funds Rate	4.25%-4.50%	4.25%-4.50%
2yr US Treasury Bonds	3.59%	3.94%
10yr US Treasury Bonds	4.23%	4.37%

Source: RBA, ASX, US Department of Treasury



90 Day Bill Futures

Bill futures remained relatively flat this month, consistent with the movement in the bond market:



Source: ASX

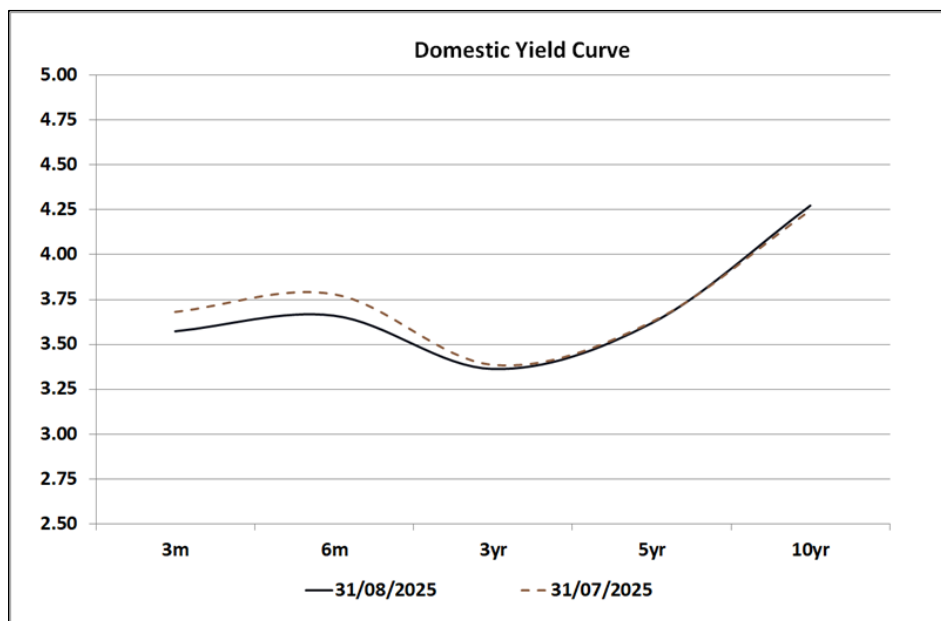


Fixed Interest Outlook

US Fed chair Powell recently commented *"the balance of risks may be shifting"* (in relation to the Fed's dual mandate) and *"with policy in restrictive territory, the baseline outlook and the shifting balance of risks may warrant adjusting our policy stance"*. The market continues to factor at least two rate cuts by the US Fed for the remainder of 2025.

The latest RBA Minutes concluded *"some further reduction in the cash rate over the coming year"* was likely, with the pace of that easing being contingent on the data flow. Inflation is expected to settle close to the mid-point of the target band of 2-3%, and growth remaining subdued with little gains in productivity. This outlook assumes that the cash rate reaches 3%; the RBA notes in their Statement of Monetary Policy (SoMP) that this path for the cash rate *"...is consistent with sustaining balance in the economy, although this assessment is uncertain"*.

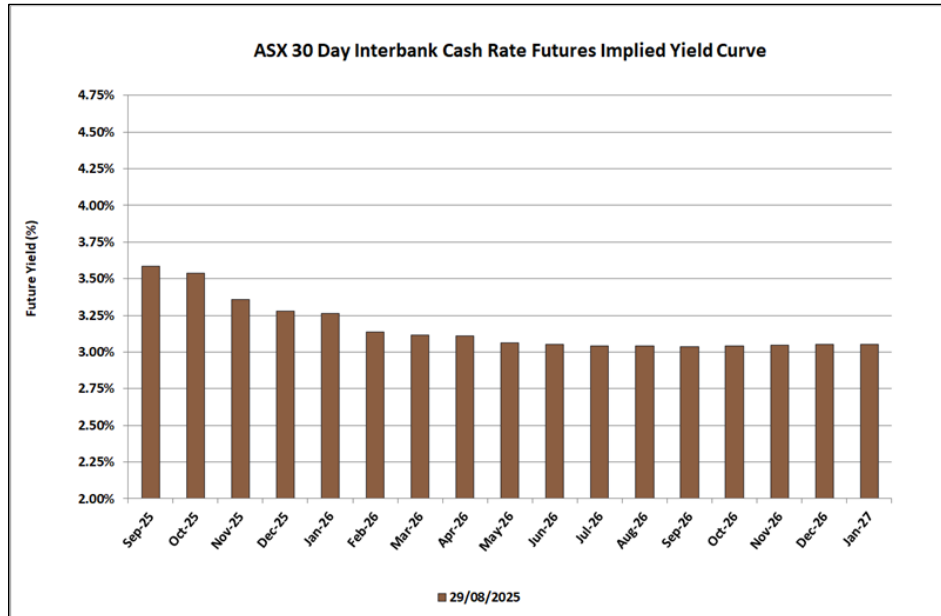
Yields remained flat at the longer-end of the curve this month:



Source: ASX, RBA



Financial markets are factoring up to two (2) additional rate cuts by early-mid 2026, taking the official cash rate down to 3.10%:



Source: ASX

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Statement of Investments

as at 31 August 2025

Portfolio by Asset as at 31/08/2025

Asset Type: CASH

Issuer	Rating	Type	Allocation	Interest Paid	Purchase Date	Maturity Date	Rate (%)	Capital Value (\$)	Face Value (\$)
State Insurance Regulatory Authority	AA+	CASH	GENERAL	Monthly	31/08/2025	31/08/2025	0.0000	6,675,000.00	6,675,000.00
AMP Bank	BBB+	CASH	GENERAL	Monthly	31/08/2025	31/08/2025	3.9500	19,695.57	19,695.57
AMP Bank	BBB+	CASH	GENERAL	Monthly	31/08/2025	31/08/2025	2.5000	859.45	859.45
Commonwealth Bank	AA-	CASH	GENERAL	Monthly	31/08/2025	31/08/2025	3.7000	8,660,508.04	8,660,508.04
Commonwealth Bank	AA-	CASH	GENERAL	Monthly	31/08/2025	31/08/2025	0.0000	36,557,660.37	36,557,660.37
CASH SUBTOTALS								51,913,723.43	51,913,723.43

Asset Type: TD

Issuer	Rating	Type	Allocation	Interest Paid	Purchase Date	Maturity Date	Rate (%)	Capital Value (\$)	Face Value (\$)
NAB	AA-	TD	GENERAL	At Maturity	02/08/2024	17/09/2025	5.1500	2,000,000.00	2,000,000.00
Bendigo and Adelaide	A-	TD	GENERAL	At Maturity	30/01/2025	24/09/2025	4.8500	5,000,000.00	5,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	21/02/2025	08/10/2025	4.7000	5,000,000.00	5,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	03/10/2024	08/10/2025	4.9000	5,000,000.00	5,000,000.00
Suncorp Bank	AA-	TD	GENERAL	At Maturity	28/03/2025	28/10/2025	4.7800	5,000,000.00	5,000,000.00
ING Bank (Australia) Ltd	A	TD	GENERAL	At Maturity	03/10/2024	05/11/2025	4.8400	5,000,000.00	5,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	28/02/2025	12/11/2025	4.6800	5,000,000.00	5,000,000.00

Issuer	Rating	Type	Allocation	Interest Paid	Purchase Date	Maturity Date	Rate (%)	Capital Value (\$)	Face Value (\$)
BOQ	A-	TD	GENERAL	At Maturity	03/06/2025	03/12/2025	4.3300	5,000,000.00	5,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	03/12/2024	03/12/2025	5.0500	5,000,000.00	5,000,000.00
Suncorp Bank	AA-	TD	GENERAL	Annual	01/03/2024	11/12/2025	4.9000	3,000,000.00	3,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	19/12/2024	17/12/2025	5.0000	5,000,000.00	5,000,000.00
ING Bank (Australia) Ltd	A	TD	GENERAL	Annual	01/03/2024	17/12/2025	5.0000	3,000,000.00	3,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	12/12/2024	07/01/2026	4.9300	5,000,000.00	5,000,000.00
BOQ	A-	TD	GENERAL	At Maturity	10/07/2025	12/01/2026	4.2400	5,000,000.00	5,000,000.00
Bendigo and Adelaide	A-	TD	GENERAL	At Maturity	16/07/2025	15/01/2026	4.1900	5,000,000.00	5,000,000.00
Suncorp Bank	AA-	TD	GENERAL	At Maturity	02/04/2025	04/02/2026	4.7800	5,000,000.00	5,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	21/02/2025	18/02/2026	4.6900	5,000,000.00	5,000,000.00
ING Bank (Australia) Ltd	A	TD	GENERAL	Annual	01/03/2024	04/03/2026	4.9500	3,000,000.00	3,000,000.00
Suncorp Bank	AA-	TD	GENERAL	At Maturity	12/03/2025	12/03/2026	4.5900	5,000,000.00	5,000,000.00
Suncorp Bank	AA-	TD	GENERAL	At Maturity	28/03/2025	30/03/2026	4.7000	5,000,000.00	5,000,000.00
Suncorp Bank	AA-	TD	GENERAL	At Maturity	02/04/2025	02/04/2026	4.7000	5,000,000.00	5,000,000.00
Westpac	AA-	TD	GENERAL	At Maturity	31/07/2025	08/04/2026	4.1700	5,000,000.00	5,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	09/05/2025	06/05/2026	4.1000	5,000,000.00	5,000,000.00
ING Bank (Australia) Ltd	A	TD	GENERAL	At Maturity	03/06/2025	03/06/2026	4.1300	5,000,000.00	5,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	12/06/2025	12/06/2026	4.1700	5,000,000.00	5,000,000.00
ING Bank (Australia)	A	TD	GENERAL	At Maturity	10/07/2025	10/07/2026	4.1400	5,000,000.00	5,000,000.00

Issuer	Rating	Type	Allocation	Interest Paid	Purchase Date	Maturity Date	Rate (%)	Capital Value (\$)	Face Value (\$)
Ltd									
ING Bank (Australia) Ltd	A	TD	GENERAL	At Maturity	15/07/2025	15/07/2026	4.1300	5,000,000.00	5,000,000.00
Westpac	AA-	TD	GENERAL	At Maturity	31/07/2025	31/07/2026	4.1700	5,000,000.00	5,000,000.00
NAB	AA-	TD	GENERAL	At Maturity	06/08/2025	06/08/2026	4.1600	5,000,000.00	5,000,000.00
Westpac	AA-	TD	GENERAL	Annual	18/08/2025	18/08/2026	4.1200	5,000,000.00	5,000,000.00
Westpac	AA-	TD	GENERAL	At Maturity	21/08/2025	21/08/2026	4.1300	10,000,000.00	10,000,000.00
Westpac	AA-	TD	GENERAL	At Maturity	28/08/2025	28/08/2026	4.1400	10,000,000.00	10,000,000.00
NAB	AA-	TD	GENERAL	Annual	01/03/2024	15/12/2027	4.7000	3,000,000.00	3,000,000.00
TD SUBTOTALS								164,000,000.00	164,000,000.00

Asset Type: FRN

Issuer	Rating	Type	Allocation	Interest Paid	Purchase Date	Maturity Date	Rate (%)	Capital Value (\$)	Face Value (\$)
Macquarie Bank	A+	FRN	GENERAL	Quarterly	09/12/2020	09/12/2025	4.1952	3,999,960.00	4,000,000.00
Suncorp Bank	AA-	FRN	GENERAL	Quarterly	24/02/2021	24/02/2026	4.0047	2,100,088.20	2,100,000.00
Suncorp Bank	AA-	FRN	GENERAL	Quarterly	25/01/2022	25/01/2027	4.4997	2,709,871.20	2,700,000.00
Rabobank Australia Branch	A+	FRN	GENERAL	Quarterly	27/01/2022	27/01/2027	4.4310	2,006,210.00	2,000,000.00
DBS Bank	AAA	FRN	GENERAL	Quarterly	16/08/2023	16/08/2027	4.3900	1,005,070.00	1,000,000.00
HSBC Bank, Sydney Branch	AA-	FRN	GENERAL	Quarterly	03/03/2023	03/03/2028	4.7595	2,019,380.00	2,000,000.00

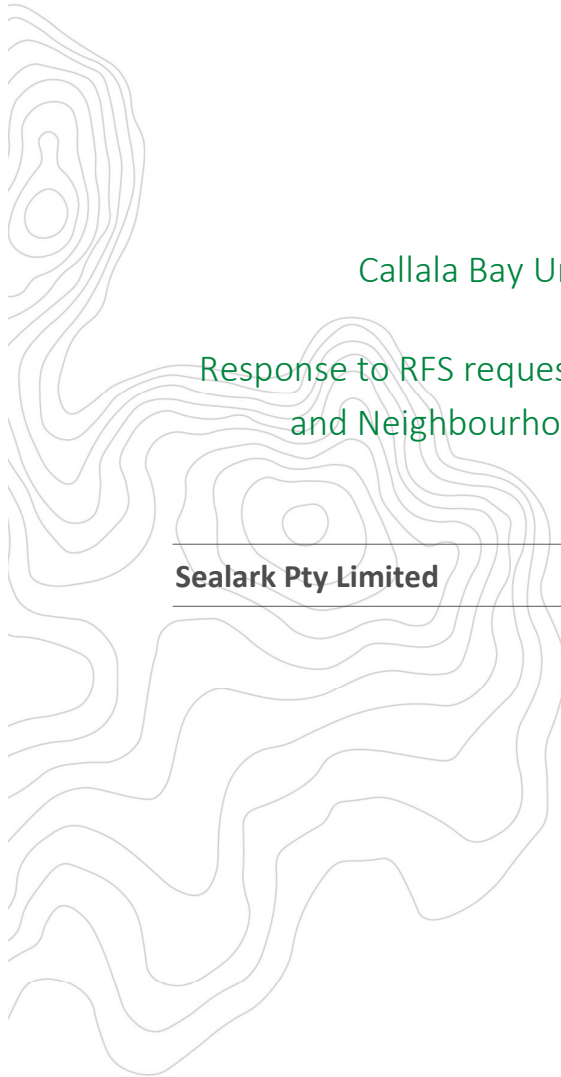
Issuer	Rating	Type	Allocation	Interest Paid	Purchase Date	Maturity Date	Rate (%)	Capital Value (\$)	Face Value (\$)
Suncorp Bank	AAA	FRN	GENERAL	Quarterly	12/07/2023	12/07/2028	4.7668	2,022,326.00	2,000,000.00
Commonwealth Bank	AA-	FRN	GENERAL	Quarterly	17/08/2023	17/08/2028	4.5400	1,009,056.00	1,000,000.00
Bendigo and Adelaide	A-	FRN	GENERAL	Quarterly	24/10/2024	24/10/2028	4.6500	602,833.20	600,000.00
ANZ Bank	AA-	FRN	GENERAL	Quarterly	05/02/2024	05/02/2029	4.6223	2,523,027.50	2,500,000.00
Rabobank Australia Branch	A+	FRN	GENERAL	Quarterly	26/02/2024	26/02/2029	4.5781	2,018,524.00	2,000,000.00
Suncorp Bank	AA-	FRN	GENERAL	Quarterly	19/03/2024	19/03/2029	4.6736	1,259,270.00	1,250,000.00
Rabobank Australia Branch	A+	FRN	GENERAL	Quarterly	17/07/2024	17/07/2029	4.6200	1,306,934.20	1,300,000.00
ING Bank (Australia) Ltd	A	FRN	GENERAL	Quarterly	20/08/2024	20/08/2029	4.5925	2,721,451.50	2,700,000.00
NAB	AA-	FRN	GENERAL	Quarterly	14/11/2024	14/11/2029	4.4320	1,506,699.00	1,500,000.00
Commonwealth Bank	AA-	FRN	GENERAL	Quarterly	09/01/2025	09/01/2030	4.6063	2,512,812.50	2,500,000.00
Suncorp Bank	AA-	FRN	GENERAL	Quarterly	21/05/2025	21/05/2030	4.5016	2,410,802.40	2,400,000.00
Westpac	AA-	FRN	GENERAL	Quarterly	19/06/2025	19/06/2030	4.5236	4,017,608.00	4,000,000.00
ING Bank (Australia) Ltd	AAA	FRN	GENERAL	Quarterly	15/08/2025	15/08/2030	4.3965	2,005,154.00	2,000,000.00
FRN SUBTOTALS								39,757,077.70	39,550,000.00

Asset Type: BOND

Issuer	Rating	Type	Allocation	Interest Paid	Purchase Date	Maturity Date	Rate (%)	Capital Value (\$)	Face Value (\$)
Northern Territory Treasury	AA-	BOND	GENERAL	Semi-Annual	27/08/2021	15/12/2025	1.2000	2,000,000.00	2,000,000.00
BOND SUBTOTALS								2,000,000.00	2,000,000.00

Portfolio by Asset Totals as at 31/08/2025

Type	Capital Value (\$)	Face Value (\$)
CASH	51,913,723.43	51,913,723.43
TD	164,000,000.00	164,000,000.00
FRN	39,757,077.70	39,550,000.00
BOND	2,000,000.00	2,000,000.00
TOTALS	257,670,801.13	257,463,723.43



Callala Bay Urban Release Area

Response to RFS request for Additional Information
and Neighbourhood Safer Place options

Sealark Pty Limited

DOCUMENT TRACKING

Project Name	Callala Bay Expansion Area – response to RFS request for Additional Information & NSP options
Project Number	22HNC1174
Project Manager	Rod Rose (FPAA BPAD Certified Practitioner BPAd1940-L3)
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Approved by	Rod Rose (FPAA BPAD Certified Practitioner BPAd1940-L3)
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Template 2.8.1

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1. Background

The following identifies and summarises the interactions between the NSW Rural Fire Service (**RFS**), Shoalhaven City Council (the **Council**) and representatives of the proponent of the residential subdivision (Sealark Pty Ltd) for the 'bushfire matters' related to the Callala Bay Urban Release Area. Staff from the Department of Planning Housing and Infrastructure (**DPHI**) have also been directly involved in some of the matters.

- Bushfire Strategic Study: Callala Bay Expansion Area (ELA, 28 January 2022)
- RFS RFI dated 7 February 2022 regarding the Bushfire Strategic Study
- ELA response to RFS RFI (of 7.2.22) dated 7 March 2022
- Meeting of stakeholders dated 9 March 2022
- RFS correspondence to DPE regarding further RFI, dated 14 March 2022
- Meeting of stakeholders dated 16 May 2022 where RFS clarified the current RFI
- RFS letter to DPE dated 20 May 2022, which included RFI related to Neighbourhood Safer Place (NSP) and evacuation
- ELA response to RFS RFI (of 20.5.22) dated 24 June 2022
- Meeting of stakeholders, dated 7 November 2022
- Meeting on 14.12.22 between ELA, RFS and Council to clarify bushfire work required to satisfy RFI
- Meeting between RFS, Council and ELA dated 3 April 2023 (included establishing a technical sub-group to progress specific matters)
- Technical sub-group (RFS, Council, ELA) met 3 May 2023 and discussed NSP, evacuation and fire modelling
- Technical sub-group (RFS, Council, ELA) met 2 June 2023 to discuss approach to Neighbourhood Safer Place (**NSP**)

The above listed correspondence and meetings have progressively dealt with or refined the response required to the RFS RFIs since January 2022. ELA has completed the additional investigations required for the latest RFI with the assistance of agreements or advice from the technical sub-group, notably related to NSPs and evacuation.

In the most recent RFS RFI (dated 20 May 2022) the RFS said it "... generally raises no objections to the proposal subject to a requirement that the future subdivision of the land complies with Planning for Bush Fire Protection 2019 and the following matters are adequately addressed ... Commitment to establishment of a NSP... [and the] ... Northern hazard interface treatment". These remaining matters are discussed below.

2. Commitment to a neighbourhood safer place

The inadequacies of a NSP on the Site was identified in the ELA (24.6.22) response:

“Discussion at the 16 May 2022 meeting included the suitability of a NSP on the Site [i.e. the URA site]. While any NSP ultimately requires the approval of the NSW RFS Commissioner, the limitations of the Site as a NSP were identified, these included:

- a. The inability of a NSP on the Site to cater for all potential Callala Bay village ‘evacuees’, due to the size of building or the outdoor area and car parking / access requirements to cater for a large proportion of the Village population.*
- b. The undesirability of a NSP being located close to a potential major ‘western control line’ of Callala Beach Road. This includes the potential for fire front flames being visible and being located near dense smoke and the emotional stresses associated with the sound or sight of nearby bushfire suppression operations.*
- c. The potential conflict between Village residents moving westward along Emmett Street at the same time emergency service responder’s movement back and forth on Emmett Street.*
- d. The ‘instinctive’ move of residents toward the water at Callala Bay or leave the village to the north and not move toward a fire approaching from the west.*
- e. The potential for safer and more effective NSP options deeper in from the Village perimeter.”*

Given this undesirability of a NSP on the Site alternative NSP options have been investigated. The technical sub-group agreed the development approval process could not provide an **approved** NSP and this shifted the investigation to finding potential NSP options that are compliant with the RFS NSP guidelines. This report identifies the findings of these investigations and the potential NSP options. [It also includes a letter confirming Sealark’s commitment to fund a NSP in Callala Bay, in accord with the findings in this report \(see Appendix F\).](#)

2.1. Investigation of NSP options

Six potential NSP sites at Callala Bay were investigated: the Community Centre, Callala Bay Public School, Anglican Church, commercial centre/carpark area, Callala Bay Progress Hall and the sailing club/boat ramp. [Figure 1](#) shows the six (6) sites relative to the four (4) radiant heat flux (RHF) thresholds within the RFS NSP guidelines. Five (5) sites are located beyond their required RHF thresholds of 10 kW/m² (building NSP) and 2 kW/m² (open space NSP) with the sixth site (the school) only partially beyond the threshold. Three (3) sites are located beyond the NSP Guideline ‘automatically compliant’ distance i.e. Callala Bay Progress Hall (>139 m) and the commercial centre carpark and sailing club/boat ramp open space NSP (>310 m).

An opportunity exists for Callala Bay to have more than one NSP and this may be desirable as it provides redundancy, and reduces the risk of overcrowding, parking issues and traffic congestion. All six (6) sites were inspected and [Table 1](#) shows the findings, with three NSP options found to be suitable.

Callala Bay [Urban Release/Expansion](#) Area – RFS request for Additional Information and NSP options | Sealark Pty Limited

Table 1: Suitability of Callala Bay NSP options

Site	Compliant with NSP Guidelines	Comment	Recommendation
Community Centre	yes	ample parking, locally well known, large capacity (110 seated) and good internal facilities. Best NSP option.	Sealark help with existing NSP application by the Hall committee. <u>Establish the APZ, including tree pruning/thinning where required.</u> Provide <u>other</u> minor improvements e.g. landscaping and signposting. <u>Provide any environmental assessment associated with APZ.</u>
Callala Bay Public School	no	assembly hall most suitable building but is exposed to >10kW/m². RFS advised FPAA schools are not to be NSPs in the future	RFS consider notifying School that their current bushfire evacuation plan uses their Assembly Hall which is exposed to >10kW/m². NB: this could be remedied if APZ was extended onto Council land.
Anglican Church	yes	good position, parking and internal facilities, useful overflow for Community Centre. Best suited as an overflow or ancillary NSP given its proximity to the Community Hall.	Include with Community Hall in NSP application
Commercial centre/carpark area	yes	unsuitable as likely to be congested or required for other services to the community	No action
Callala Bay Community Hall	yes	internal capacity too small	No action
Sailing club/boat ramp	yes	very large open space, abuts the waters of Jervis Bay and is locally perceived as a 'safer area' in a bushfire. Parking capacity less than Community Hall. Best open space NSP.	Sealark help with NSP application, and any minor improvements required e.g. landscaping, signposting

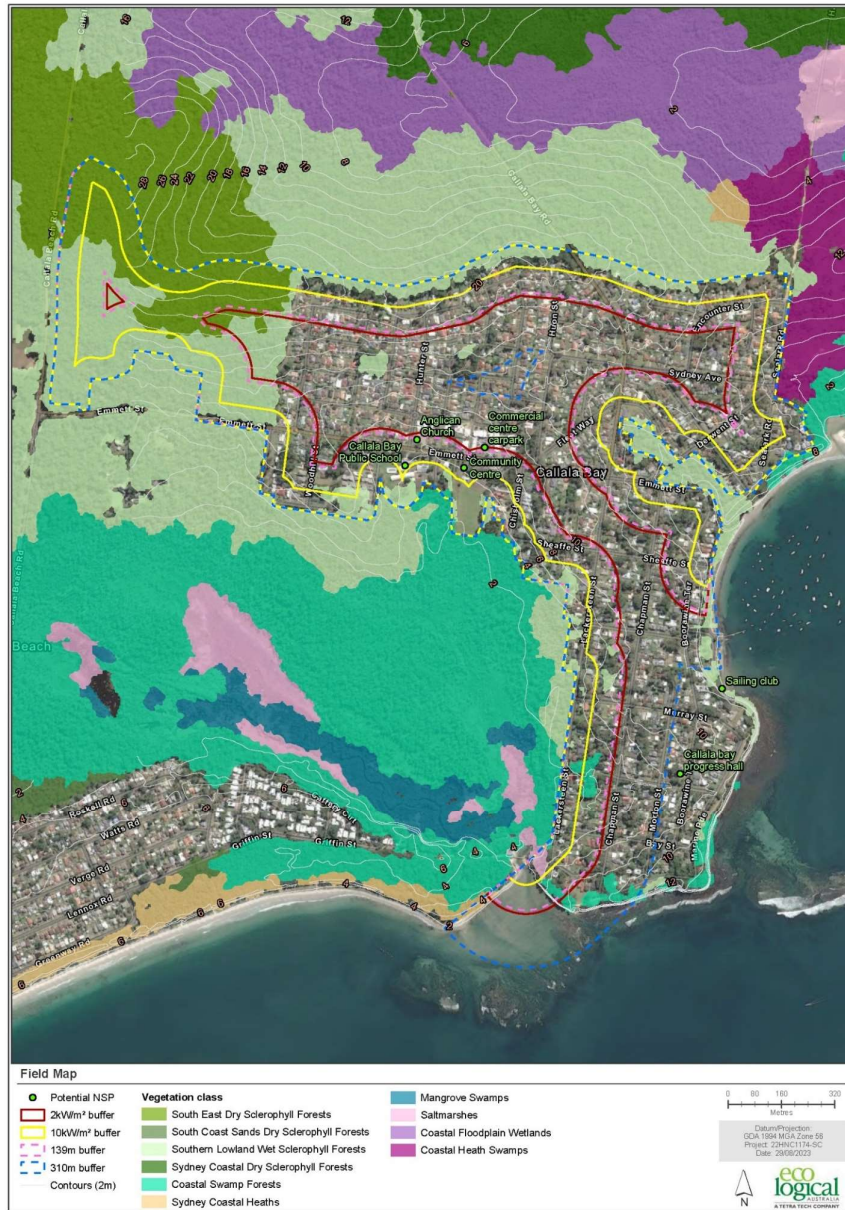


Figure 1: Location of six (6) sites investigated and their relationship to NSP Guidelines RHF thresholds

2.2. Response to RFI regarding NSP

Of the NSP options within Callala Bay village investigated three (3) are considered suitable and meet the NSP Guidelines. If any of these options are supported the next steps require agreement from the managers/owners of the site/building, endorsement of the NSP(s) by the Shoalhaven Bushfire Management Committee and potentially assisting in obtaining approval of the NSPs by the RFS.

2.2.1. Callala Bay Community Centre

The Community Centre is located beyond the RHF threshold of 10 kW/m² as assessed through the site survey of the forest hazard located on >0 - 5° downslope and a separation from the hazard of approximately 90 m (see [Figure 1](#) ~~Figure 1~~).

Some thinning and/or pruning of trees is required south of the RFS brigade station to establish an NSP-guideline compliant APZ for the Community Centre. A preliminary biodiversity assessment of these APZ works concluded that “the proposed APZ is likely to be achievable without any substantial adverse impacts to biodiversity” (ELA 2025). The preliminary biodiversity assessment is provided as Appendix C. The report includes in Figure 1 the APZ footprint required for the Community Centre to be compliant with the NSP guidelines and it also shows the 500 sqm area within which tree pruning and/or removal is required.

The majority of the area within the required APZ is currently APZ-compliant and is provided by roads and tracks, sewer pumping station, powerline easement and the sporting complex. Some minor increase in the maintenance frequency for the powerline easement may be required to ensure it is always APZ compliant. The drainage easement periodically contains emergent vegetation but given it is only a few meters wide and does not lead fire directly to the Community Centre from the hazard it is considered APZ compliant.

The Community Centre Committee has sought NSP approval over recent years and expressed some frustration with its progress. Sealark is willing to assist with the NSP application and any establishment costs as a condition of consent. The site is central to the Village and has excellent access and parking space within its grounds and the adjacent sports field and public school. It is also next to the Callala Bay RFS brigade station. Photographs provided in Appendix A.

Shoalhaven City Council has indicated their in-principle support for the use of the Callala Bay Community Centre as an NSP (see Appendix D).

2.2.2. Anglican Church

The Church is beyond the RHF threshold of 10 kW/m² as assessed through the site survey of the forest hazard located on >0 - 5° downslope and a separation from the hazard of approximately 135 m (see [Figure 1](#) ~~Figure 1~~).

The Anglican Minister also confirmed their willingness to be an NSP for the community ([see Appendix E](#)). There are no obvious improvements required to the building or landscaping, however Sealark could assist with the application process for the NSP and any establishment costs e.g. signposting. Photographs provided in Appendix A.

Callala Bay [Urban Release/Expansion](#) Area – RFS request for Additional Information and NSP options | Sealark Pty Limited

2.2.3. Sailing club and boat ramp open space

This provides a quality open space NSP option with a very large capacity located more than 400 m from the hazard. Signposting and minor changes to landscaping is required to reduce the burning debris ignition risk of some small, isolated patches of vegetation. The short single access road would benefit by site management during use, but is not considered essential. Photographs provided in Appendix A.

[Shoalhaven City Council has indicated their in-principle support for the use of the Sailing Club and boat ramp open space as an NSP \(see Appendix D\).](#)

3. Northern hazard interface treatment

The northern hazard interface is improved in many ways by the development of the site with the key issues regarding this area raised by the RFS addressed below.

3.1. Internal road network compliance with Planning for Bushfire Protection 2019 (PBP)

All new internal roads will be compliant with PBP 2019, and a new public road to the north-east is not required to ensure egress from the Site is compliant with PBP 2019. However, an additional egress to the north-east is to be provided for emergency service vehicles (see below).

3.2. Access and bushfire protection to the north-east improved for emergency services

A multi-purpose cycleway or similar (with locked gates either end) connecting the north-eastern corner of the Site with Callala Bay Road will be provided. In a bushfire this accessway would be exclusively used by emergency services providing a perimeter access abutting existing development and an access without the traffic congestion or interaction with residents/evacuees. Importantly, this means avoiding 'interactions with public vehicles' e.g. when hoses are run across roads or firefighters and tankers operate along the perimeter public road amid resident vehicle movements (including evacuation).

The multi-purpose cycleway will provide a 4 m wide trafficable surface suitable for fire tankers, with passing bays and turnaround areas in accord with PBP (2019). This provides improved bushfire protection in the north-east as the current access is upgraded to the equivalent of a property access road under PBP (2019), and the historic 'fuel management zone' (along the north-east boundary of the existing Village) improved to current APZ standards and the north-east egress providing exclusive and PBP compliant access for emergency services.

There will also be a similar connection from the north-western corner of the site to Callala Beach Road.

3.3. Evacuation along Emmett Street

The Traffic Engineer's report (Stantec 2022) provided in the ELA response to the RFS RFI (dated 22.3.22) was revisited to confirm that the traffic modelling was not reliant on Police or other traffic management and that it included both the existing residents and those within the Planning Proposal. This has been confirmed by Stantec who also provided a revised report (see Appendix B) to include a 4-hour evacuation period as 'Scenario 3' which is more indicative of an early evacuation timeline. The Scenarios 1 and 2 provided are 1-hour and 2-hour evacuation scenarios (respectively).

The Stantec (2023) traffic report concluded the following for the Emmett Street and Lackersteen Street intersection i.e. the primary intersection along Emmett Street:

"The intersection was recorded to have an average delay of approximately 29.6 seconds in a worst case Callala Bay Village evacuation scenario (Scenario 1). Based on the above, the longest time it would take for a vehicle to exit the site and get on to Callala Bay Road would be approximately 150 seconds."

4. Conclusion and recommendation

The two RFS matters requiring resolution from their 20 May 2022 letter to the DPE have been addressed in a manner that achieves compliance with PBP 2019 and provides additional protection measures such as BAL-12.5 construction as a minimum standard and more than two egress routes from the Site.

Options exist for three NSPs within the existing Callala Bay village and this report demonstrates all meet the NSP Guidelines and therefore have the potential to be approved as NSPs by the RFS. Consent conditions can be used to ensure the proponent provides support to the community in obtaining approval for one or more of these NSPs. Sealark has confirmed its commitment to fund an NSP at Callala Bay in keeping with the findings and recommendations of this report (Appendix F).

Modelling in the updated traffic report demonstrates the development of the site does not adversely affect evacuation within the Village and the multipurpose cycleway proposed in the northern reserve provides an improvement to the access to and from the site for emergency services and existing residential areas.

It is recommended that the RFS acknowledge no objections to the proposal subject to a requirement that the future subdivision of the land complies with Planning for Bush Fire Protection 2019 and in accord with this report the proponent fund the provision of a NSP in Callala Bay.



Rod Rose
Senior Principal - Bushfire
FPAA BPAD Accredited Practitioner No. BPAD1940-L3



References

NSW Rural Fire Service (RFS). 2017. Neighbourhood Safer Places – Guidelines for the Identification and Inspection of Neighbourhood Safer Places in NSW.

Stantec 2022. Planning proposal for residential subdivision at Callala Bay – Bush fire Evacuation (Traffic) Report dated 4 March 2022 by Desmond Ang (Transport Engineer).

Stantec 2023. Planning proposal for residential subdivision at Callala Bay – Bush fire Evacuation (Traffic) Report dated 25 September 2023 by Sunny Hong (Senior Transport Engineer).

Callala Bay Urban Release/Expansion Area – RFS request for Additional Information and NSP options | Sealark Pty Limited

APPENDIX A: PHOTOGRAPHS



Northern façade of Anglican Church



Western façade of Anglican Church (school to south of Emmett St)



Eastern façade of Anglican Church (carpark)



Southern end of Callala Bay Community Centre adjacent sports field and associated carparking



Eastern side of Callala Bay Community Hall & adjacent carparking



Northern side of Community Hall and Emmett Street

CL25.316 - Attachment 1

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Potential boat ramp and sailing club open space NSP (carpark visible)



Entrance to potential boat ramp and sailing club open space NSP

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APPENDIX B: Stantec 2022 [assessment of evacuation traffic](#)



Addendum

To: Matt Philpott
Sealark Pty Ltd

From: Sunny Hong
Stantec Australia
Date: 25 September 2023

Reference: Planning proposal for Residential Subdivision at Callala Bay – Bushfire Evacuation (Traffic)

This addendum has been prepared in response to NSW Rural Fire Service (NSW RFS) comments, in a letter issued to Shoalhaven City Council dated 7 February 2022, and should be read in conjunction with the traffic report (300303256_fa_220127 final.docx). The issues identified by the RFS are as follows:

- All evacuation traffic will be eastward along Emmett Street.
- Emmett Street is the only east – west road through the village and congestion issues are already apparent without the additional traffic generation.
- Emmett Street, along the southern interface of the planning proposal area, is impacted by forested vegetation.
- It is unclear where within the existing village evacuating residents would take refuge. Existing public building and places Callala Bay are sited on the southern side of the village with potential impact from bushfire within the southern hazard area.
- Further information should be provided to demonstrate the two roads on either side of proposed C3 zoned land will not directly adjoin retained forested vegetation.

A traffic assessment was undertaken for the existing conditions of the road network near the proposed development. As detailed in Section 6.8 of the traffic report, SIDRA analysis for the intersection of Emmett Street and Lackersteen Street indicates that the intersection operates at a very good Level of Service (LoS) A with minimal delays during the peak periods. It is noted that no issues, relating to existing traffic performance, were identified in the traffic assessment.

In general, there are a number of evacuation routes from the site and from Callala Bay Village, as outlined in the ELA response. This submission is written on the assumption that all evacuation traffic will travel eastward along Emmett Street.

This addendum assesses the following:

- Proposed and existing road network to deal with evacuating residents and responding emergency services.
- The location of key access routes and direction of travel.
- The longest time it would take for the residents to leave the village from the site and onto Callala Bay Road, by private vehicle, in the event of a bush fire.

Design with community in mind



Callala Bay Urban Release/Expansion Area – RFS request for Additional Information and NSP options | Sealark Pty Limited

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Reference: 300303256_bushfire_evacuation_traffic

1.1 TRIP GENERATION

The study area has been broken into the areas shown within Figure 1 in order to determine the movements at the intersections.

Assumptions used for this assessment:

- **Emergency Access:** As shown in Figure 1, there will be a route from Callala Bay Road to the North-eastern corner of the site for emergency service ingress only, if required. In addition, it has been assumed that all vehicles on the road network are evacuating using the left lane only, allowing entry by emergency services if necessary.
- **Trip Generation:**
 - The bushfire evacuation has been assumed to occur with 100% of dwellings within the study area occupied (noting at any given time, some properties would be vacant or temporarily unoccupied). For this assessment, it has been assumed that all trips would be generated from residential land uses.
 - Each dwelling will generate one vehicle movement. Any dwellings accommodating six or more people will generate two vehicle movements.
 - Based on the number of dwellings from the south of Lackersteen Street / Emmett Street intersection (Area G), there will be about 500 trips travelling northbound from the south and some 20 trips travelling northbound from the east of the intersection. It is expected that the 20 trips will be generated from dwellings along the east of the intersection.
 - Trips generated from Area F is assumed to depart from Sydney Avenue.
- **Traffic Management** – The operation of the intersection between Lackersteen Street/ Emmett Street has been assessed using SIDRA INTERSECTION, a modelling software package which calculates intersection performance. The commonly used measure of intersection performance, as defined by TfNSW, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service. Whilst SIDRA INTERSECTION is not a microsimulation tool and cannot incorporate changes in traffic behaviour due to police and traffic management, during emergency evacuations, it is expected that there will be traffic management and other appropriate measures established to facilitate safe and efficient movements.

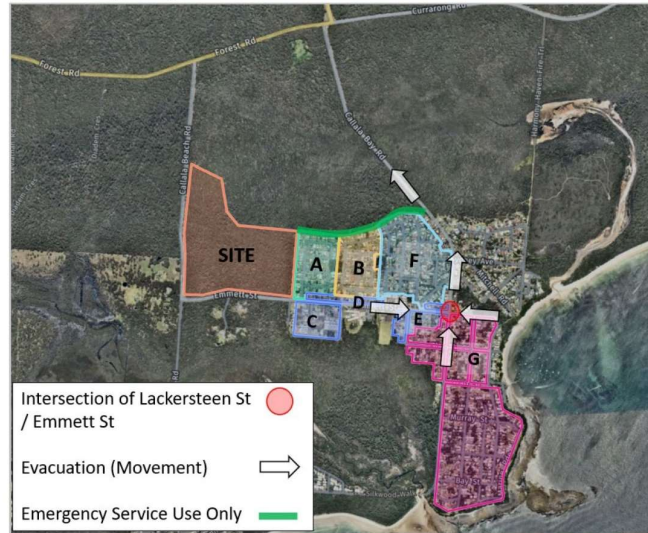
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Reference: 300303256_bushfire_evacuation_traffic

Figure 1: Existing Dwelling Zones



Using 2016 Census data, it has been identified that approximately 2.5% of all dwellings within the Callala Bay area have six or more persons residing in the premises. It has been assumed that all dwellings will generate one vehicle movement during a bushfire, with any dwelling accommodating six or more people generating two vehicle movements. Therefore, a trip rate per dwelling of 1.03 vehicles has been applied to the study area.

The existing areas and proposed subdivision (from west of Lackersteen Street and Emmett Street intersection) are shown to accommodate approximately 677 dwellings, generating about 694 vehicle movements from the west of the intersection, as noted in Table 1.

Table 1: Estimated Number of Dwellings in Study Area and Trip Generation (from the west of the intersection)

	A	B	C	D	E	Site	Total
Dwellings	104	113	43	23	35	359	677
Vehicle Trips	107	116	44	24	36	368	694

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Reference: 300303256_bushfire_evacuation_traffic

9.2 TRAFFIC ANALYSIS

An analysis of the carriageway capacity has been undertaken for the roadways within the study area for the future traffic volumes plus the development traffic. The results of the assessment are provided within Table 2. The concept of carriageway capacity and level of service is detailed in **Appendix A**.

Table 2: Level of Service for Roadway

Location	Lanes	Evening Peak			
		NB/EB Volumes	LoS	SB/WB Volumes	LoS
Lackersteen Street (North of Emmett Street)	2 lanes undivided	0	-	0	-
Lackersteen Street (South of Emmett Street)	2 lanes undivided	500 (NB)	A	0	-
Emmett Street (East of Lackersteen Street)	2 lanes undivided	20 (NB)	A	0	-
Emmett Street (West of Lackersteen Street)	2 lanes undivided	694 (NB)	B	0	-

Based on the results from Table 2, Lackersteen Street and Emmett Street is expected to operate at a relatively good performance with slight delays.

A SIDRA analysis has been undertaken for the intersection of Lackersteen Street / Emmett Street in the event of an evacuation. SIDRA inputs for this analysis are based on the trip numbers in Table 2. It is expected that traffic generated would be from the residential land use.

As part of this assessment, the following scenarios have been analysed:

- Scenario 1: All residents will evacuate over a 60-minute period. It is understood that, based on typical evacuations, the likelihood of this scenario happening is relatively low.
- Scenario 2: All residents will evacuate over a 120-minute period.
- Scenario 3: All residents will evacuate over a 240-minute period.

The results of the analysis are provided within Table 3 with the detailed results presented in **Appendix B**.

Table 3: Bushfire Evacuation SIDRA Results

Scenario	Intersection	Approach	Degree of Saturation (%)	Average Delay (s)	Level of Service
1	Lackersteen Street / Emmett Street	East Approach	14.3%	26.0	B
		West Approach	92.5%	25.6	B
		South Approach	27.1%	0.0	A
2	Lackersteen Street / Emmett Street	East Approach	2.5%	9.8	A
		West Approach	33.3%	7.2	A

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Reference: 300303256_bushfire_evacuation_traffic

Scenario	Intersection	Approach	Degree of Saturation (%)	Average Delay (s)	Level of Service
3	Lackersteen Street / Emmett Street	South Approach	13.6%	0.0	A
		East Approach	0.9%	6.9	A
		West Approach	14.6%	6.2	A
		South Approach	6.9%	0.0	A

The SIDRA results show that the intersections are expected to operate in an acceptable manner, with some delays expected in Scenario 1 and minimal delays in Scenarios 2 and 3. These delays are expected considering that the south approach is the major (priority) road in this priority controlled intersection.

Summary

The longest travel path for a vehicle to exit the site (in the eastward direction) and depart Emmett Street is approximately 1.0 km. Assuming an average travel speed of 30km/hr, the vehicle is expected to take approximately two minutes (120 seconds) to traverse the midblock sections and reach Callala Bay Road. In order to do so, a vehicle travelling from the site would need to give way at the intersection of Lackersteen Street and Emmett Street.

The intersection was recorded to have an average delay of approximately 29.6 seconds in a worst case Callala Bay Village evacuation scenario (Scenario 1). Based on the above, the longest time it would take for a vehicle to exit the site and get on to Callala Bay Road and would be approximately 150 seconds.

As discussed, the time taken to depart the Callala Bay village, for refuge areas in other locations such as those identified in the ELA response to the RFS, is expected to vary depending on the extent of the wider area evacuation, the location of where people are evacuated to, and the traffic management that is implemented during the evacuation.

Regards,

Stantec Australia Pty Ltd



Sunny Hong
Senior Transport Engineer
sunny.hong@stantec.com

Reviewed by Brett Maynard (Senior Principal Transport Engineer)

Attachment A – Concept of carriageway capacity and level of service
Attachment B – SIDRA results

Design with community in mind

CL25.316 - Attachment 1

Callala Bay Urban Release/Expansion Area – RFS request for Additional Information and NSP options | Sealark Pty Limited

Appendix C: Preliminary biodiversity assessment, proposed APZ for Callala Bay NSP



Unit 1
51 Owen Street
Huskisson NSW 2540
t: (02) 4428 0705

29 January 2024
Our ref: 24HUS9140

Sealark Pty Ltd
GPO Box 2678
Sydney 2001
Attention: Matt Philpott

Dear Matt,

Preliminary Biodiversity Assessment, Proposed APZ for Callala Bay NSP

Introduction

As part of the proposed Callala Bay Urban Expansion Area Neighbourhood Safer Place (NSP), Eco Logical Australia (ELA) was engaged by Sealark Pty Ltd to undertake a preliminary biodiversity assessment of an enlarged bushfire Asset Protection Zone (APZ) for the Community Centre on Emmett Street. While much of the proposed APZ is in place or subject to some form of periodic vegetation management, it would need to include an area of unmanaged native vegetation in the north-east of Lot 2 DP 848057 which is the focus of this assessment. This area of unmanaged native vegetation (hereafter referred to as the 'site'), is approximately 500 m² and located immediately south of the Callala Bay Rural Fire Service station and immediately north of the sewer pumping station (Figure 1).

The objective of the preliminary assessment was to investigate the biodiversity values of the site, especially relating to threatened species and communities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and to assess whether the impacts of the proposed APZ have potential to substantially affect those values.

The preliminary assessment provided is based on a site inspection and desktop analysis of available information. No detailed or targeted surveys of the site or surrounds were undertaken. No formal impact assessment has been undertaken.

Methods

A number of background resources pertaining to the site were reviewed, including the NSW State Vegetation Type Map (SVTM), Biodiversity Values mapping, BioNet threatened species records within 2 km, surface geology, topography, hydrology, flooding, and Shoalhaven Local Environmental Plan 2014 (SLEP) mapping.

The site was inspected on 9 September 2024 for approximately 1.25 hours, to determine site condition and site values including vegetation communities, characteristic flora species, and habitats. The site inspection included meeting with ELA bushfire consultant Rod Rose to confirm the extent of vegetation removal required to implement the proposed APZ.

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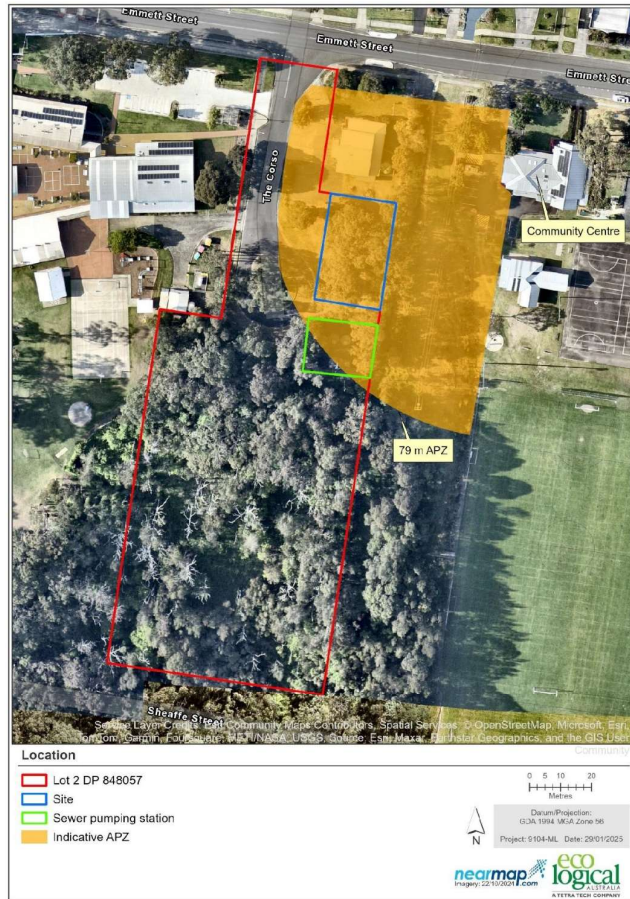


Figure 1: Location of the study site within the proposed APZ.

Expected impacts of proposed APZ

To implement the proposed APZ, most of the mid-layer and groundcover vegetation within the site are expected to be removed, although selected shrubs and groundcovers could potentially be retained if required. The removal of some canopy trees and branches will be required. The majority of canopy trees are expected to be retained through the selective removal of trees and trimming of branches on some retained trees, to achieve the required canopy separation. The emergent aquatic vegetation in the open drainage channel to the east of the site is not required to be maintained or managed as part of the proposed APZ.

Desktop review

The site occurs on relatively flat land, below 10 m AHD, and is not subject to flooding based on available flood maps from Shoalhaven City Council. The site does not contain any mapped drainage lines or riparian areas, although a constructed open drainage channel occurs immediately to the east of the site. This site is mapped as containing non-alluvial soils derived from silty sandstone, mudstone and siltstone of the underlying Wandrawandian Formation.

No Biodiversity Values mapping (Appendix A) occurs on the site, nor do any SLEP Terrestrial Biodiversity layers.

The site is mapped under the SVTM as containing Plant Community Type (PCT) 3273 South Coast Lowland Shrub-grass Forest, which is not associated with any Threatened ecological communities (TECs) (Appendix B).

BioNet records of threatened flora species within 2 km of the site are shown in Appendix C. Four threatened terrestrial orchid species known from the Callala Bay area are listed as sensitive species and not displayed on the map. None of these orchid species are known to occur within or close to the site.

BioNet records of threatened fauna species within 2 km of the site are shown in Appendix D. Many records of *Petaurus australis* (Yellow-bellied Glider) occur to the south-west of the site, and one *Litoria aurea* (Green and Golden Bell Frog) record occurs close to the south-east of the site.

Site inspection

The site and surrounds have been extensively disturbed. The site is surrounded by urban development including the Rural Fire Service station to the north, The Corso road easement and public school to the west, the pumping station to the south, and to the east a drainage easement, electricity easement, the Community Centre and Sporting Complex. While the site retains some native vegetation, the groundcover stratum especially has been modified by clearing and other disturbances such that it is dominated by exotic species. Features of the site and surrounds are shown in Photos 1-6.

Vegetation communities and TECs

The site vegetation contains a canopy stratum to approximately 15 m in height, dominated by *Eucalyptus punctata* (Grey Gum), *Corymbia gummifera* (Red Bloodwood) and *Eucalyptus longifolia* (Woollybutt). The canopy also includes *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus pilularis* (Blackbutt), *Eucalyptus botryoides* (Bangalay) and occasional *Melaleuca decora* (Paperbark) in the sub-canopy.

The mid-layer, which has been disturbed by clearing and landscape plantings, includes *Allocasuarina littoralis* (Black She-oak), *Acacia mearnsii* (Black Wattle), *Callistemon* sp., *Glochidion ferdinandi* (Cheese Tree), *Pittosporum undulatum* (Sweet Pittosporum), *Hakea salicifolia* (Willow-leaved Hakea), *Gahnia* sp., and *Leptospermum* sp.

The groundcover has been extensively modified and is dominated by exotic grasses and other weeds including *Sporobolus africanus* (Parramatta Grass), *Trifolium repens* (White Clover), *Agapanthus praecox*

(African Lily), *Asparagus aethiopicus* (Asparagus Fern), *Lonicera japonica* (Japanese Honeysuckle), *Senna pendula* (Winter Cassia) and *Senecio madagascariensis* (Fireweed). Native groundcover species include *Lomandra longifolia* (Spiny-headed Mat-rush) and *Imperata cylindrica* (Blady Grass).

Vegetation within the site generally conforms to PCT 3273 South Coast Lowland Shrub-grass Forest, which is consistent with the SVTM. PCT 3273 is not associated with any TECs listed under the BC Act or EPBC Act.

To the south of the site the vegetation becomes increasingly dominated by *E. longifolia*, *E. robusta*, *Casuarina glauca* (Swamp Oak) and *Melaleuca* species, which is consistent with a transition to a wetter forest type, such as PCT 4009 Shoalhaven Lowland Flats Wet Swamp Forest (mapped in this area on the SVTM). PCT 4009 is associated with the TEC Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, listed under the BC Act.

While the southern end of the site is close to an ecotone with PCT 4009, key flora species appear to be still consistent with PCT 3273 and the site appears to lack other features usually associated with PCT 4009 and Swamp Sclerophyll Forest TEC, such as periodic inundation and alluvial soils. The site is now permanently separated from intact vegetation to the south by clearing and infrastructure works, being the adjacent road and sewer pumping station.

Fauna habitat

Canopy connectivity is disrupted with intact vegetation to the south, and largely absent in other directions. Understorey habitat connectivity is largely absent due to surrounding clearing.

The site contains generic foraging resources provided by canopy trees, and to a lesser extent smaller understorey trees, suitable for a range of mobile fauna, including threatened species. The canopy includes winter flowering trees suitable for Yellow-bellied Glider and *Pteropus poliocephalus* (Grey-headed Flying-fox). No evidence of threatened fauna use, such as sap-feeding trees incised by the Yellow-bellied Glider, or crushed *A. littoralis* seed cones from *Calyptorhynchus lathamii* (Glossy Black Cockatoo) feeding, was observed on the site.

No hollow-bearing trees or stick nests were observed within or adjacent to the site. No logs or rocky areas were observed, and terrestrial shelter habitat was limited, although denser groundcover vegetation and building waste (piles of discarded bricks) could provide sheltering habitat for small reptiles and amphibians.

No water sources are present within the site, although the adjacent open drainage channel, dominated by emergent *Typha* sp. (Cumbungi) provides suitable habitat for some fauna, including the Green and Golden Bell Frog.

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Photo 1: The site (centre) from The Corso, looking north towards the RFS station, with the sewer pumping station vehicle access on the right.



Photo 2: Looking south through the site to the sewer pumping station fencing.

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Photo 3: The site is separated from intact forest to the south by the fenced pumping station, gravel vehicle access, and the adjacent sealed road.



Photo 4: Groundcover within the site is predominantly comprised of exotic grasses and other weeds including *Agapanthus praecox* (African Lily), *Asparagus aethiopicus* (Asparagus Fern) and *Lonicera japonica* (Japanese Honeysuckle).

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Photo 5: Mown exotic grasses on the western side of the site also extend into the site. Young *Allocasuarina littoralis* (Black She-oak) trees can be seen in the centre understorey. Landscape plantings and mulch can be seen in the left of the photo.



Photo 6: Looking east from the site to the sports fields and community centre, over the open drainage channel. Regrowth *Acacia* sp. (Wattle) occur on the far bank.

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Threatened flora species

PCT 3273 is associated with a number of threatened flora species, some of which are known to occur in the Callala Bay area. No threatened flora species were observed on the site, and none are known to occur in the immediate vicinity of the site. No threatened flora species are considered likely to occur on the site given the small size of the site, the extensive disturbances to the site and surrounds, and the degradation of groundcover habitats over many years.

Threatened fauna species

The Yellow-bellied Glider is relatively common in the forests surrounding the Callala Bay urban area and many BioNet records (mainly sap-feeding trees) occur to the south-west of the site. The site provides a small amount of suitable feeding resources in the form of flowering trees and invertebrates. No Yellow-bellied Glider sap-feeding incisions were observed. While canopy connectivity between the site and intact forest to the south is disrupted, the Yellow-bellied Glider could still access the site to forage there on occasions. The site is unlikely to be important to the species or used regularly given its small size, disrupted connectivity, and the extent of similar foraging resources in the intact forest to the south. The current level of canopy connectivity to the site can be maintained and the majority of Yellow-bellied Glider feeding resources within the site are expected to be retained while implementing the proposed APZ.

A single 2015 record of the Green and Golden Bell Frog occurs in Callala Bay, on the sports fields to the south-east of the site. The next closest Green and Golden Bell Frog record is approximately 3 km to the west from 1996. The Green and Golden Bell Frog is not regularly recorded in the Callala Bay area and probably only occurs in the area intermittently or at low densities. The site provides low quality habitat for the species, with marginal shelter and connectivity values. The constructed drainage channel with emergent vegetation (*Typha* sp.) adjacent to the site provides some aquatic habitat for the species, but does not provide any connectivity north of Emmet Street. Large areas of potentially suitable habitat for the species occur to the south of the site. It is anticipated that emergent vegetation within the drainage channel does not need to be managed as part of the proposed APZ.

The relatively young *A. littoralis* trees in the mid-layer of the site provide a small amount of potential foraging resources for the Glossy Black Cockatoo, although no evidence of feeding (chewed seed cones) was observed. These potential feeding resources on the site are not likely to be important to the species considering their restricted size, low abundance, and relatively isolated location.

The canopy trees in the site provide a small area of generic foraging habitat for several highly mobile threatened birds and mammals known to occur in the area, including the Grey-headed Flying-fox, *Glossopsitta pusilla* (Little Lorikeet), *Lophoctinia isura* (Square-tailed Kite), *Callocephalon fimbriatum* (Gang-gang Cockatoo), and several threatened microbats.

The extensive disturbances to groundcover vegetation and terrestrial habitats within and surrounding the site suggests that the occurrence of terrestrial threatened fauna, including *Isodon obesulus* (Southern Brown Bandicoot), *Potorous tridactylus* (Long-nosed Potoroo) and *Sminthopsis leucopus* (White-footed Dunnart) is highly unlikely.

The site is unlikely to be important for *Cercartetus nanus* (Eastern Pygmy Possum) due to the lack of terrestrial and arboreal sheltering habitat (logs and tree hollows), reduced mid-layer foraging habitat (e.g. Banksias), surrounding disturbances and reduced connectivity. Similarly, the site provides only marginal habitat for *Petaurus norfolcensis* (Squirrel Glider) and *Phascogale tapoatafa* (Brush-tailed Phascogale), which are rare or absent from the area. The site is unlikely to be important for *Petauroides volans* (Greater Glider) due to lack of tree hollows, small area and disrupted connectivity.

Conclusion

The site is surrounded by urban development which has removed or reduced connectivity with other similar habitats. The site itself has been extensively disturbed and degraded, particularly the groundcover vegetation, which is mostly exotic. The highly modified groundcover appears unlikely to provide habitat for threatened flora species or terrestrial threatened fauna species.

The main site values are provided by canopy trees, which provide foraging habitat for a range of mobile fauna species, including some threatened fauna species. Most canopy trees in the site are expected to be retained while implementing the proposed APZ, along with the existing level of fragmented canopy connectivity to nearby forest.

The emergent vegetation in the adjacent drainage channel is expected to be retained or otherwise managed independently to the proposed APZ.

The area would benefit from the removal and control of invasive weeds on the site, which have potential to spread into nearby vegetation and TECs to the south.

Based on this initial assessment of the site, implementation of the proposed APZ is likely to be achievable without any substantial adverse impacts to biodiversity. A significant impact to threatened species or TECs listed under the BC Act or EPBC Act as a result of the proposed APZ appears unlikely.



David Coombes
Associate Ecologist

Callala Bay Urban Release Expansion Area – RFS request for Additional Information and NSP options | Sealark Pty Limited

Appendix A: Biodiversity Values map (November 2024)



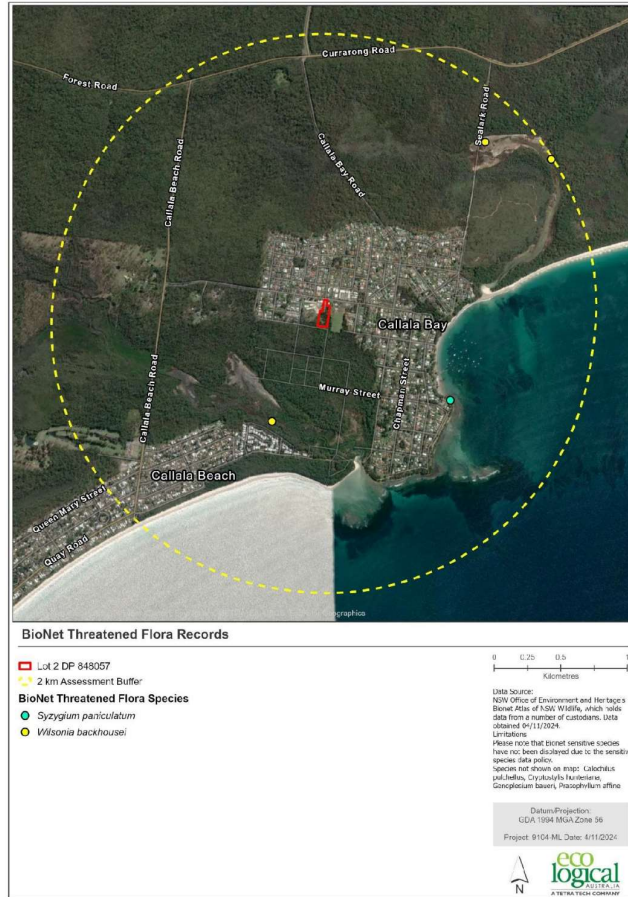
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Appendix B: State Vegetation Type Map



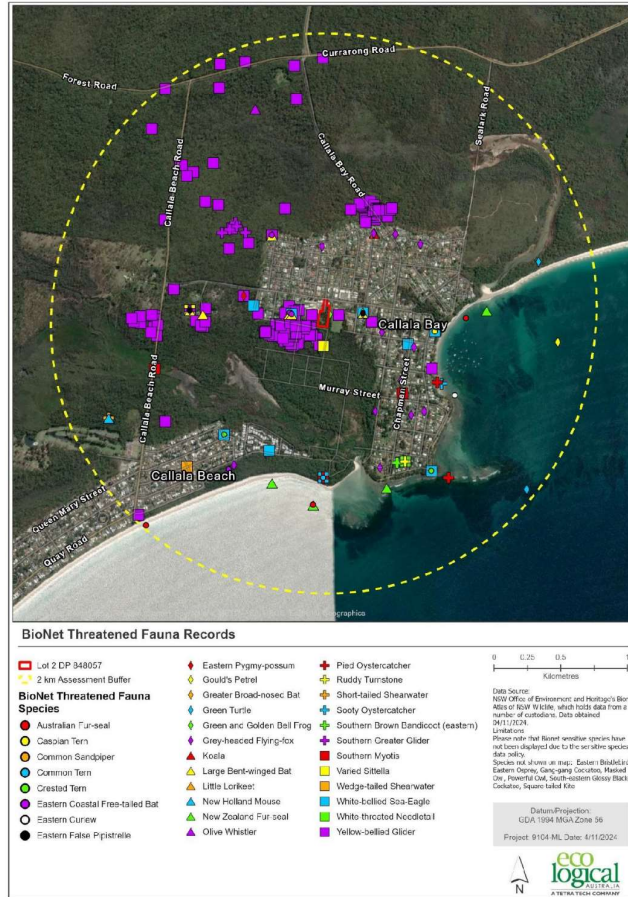
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Appendix C: BioNet threatened flora records within 2 km



Callala Bay Urban Release Expansion Area – RFS request for Additional Information and NSP options | Sealark Pty Limited

Appendix D: BioNet threatened fauna records within 2 km



Callala Bay [Urban ReleaseExpansion](#) Area – RFS request for Additional Information and NSP options | Sealark Pty Limited

[Appendix D: Shoalhaven City Council in-principle support for the NSP in the Callala Bay Community Centre and the Sailing Club/Boat Ramp locality](#)

CL25.316 - Attachment 1

Callala Bay [Urban Release/Expansion Area](#) – RFS request for Additional Information and NSP options | Sealark Pty Limited

Appendix E: Callala Anglican Church support for the NSP in their facility

From: [Paul McPhail](#)
To: [Matt Philpott](#)
Cc: [Belinda Davie](#); [James Harris](#)
Subject: Re: Callala Bay "Neighbourhood Safer Place" - Bushfire Emergency Facility
Date: Saturday, 7 September 2024 11:03:42 AM

Dear Matt,

Thanks for your patience.

Our parish is happy for Callala Anglican Church to continue to be considered as possible Neighbourhood Safe Place.

Thanks,
Paul

From: Matt Philpott <matt@sealark.com.au>
Date: Tuesday, 16 July 2024 at 10:31 am
To: Paul McPhail <paul@culburraanglican.asn.au>
Cc: Belinda Davie <belinda@sealark.com.au>, James Harris <jamesharris@allenprice.com.au>
Subject: RE: Callala Bay "Neighbourhood Safer Place" - Bushfire Emergency Facility

Hi Paul,

Just following this email up from a few weeks ago.

I left a message on your voicemail just now.

Regards,

Matt Philpott
 Managing Director – Land and Development
 Sealark Pty Limited (An entity of The Halloran Trust)



| 0438 888 857 | matt@sealark.com.au
 | Sydney Office: Suite 1006 97-99 Bathurst Street, Sydney NSW 2000
 | Sydney Postal Address: GPO Box 2678, Sydney NSW 2001
 | Culburra Beach Postal Address: PO Box 12, Culburra Beach NSW 2540
 | www.sealark.com.au | www.hallorantrust.com.au

Sealark acknowledges the traditional custodians of the lands on which our business operates and recognises their continuing connection to land waters and communities.
 We look forward to sharing in a common future.

If you are not the intended recipient, please notify the sender immediately and delete the email and all copies.

Callala Bay Urban Release/Expansion Area – RFS request for Additional Information and NSP options | Sealark Pty Limited

From: Matt Philpott
Sent: Wednesday, 12 June 2024 2:38 PM
To: paul@culburraanglican.asn.au
Cc: Belinda Davie <belinda@sealark.com.au>; James Harris <jamesharris@allenprice.com.au>
Subject: Callala Bay "Neighbourhood Safer Place" - Bushfire Emergency Facility

Hi Paul,

Please find enclosed a letter and report for you and the Church's consideration regarding the possible establishment of a Neighbourhood Safer Place at the Callala Bay Anglican Church.

Please feel free to reach out if you have any questions.

I will schedule to give you a call next week to discuss this further.

Regards,

Matt Philpott
Managing Director – Land and Development
Sealark Pty Limited (An entity of The Halloran Trust)



| 0438 888 857 | matt@sealark.com.au
| Sydney Office: Suite 1006 Level 10, 99 Bathurst Street, Sydney NSW 2000
| Sydney Postal Address: GPO Box 2678, Sydney NSW 2001
| Culburra Beach Postal Address: PO Box 12, Culburra Beach NSW 2540
| www.sealark.com.au | www.hallorantrust.com.au

Sealark acknowledges the traditional custodians of the lands on which our business operates and recognises their continuing connection to land waters and communities.
We look forward to sharing in a common future.

If you are not the intended recipient, please notify the sender immediately and delete the email and all copies.

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Appendix F: Sealark letter confirming willingness to fund the establish an NSP in Callala Bay



10 February 2025

NSW Rural Fire Service
Locked Bag 17
Granville NSW 2142

And

Shoalhaven City Council
42 Bridge Road
Nowra NSW 2541

To whom it may concern,

Sealark acknowledges that as a requirement of the delivery of the Callala Bay Urban Release Area, the NSW Rural Fire Service requires a Neighbourhood Safer Place (NSP) to be established in Callala Bay.

Sealark confirms its commitment to the investigation and delivery of a NSP in accordance with the RFS processes and requirements.

Sealark also confirms its willingness to fund the necessary works to deliver the NSP-solution within Callala Bay in accordance with the ELA report dated 10 February 2025.

Regards,

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Managing Director – Land and Development

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Draft Chapter NB4: Moss Vale Road North Urban Release Area

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Amendment History			
Version Number	Date Adopted by Council	Commencement Date	Amendment Type
1			

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1 Purpose

The purpose of this Chapter is to guide the **development** of the Moss Vale Road North **Urban Release Area** (URA) in accordance with the provisions of Part 6 of Shoalhaven Local Environmental Plan 2014 (**SLEP 2014**).

Advisory Note: In addition to the provisions outlined in this Chapter, you must also refer to:

- Supporting Document 1: Integrated Water Cycle Assessment.
- Supporting Document 2: Landscape Specifications.
- Supporting Document 3: Vegetation Management Plan Requirements.
- Moss Vale Road North Residential Planting List.

In the event of an inconsistency between a provision in this Chapter and a provision in a generic Chapter in this **Development Control Plan**, the provision in this Chapter will prevail to the extent of the inconsistency.

2 Application

This Chapter applies to the Moss Vale Road North URA within the suburb of Badagarang (**Figure 1**).

3 Context

The URA was first identified as a “New Living Area” in Council’s adopted *Nowra-Bomaderry Structure Plan* (2008). It was confirmed with land use zones and other planning controls guiding its release in *Shoalhaven Local Environmental Plan 2014*. The URA is also part of the Nowra-Bomaderry Regional Release Area identified in the *Illawarra-Shoalhaven Regional Plan* (2021). The URA has a significant role in providing a supply of new, diverse, and affordable homes and the infrastructure necessary to support new communities.

The URA is in a pastoral landscape of scenic value providing a transition in land use and topography from the heavily forested Cambewarra Range and the urban settlement of Nowra-Bomaderry. Located on the lower, southern slopes of the Cambewarra Range, the area is highly visible from Moss Vale Road, the Cambewarra Mountain Lookout, and the Princes Highway.

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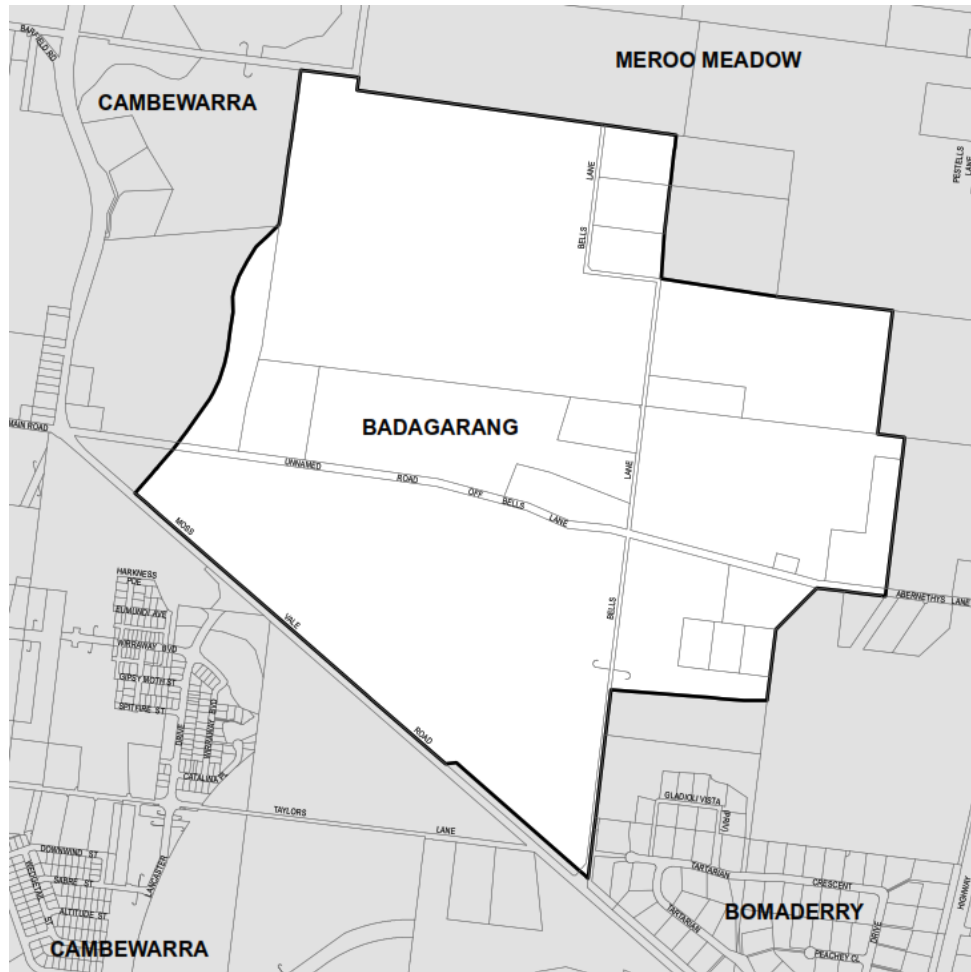


Figure 1: Subject Land

4 Objectives

The **objectives** of this Chapter are to:

- i. Provide key development objectives and controls to deliver sustainable living, economic vitality, and community wellbeing principles.
- ii. Promote neighbourhood design which achieves healthy, active and high-quality urban design outcomes.
- iii. Ensure the environmentally sensitive development of the URA occurs in an integrated and efficient manner.

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5 Vision

The URA is a highly desirable residential area providing a variety of lot sizes, dwelling types, styles, and densities to meet a range of budgets. A diverse range of housing appeals to potential residents, including first-home buyers, downsizing retirees, and young families. Higher densities are concentrated in high amenity areas, easily serviced by public transport, and close to **public open space**, with lower housing density transitioning into the adjacent rural landscape.

The URA complements its natural environment by retaining significant assets, including riparian corridors and elaborate **views** of natural features including creeks, wooded backdrops, and pastoral landscapes. The URA incorporates large environmental areas enabling management of riparian corridors, significant and **remnant vegetation**, and integration of **water sensitive urban design**. Emphasis is placed on the conservation of existing **vegetation** in riparian corridors and open space areas.

The URA contains a passive open space network providing a variety of recreational opportunities complemented by an integrated movement network for pedestrians and cyclists.

6 Key Development Outcomes for Moss Vale Road North URA

The Indicative Layout Plan (ILP) at **Figure 2** illustrates the key desired outcomes for the URA. Setting and achieving key development outcomes ensures the URA meets the Vision. Each application seeking Council's development consent for the subdivision of the URA should address the following objectives in a Design Verification Statement:

1. The URA provides housing diversity by enabling the development of various dwelling types to meet the Shoalhaven's communities' identified housing needs.
 - a. Medium density development is concentrated in areas within 400m of the Village Centre, areas of high amenity adjacent to the riparian corridors and open space areas and areas adjacent to certain **collector roads**.
 - b. Medium density development directly fronting the Village Centre Core and the Village Green provides an active frontage of business or health uses addressing the street to encourage pedestrian activity, enhance public security, improve the amenity of the public domain, and support the economic viability of the Centre.

Note: A range of health services facilities are made permissible by the provisions of *State Environmental Planning Policy (Transport and Infrastructure) 2021*.

- c. Where small **lots** (**lots** under 500m²) are provided they:
 - i. Are generally located within 400m of the Village Centre and formal open space,
 - ii. Engage with the street and open space by minimising the dominance of garages and vehicular **parking spaces**, especially where adjoining riparian roads, and

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- iii. Maximise access to open space areas.
2. The defined street hierarchy is determined by the placement and design of road types and achievement of the intended function. The street hierarchy is important to enable a safe, accessible and well-connected movement network of shared use pathways and public transport routes. The street types include:
 - a. **Collector Roads (Entry)** - provide an attractive entry boulevard characterised by tree lined verges, planted road blisters, and shaded footpaths.
 - b. **Collector Roads (Tier 1 and Tier 2)** – provide an attractive circulation network through the URA which will facilitate future public transport routes. All dwellings within the URA are approximately 400m walking distance, and a maximum of two intermediate intersections from the Collector Road network. Collector Roads are characterised by tree lined verges and shaded footpaths.
 - c. **Local Streets** – provide access from the Collector Roads and circulation within residential areas. Local streets are important components of the street network as they facilitate permeability within the URA.
 - d. **Retail Streets** – provide access within the Village Centre and are important components of the street network as they encourage pedestrian activity.
 - e. **Access Streets (Tier 1 and Tier 2)** - provide lower tier access and circulation within residential areas.
 - f. **Riparian Streets** – provide access to the high amenity riparian areas, connections to the wider URA, and assist with bushfire management.
 - g. **Rear Laneways** – provide rear access and waste collection for small lots. They are designed to be short in length to optimise passive surveillance and minimise the visual impact of the laneways. They are functional and include a level of amenity.
3. Open space areas will meet environmental sustainability objectives and be adaptable spaces. They will protect and enhance riparian corridors and significant and remnant vegetation, incorporate water sensitive urban design elements, and create opportunities for passive recreation. The controls for the open space network also ensures:
 - a. elements of environmental heritage are incorporated within open space areas to contribute to their protection and management.
 - b. all homes are within an 800m walk via a formed footpath to more than one open space area.
 - c. users feel safe and secure.
 - d. adequate places are provided to sit and dwell.
4. Prior to development in the URA, adequate essential infrastructure must be in place or arrangements made to provide it, to ensure the orderly and economical delivery of the URA. The specific infrastructure considered to be essential in this regard is set out in **Section 7** of this Chapter. New development should not occur in the absence of the provision, or satisfactory arrangements for the provision, of such essential infrastructure.

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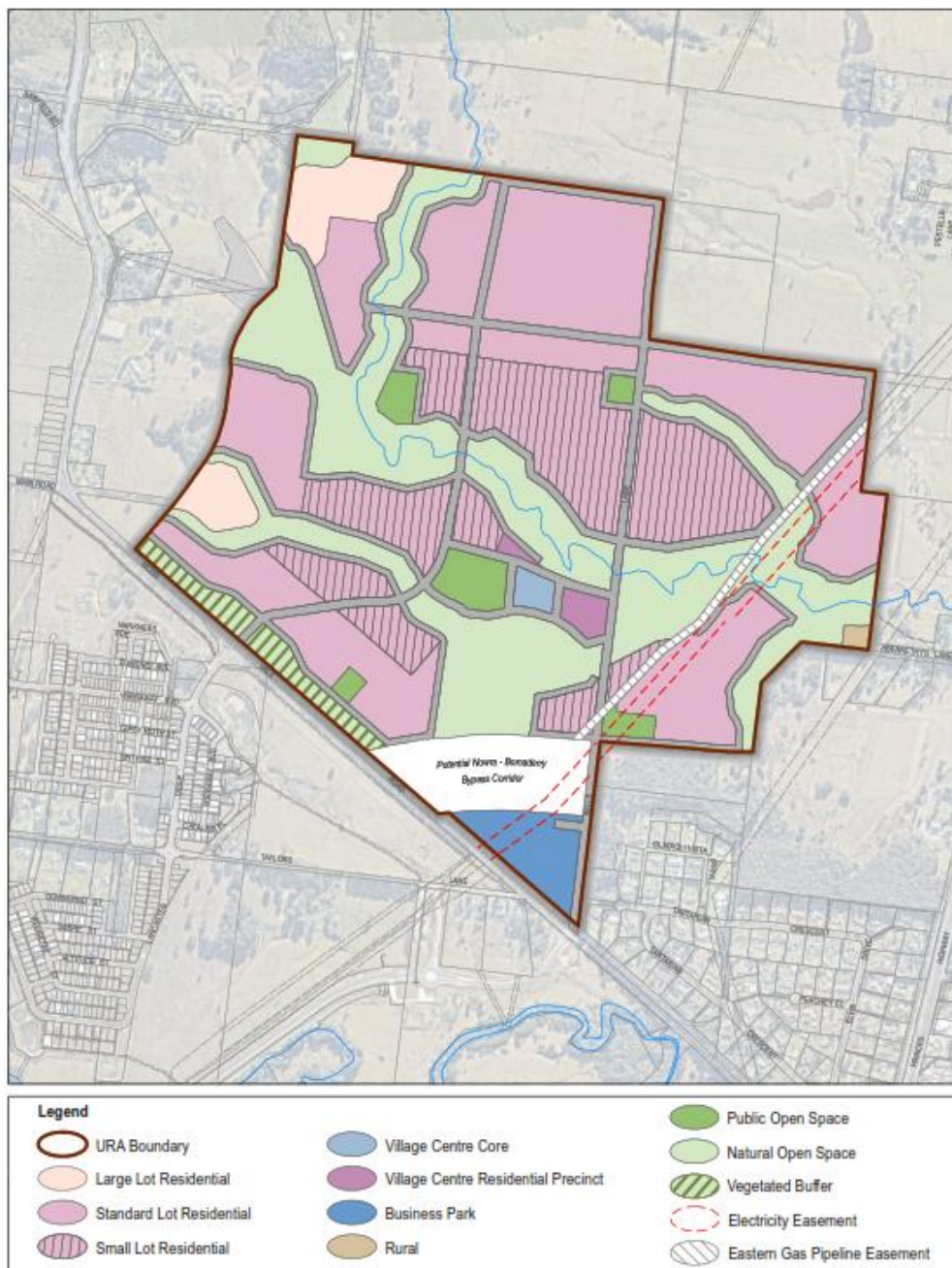


Figure 2: Indicative Layout Plan

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7 Satisfactory Arrangements for Local Infrastructure

Note: The development controls and information in this part (Part 7 Satisfactory Arrangements for Local Infrastructure) will be updated (through an amendment of the development controls) as work continues on final local infrastructure arrangements for the release area.

When assessing a development application, Council will consider whether satisfactory arrangements exist or are proposed by the developer for the provision of good quality local infrastructure essential to support the proposed development, support the orderly and economic development of the URA, and meet the needs of future communities.

Infrastructure includes, but is not limited to, open space, parks, roads and intersections, footpaths, and stormwater drainage. The provision of this essential infrastructure is important as it facilitates the timely delivery of new housing, increases liveability, and meets the ongoing needs of a growing population. New development should not occur in the absence of the provision of or satisfactory arrangements for the provision of such essential infrastructure.

The URA is a large and diverse new urban area which requires a range of infrastructure to support it during the development phase and into the future. The infrastructure listed in **Table 1** is considered essential to support the orderly and economic development of the URA. The essential infrastructure is identified in **Figure 3**.

The provision of essential infrastructure needs to be properly sequenced to result in the best outcome for the MVRN URA. Core infrastructure, services and facilities are to be established at the early phases of each development stage.

Satisfactory arrangement could include, but are not limited to, the addition of infrastructure to the existing *Shoalhaven Development Contributions Plan 2019*, a new development contribution plan specific to the release area, voluntary planning agreements, and Government funding initiatives.

Any proposal for future dedication of land to Council should ensure a suitable mechanism for the dedication is established at Development Application stage in accordance with Council's [Planning Agreement Policy](#).

Note: The indicative location of roads, roundabouts, other intersections, traffic calming measures, bridges, and drainage infrastructure will be confirmed by designs prepared as part of the local infrastructure contributions framework.

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Table 1: List of Essential Infrastructure

Road Infrastructure, Intersections & Bridges
The Collector Road network identified in Section 8.10 consisting of approximately 7.7km of road, 15 roundabouts, other intersections, and required traffic calming measures. This network also provides the planned evacuation route to help manage flood risk.
External connections (3) to the existing road network at Moss Vale Road, Bells Lane and Pestells Lane.
New or upgraded bridges (4) on specified parts of the Collector Road Network and identified in Figure 3.
Drainage Infrastructure
1 wetland, 1 detention basin, 11 bio-retention basins and a selection of other devices (e.g. gross pollutant traps, sediment basins and trash racks) identified in Figure 3 and <i>Supporting Document 1: Integrated Water Cycle Assessment</i> .
Open Space & Recreation Facilities
A district park (2.4ha) containing recreational outcomes such as a multi-sports court, playground, amenities block, car parking (including provision for mobile library service) and embellishment.
A local park (1.15ha) containing recreational outcomes such as a nature-based playground, amenities block, and car parking.
Three (3) Local Parks in the locations identified on the Indicative Layout Plan (Figure 2) containing embellishments such as exercise equipment, seating etc.
Embellishment of natural areas with a range of interpretive elements, viewing platforms, art, furniture, and wayfinding signage.
Delivery of shared use pathway network in riparian corridors, between subdivision stages, and links to existing/future network.
Contributions to Delivery and/or Upgrade of Established City-wide Infrastructure
• Northern Shoalhaven Sports Stadium • Nowra Swimming Pool Extension • Planning Area 1 Recreation Facilities Upgrade • Nowra Integrated Youth Services centre • Shoalhaven Community and Recreation Precinct • Shoalhaven Entertainment Centre • Shoalhaven City Library Extensions • Shoalhaven Regional Gallery • Citywide Fire & emergency Services • Shoalhaven Fire Control Centre • Contributions Management and Administration
Note: Refer to the <i>Shoalhaven Contributions Plan 2019</i> for further detail on established City-wide infrastructure

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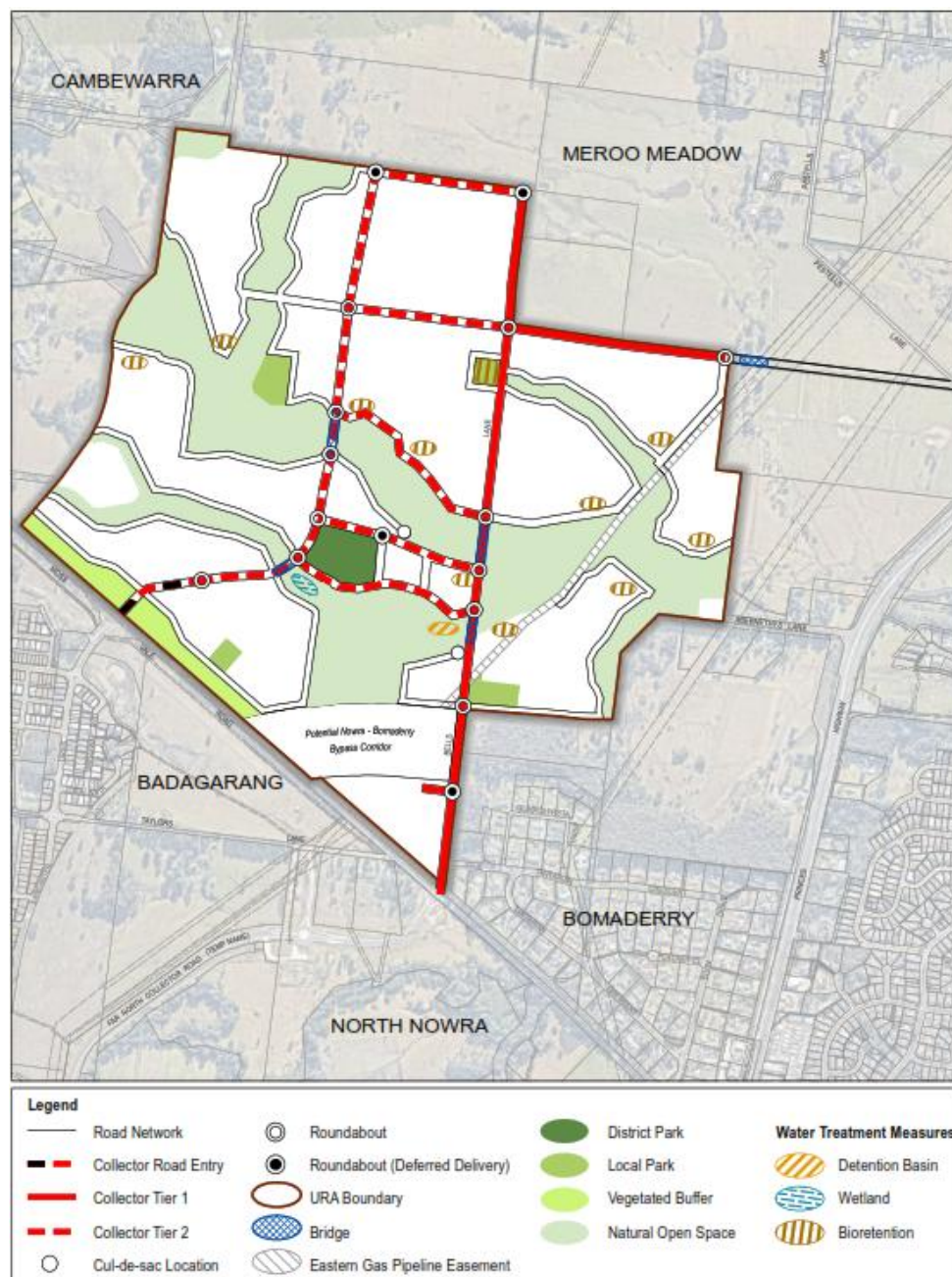


Figure 3: Satisfactory Arrangements for Infrastructure

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8 Subdivision Controls

8.1 Indicative Layout Plan

The Indicative Layout Plan (ILP) at **Figure 2** illustrates the key outcomes for the URA.

The specific **objectives** are to:

- i. Ensure development is undertaken in a coordinated manner which responds to the topography, **views**, natural environment, and in accordance with the Indicative Layout and Staging Plan.
- ii. Provide a variety of **lot** sizes to facilitate a range of housing types in appropriate locations.
- iii. Deliver a vibrant mixed use neighbourhood centre to service the needs of the suburb of Badagarang.
- iv. Require a well-connected and legible movement network providing a variety of routes for vehicles, pedestrians, and cyclists both within the URA and connecting to surrounding areas.
- v. Supply **public open space** which enhances existing landscape values, protects significant and **remnant vegetation**, promotes continuous, connected biodiversity corridors, provides opportunities for **stormwater** management, and improves the amenity for future residents.
- vi. Provide buffers to significant remnant vegetation and riparian areas.

Performance Criteria	Acceptable Solutions
P1 Development is undertaken in a coordinated manner consistent with the ILP.	A1.1 Development within the URA is in accordance with the ILP (Figure 2). Note: The ILP is to be read in conjunction with the provisions in this Chapter, broader Development Control Plan, SLEP 2014 and other relevant policy documentation and legislation. For example, applications for development consent on land zoned E3 Productivity Support need to address the provisions of <i>Chapter G20 Industrial Development</i>. Note: Variations to the ILP may be considered where the applicant provides sound justification and can demonstrate that the proposal meets the intent of the relevant objectives and provisions in this

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Chapter. This justification to be provided in the required Design Verification Statement.

A1.2 Subdivisions must demonstrate consistency with the following residential density targets in relation to the ILP:

- Large **Lot** Residential (1,000m²+ lots): less than or equal to 10 **dwelling**s per hectare.
- Standard **Lot** Residential (500-999m² lots): 11-20 **dwelling**s per hectare.
- Small **Lot** Residential and Medium Density / Integrated Housing (300-499m² **lots**): 21-33 **dwelling**s per hectare.

A1.3 Roads are utilised to provide buffers to significant remnant vegetation and riparian areas.

Note: Density is measured exclusive of **roads**.

Note: Development under the high voltage power line easement is restricted. Early discussions with Endeavour Energy regarding underground trenching and alternative infrastructure/ easement arrangements is encouraged.

8.2 Staging

The specific **objectives** are to:

- i. Recognise development of the URA will occur progressively over several years and that early stages have the potential to influence long term outcomes for the area.
- ii. Ensure the development of the URA is appropriately sequenced and enables efficient, orderly release of residential land, business land and essential infrastructure.
- iii. Supply a coordinated and managed open space network delivered in a timely manner with development at each stage.
- iv. Provide for reasonable flexibility in development staging where appropriate.

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- v. Mitigate against adverse impacts on the community and environment during and following development.

Performance Criteria	Acceptable Solutions
P2 Development is staged to enable orderly development and provision of necessary infrastructure.	A2.1 The staging of the URA is undertaken in accordance with Figure 4 and development and infrastructure are delivered in an orderly manner ensuring the needs of the community are appropriately met. A2.2 Variations to the staging plan shown in Figure 4 (including substages and concurrent delivery of stages) will be considered if the orderly delivery of the overall development and associated infrastructure is not compromised and the community is not unreasonably impacted. Where alternative staging is proposed it must demonstrate: • Sufficient utility services and infrastructure (including reticulated water, sewage, electricity, gas, stormwater, telecommunications, road, pedestrian, cyclist and community) is or will be made available to service the proposed development prior to its delivery. • The design of the infrastructure takes into account demands generated by projected growth associated with future development stages. • Contiguous vehicular access to an existing street network will be provided at each stage of development. • Waste vehicles can safely and efficiently service each stage of development. • Adequate evacuation routes for bushfire and flooding will be

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provided at each stage of development.

- Contiguous active transport connections to open space and collector roads will be provided at each stage of development.
- Adverse drainage/stormwater and landform impacts will be avoided in respect of nearby/neighbouring properties and the public realm.
- An appropriate quantum and type of open space will be delivered to support the needs of the community at each stage of development in accordance with the Shoalhaven Community Infrastructure Strategic Plan.
- Development will not excessively or unreasonably impact on amenity or the activities of the community including residents, businesses and visitors to the area.

Note: To ensure access to residential properties is provided in the early stages of development, Council may consent to the construction and operation of temporary access roads. Temporary access arrangements must comply with Council's Engineering Specifications. Temporary turning heads may be required to facilitate waste collection and must be sealed.

- A2.3 To the extent that it is practical, early development in the URA is to consider the layout, orientation and scale of future stages of development and whether the proposed development cohesively integrates with and complements these stages. Council may require the applicant to

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submit concept plans showing how the proposed development would integrate with potential future stages of development on the land or on adjoining land.

Note: Early coordination with adjacent sub-stages/owners regarding infrastructure delivery is encouraged.

CL25.319 - Attachment 1

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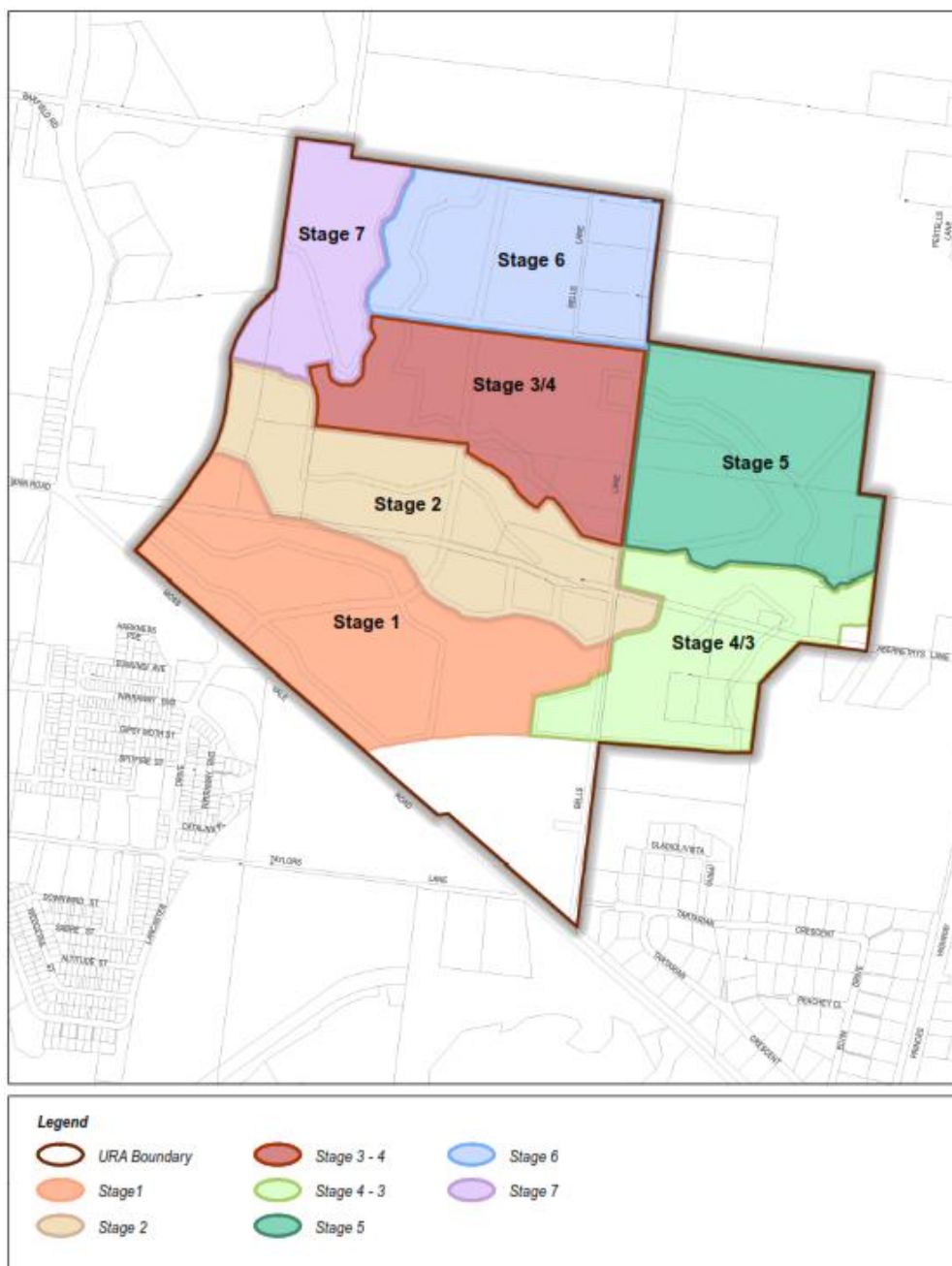


Figure 4: Indicative Staging Plan

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8.3 Aboriginal Cultural Heritage

The specific **objectives** are to:

- i. Recognise Aboriginal people as the First Nations' People of Australia and traditional custodians of the land.
- ii. Conserve Aboriginal objects and Aboriginal places of heritage significance.
- iii. Minimise impacts of development on Aboriginal cultural heritage.
- iv. Celebrate Aboriginal culture and language and recognise and reflect Aboriginal connection to Country.

Mandatory Controls

- 1) Subdivision applications are to be accompanied by an Aboriginal Cultural Heritage Assessment (ACHA), prepared in respect of all proposed impacts (inclusive of riparian corridor enhancement works). The ACHA must be undertaken by an archaeologist in accordance with the current State government guidelines, policies and codes of practice including in regard to consultation.

Performance Criteria	Acceptable Solution
P3 Aboriginal cultural heritage is protected, respected and celebrated.	A3.1 Aboriginal Cultural Heritage is considered and managed in accordance with Shoalhaven DCP Chapter 2: General and Environmental Considerations. A3.2 Subdivision layout, the design of the public domain areas and the design of the Village Centre incorporate the NSW Government's Connecting with Country Framework as part of the design approach, drawing on ACHA findings and developed in consultation with relevant Aboriginal stakeholders. This includes (but is not limited to) the design of wayfinding signage and interpretive elements such as signage, art, furniture and facilities. Note: Clause 5.10(8) of Shoalhaven Local Environmental Plan 2014 outlines the consent requirements for carrying out development in an Aboriginal place of heritage significance. Note: Relevant Aboriginal stakeholders include Traditional Owners, Registered

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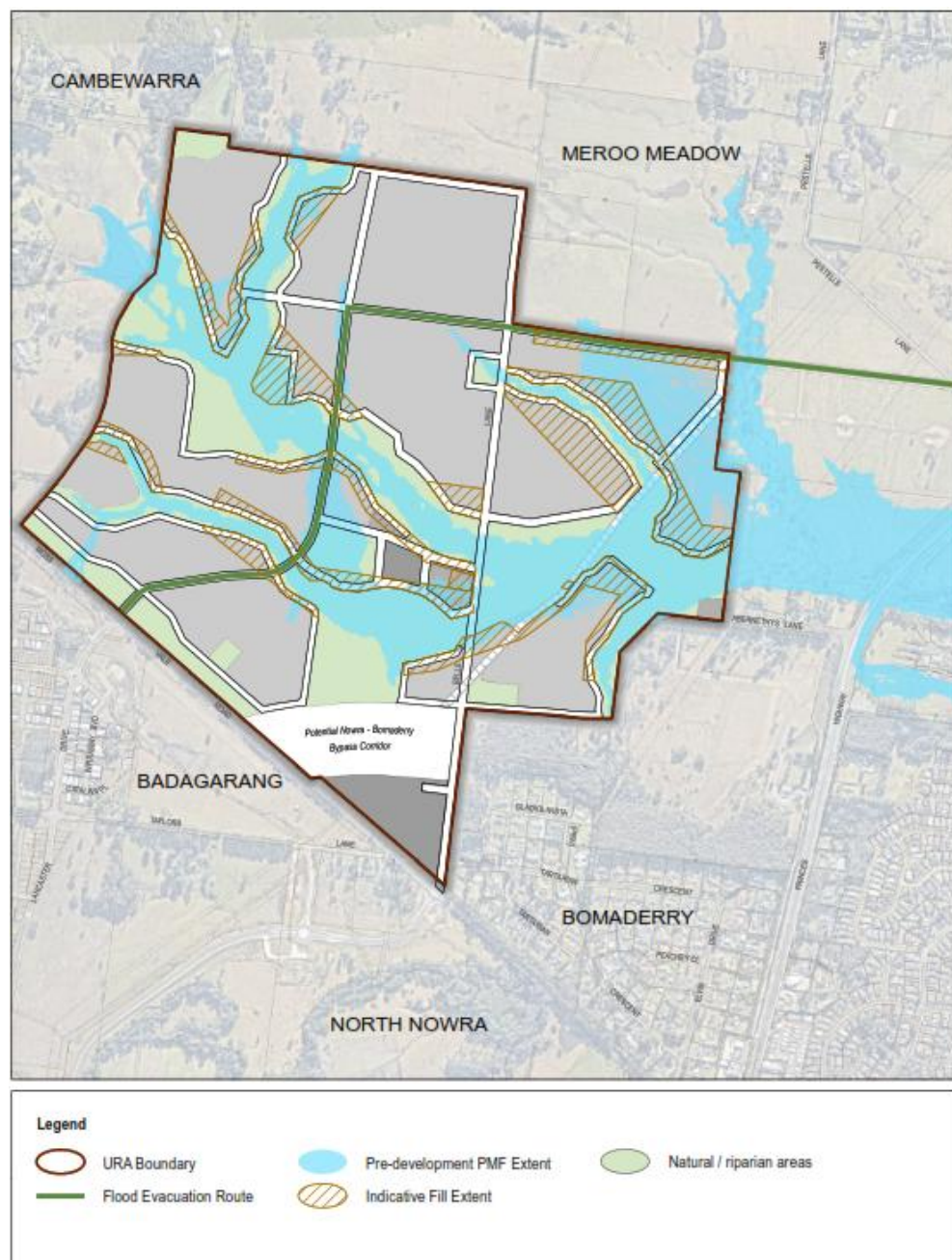
	Owners, Native Title/Land Rights claimants, Local Aboriginal Land Councils, and relevant government agencies. Note: An Aboriginal Heritage Impact Permit may be required subject to the findings of any Aboriginal Cultural Heritage Assessment. Note: Consultation with a suitably qualified heritage professional or Aboriginal cultural heritage profession may be required.
P4 Place names incorporate local Aboriginal language to enhance and strengthen the cultural connection to place.	A4.1 New public spaces, places and roads give preference to the use of local Aboriginal language for naming purposes. A4.2 For Aboriginal naming, the NSW Geographical Names Board, Traditional Custodians and local language subject matter experts are consulted.

8.4 Managing Flood Risk

Parts of the URA are currently exposed to high hazard flash flooding from Abernethys Creek and tributaries. The nature of flooding would adversely impact efficient evacuation and safe occupation of flood prone land during flood events, making both unviable risk management strategies. To reduce the risk of flooding on future **development**, filling is required to a level at or above the Probable Maximum Flood (PMF) event.

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Figure 5 identifies the current PMF extent and the indicative area that is required to be filled. Once filling in the locations indicated on **Figure 5** has occurred, flow routes will be altered and the PMF extent in future **development** areas will be reduced.

Flood modelling has been undertaken to investigate any potential flood impacts and risk implications associated with the required filling. This modelling confirmed the required filling would result in no adverse flood impacts on downstream communities.

The existing road network servicing the URA, including the Princes Highway, is at risk of inundation from various flood events. Evacuation of the URA may be necessary for large floods events; alternatively, residents may need to remain-in-place for the duration of any isolation resulting from flooding of roads. An evacuation route will be provided from the release area using the Collector Road network connecting Moss Vale Road and Pestells Lane (identified in **Figure 5**).

The site is in the South East Zone of the NSW State Emergency Service (SES). Council will work with the NSW SES to include evacuation requirements into the Local Flood Plan.

The specific **objectives** are to:

- i. Ensure **development** on flood prone land is consistent with the NSW Flood Prone Land Policy (2023), the NSW Flood Risk Management Manual (2023), and the Flood Risk Management Toolkit (2023) (or any subsequent versions).
- ii. Minimise the flood risk to life and property, including impacts to downstream properties, associated with the use of land considering the full range of flooding.
- iii. Enable key community services and infrastructure that respond to flood events to function during flooding.
- iv. Allow **development** on land that is compatible with the flood function and behaviour of the land, taking into account projected changes as a result of climate change.
- v. Consider areas within the floodplain for amenity and recreation use where compatible with flood function and flood risk.
- vi. Avoid adverse or cumulative impacts on flood behaviour and the environment.
- vii. Enable the safe occupation and efficient evacuation of people in the event of a flood.

Mandatory Controls

- 1) The finished level of all lots and roads must be at or above the Flood Planning Level (based on 0.5m freeboard above the ARR1987 1% AEP peak flood level) or Probable Maximum Flood Level (PMF) level, whichever is higher, including increases in rainfall intensities from climate change impacts in accordance with the latest release of Australian Rainfall and Runoff guidelines using the SSP3-7.0 projections.
- 2) Fill must not extend into the riparian corridors of Abernathy's Creek and its tributaries and should generally be consistent with **Figure 5**.
- 3) Subdivision and drainage infrastructure must be provided to ensure no adverse downstream flood impacts. The evacuation route (roads and bridges) shown in **Figure 5** must be constructed at or above the PMF level.

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Performance Criteria	Acceptable Solution
P5 The design and construction of the subdivision including evacuation routes and stormwater drainage infrastructure ensure communities are kept safe from flood impacts.	A5.1 Flood risk is considered and managed in accordance with the Shoalhaven Development Control Plan Chapter G9: Development on Flood Prone Land and the NSW Government's NSW Flood Prone Land Policy, NSW Flood Risk Management Manual and Flood Risk Management Toolkit and any other relevant flood legislation as applicable at the time of lodgement. Note: Flood risk should be considered and managed in accordance with the above documents and any other relevant flood legislation applicable at the time of lodgement of an application for Council's development consent. A5.2 Stormwater detention infrastructure has been provided in accordance with the Moss Vale Road North Integrated Water Cycle Management Strategy (IWCMS) and Contributions Plan. Note: Refer to Clauses 5.21 and 5.22 of SLEP 2014 which set out requirements for flood planning and special flood considerations.
P6 Stormwater treatment and detention infrastructure is protected from unacceptable flood damage (i.e. protected from more frequent flood events, but not all flood events).	A6.1 Stormwater treatment and detention infrastructure constructed adjacent to waterways must be installed above the 1% AEP flood level as identified using ARR1987 design parameters.

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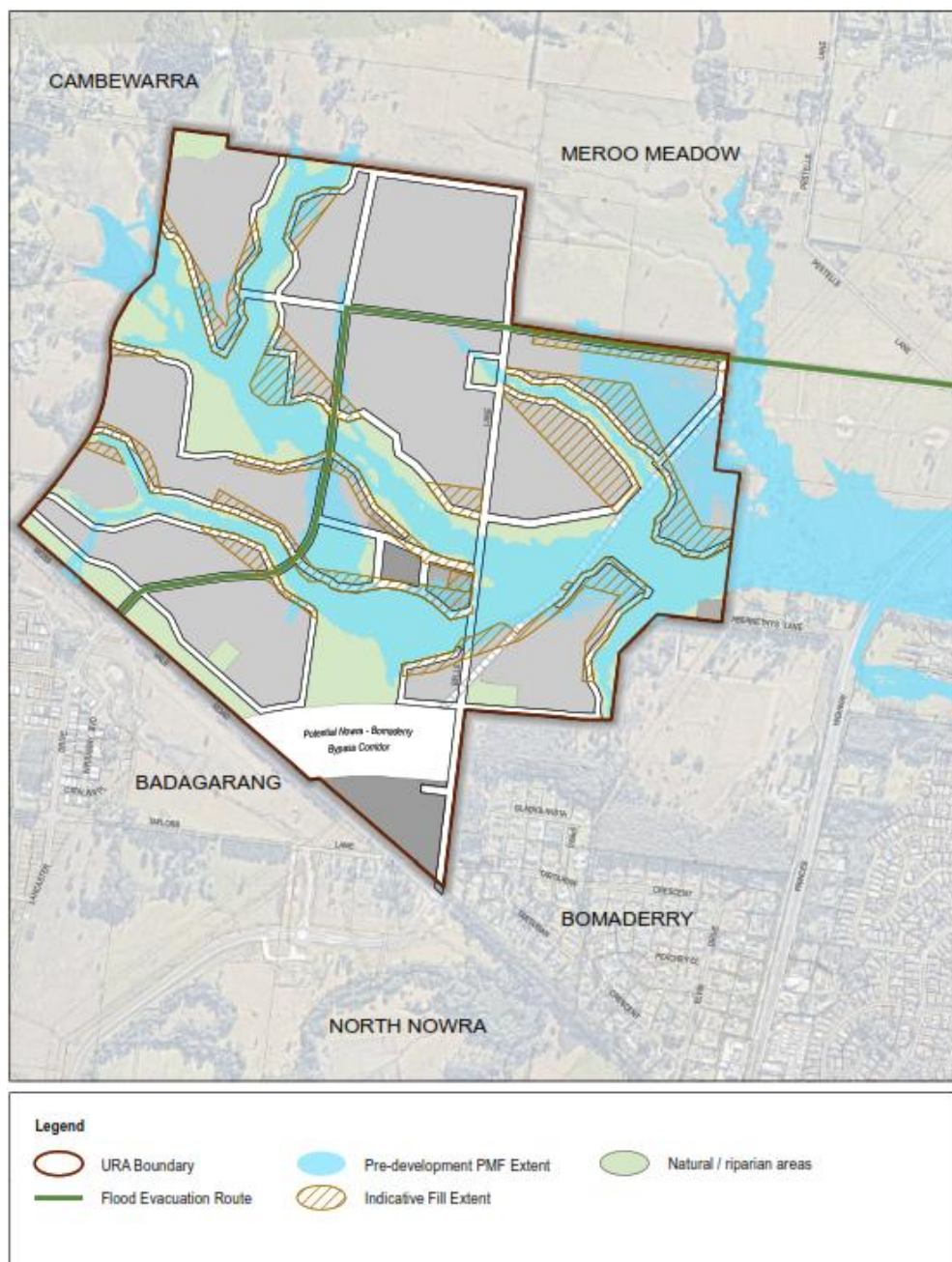


Figure 5: Extent of Flooding and Indicative Area of Fill and Flood Evacuation Route

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8.5 Stormwater Management

The objectives are to:

- i. Manage stormwater flow paths and systems to ensure development does not increase flood risk elsewhere or adversely impact public safety, property, and the environment.
- ii. Minimise any impacts on water quality, natural watercourses, and associated ecosystems during rainfall events.
- iii. Incorporate Water Sensitive Urban Design measures into the subdivision layout design in an aesthetic and efficient manner that also considers life-cycle costs.
- iv. Ensure that climate change impacts on rainfall intensities are considered when designing stormwater infrastructure.

Mandatory Controls:

- 1) Subdivision applications are to be accompanied by an Integrated Water Cycle Management Strategy (IWCMS), developed in accordance with the Moss Vale Road North IWCMS (March, 2022).

Note: Refer to the Engineering Design Specifications and the following chapters of the Development Control Plan as appropriate:

- Chapter G2: Sustainable Stormwater Management & Erosion / Sediment Control, including Supporting Document 1.
- Chapter G11: Subdivision.

Performance Criteria	Acceptable Solution
P7 Stormwater flows and quality is managed using Water Sensitive Urban Design (WSUD) principles.	A7.1 Stormwater management infrastructure is to be designed and implemented within the URA boundaries.
P8 Stormwater assets are designed to enhance public amenity, provide efficient maintenance, ensuring ongoing reduction of stormwater pollutants and consider life-cycle costs.	A8.1 Stormwater treatment and detention is provided in a combined end-of-line device. A8.2 Stormwater treatment devices (pre-treatment and secondary devices) shall be provided in accordance with the Moss Vale Road North IWCMS (March, 2022).

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	A8.3 Stormwater detention is to be provided on a precinct scale. A maximum of 2kL rainwater tanks per residential lots can contribute towards detention requirements. A8.4 A2.4 The footprint of proposed stormwater devices needs to adequately consider maintenance access requirements and safe batters to ensure sufficient land is provided. ○ Batter slopes steeper than 1:4, including vertical retaining walls, are not permitted. ○ Where ponding depth exceeds 300mm, batter slopes are required to be 1:6 or flatter. A8.5 Land must be made available for decanting in accordance with the <i>Water Management and Disposal requirements of the Guidelines for the Maintenance of Stormwater Treatment Measures</i>. A8.6 A safety in design assessment prepared in accordance with the Work Health and Safety Act 2011 must be provided to Council with the design documentation. A8.7 Stormwater treatment devices must not be subject to backwater effects. A8.8 WSUD assets shall be designed by a suitably qualified Landscape Architect, consider WSUD co-benefits, and Landscape Plans provided to Council with the design documentation.
P9 Manage stormwater flow as a result of rainfall events to minimise risk of flooding to residential properties.	A9.1 The design of stormwater systems is to consider increase in rainfall intensities from climate change impacts, in accordance with the latest release of Australian Rainfall and Runoff guidelines using the SSP3-7.0 projections.

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	A9.2 Stormwater infrastructure is required to manage stormwater runoff from upslope areas around the URA to achieve mandatory control 1) Section 8.4 Managing Flood Risk. A9.3 Stormwater infrastructure shall be designed in accordance with ARR2019 Guidelines.
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8.6 Bushfire Considerations

The MVRN URA is characterised as **bush fire prone land** and this risk has been carefully considered through the planning process for the URA.

The subdivision of land within the URA must comply with *Planning for Bush Fire Protection 2019* (PBP), especially (not exclusively):

- Provision of **asset protection zones (APZs)** to comply with Table A1.12.2 for residential **development** and Table A1.12.1 of PBP for Special Fire Protection Purpose (SFPP) developments.
- Access is to be provided in accordance with Table 5.3b of PBP which will include, but not limited to, a staging plan that demonstrates more than one access **road** in and out of the development at each subdivision stage (where that stage includes three or more **allotments**).

Note: Residential subdivision on **bush fire prone land** requires an approval from the NSW Rural Fire Service, known as a Bush Fire Safety Authority. Applications for the NSW Rural Fire Service's approval must address the extent to which the subdivision complies with Planning for Bushfire Protection, including the preparation of a bushfire assessment. For full requirements, refer to Appendix 2 of PBP *Submission Requirements, Performance based Solutions, and Bush Fire Design Briefs*.

Indicative **APZ** requirements have been established based on residential **development** and potential future bushfire fuel loads (**Figure 6**). Greater **APZs** will be required for Special Fire Protection Purpose developments. **APZs** may increase or decrease depending on the **development** outcomes of the bushfire assessments that will be required at the subdivision stage.

Note: Asset protection zones along Riparian and Vegetated Buffer Streets are to be located within the road reserve where

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possible (except where adjacent to the large lot areas). The entire road reserve should provide the APZ. The verge (riparian and buffer side) is to be widened as required*. Where there is a transition between APZ widths, a smooth transition is preferable (i.e., not stepped).

Note: Short-fire run modelling results endorsed by the NSW Rural Fire Service should inform reduced APZs.

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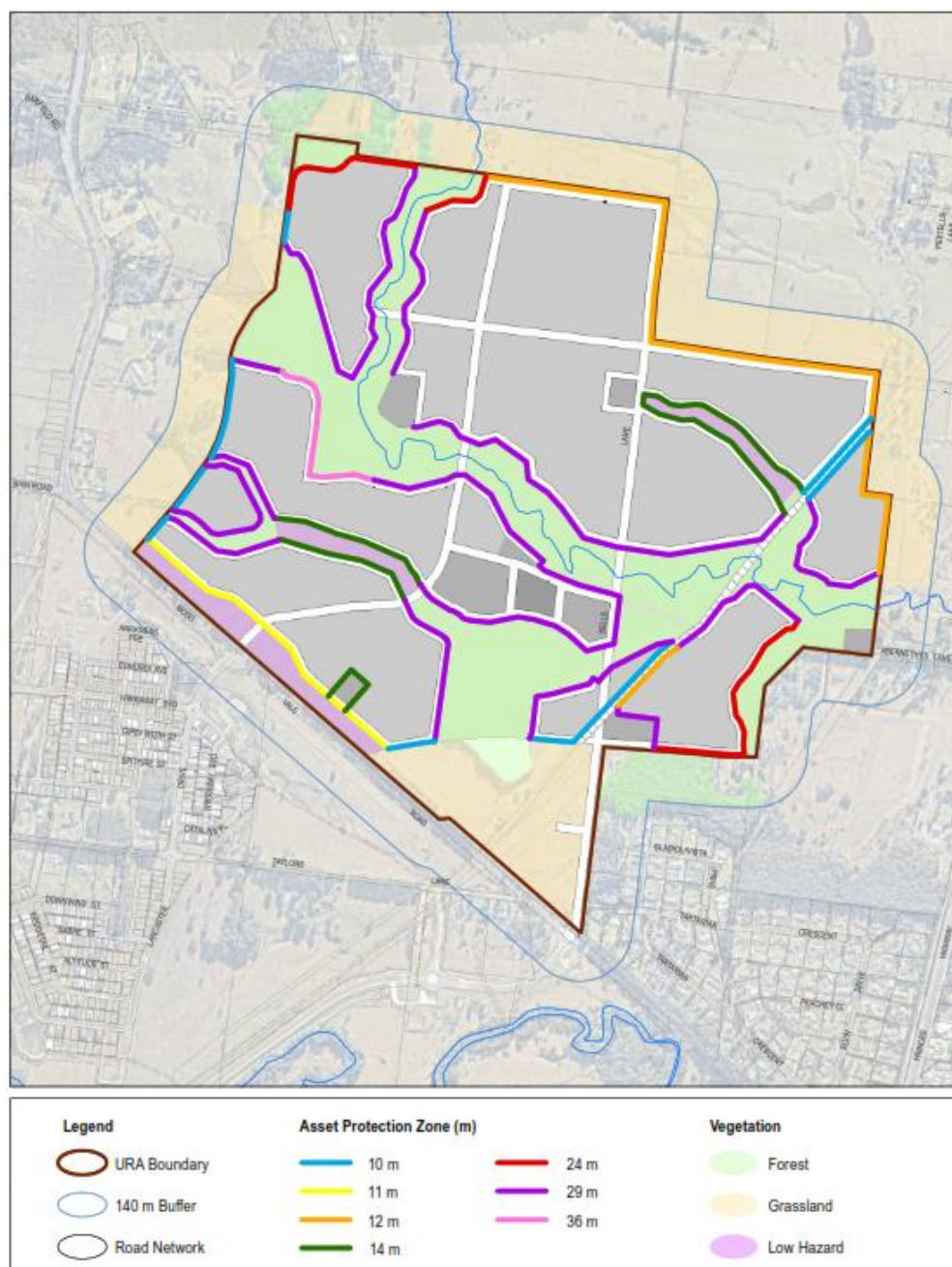


Figure 6: Bushfire Considerations – Indicative Asset Protection Zones

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8.7 Managing Natural Resources and Environmental Heritage

The specific **objectives** are to:

- i. Achieve a high standard of environmental performance and management of natural assets and environmental heritage.
- ii. Protect and enhance **remnant vegetation** through incorporation within the open space and **stormwater** network.
- iii. Retain the maximum number of established **trees** as possible in the public domain within the URA.
- iv. Mitigate the impacts of **development** on water quality and quantity.

Performance Criteria	Acceptable Solutions
P10 Significant and remnant vegetation and habitat for threatened species is retained and protected.	A10.1 Significant and remnant vegetation (including native vegetation) within the public domain, including in open space areas, is retained and opportunities for enhancement are included. Note: Threatened species have been identified in this URA. A comprehensive flora and fauna assessment is to be prepared by a suitably qualified and experienced person and is to include an analysis of constraints and opportunities and identify/ map areas for rehabilitation. Refer to Chapter G5: Biodiversity Impact Assessment of this Development Control Plan for further information. A Biodiversity Development Assessment Report (BDAR) under the Biodiversity Conservation Act 2016 may be required at development application stage. An arborist report may be required to consider any trees for removal for risk and safe useful life expectance (SULE). A10.2 Hollow bearing trees are to be retained except where tree removal is required for safety reasons or to facilitate residential subdivision or fill

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	for flood management purposes. Where removal is required, the trunks and large limbs (>20cm diameter) are to be re-used as coarse woody debris in the riparian C2 Environmental Conservation zone in locations where they are unlikely to be washed downstream.
	Note: An arborist assessment may be required to identify any unsound trees that require removal. Conditions of consent may be imposed regarding the removal of hollow bearing trees, including but not limited to fauna protection measures such as hollow inspections pre and post felling, soft felling and ecologist presence during felling.
	A10.3 Impact mitigation and management measures shall be proposed to protect threatened species, including, but not limited to, bats.
P11 Riparian corridors are protected and improved to:	A11.1 Continuous riparian zones are provided along Abernethy's Creek and other unnamed tributary creeks.
• Improve water quality and riparian vegetation. • Improve ecological health and integrity. • Maintain and enhance habitat values. Note: The riparian corridors are linear tracts of land associated with the Shoalhaven River drainage system. They are important for maintaining biodiversity, water quality and bank stability. They are a significant component of the Nowra-Bomaderry conservation strategy and represent both constraints and opportunities to urban development.	Note: It is anticipated that the riparian corridor will be dedicated to Council and managed as one continuous natural area.
	A11.2 Each development application that includes the subdivision of land zoned C2 Environmental Conservation must be accompanied by a 5-year Vegetation Management Plan (VMP) that has been prepared in accordance with Supporting Document 3.
	A11.3 Flat metal grass edging is required to separate turfed areas and riparian vegetated areas along Riparian Streets.
	A11.4 Fencing within riparian corridors shall be minimised and is not permitted across watercourses . Where fencing

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	is required for safety purposes, the design must allow terrestrial and aquatic fauna to pass through.
	A11.5 Waterway crossings are to be designed in accordance with NSW Department of Primary Industries Fish Passage Requirements for Waterway Crossings (see the Council and Developer Toolkit for more information).
P12 Elements of environmental heritage are incorporated within open space areas to ensure their protection	A12.1 Subdivision layout, the design of the public domain areas and the design of the Village Centre incorporate identified environmental heritage. This includes (but is not limited to) wayfinding signage and interpretive elements such as signage, art, furniture and facilities.

8.8 Landscape Strategy

The specific [objectives](#) are to:

- i. Achieve a landscape setting to balance the built form through well planted streets, open spaces, [treed](#) backdrops and [lot](#) sizes that provide opportunities for planting in [private open space](#) areas.
- ii. Protect, maintain and enhance areas containing environmental heritage, [remnant vegetation](#) and established [trees](#).
- iii. Enhance both the public and private amenity within the URA.
- iv. Contribute to the overall [water sensitive urban design](#) approach within the URA.
- v. Protect the landscape and environmental values of the URA.
- vi. Establish a vegetated buffer adjacent to Moss Vale Road to manage acoustic impacts on dwellings within the URA and the scenic values associated with the existing vegetation on Moss Vale Road.

Performance Criteria	Acceptable Solutions
P13 Landscaping is provided to complement and soften the built form and surrounding natural landscape and provide high levels of amenity.	A13.1 A landscape strategy, prepared by a suitably qualified and experienced Landscape Architect, is submitted at the subdivision DA stage consistent with: Supporting Document 2: Landscape Specifications; and

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- [Chapter G3: Landscaping Design Guidelines](#) of this [Development Control Plan](#); and
- [Chapter G11: Subdivision](#); and
- [Shoalhaven City Council's Community Infrastructure Strategic Plan](#).

As a minimum, the landscape strategy is to include:

- A [Landscape Plan](#).
- Entry treatments that support way finding and sense of place and provide an inviting, high amenity gateway to the precinct (only for stages that include entry from Moss Vale Road, including Bells Lane).
- Extensive landscaping and street [tree](#) planting that incorporates deep rooted canopy [trees](#) as per Supporting Document 2.
- Protection of [remnant vegetation](#) and established [trees](#) in the public domain.
- Avenue [tree](#) planting along the [collector road](#) system.
- Establishment of a street lighting and furniture palette consistent with Supporting Document 2.
- Inclusion of any relevant signage detailing local history, Aboriginal cultural values, environmental education themes and the like.
- Deep soil planting to enable a substantial [tree](#) cover to be created over time.
- Detail of [vegetation](#) (low growing shrubs and ground covers only) within the electricity easement area which must not exceed 3m.

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		• Removal of existing noxious and environmental weed species. • Rehabilitation of C2 Environmental Conservation zones in accordance with the Vegetation Management Plan for the land.
P14	Landscaping works are delivered in a timely manner.	A14.1 Street tree planting is to be implemented at the subdivision stage to ensure plantings are visually consistent in height, spread and form across each stage of the development. Note: A condition requiring a bond for new street trees may be imposed by Council for payment prior to issue of a subdivision certificate. This will defer the planting of street trees until 80% of dwellings in a subdivision stage have received Occupation Certificates and 12-month establishment/management period.
P15	A vegetated buffer: • Provides a visual and acoustic buffer. • Rehabilitates and regenerates natural vegetation via a VMP prepared by a suitably qualified ecologist/restoration contractor. • Minimises chance of vehicle strike along Moss Vale Road.	A15.1 A 45-75m vegetated buffer is to be provided along Moss Vale Road (refer to Figure 7 and the ILP at Figure 2) and is to include: • Rehabilitation of native vegetation via a VMP. The VMP must include natural regeneration occurring on the site, as well as revegetation (including multi-strata and canopy species) of any areas as required. • A fauna fence along Moss Vale Road to minimise chance of vehicle strike. Note: It is anticipated that the vegetated buffer will be dedicated to Council. The VMP may be an addendum to any riparian VMP.

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Perimeter road reserves may encroach into the Vegetated Buffer (as a permissible use in the C3 Environmental Management zone) provided related performance criteria are still achieved.

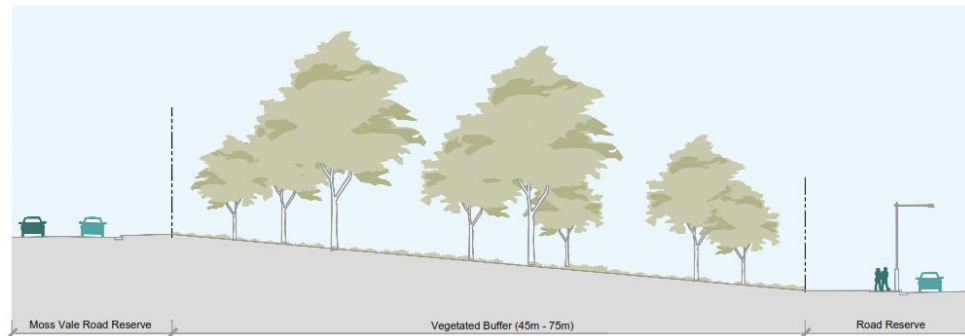


Figure 7: Vegetated Buffer Typical Section

8.9 Open Space System

The specific **objectives** are to:

- i. Provide future residents of all ages, abilities and backgrounds access to high quality, high amenity open space areas catering for a range of passive and active recreational, social and cultural activities.
- ii. Ensure the network of open spaces within the URA are accessible and incorporate safe and convenient pedestrian and cycle routes.
- iii. Provide multi-functional open space areas recognising and responding to the different functions, characteristics and topographical qualities of the area.
- iv. Incorporate areas of existing significant natural amenity and environmental value within the open space network.
- v. Ensure the design and embellishment of the open space is of high quality, robust, low maintenance and addresses the vision of the URA and the Shoalhaven City Council's Community Infrastructure Strategic Plan.

Performance Criteria	Acceptable Solutions
P16 Open space areas are of a high amenity, safe, accessible, inclusive, comfortable, well connected, and provide for a diversity of uses (both passive and active) to encourage	A16.1 Open space areas are provided in accordance with Chapter G11: Subdivision of Land and the Shoalhaven Community Infrastructure Strategic Plan (CISP),

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physical movement, activity and social interaction.	including the desired standards of service (quantum, access, characteristics, level of embellishment) specified in the CISP.
A16.2	Open space areas are delivered in accordance with the Indicative Layout Plan shown in Figure 2 (in terms of both quantum and location) and include the overall provision of: • 4.9 ha of public recreation areas (parks), including: ◦ 1 district park (as per the classification framework and provision standards defined in the Shoalhaven CISP). ◦ 4 local parks (as per the classification framework and provision standards defined in the Shoalhaven CISP). • 64 ha of public natural areas (riparian corridors and vegetated buffer) • Linear recreation areas within riparian corridors and along infrastructure easements.
A16.3	Variations to the Indicative Layout Plan shown in Figure 2 may be considered if an equal or better outcome can be demonstrated that ensures at a minimum: • An equal or greater total quantum of public open space is provided. • A minimum of at least 1 district park and 4 local parks. • Diversity of uses, functionality, accessibility, safety and amenity are equal or improved. • Active transport connections to public opens spaces are equal or

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		improved (including in terms of quality, safety and distances).
		• Water sensitive urban design measures and the management of stormwater and floodwater are equal or improved. • Environmental and sustainability outcomes are equal or improved. • Significant remnant vegetation is retained and protected.
	A16.4	All parks can be accessed via the shared use pathway network with bike parking provided within all parks.
	A16.5	Open space embellishment does not compromise revegetation through any Vegetation Management Plan .
		Note: Refer to Supporting Document 2 for plant species and furniture/embellishments suitable for open space areas.
	A16.6	
P17	Open space is delivered in a timely manner	A17.1 Open space is to be provided at final design levels prior to the issuing of subdivision certificates for a development stage or in accordance with a planning agreement for the site.

8.10 Street Network and Hierarchy

The specific **objectives** are to:

- i. Achieve a safe, functional and convenient movement network for private vehicles, public transport, pedestrians and cyclists.
- ii. Provide a high quality, visually attractive, connected and clearly discernible hierarchy of streets within and beyond the URA that is informed by natural features, terrain and **views**. Street types are discernible through variations in carriageway width, pedestrian amenities, street tree planting, and on-street parking.
- iii. Ensure adequate carriageway and verge widths are provided to allow streets to perform their designated functions within the street network and to accommodate essential services and stormwater drainage.
- iv. Promote passive surveillance of publicly accessible areas to increase pedestrian and cyclist safety.

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Mandatory Controls

- 1) The major street network is to be provided in accordance with the Indicative Layout Plan at Error! Reference source not found. and the Street Hierarchy and Network Plan at **Figure 8**. The major Street Network includes Collector Roads, Retail Streets, and Riparian Streets.
- 2) The proposed minor street network, and any variation to the major street network is to be designed to achieve the following principles:
 - A defined street hierarchy and permeable, grid-based street network as per the key development **objectives**.
 - Minimise the number of roads and road crossings in vegetated buffer areas and riparian corridors to ensure minimal roads are established on land zoned for environmental purposes.
 - Walking and cycling is encouraged by ensuring the majority of **allotments** are within 400m walking distance from the **Collector Road** and open space network.
 - Maximised connectivity between residential areas, the village centre, and open space.
 - Take account of topography and accommodate significant and **remnant vegetation**.
 - Optimise **solar access** opportunities for **dwelling**s.
 - Provide frontage to and maximise surveillance of open space and riparian corridors.
 - Provide **views** and **vistas** to key landscape features, including riparian corridors.
 - Maximise the use of **water sensitive urban design** measures.
 - Provide well landscaped, traffic-calming, and connected streets.

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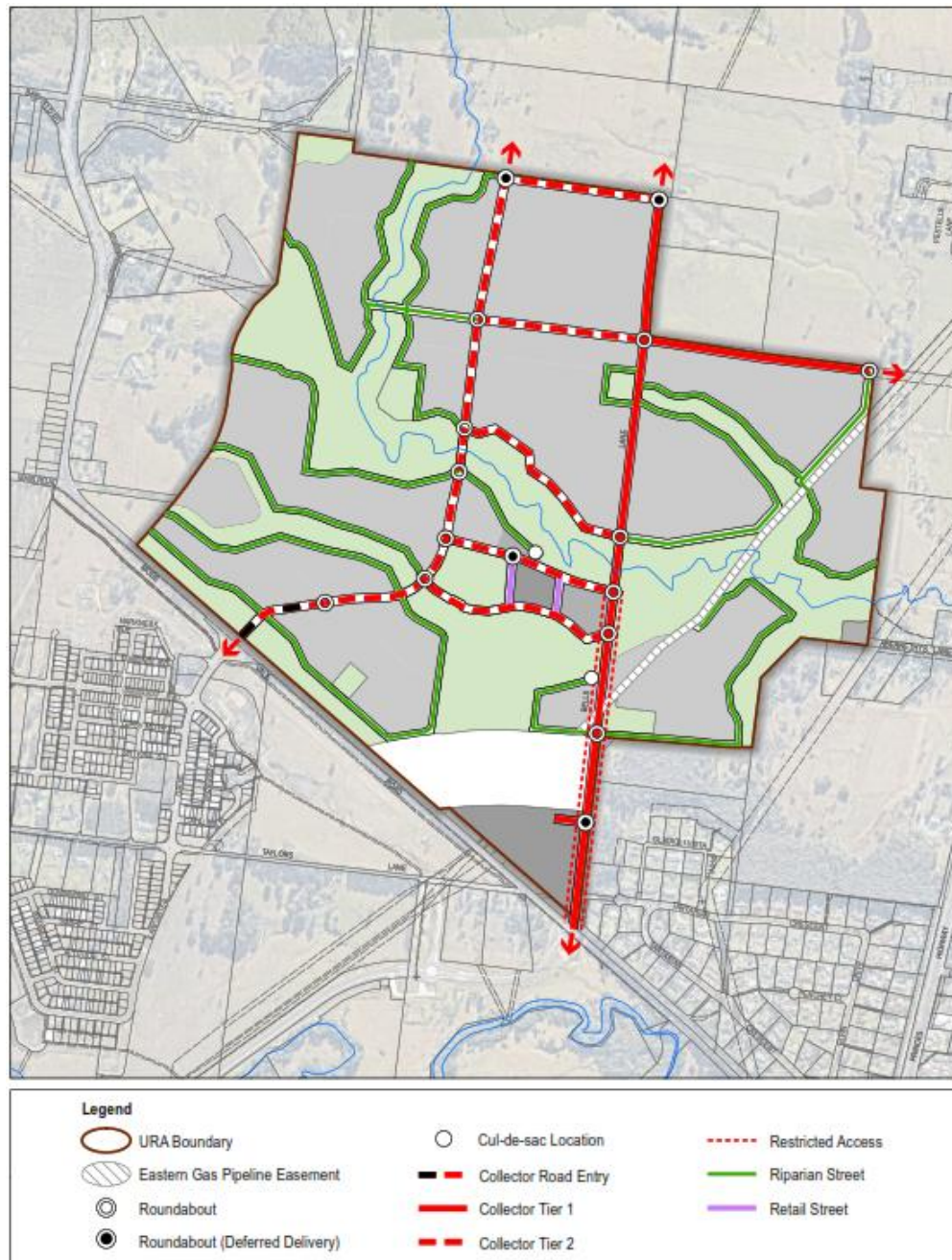


Figure 8: Street Hierarchy and Network Plan

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Note: The location of roundabouts and the length of the road profile Collector Road Entry are indicative only. The final location and length will be determined by the road and intersection designs prepared for the local infrastructure contributions framework.

Note: Existing trees and vegetation along and adjacent to indicative road corridors may need to be removed to facilitate the delivery of planned roads and intersections. These trees and vegetation will be identified in the road designs prepared for the local infrastructure contributions framework.

- 3) Streets are designed in accordance with Chapter G11: Subdivision and [Supporting Document 1: Subdivision Technical Guidelines](#), unless specifically varied in this section. [Carriageway](#) widths are measured from invert to invert.

Note: Construction of [roads](#) is to be in accordance with the requirements of Chapter G11: Subdivision of Land. Indicative layouts are diagrammatic only and do not represent the minimum widths to true scale.

Note: Indicative parking lanes identified in road profiles are designed to accommodate a range of future uses including parking, on-street active transport, increased vehicle movements etc.

Note: Shared use pathways are located within the verge or adjacent natural areas and open space.

- 4) The Collector [Road](#) network is designed to accommodate buses facilitating future public transport planning and delivery of services.

Note: [Collector Roads](#) (Tier 1 and Tier 2) and Local Streets have been designed to accommodate buses to provide flexibility for future route planning.

The requirements of Transport for NSW's Guidelines for Bus Capable Infrastructure in

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Greenfield Sites must be considered and complied with in any application.

- 5) All streets must incorporate appropriate [road](#) geometry, traffic management, and traffic calming devices to produce a self-enforcing low-speed traffic environment. Appropriate traffic management and traffic calming devices are to be identified at subdivision DA stage. Refer to G11: Subdivision and its Supporting Document 1: Subdivision Technical Guidelines, Austroads Guide to Traffic Management Part 8: Local Street Management, and AS1742.13 for measures which constitute satisfactory traffic management and traffic calming elements to be incorporated into the network.
- 6) Street [trees](#) are required on all streets and are to be placed within the verge. Placement of street [trees](#) will consider underground services, driveways and easements. Street [tree](#) species are to be selected from the relevant street plan list at Supporting Document 2. Street [trees](#) are planted with appropriate root guards to protect underground infrastructure, pathways, kerb and gutters. Street [tree](#) planting is alternated with street lighting.
- 7) Construction of verges provide adequate space for underground service allocation and street [trees](#) as per:
 - For verges between 3-3.6m in width: In accordance with Figure 3 of Chapter [G11: Subdivision - Supporting Document 1: Subdivision Technical Guidelines](#).
 - For verges greater than 3.6m in width: The NSW Streets Opening Coordination Council's [Guide to Codes and Practices for Streets Opening](#).

Note: Where rear laneways are required, underground service allocation is to be provided along the primary street frontage, not the laneway.

The centre line for street [trees](#) is determined as an equal distance from the kerb to the trench for the water service allocation.

If water mains are located under the footpath or hard stand areas, connections and service lines must be installed at the time of water main construction and extended into the property boundary by a minimum 0.5m. Pathcocks are to be raised to surface and incorporated if located in hardstand and footpaths. Early consultation with Shoalhaven Water is encouraged.

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8.10.1 Collector Road (Entry)

Table 2: Minimum Cross-section Widths – Collector Road (Entry)

Verge (m)			Carriageway (m)					Verge (m)			Total Reserve
Offset	Shared Path	Plant	Parking	Lane	Median	Parking	Lane	Plant	Path	Offset	
1	2	1.5	3	3.5	2	3.5	3	1.5	1.5	1.5	24m
4.5			15					4.5			

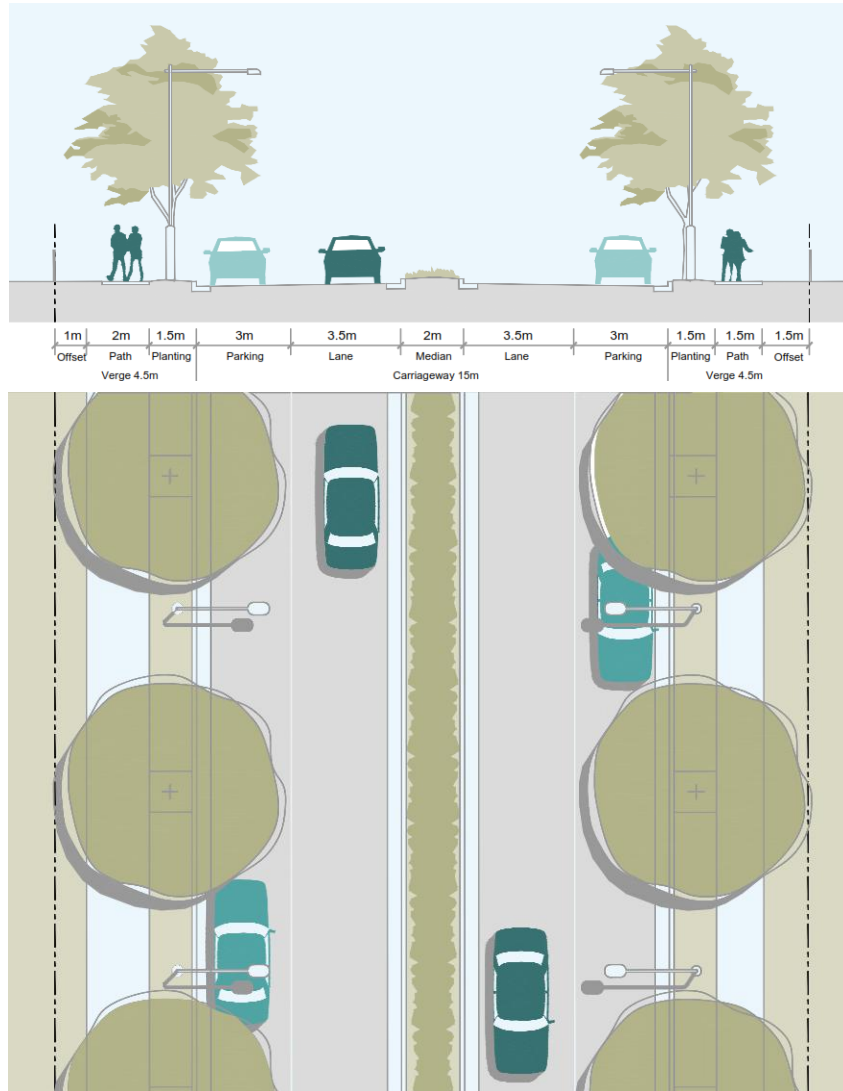


Figure 9: Typical Plan and Section – Collector Road (Entry)

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8.10.2 Collector Road – Tier 2

Table 3: Minimum Cross-section Widths – Collector Road – Tier 2

Verge (m)			Carriageway (m)			Verge (m)			Total Reserve
Offset	Shared Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
1	2	1.5	3	7	3	1.5	1.5	1.5	
4.5			13			4.5			

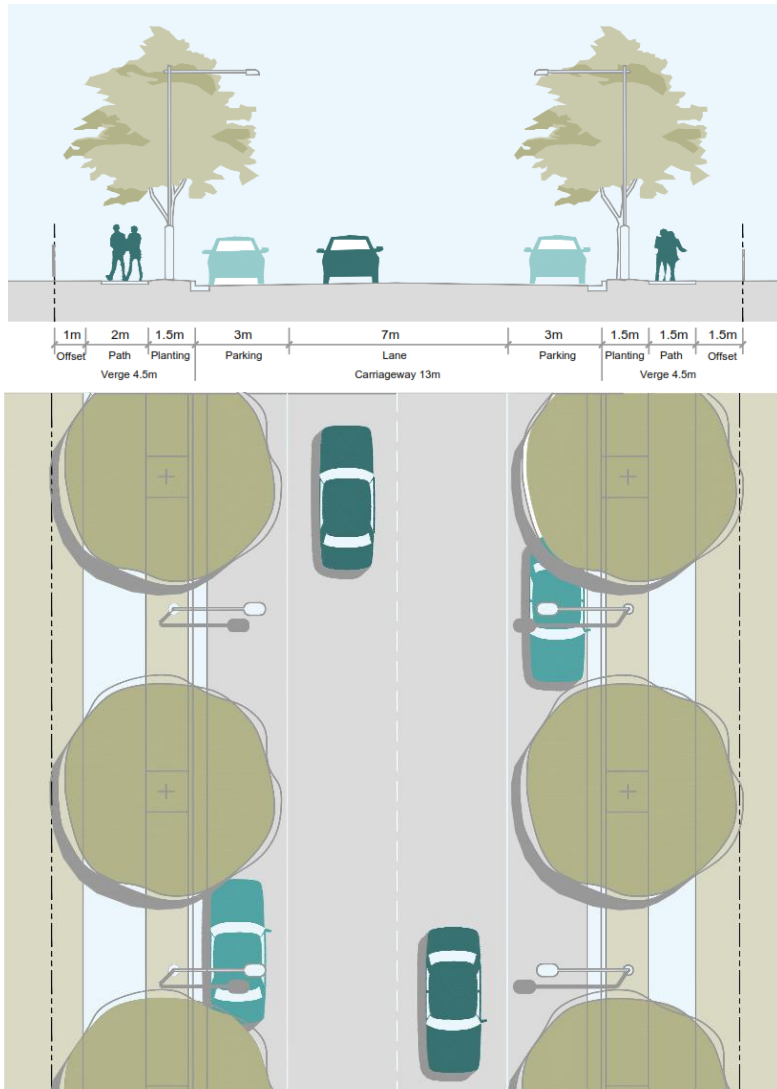


Figure 10: Typical Plan and Section – Collector Road – Tier 2

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8.10.3 Local Street

Table 4: Minimum Cross-section Widths – Local Street

Verge (m)			Carriageway (m)			Verge (m)			Total Reserve
Offset	Shared Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
1	2	2	2.3	7	2.3	2	1.5	1	21.1m
5			11.6			4.5			

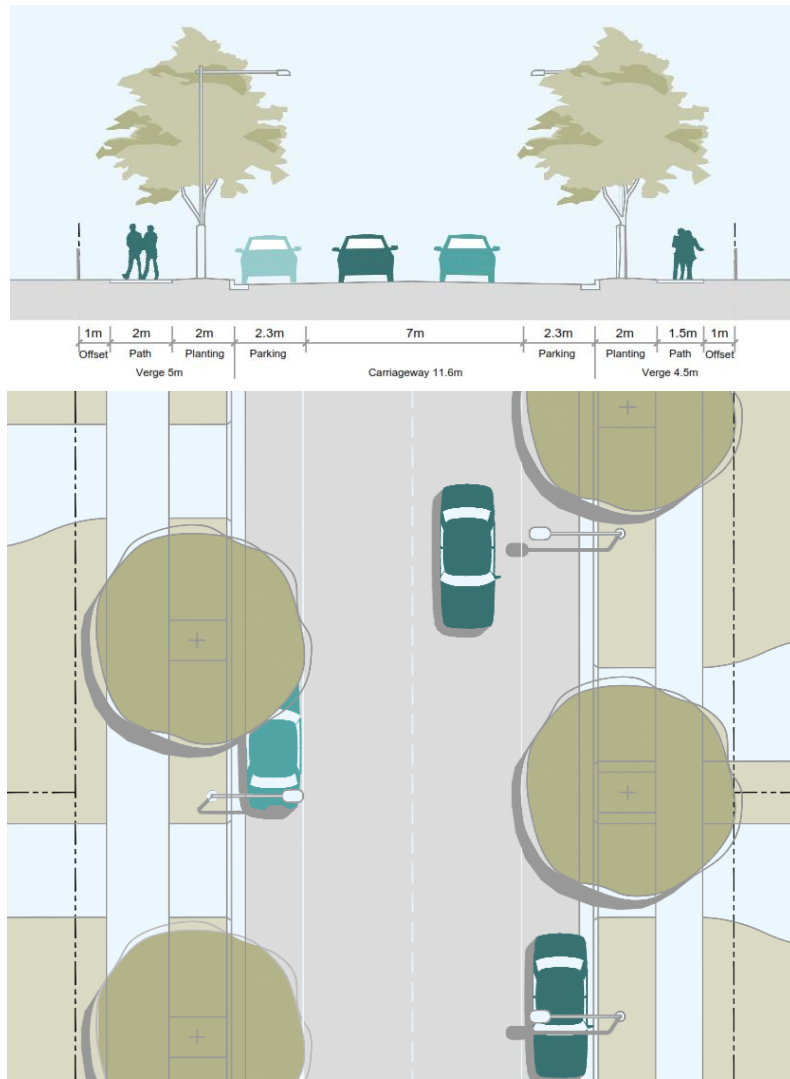


Figure 11: Typical Plan and Section – Local Street

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8.10.4 Retail Streets

Table 5: Minimum Cross-section Widths – Retail Streets

Verge (m)		Carriageway (m)			Verge (m)			Total Reserve
Retail Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
2.8	2	2.3	7	2.3	2	1.8	1	21.2m
4.8		11.6			4.8			
Driveways are not to be provided along sides of retail streets – rear servicing is required.								
Raingardens are encouraged within verge planting areas and between carparking bays								

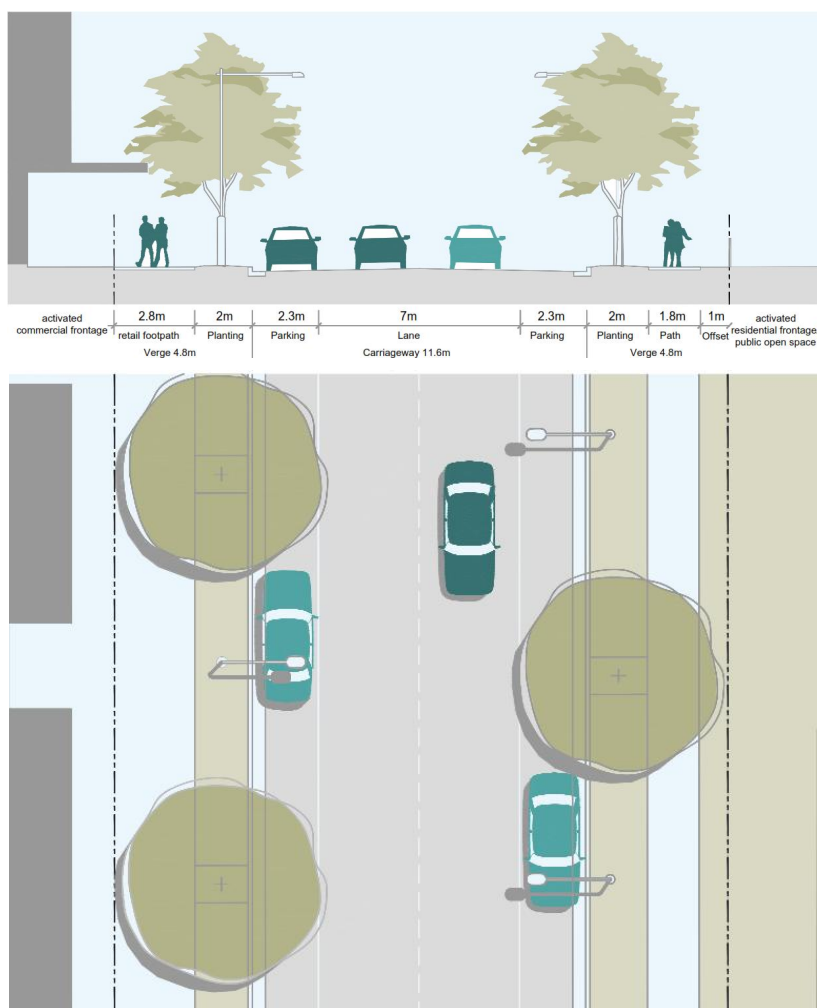


Figure 12: Typical Plan and Section – Retail Streets

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8.10.5 Riparian Street

Table 6: Minimum Cross-section Widths – Riparian Streets

Verge (m)		Carriageway (m)		Verge (m)			Total Reserve
Grass *	Path / Shared Path	Lane	Parking	Plant	Path	Offset	
0 - 17	2	7	3	2	1.5	1	17–36m
2 – 19		10		4.5			

Note: Asset protection zones along Riparian Streets are to be located within the road reserve where possible (except where adjacent to the large lot areas). The entire road reserve should provide for the APZ. The verge (riparian side) is to be widened as required*. Where there is a transition between APZ widths, a smooth transition is preferable (i.e., not stepped). Refer to indicative APZ requirements in **Figure 6**.

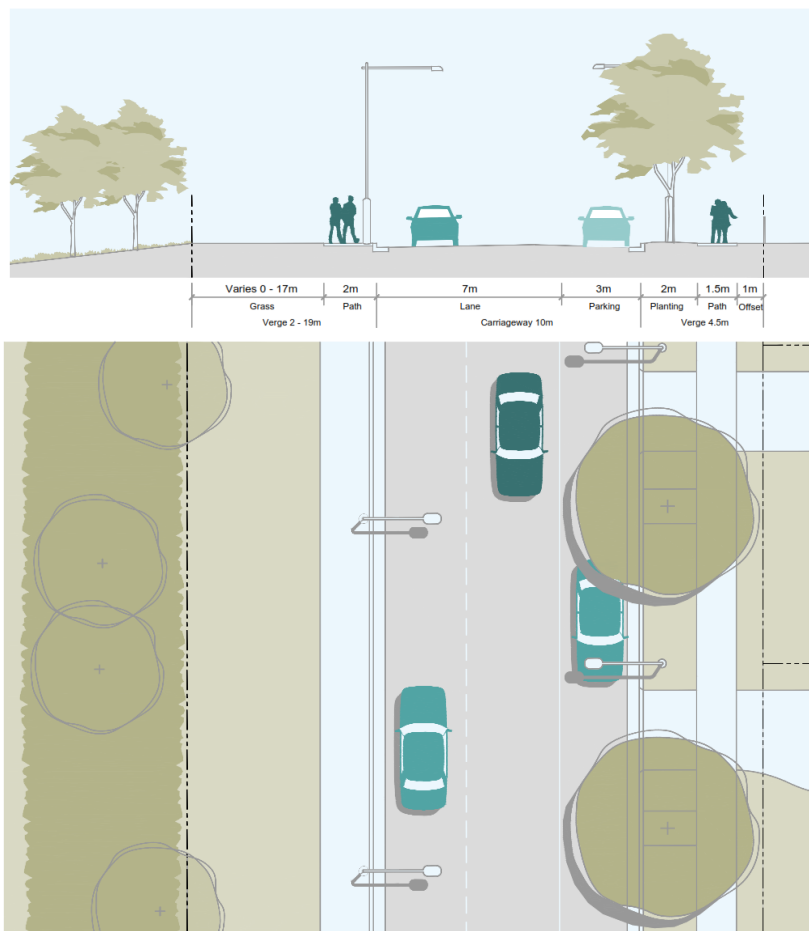


Figure 13: Typical Plan and Section – Riparian Street

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8.10.6 Laneways

The specific **objectives** are to:

- i. Create attractive **primary frontages** by removing garages and driveway crossovers, improving the presentation of **dwelling**s and maximising on street **parking spaces** and street **trees** to the primary frontage.
- ii. Promote housing diversity without compromising amenity, particularly for smaller sized **allotments**.
- iii. Create a slow speed zone that are distinctly different in character and materials to residential streets to reflect the very low volume and frequency of vehicle movements.

Performance Criteria	Acceptable Solutions
P18.1 Laneways are of a size, layout and orientation that encourage low volume and safe use, maximise favourable lot orientations, legibility, passive surveillance, solar access to lots and the laneway and accommodate waste collection. Note: Laneways are secondary frontages providing rear access. They do not: • Act as a primary frontage; • Provide on-street car parking; or • Include footpaths. P18.2 A rear lane network is established to support access and serving of development: • On a restricted access street. • Within the Village Centre. • With a lot size of less than 400m².	A18.1 Where a site is located on a restricted access street, within the Village Centre or the lot size is less than 400m², waste collection and general vehicular access is to occur from a laneway. A rear lane network is to be established. Note: A restriction is to be included on a Section 88B Instrument to restrict driveways on the primary frontage. A18.2 Where an alternative to a rear access to lots less than 400m² is proposed, the development demonstrates that one (1) on-street car parking space with a minimum clear length of 6 metres can be provided directly adjacent to and wholly within the extents of the primary frontage to ensure the proposed driveway crossover does not impact car parking provision, vehicle manoeuvring, and waste collection services in the public domain. A18.3 No more than two sets of continuous laneways are provided, except where they are transected by a Collector Road. A18.4 The residential laneway verge (excluding driveway crossovers) is to be soft landscaped to improve

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	overall amenity and stormwater infiltration.
A18.5	The laneway should generally be straight across the block but may employ subtle bends. Any bends are to be sized for garbage truck movements.
A18.6	A waste collection point for each lot is to be provided which: • Is directly adjacent to the driveway crossover on the laneway. • Is provided as a constructed bay that is a minimum of 1m deep and 2.5m wide. • Is constructed from permeable materials.
A18.7	Laneways incorporate sufficient lighting to meet Crime Prevention Through Environmental Design (CPTED) principles.
	Note: Refer to Chapter 2: General and Environmental Considerations of this Development Control Plan for an overview of CPTED considerations.

8.10.7 Shared Driveways

The specific **objectives** are to:

- Minimise the impact of driveways on the function of main streets, quality of the public domain and pedestrian safety.
- Enable shared driveway access to **lots** fronting restricted access **roads**.
- Provide safe and easy access to garages and on-site parking arrangements.

Performance Criteria	Acceptable Solutions
P19.1 Shared driveways provide access to small allotments to discourage garage dominated streetscapes.	A19.1 Shared driveways are provided for small lots from local streets only.
P19.2 Waste collection points are appropriately sited to facilitate effective collection and avoid adverse impacts on dwelling amenity.	A19.2 Shared driveways provide vehicular access to no more than 4 dwelling s. A19.3 Shared driveways are configured as per Figure 14 below.

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Note: Shared driveways are privately owned and maintained driveways that serve two to four dwellings through a titling arrangement such as a reciprocal right of way or community title subdivision.

- A19.4 Shared driveways have a different construction material to the general road surface.
- A19.5 Lots that are accessed via a shared driveway must have a primary street frontage.
- A19.6 Shared driveways are a maximum of 6m wide.
- A19.7 Shared driveways have a maximum crossover width of 5m.
- A19.8 The location of driveways must consider dwelling design and orientation, distance from intersection, street gully pits and street tree plantings.
- A19.9 Shared driveways must be located a minimum of 10m from splitter islands associated with roundabouts.
- A19.10 Shared driveways are a minimum 0.5m from any drainage facilities on the kerb and gutter.
- A19.11 Shared driveways incorporate soft landscaped areas on either side at a minimum width of 1m, suitable for infiltration.
- A19.12 Waste collection from shared driveways is not permitted. A waste collection point is to be provided which:
 - Is directly adjacent to the shared driveway crossover on the local street.
 - Is provided as a constructed bay.
 - Is a minimum 1m deep and 5.5m wide and must have sufficient unobstructed kerbside frontage to service all dwellings accessed via the shared driveway. The kerbside frontage required per bin is 1m wide.

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Figure 14: Shared Driveway Configuration

8.11 Shared Use Pathway Network

The specific **objectives** are to:

- i. Ensure shared use pathways are part of a comprehensive and connected system which provides connections to the open space network and a variety of routes to destinations within and outside of the URA.
- ii. Encourage residents to walk and ride to access their daily needs and services in the Village Centre.

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Performance Criteria	Acceptable Solutions
P20.1 The shared use pathway network connects to and through the urban area and through to the Village Centre, as well as the riparian and open space networks in accordance with the ILP.	A20.1 Shared use pathways are predominantly located adjacent to the riparian corridor and the outskirts of the URA; adjoining the Collector Roads , Retail Streets and certain Local Streets; and have connections to Moss Vale Road and Local Streets in general accordance with 5 .
P20.2 The shared use pathways are appropriately located to ensure the safety and comfort of users of all abilities.	A20.2 Shared use pathways are located within the verge or adjacent natural areas and open space. Note: The location of shared use pathways in the verge is to avoid any water supply mains.
	A20.3 Shared use pathways are designed to achieve the following minimum width: • Within the verge (excl. Riparian Streets): 2m. • Within the verge (Riparian Streets): 2.5m. • Within the riparian corridors: 2.5-3m.
	A20.4 Shared use pathways, in relation to Riparian Streets, are to be located along the riparian edge and adjacent to the kerb (i.e., no vegetated strip between path and kerb).
	A20.5 Shared use pathways are to be constructed as per Chapter G11: Subdivision of Land.

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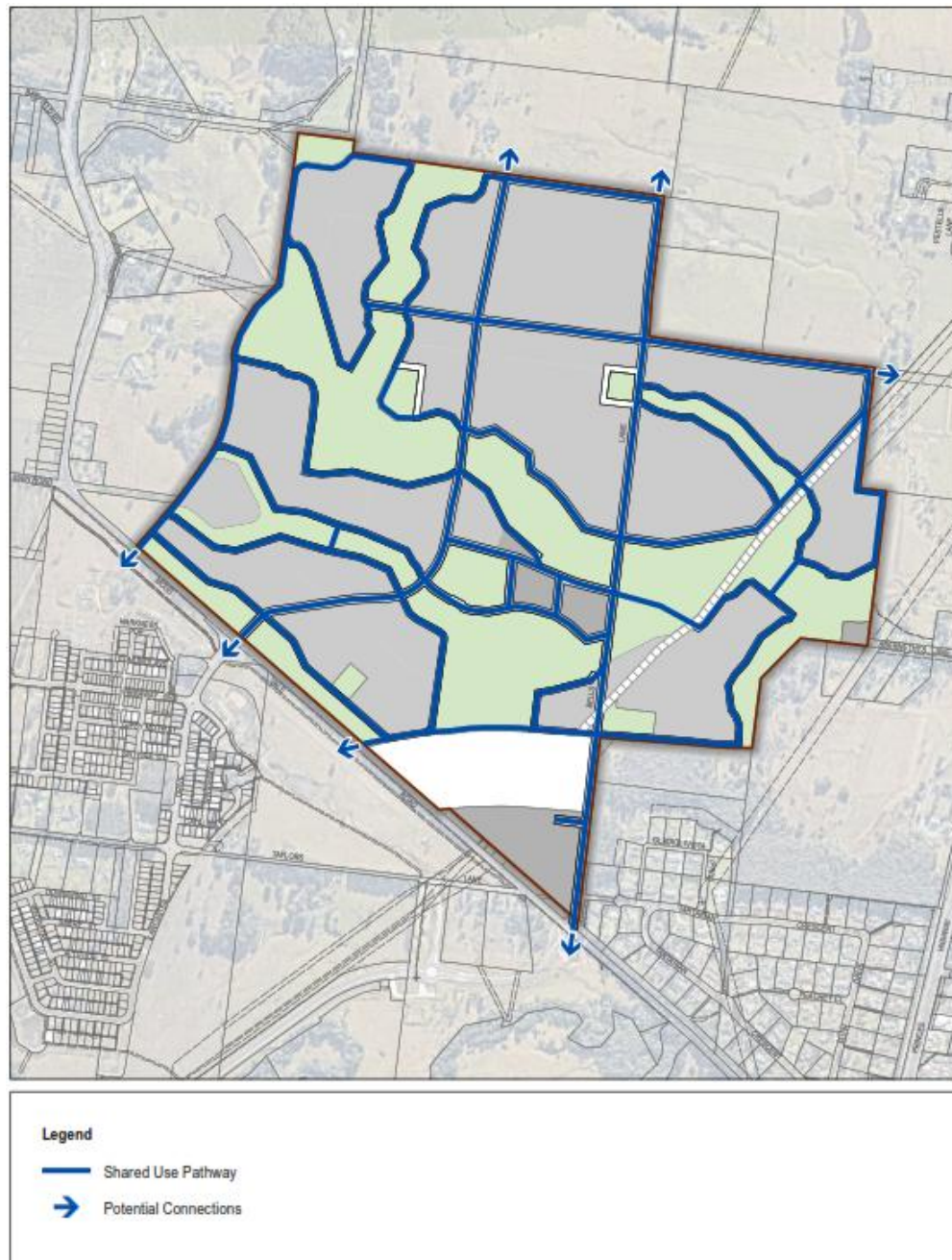


Figure 15: Shared Use Pathway Network

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8.12 Subdivision Design

The specific **objectives** are to:

- i. Create an attractive urban environment to meet the changing needs of the community and offers a wide choice in good quality housing.
- ii. Create a mix of **lot** sizes to provide opportunity for a range of **dwelling** types and sizes to meet housing need.
- iii. Ensure all residential **lots** have a high level of amenity in terms of **solar access**, **views**, outlook and proximity to **public open space**.
- iv. Ensure subdivision layouts respond to the natural environment, topography, the escarpment, and rural **vistas**.
- v. Create a subdivision pattern that facilitates the efficient provision of infrastructure.
- vi. Enhance community interaction, outdoor activity, and positive health outcomes through the provision of attractive and functional streetscapes and public open spaces.

Mandatory Controls

Note: Refer to Clause 4.1H of **SLEP 2014** which sets out certain requirements for the subdivision of small **lots**.

- 1) Subdivision applications are to be accompanied by a Design Verification Statement in support of the application.

Note: Refer to the following guidelines by Heritage NSW as the relevant authority under the *National Parks and Wildlife Act 1974*:

- [Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW.](#)
- [Code of practice for archaeological investigation of Aboriginal objects in New South Wales.](#)
- [Aboriginal cultural heritage consultation requirements for proponents 2010.](#)

- 2) Lot widths are to be relative to the lot area as per **Table 7** below:

Table 7: Lot Width Requirements

Lot Type	Lot size (m ²)	Minimum Width (m)
Small	300 - 399	>8 and <12

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	400 - 499	Equal to or >12 and <15
Standard	500-999	In accordance with Chapter G11: Subdivision of Land
Large	1000+	

- 3) Small **lots** must have varying **lot** widths. No more than three consecutive **lots** shall have the same **lot** width. A minimum variation of 10% of the adjacent **lot** width is required.
- 4) Street blocks are designed to enable permeability. The length and width of street blocks (excluding **road** verges) are as follows:
 - Small and standard **lot** areas are a maximum of 160m x 70m, particularly where rear lane access or shared driveways are located.
 - Large **lot** areas may have larger block sizes to accommodate specific topographic circumstances or rural transitions.
- 5) The subdivision layout provides a level building area on each lot that does not require inter-allotment retaining walls. The location of embankments and building envelopes is shown on the subdivision plan.
- 6) The subdivision layout is designed to optimise **solar access** to **dwellings**. In the case of certain forms of medium density housing and **zero lot line allotments**, preference will be given to an east-west **dwelling** orientation in order to maximise **solar access** along the longest **dwelling** elevation.
- 7) **Lots** less than 400m² must include a restriction as to user on a Section 88B instrument that restricts vehicular access from the primary **road** frontage.
- 8) Lots with an area of between 400m²– 499m² (inclusive) shall have a slope no greater than 5% (1:20).
- 9) **Battle-axe lots** are avoided unless the access handle provides rear access to small **lots**.
- 10) Subdivision applications are to be accompanied by a detailed Landscape Strategy.

Note: Refer to Section 8.7 of this Chapter for Landscape Strategy requirements.

Performance Criteria	Acceptable Solutions
P21 Zero lot line developments are appropriately placed on small lots. Note: At the subdivision stage, a restriction is to be included on a Section 88B Instrument on lots with	A21.1 The location of proposed zero lot lines in accordance with A25.1 and Figure 22 must be demonstrated on the subdivision plan.

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potential zero lot lines, and the adjacent burdened lot, to: • Include a 900mm easement for ongoing maintenance and support of the zero lot line boundary wall. • Exclude Council from any dispute resolution process between the adjoining lots. • Restrict placement of overhanging eaves, gutters or services (rainwater tanks, air conditioning units, hot water units and the like) within the easement.	
P22	Corner allotments are designed to encourage safe vehicular and pedestrian movement. A22.1 Corner lots shall allow for a minimum splay of 2m x 2m to allow for pedestrian and vehicular sight distance (except at the entrance to one-way rear lanes where splays are not required).
P23	Lot layout avoids rear boundaries fronting public spaces. A23.1 Where residential development adjoins public spaces (excluding laneways) the subdivision design ensures the configuration of dwellings or other residential accommodation uses to front the public space. A23.2 Where lots have a frontage to a riparian road rear lane access is encouraged to ensure a high degree of street activation. A23.3 Lots are orientated and aligned to encourage building design that has frontage to riparian corridors and open space.
P24	Subdivision layout enables significant views and vistas to be retained. A24.1 The street layout enables view lines to be established to riparian corridors, open space and woodland areas within the URA, and to escarpment and pastoral landscapes beyond the URA as per Figure 16.

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		A24.2	The subdivision layout considers views into the URA from Moss Vale Road, Abernethys Lane, Bells Lane and other nominated viewpoints.
P25	Subdivision layout manages impacts on existing residential and rural-residential properties proposed to be retained in their current form.	A25.1	The subdivision layout considers opportunities to manage impacts on the privacy, amenity, and access arrangements of existing residential and rural-residential properties.

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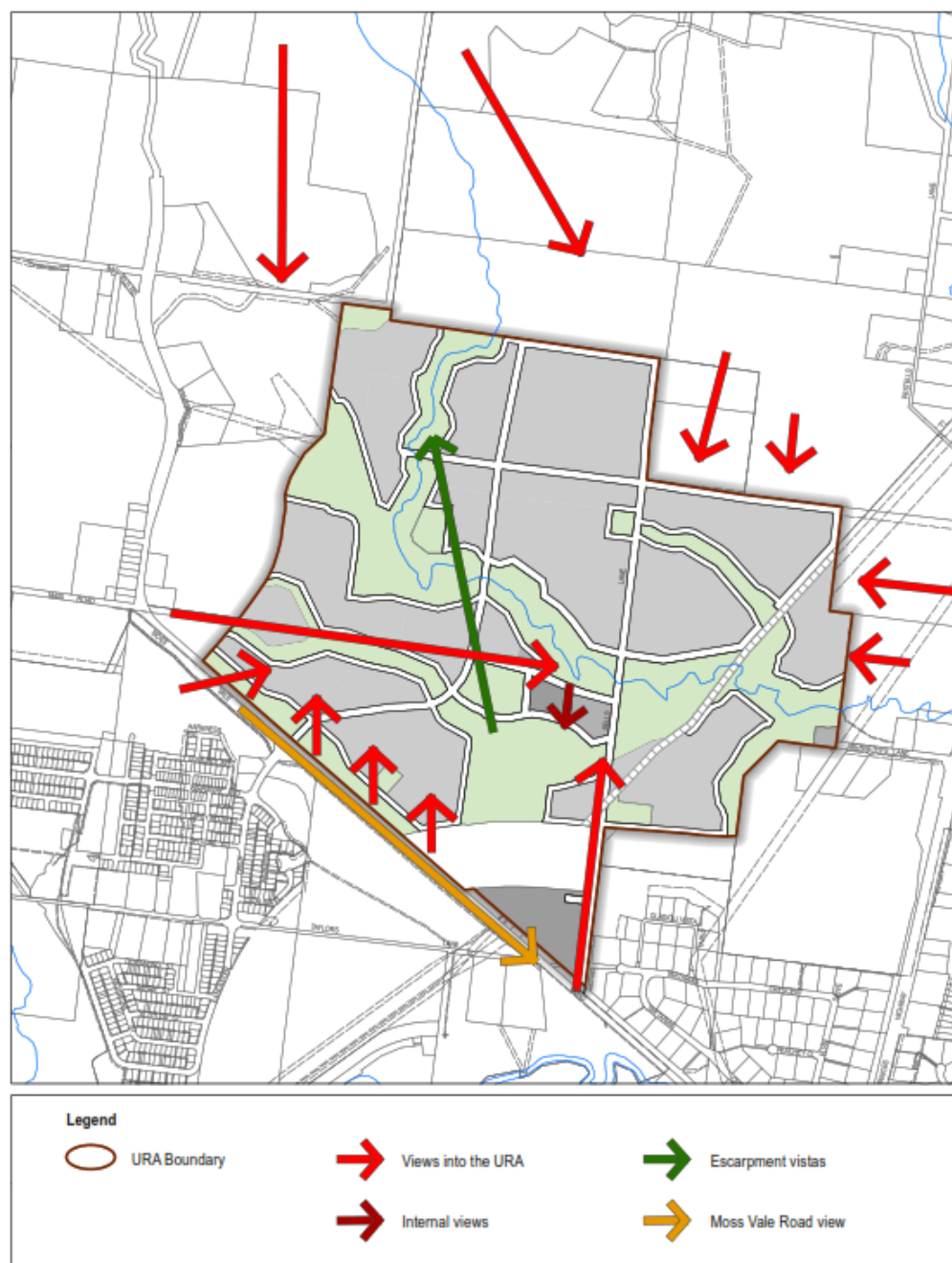


Figure 16: Significant Views and Vistas

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9 Development in the Vicinity of the Eastern Gas Pipeline

The Eastern Gas Pipeline is a high-pressure natural gas pipeline supplying gas to a large portion of New South Wales (NSW), including the major demand centres of Sydney, Canberra and Wollongong, as well as regional centres including Nowra-Bomaderry. The pipeline has been constructed to a standard suitable for a residential area and is appropriately maintained by its operator, Jemena.

The pipeline spans from Victoria to NSW and crosses the MVRN URA as detailed in **Figure 17**. Construction activity and certain types of **development** in the vicinity of the pipeline must be considered in the assessment process to avoid impacts on the pipeline, such as potential damage or puncture, and to manage the potential risk of any failure of the pipeline.

A 550m buffer (measurement length) has been established from the pipeline to identify the area of the URA likely to be affected should the pipeline fail or be ruptured.

Note: As per the requirements of State Environmental Planning Policy (Infrastructure) 2007, **Council** will notify Jemena (the pipeline operator) of any development application adjacent to or within the pipeline corridor (i.e., the easement). Jemena's response will be taken into consideration as part of the assessment process.

The specific **objectives** of this Section are to:

- i. Ensure **development** does not impact on the Eastern Gas Pipeline.
- ii. Manage impacts to life, property and the environment.
- iii. Provide for the long-term safety and amenity of residents in the vicinity of the pipeline.

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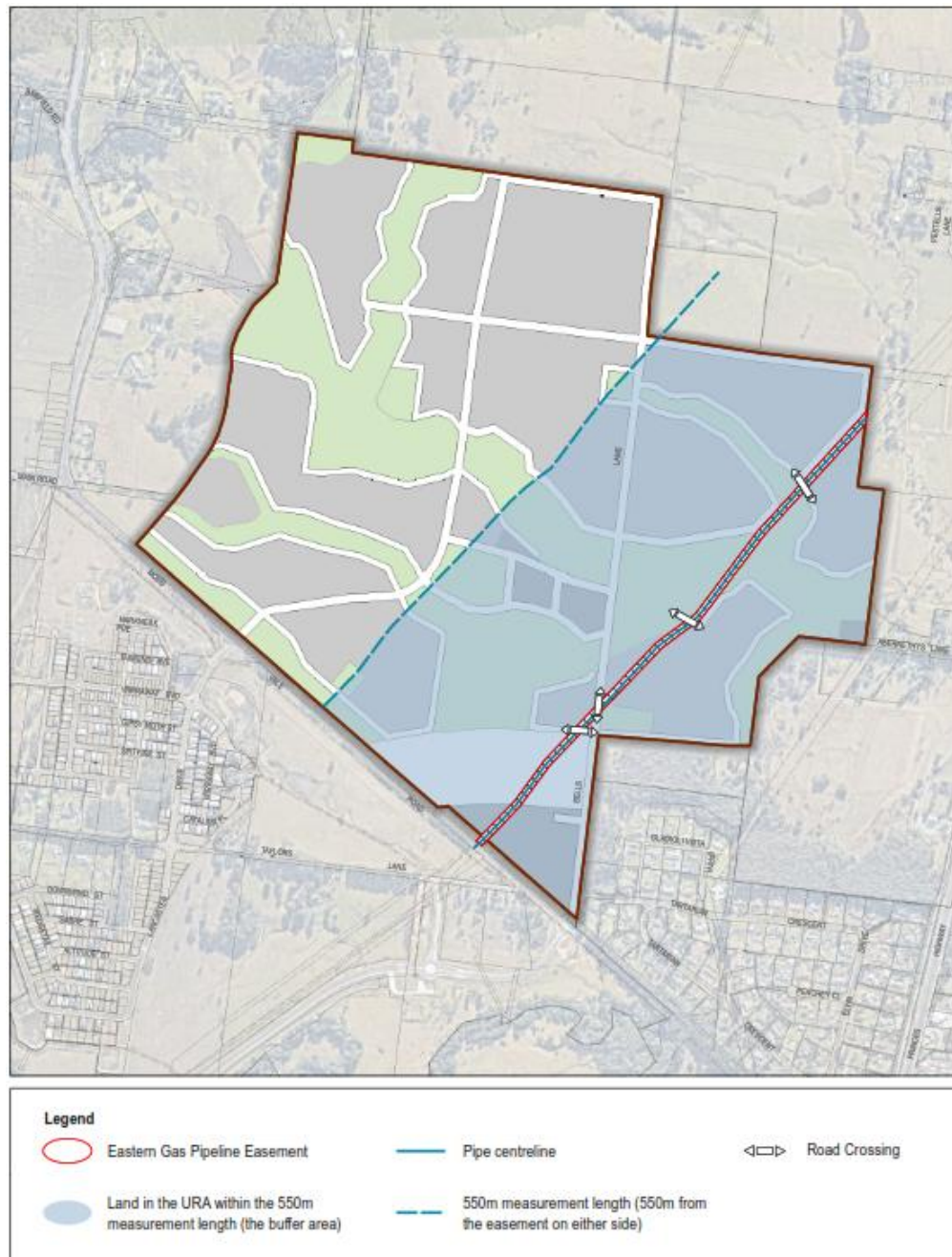


Figure 17: Key Gas Pipeline Elements

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Mandatory Controls

- 1) Jemena must be consulted prior to lodging an application for:
 - Any activity, **development** or works within the identified easement.
 - Subdivision stages adjacent to the pipeline and within the pipeline buffer area.
 - Early education and care facilities (e.g., childcare centres), medical centres and seniors housing developments within the pipeline buffer area.

Note: The Transport and Infrastructure SEPP 2021 mandates a referral to Jemena during the development application process, where a **development** is located in or adjacent to a pipeline corridor. Early consultation with Jemena is recommended.

A development application must be supported by evidence (to **Council's** satisfaction) which demonstrates consultation with Jemena and provides the outcomes of that consultation.

Consultation with Jemena prior to lodging an application may also be required for other land uses deemed by **Council** or Jemena to be sensitive.

- 2) The minimum design and construction for utility crossings (trenched /trenchless installations), vertical drilling, road work maintenance, changes to surface levels and vehicle crossings in the vicinity of the Jemena Pipelines must comply with:
 - AS2885: *Pipelines – Gas & Liquid Petroleum*.
 - Jemena's Guideline to Designing, Constructing and Operating Around Existing AS2885 Natural Gas Pipelines.
 - Locations of easement road crossings as per **Figure 17**.
 - A construction safety management study, developed in consultation with Jemena, must be prepared at the development application stage for:
 - Subdivision activities within the pipeline buffer.
 - Proposed road and utility crossings.
- 3) With the exception of specified crossings, **drainage** infrastructure (storage, conveyance and discharge) is not to be located in the pipeline easement.
- 4) Specified infrastructure (including road and utility crossings), **earthworks**, landscaping and other works within the pipeline easement will be subject to detailed review by Jemena and any subsequent conditions and requirements.
- 5) The subdivision of the pipeline easement is to be minimised.

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Note: Dedication of land within the pipeline easement area will be required.

10 Desired Future Character Controls – Colours and Materials

With an aspiration to create an integrated character for the URA, this Section outlines desired colours and materials.

The specific **objectives** of this Section are to:

- i. Avoid the expansive use of any single material or blank walls through appropriate use of design, materials and **articulation**.
- ii. Utilise high quality and durable materials and finishes.
- iii. Ensure colours with native bushland tones are prioritised in public spaces.

Performance Criteria	Acceptable Solutions
P26 Building materials and colours allow for individual expression whilst: - Establishing a strong local character throughout the URA. - Being sympathetic to the surrounding rural landscape. - Ensuring integration within the streetscape, setting and functional elements of with Village Centre. - Avoiding the expansive use of any single material or blank walls.	A26.1 The materials and colours respond to the existing native bushland context within and surrounding the URA. A26.2 Despite A22.1, the colours of dwellings with a rural interface are to be sympathetic, non-reflective and blend with the surrounding rural landscape. Note: White and bright colours are not acceptable at the rural interface. A26.3 Detailing, signage, and material palette in the Village Centre is to reinforce the character of the Village Centre, whilst distinguishing and capitalising upon the natural and native bushland features in the vicinity.

11 Village Centre Key Design Principles and Controls

Note: This Section should be read in conjunction with the following Chapters of this Development Control Plan:

- Chapter G13: Medium Density and Other Residential Development.
- Chapter G17: Business, Commercial and Retail Activities.

In the event of an inconsistency between a provision in this Section and a provision in a Generic Chapter of this **Development**

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Control Plan, the provision in this Section will prevail to the extent of the inconsistency.

Section 12 of this Chapter applies to low density residential development.

Section 13 of this Chapter applies to medium density development.

Centrally located within the URA and with a line of sight from the initial approach from Moss Vale Road, the Village Centre will provide for local shopping, community facilities, services, **public open space**, and medium density housing opportunities.

The Village Centre consists of the following key precincts (**Figure 18**):

- **The Village Core**, the E1 Local Centre zoned land, with the greatest intensity of ground floor use and direct exposure to public space and Abernethys Lane, will provide day to day services, community opportunities, retail and **shop top housing**. A supermarket, independent retail, parking, and a play space will benefit from north-south street access and vital exposure from the entry from Moss Vale Road across to the public **recreation area**. Cafés/dining with outdoor dining opportunities will interface with (and provide passive surveillance to) public **recreation areas** and the public domain.
- **The Village Activation Precinct** – ‘frames’ the Village Core, spanning the north and south of Abernethys Lane and the retail streets fronting the Village Core. Development in this Precinct references medium density development providing an activated urban streetscape with a continuous, articulated built form to provide a focal entry into the Village. This could include live-work units, commercial offices, or health services as ground floor uses. **Development** then transitions to medium density or detached residential beyond the Abernethys Lane frontage and towards Bells Lane.
- **The Village Residential Precinct** preferences activated medium density residential **development** fronting the riparian corridor with a strong presence and interface at the corner of Bells Lane and Abernethys Lane.
- **The Village Park**, the RE1 Public Recreation zoned land directly to the west of the Village Centre Core provides active and passive recreational opportunities.

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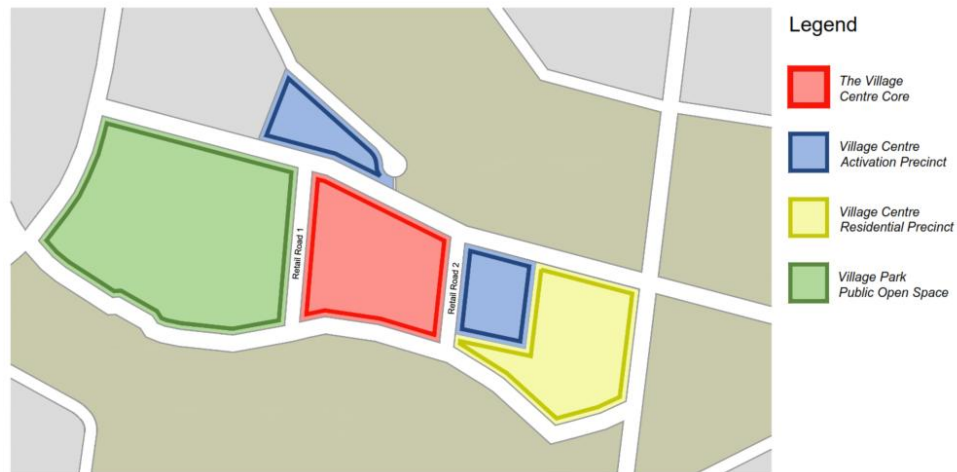


Figure 18: The Village Centre

The specific **objectives** are to:

- i. Ensure the development of the Village Centre facilitates and aligns with the efficient release of residential land and essential infrastructure.
- ii. Establish a highly desirable Village Centre, with high quality urban design, a subdivision pattern providing permeability, ground level activity associated with retail, café/outdoor seating, and commercial uses providing day to day local and independent/specialist retail, commercial and social experiences for residents and visitors.
- iii. Ensure the design of the Village Centre incorporates the NSW Government's Connecting with Country Framework as part of the design approach.
- iv. Deliver a high-quality and visually attractive public domain, which is legible, adaptable, generous, pedestrian scaled and oriented suitable for a variety of people, uses, events, weather, times of the day and weekly and seasonal cycles.
- v. Ensure a safe, accessible and convenient movement network with strong connectivity between residential areas, open space, riparian corridors and retail and service offerings prioritising pedestrians, cyclists, and public transport.
- vi. Create order, interest and sense of place in the public domain through a mix of unifying elements, punctuated by elements that are different at important public spaces and **buildings**.
- vii. Provide a street layout informed by natural features, terrain, and **views**, including a direct connection between the two riparian corridors through active transport links, marking the transition from the Village Centre into residential and open space areas.
- viii. Ensure that the type, distribution, and amount of retail floorspace will establish a specific and diverse mix of community-focused and interesting retail, fresh food, essential services, dining and cultural experiences which serve the needs of people who live and work in the surrounding area.

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- ix. Provide multi-functional spaces and places to enable the opportunity for temporary early activation and implementation, focusing on a sense of place with consideration of activation during day and night, weekday and weekends, season to season.
- x. Encourage co-location of uses such as community, recreation and health facilities to generate activity in and around the centre.
- xi. Provide a variety of medium- and higher-density residential opportunities, appropriate for a mixed-use village, to support and activate the Village Centre.
- xii. Ensure **buildings** are at a human **scale**, are responsive to and integrated with the street **scale** with **buildings** addressing the street frontage, and where the principle form defines and follows the boundary orientation.
- xiii. Create high quality, adaptable and an activated built form with active and defined frontages to key places and streets reinforcing a fine grain block pattern with limited setback boundaries and attractive street presentations to meet the diverse and changing needs of the community.
- xiv. Ensure development minimises impact on the amenity and character of the surrounding area whilst protecting and enhancing **views** towards the escarpment, riparian corridors and the public open spaces.
- xv. Embrace the native **bushland** character of the surrounds and integrate existing areas of **vegetation** into landscaped areas associated with the public domain, to connect residents, workers, and visitors with the natural environment and to soften the visual impact of the built form.
- xvi. Provide an exemplar of sustainable development through benchmark commitments, resilient design principles across the aesthetics and function of **buildings**, streetscapes, and public spaces and the integration of green infrastructure and smart technologies in the development of the public domain.

Mandatory Controls

- 1) A concept plan setting out proposals for the development of the Village Centre is required to be lodged with the first subdivision application relating to the Village Centre. The Concept Plan shall incorporate the Key Design Principles in this Section or demonstrate an equal or better outcome. The Concept Plan shall outline:
 - a. Proposed urban structure and public domain elements, including proposed land uses.
 - b. Proposed dwelling yield and types.
 - c. Proposed road network and car parking arrangements.
 - d. Proposed pedestrian and cycle network.
 - e. Proposed staging of development.

Note: The Concept Plan for the **Village Centre** shall include all four key elements:

- The Village Core
- The Village Activation Precinct
- The Village Residential Precinct

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- The Village Park 1

- 2) Subsequent detailed development applications in the Village Centre area are to be consistent with the approved concept plan and provide a detailed response to the **objectives** and key design principles in this Section.

11.1 Key Design Principle - Staging

Initial staging should consider the capacity and amenity of the Village Centre to be established in advance of the local residential population through destination retail, event and community spaces leveraging the distinguishing natural features of the site, particularly the open space network.

Whilst the character of the retail and services will expand over time from more leisure focused to day-to-day amenities, the critical sense of community and place benefits can be potentially realised much earlier through interim and temporary uses, less strictly reliant on precinct population growth.

The key Staging principles are to:

1. Ensure staging follows key access along Abernethys Lane and Bells Lane with medium density typologies along these routes in early staging to allow for stronger demand for product, services, and community **building**.
2. Identify areas suitable for early activation temporary uses, with a focus on future adaptability.
3. Demonstrate how pedestrian and cycle routes within the Village Centre connect to the active transport network.
4. Incorporate multipurpose elements in the Village Centre Core that avoid single purpose uses through generous ceiling heights (refer to **Section 11.3**), street access, and minimum internal **scale**.

Note: Early stage community, hospitality and destination offerings fronting the **public open space** area and open space network would support the vitality of the setting and engage with the vision for place.

Possible interim uses could include (for example) outdoor cinema, **markets**, local exhibitions, maker spaces, men's shed and food vans.

Suitable road network provision/upgrades must be in place to support early activation temporary uses.

11.2 Key Design Principle - Land Use

A complementary mix of uses, built form and spaces are to provide flexibility for future adaptability, attract a diversity of activity, and promote an inclusive community. Activities

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should be mutually supportive to promote feasibility and enrich the Village Centre, for example, a [medical centre](#) and pharmacy or play space and café.

Note: The *State Environmental Planning Policy (Transport and Infrastructure) 2021* provides a pathway for *health services facilities* in the R1 General Residential zone.

The key Land Use principles are to:

1. Provide a minimum of 1,000m² of viable retail floor space in the Village Centre Core Area.
2. Ensure that the Village Centre Core is directly associated and provides a frontage to the public open space area.
3. Provide a diverse range of activities at street level to reinforce the vitality of the Village Centre Core and the public domain.
4. Maximise entries and display windows to shops and/or food and drink premises or other uses, customer service areas and activities which provide pedestrian interest and interaction.
5. Provide a supermarket with a minimum area of 800sqm, hidden from the street frontage by retail and commercial uses and accessible from the Abernathy's Lane or the Village Green frontages.
6. Locate at grade parking areas and service areas such as waste and loading, behind building lines and screened from streets and public open space.
7. Provide first floor (and above) residential land uses across the Village Centre area.
8. Promote outdoor dining on active commercial street frontages.

Note: Some land in the verge planting area could be utilised for this purpose, ensuring that planting remains a high priority. Opportunities for outdoor dining within front setback should also be considered.

11.3 Key Design Principle - Built Form

The built form should clearly define public and private spaces that are appropriate to the hierarchy, function, and character of the Village Centre. The form and fabric of [buildings](#) and public domain should create spaces with varied [scales](#) and proportions to support movement and place, and to capture the unique landscape setting.

The key Built Form principles are to:

1. Provide heights:

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- Up to 3 **storeys** in the Village Core, providing a transition to the public **recreation area** and public domain interface to minimise overshadowing.
 - That promote an intimate pedestrian and residential **scale**.
 - That promote a high level of articulated building frontage within the Village Core and the Village Activation Precinct.
 - Between two and three **storeys** in the Village Activation Precinct, with heights decreasing away from Abernethys Lane and the Village Residential Precinct towards Bells Lane.
2. Provide minimum ceiling heights of 3.3m for non-residential development.
 3. Transition from a greater intensity of use in the west (the Village Core) to the east.
 4. Provide active frontages and setbacks consistent with Error! Reference source not found. and Error! Reference source not found., ensuring that:
 - Shops/premises along an active frontage have an average width of 5m to 8m. Where wider frontages (>8m in width) are considered appropriate, they are to be limited to five wider frontages per 100m and are to be separated by at least one development with a frontage less than 8m.
 - Ground floor pedestrian entrances to shop top residential development are limited in width and/or accessed from alternate frontages, where possible.
 - Provide a minimum of 70% of the ground floor building frontage as transparent glazing with a predominantly unobstructed view from the adjacent footpath into the building.
 5. Provide high level detail of the supermarket, including:
 - Anticipated size and development footprint of the supermarket.
 - Location of the entry.
 - Location of the separate at-grade parking area and servicing/loading area.
 6. Provide a strong built form interface to the key intersection of Abernethys Lane and Bells Lane.
 7. On corner sites, shop fronts are to wrap around the corner and highlight the corner location.
 8. Provide an address to the public **recreation area** and open space network with **building** elements reinforcing the landform, dominant topography and 'gateway' into the Village Centre precinct.
 9. Maximise opportunities for entries or display **windows** to non-residential land uses or other uses which provide pedestrian interest, social interaction, natural surveillance, and safety. Long and large areas of continuous walls are to be avoided.

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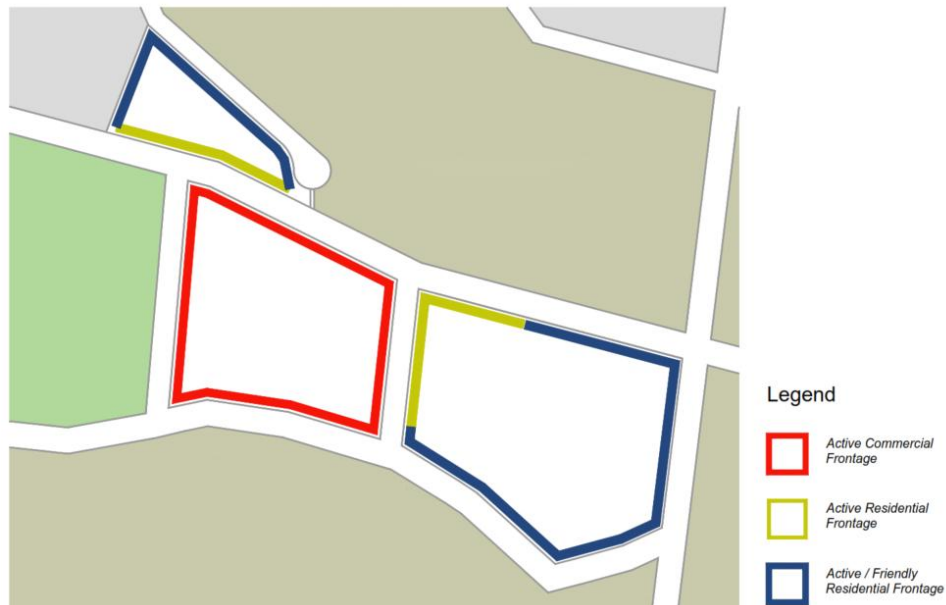


Figure 19: Active Frontages



Figure 20: Ground Floor Setbacks

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11.4 Key Design Principle - Movement and Access

Movement and accessibility are critical to the centre's viability. Design of the Village Centre should create pedestrian dominated environments with strong connectivity between commercial uses, residential areas and open space. This connectivity and permeability supports community interaction and place activation, further enhanced with focus on multi-modal transport and accommodating evolving sustainable modes.

The key Movement and Access principles are to:

1. Comply with the street network/hierarchy and shared use pathway network requirements in this Chapter.
2. Provide rear lane access to residential development (including [basements](#)) and shared parking areas.
3. Establish safe and accessible [road](#) crossing locations to ensure connectivity and walkability (21).
4. Ensure onsite parking does not compromise envisaged setbacks, ability to activate key frontages, or the character of the Village Centre. A centralised [car park](#)/parking court accessed from Retail Street 2 is encouraged and could accommodate up to 50 [parking spaces](#) for private development. Dedicated parking areas will be required on the development site of specific uses such as the supermarket, as well as any childcare and [medical centres](#) (for example).



Figure 21: Village Centre Pedestrian Connections

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11.5 Key Design Principle - Public Domain

To reinforce the natural character of the Moss Vale Road North URA, the Village Centre will address the open space networks and riparian **bushland**, and retain **views** to the Escarpment, to provide a backdrop and sense of place and space.

The character of the public domain supports the unique identity for the community, drawing the sense of the wider **bushland** landscapes into the heart of the Village Centre. This ensures that development contributes to the character of Moss Vale Road North URA as a whole and supports and promotes a socially and ecologically resilient public domain.

The key Public Domain principles are to:

1. Retain existing **trees** wherever possible, particularly in open space areas.
2. Spaces between **buildings** are seen as positive open spaces and should receive the same amount of design care as the built form and street frontage public domain.
3. Preference deciduous **trees** on east-west streets.
4. Establish an indicative colour and material palette that responds to the existing native **bushland** context within and surrounding the URA.
5. Establish strong passive surveillance to the open space network, riparian corridor, and other public areas.
6. Ensure lighting is sensitive to the location especially at the interface between retail and residential uses.
7. Seamlessly incorporate public domain elements into front setback areas.
8. Respond to the **scale**, **views** and **vistas** from entry points to and within the Village Centre to the open space network and riparian areas.
9. Incorporate public art into the public domain. Concept locations are to be identified to ensure early consideration and integration into the public domain.
10. Incorporate smart technologies in the public domain.
11. Provide street electric charging facilities.
12. Ensure a consistent use of street furniture throughout the public domain

12 Low Density Residential Development Controls

This Section applies to all low-density residential development in the URA. Low density residential development includes **dwelling** houses, **secondary dwellings** and ancillary **structures**.

Note: This Section should be read in conjunction with Chapter G12: Dwelling Houses and Other Low Density Residential Development of this Development Control Plan. In the event of an inconsistency between a provision in this Section and a provision in a Chapter G12, the provision in

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this Section will prevail to the extent of the inconsistency.

Section 11 of this Chapter also applies to development in the Village Centre area.

The specific **objectives** of this Section are to:

- i. Provide a mix of densities to cater for the various housing needs of a range of different demographic groups.
- ii. Encourage residential development that will contribute to the amenity and streetscape character of the area.
- iii. Encourage innovative design with a high level of water and energy efficiency.
- iv. Encourage the delivery of small housing products that contribute to **affordable housing**.

Performance Criteria	Acceptable Solutions
P27 The design of residential development contributes to the character and amenity of the URA and each dwelling.	A27.1 Dwellings are designed in accordance with the relevant controls in Table 8. A27.2 Dwellings are designed and located to manage potential traffic noise from Moss Vale Road.
P28 Dwellings appropriately address the primary street frontage.	A28.1 The primary street façade of a dwelling must incorporate at least two of the following design features as part of the articulation zone: • Open verandah or porch. • Awnings over windows. • Balcony treatment to first floor elements. • Recessing or projecting architectural elements. • Bay windows or similar features. • Pergolas or similar features above garage doors. A28.2 Dwellings with dual road frontage (corner lots and rear loaded lots): • Must address both the primary and secondary road frontage. • The secondary road frontage must incorporate at least two of the design features mentioned in A24.1.

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- Landscaping in the front setback should continue around the secondary setback to the depth of the transition zone.



- On corner lots, carports and garages must be located and accessed from the secondary road frontage.
 - On rear loaded lots, carports and garages must be located and accessed from the laneway or shared driveway.
-

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P29 **Zero lot line developments** provide adequate **solar access** and amenity to neighbouring residences.

A29.1 Zero lot line developments are identified at subdivision stage and provide details of the restrictions over adjoining land for maintenance of external walls.

A29.2 The location of **zero lot lines** are based on orientation and topography. The **zero lot line** should be located on the:

- Most southern side of the **lot** (refer to Error! Reference source not found.2) to maximise **solar access**, and
- Low side of the **lot** to minimise water penetration and termite issues.

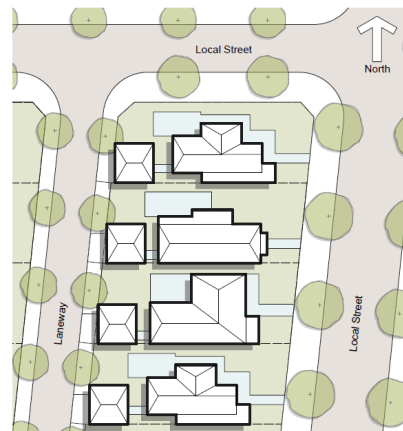


Figure 22: Location of Zero Lot Lines

A29.3 **Dwellings** built to the **zero lot line** are single storey.

Note: **Zero lot lines** are not permitted where an easement to drain **sewage** is within the side setback.

A29.4 The external **zero lot line** wall shall be constructed no more than 250mm from the property boundary.

A29.5 Gutter and **drainage** services must be wholly contained within the **allotment**.

A29.6 A boundary **fence** shall not be constructed adjacent to the **zero lot line** wall.

A29.7 Zero **lot** boundary wall finishes consider the character of the **development** on the neighbouring property which exists at the time of the DA.

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		A29.8 Zero lot boundary walls built to the side or rear boundary must not exceed a maximum height of 3.5 metres above existing ground level unless the wall: • Abuts another higher existing or simultaneously constructed wall, in which case the wall must not be higher than the boundary wall on the adjoining lot, or • Abuts a side or rear lane, in which case the maximum height is 5.5 metres.
P30	Parking and access is to be functional and contribute to streetscape and laneway amenity.	A30.1 On-site car parking is provided in accordance with Chapter G21: Car Parking and Traffic. A30.2 Carports and garages are to complement the dwelling design. A30.3 Where garages are provided in rear laneways: • Minimum garage doorway widths shall be 2.4m (single) and 4.8m (double). • Garage location is based on the orientation of the allotment (refer to Figure 23), so as to improve solar access to the rear yard. • General vehicular access is to occur from the laneway. • Vehicle crossings are not to exceed 4.8m in width. A30.4 Triple fronted garages are not permitted

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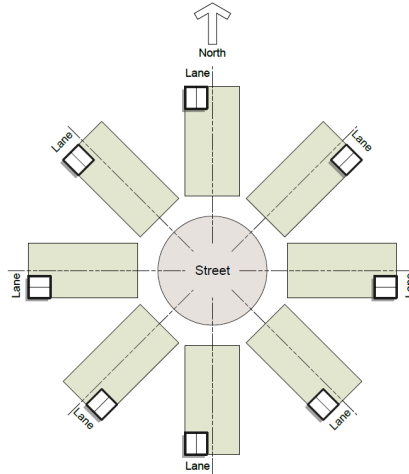


Figure 23: Garage Location Principles

P31	Development on corner lots contribute to streetscape character.	A31.1	Walls facing the secondary frontage (corner lots) shall have an active frontage for at least 4m back from the front building line of the dwelling (i.e., the transition zone) with a maximum continuous a wall length of 6m.
P32	Dwellings are designed to maximise energy efficiency.	A32.1	Dwellings and private open space are sited as per the orientation of the dwelling (refer to 4).
		A32.2	Direct solar access to living area windows and hardstand private open space areas is achieved for at least 3 hours between the hours of 9:00am and 3:00pm on 21 June for: - The proposed development, and - Adjoining development Note: A shadow diagram may be required to demonstrate compliance with solar access requirements, including the location of adjacent buildings affected by shadow as well as the location of its living areas, private open space areas and any solar collectors (existing or likely future). In determining the extent of overshadowing, the impact of fences, roof overhangs and changes in level should be taken into consideration.

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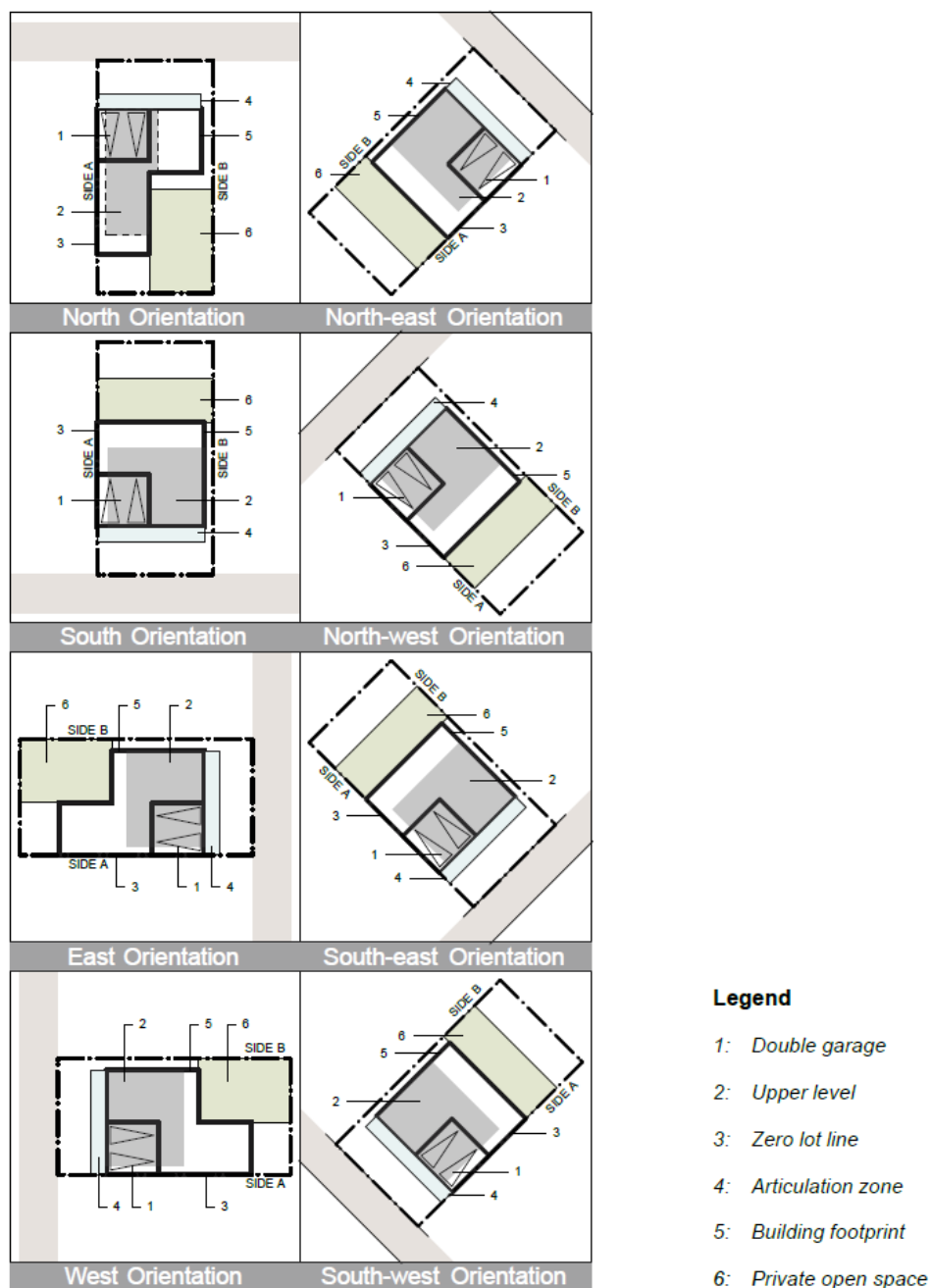


Figure 24: Dwelling Configuration Based on Orientation

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Table 8: Key Development Controls for Low Density Residential Development

Built Form Controls - Lot width (measured at front setback line)				
Control	>8m to <12m	>12m to <15m	>15m to <18m	>18m (Large Lot)
Maximum Gross Floor Area (GFA) (excluding garage floor space) Note: A total maximum of 50m² floor area may be excluded from the gross floor area calculation for garage floor space	50% of lot area	60% of lot area	60% of lot area	60% of lot area
Front setback – refer to Error! Reference source not found.5 Note: Minimum front setbacks must not encroach into an easement to drain sewage.	3.5m to building façade front setback; 2.5m to articulation zone.	3.5m to building façade front setback; 2.5m to articulation zone.	4m to building façade front setback; 3m to articulation zone.	5m to building façade front setback; 4m to articulation zone.
Minimum front garage setback – refer to Error! Reference source not found.5	5.5m	5.5m	5.5m	5.5m

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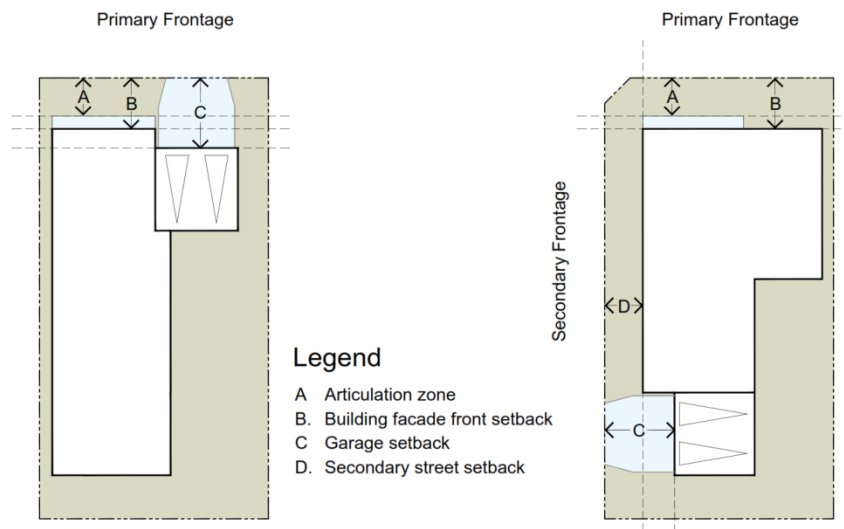


Figure 25: Location of Setbacks (Standard and Corner Lots)

Built Form Controls Continued				
Control	>8m to <12m	>12m to <15m	>15m to <18m	>18m (Large Lot)
Minimum side setbacks (ground floor)	Zero lot or attached boundary (Side A*): 0m Detached boundary (Side B*): 0.9m	Zero lot or attached boundary (Side A*): 0m Detached boundary (Side B*): 0.9m	Side A*:0.9m Side B*:0.9m	Side A*:1.5m Side B*:1.5m
Minimum side setback (upper level)	Side A:1.5m Side B: 0.9m	Side A:1.5m Side B: 0.9m	Side A:1.5m Side B: 0.9m	Side A:3m Side B:1.5m
Minimum rear setback (single storey)	3m	3m	3m	6m
Minimum rear setback (double storey)	6m	6m	6m	9m
Corner lots – Minimum secondary street side setback – refer to Error! Reference source not found.6	2m	2.5m	3m	4.5m

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Note: Minimum setbacks must not encroach into an easement to drain sewage.				
Corner lots – Minimum secondary street garage setback – refer to Error! Reference source not found.6	5.5m	5.5m	5.5m	5.5m
* Side boundary A and side boundary B are nominated by the applicant or nominated on the plan of subdivision. Where the boundaries are nominated by the applicant the following criteria must be applied: a) where the adjoining development is built to the boundary this boundary is to be nominated as Side A, b) where the adjoining development is setback less than 1.5m from the boundary but not built to the boundary, this boundary is to be nominated as Side B, c) where the lot is burdened by an easement of maintenance and support or easement to drain sewage, this boundary is to be nominated Side B, d) where there is adjoining development only on one side, the other side is to be nominated the alternate, e) a corner lot has two side boundaries and no rear boundary, f) where the lot is located on a corner, the secondary street side setback is neither Side A nor Side B.				

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Front and Side Garages				
Control	>8m to <12m	>12m to <15m	>15m to <18m	>18m (Large Lot)
Maximum garage door width	Up to 50% of the façade width.	Double – 6m	Up to 50% of the façade width or a maximum of 7.2m, whichever is the lesser	Up to 50% of the façade width or a maximum of 7.2m, whichever is the lesser
Maximum driveway width (at front property boundary)	3m	4.8m	4.8m	4.8m
Maximum garage door width (access from secondary road only – corner lots)	6m	7.2m	7.2m	7.2m
Rear Garages – small lots only				
Control	>8m to <12m	>12m to <15m	>15m to <18m	>18m (Large Lot)
Minimum side setback	0m on one side for a maximum length of 6.5m. Other side 0.9m.	0m on one side for a maximum length of 6.5m. Other side 0.9m.	N/A	N/A
Minimum rear garage setback (to lane)	0m	0m	N/A	N/A
Landscape controls				
Control	>8m to <12m	>12m to <15m	>15m to <18m	>18m (Large Lot)
Landscaped area (min. 1.5m wide)	50% of lot area minus 100m ²	50% of lot area minus 100m ²	50% of lot area minus 100m ²	50% of lot area minus 100m ²
Landscaped area within front setback (min. 1.5m wide)	75% of area of the front setback (excluding articulation elements)	50% of area of the front setback (excluding articulation elements)	50% of area of the front setback (excluding articulation elements)	50% of area of the front setback (excluding articulation elements)
Provision of tree planting	Tree to front garden (min.3m mature height)			

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13 Medium Density Residential Development Controls

Note: This Section should be read in conjunction with Chapter G13: Medium Density and Other Residential Development of this Development Control Plan. In the event of an inconsistency between a provision in this Section and a provision in a Chapter G13, the provision in this Section will prevail to the extent of the inconsistency.

Section 11 of this Chapter also applies to development in the Village Centre area.

Whilst medium density development is permissible in varying forms across the Moss Vale Road North URA, this form of development is ideally suited to land in and within 400m of the Village Centre (including the Village Centre Activation Precinct), areas of high amenity adjacent to the riparian corridors/open space areas and areas adjacent to certain **collector roads**.

Medium density development may include (not exclusively) **dual occupancy**, **multi dwelling housing**, **multi dwelling housing (terraces)**, **attached dwellings**, **semi-detached dwellings**, **manor houses**, **integrated housing development**, **residential flat buildings** and **shop top housing**.

The specific **objectives** are to:

- i. Locate higher density housing in the URA within the Village Centre, the Village Centre Activation Precincts, and in close proximity to **public open space** areas, **collector roads** and public transport networks.
- ii. Provide a mix of **dwelling** sizes and typologies to cater for the various housing needs of a range of different demographic groups.
- iii. Ensure that the bulk and **scale** of new **development** is compatible with the envisaged character of the area.

Performance Criteria	Acceptable Solutions
P33.1 The design of residential development contributes to the character, safety and amenity of the URA, including the Village Centre.	A33.1 Medium density development is designed in accordance with the relevant controls in Table 9 .
P33.2 Landscaping contributes to the public domain by providing opportunities for trees and substantial areas of decorative planting within the front setback.	A33.2 Dwellings are designed and located to manage potential traffic noise from Moss Vale Road.
P34 In areas outside of the Village Centre Core, the built form contributes to a low-medium scale character, with levels above two storeys appearing hidden	A34.1 Any third level beyond the Village Centre Core is designed to minimise the visibility of that level when viewed at a pedestrian scale from the public domain or neighbouring sites.

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when viewed from the public domain or neighbouring sites.	Note: There are many ways to 'hide' the third level, including (not exclusively) parapets, utilisation of attic space, generous setbacks and structures that are angled back towards the rear of the dwelling/building.
P35	
P35 Dwellings with a primary street frontage appropriately address that frontage.	A35.1 Dwellings in the Village Centre are sited to face all street frontages, with visible front entries and habitable rooms fronting the street, particularly at ground level. A35.2 The façade of a dwelling adjacent to a street frontage referred to in A35.1 must incorporate at least two of the following design features as part of the articulation zone: • Open verandah or porch. • Awnings over windows. • Balcony treatment to first floor elements. • Recessing or projecting architectural elements. • Bay windows or similar features. • Pergolas or similar features above garage doors.
P36 Parking and access is functional and contributes to streetscape and laneway amenity.	A36.1 On-site car parking is provided in accordance with Chapter G21: Car Parking and Traffic. A36.2 Co-joining of double garages (i.e., a double garage for one dwelling joined with a double garage for another dwelling) is not supported unless: • One double garage is offset from the other by at least 1m. • The garages adjoin a rear laneway. A36.3 Triple fronted garages are not permitted. A36.4 Where garages are provided in rear laneways: • Minimum garage doorway widths are 2.4m (single) and 4.8m (double). • Garage location is based on the orientation of the allotment so as to improve solar access to the rear yard.

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- General vehicular access is to occur from the laneway.
- Vehicle crossings are not to exceed 4.8m wide.

Table 9: Key Development Controls for Medium Density Development

Control Type	Control		
Maximum Floor Space Ratio (FSR)	Land Use	Within the Village Centre	Outside of Village Centre
	• Dual occupancy. • Semi-detached dwellings • Integrated housing development.	0.8:1	0.6:1
	• Multi dwelling housing. • Multi dwelling housing (terraces). • Manor houses. • Attached dwellings.	1:1	0.7:1
	• Shop top housing. • Residential apartment buildings.	1.25:1	Not encouraged
Height	1 to 3 storeys. Dwellings beyond the Village Centre Core must present as up to two storeys, with any third level recessed (refer to A34.1 and the setback and building envelope provisions below).		
Setbacks (in the Village Centre Core)	Minimum Setbacks in Section 11 of this Chapter, at all levels. Articulation and varied setbacks are encouraged in the design to promote interest.		
Setbacks (beyond the Village Centre Core)	Setbacks in Section 11 of this Chapter prevail to the extent of any inconsistency.		
Note: Vehicular access to medium density residential development in the Village Centre Activation Precinct is to be via a rear lane. No garages are to be accessed via the primary or secondary frontage.	Setback	In the Village Centre Activation Precinct	All other areas
	Front Setback	Ground level:	Ground level:

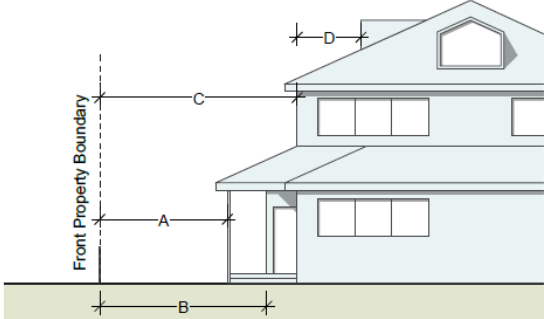
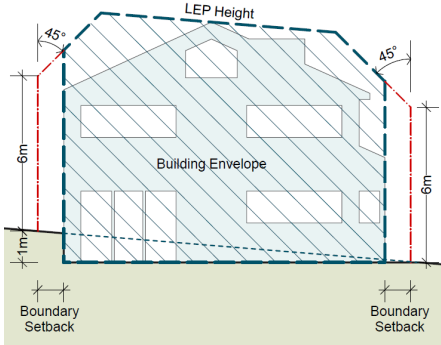
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	<i>Primary frontage</i>	• 1.5m to articulation zone. • 3m to dwelling.	• 3.5m to articulation zone. • 4.5m to dwelling. • 5.5m to the garage. Alternative setbacks which align with adjacent properties will also be considered.
		Second level: A further 1m from the dwelling setback at the ground level. Third level: As required from the setback at the second level to minimise the visibility of that level as per A34.1. Refer to Figure 266.	
	Front Setback <i>Secondary frontage</i>	Ground level: • 1.5m to articulation zone. • 3m to dwelling.	Ground level: • 3m to dwellings (including any articulation features). • 5.5m to the garage.
		Second level: A further 1m from the setback at the ground level. Third level: As required from the setback at the second level to minimise the visibility of that level as per A34.1. Refer to Figure 266.	
	Rear setback <i>Including to public reserve</i>	0m to garages opening to a laneway. 3m (average) to dwellings, with minimum setback of 900mm.	

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	 A: Minimum of 3.5m B: Minimum of 5m C: Setback at $B + 1m$ D: As required from the setback at the second level to minimise the visibility of that level Figure 26: Front Setbacks for Medium Density Development
Cumulative impacts	Despite Chapter G13 of this Development Control Plan, more than three (3) consecutive medium density developments may be considered within a street in the Village Centre and the small lot residential areas.
Building envelope Note: - Exemptions to building envelope encroachments include gutter, fascias, downpipes, eaves up to 0.6m, aerials and masonry chimneys. - For site slopes greater than 10%, or involving cut, fill or site excavations, the ground level (existing) and proposed building levels must be clearly identified on the plans and verified by a registered surveyor.	Buildings beyond the Village Centre are sited within a building envelope determined by the following method: planes are projected at 45 degrees from a height of 6m above ground level (existing) at the side and rear boundary. See Figure 27.  Figure 27: Building Envelope

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Landscaping Note: Refer to the Moss Vale Road North Species List [link] for appropriate hedge species.	Each dwelling with a primary street frontage provides a tree to the front garden (min.3m mature height). Hedge planting along front fences is encouraged.
Private open space for dwellings with a ground floor component Note: This provision does not apply to dual occupancy development or dwellings without a ground floor component. Refer to Chapter G13 for relevant provisions. Refer to the Apartment Design Guide for private open space requirements for apartments.	Private open space with a minimum area of 24sqm is provided to each dwelling that shall: • Include a defined hardstand area (e.g. concrete, paving, decking) of usable space which: ○ Is directly accessed from a living area. ○ Is setback at least 1.2m from any external boundary. ○ Has a minimum dimension of 4m in any direction, of which 50% shall be covered to provide protection from the elements. ○ Has a gradient no steeper than 1:20. ○ Does not extend further than 1m forward of the front building façade.

14 Advisory Information

14.1 Information required with subdivision applications

14.1.1 Subdivision Plans

Must demonstrate the location of proposed or potential zero-[allotments](#).

14.1.2 Staging Plans & Infrastructure Delivery

All subdivision applications must demonstrate consistency with the key development outcomes and generally in accordance with **Figure 4** in this Chapter. Staging plans must identify the indicative [dwelling](#) yield and provision of infrastructure to be delivered for that stage of the [development](#).

14.1.3 Local Centre Concept Plan

A concept plan is to be submitted for the entire Village Centre area as part of the any development application for any part of the Village Centre precinct. The concept plan must respond to the [objectives](#) and key design principles in **Section 11** of this Chapter.

14.1.4 Design Verification Statement (DVS)

A DVS is a document that provides clear and sound reasoning on how the proposed [development](#) meets the relevant [objectives](#), [mandatory controls](#), [performance criteria](#) and [acceptable solutions](#) of this Chapter.

The DVS must include, but is not limited to:

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- A description of the proposed **development** (except for where the DVS is contained within a Statement of Environmental Effects).
- A robust explanation of the design of the subdivision and how it meets the individual key development outcomes (refer to **Section 6** of this Chapter).
- Identify and justify any variations to the ILP.

14.2 Other legislation you may need to check

Council Policies & Guidelines	• Moss Vale Road North Species List [link] • Shoalhaven Contributions Plan 2019 • Shoalhaven Weed Management • Planning Agreement Policy
External Policies & Guidelines	• Aboriginal cultural heritage consultation requirements for proponents 2010 • Apartment Design Guide • AS2885: Pipelines – Gas & Liquid Petroleum • Building Code of Australia • Code of practice for archaeological investigation of Aboriginal objects in New South Wales • Connecting with Country Framework • Guide to Codes and Practices for Streets Opening • Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW • Jemena's Guideline to Designing, Constructing and Operating Around Existing As2885 Natural Gas Pipelines • NSW Department of Primary Industries Council and Developer Toolkit • NSW Rural Fire Service Planning for Bushfire Protection 2019 • Planning Circular PS 18-010 Development adjacent to high pressure pipelines transporting dangerous goods • Relevant Australia Standards • Telecommunications in New Developments Policy • Transport for NSW's Guidelines for Bus Capable Infrastructure in Greenfield Sites
Legislation	• <i>Biodiversity Conservation Act 2016</i> • <i>Environmental Planning and Assessment Act 1979</i> • Shoalhaven Local Environmental Plan 2014 • State Environmental Planning Policy (Infrastructure) 2007 • <i>Water Management Act 2000</i>

Supporting Document 1



Integrated Water Cycle Assessment for Moss Vale Road North Urban Release Area.

Prepared by: Bill Johnson

SEEC Reference 17000346-IWCA-0C

29th March 2022

Strategic Environmental & Engineering Consulting

CL25.319 - Attachment 1



Strategic Environmental and Engineering Consulting

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Document Certification

This report has been developed based on agreed requirements as understood by SEEC at the time of investigation. It applies only to a specific task on the nominated lands. Other interpretations should not be made, including changes in scale or application to other projects. Any recommendations contained in this report are based on an honest appraisal of the opportunities and constraints that existed at the site at the time of investigation, subject to the limited scope and resources available. Within the confines of the above statements and to the best of my knowledge, this report does not contain any incomplete or misleading information.

Bill Johnson
SEEC
29th March 2022

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Issue Number	By	Reviewed by	Date
DRAFT-0A	BJ	MP	6 th June 2019
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Integrated Water Cycle Assessment: Moss Vale Rd North Urban Release Area 1**1 Introduction**

SEEC have been commissioned by Shoalhaven City Council to develop an Integrated Water Cycle Management Assessment (IWCMA) for the Moss Vale Road North Urban Release Area (URA). The assessment will inform the preparation of a site-specific Development Control Plan (DCP). The DCP will seek to guide residential development in the URA in accordance with Part 6 of Shoalhaven Local Environmental Plan (SLEP) 2014.

The scope of the IWCMA is to ensure the protection of water quality and the environmental values of an E2-Environmental Conservation area and other downstream environments during both the construction and post-construction development phases. The IWCMA presents:

- A conceptual stormwater treatment system;
- Post-development stormwater quality modelling to show how water quality objectives can be met;
- Advice on any changes required to the Indicative Layout Plan;
- A preliminary life cycle assessment;
- Identification of any significant soil constraints; and
- Advice on subdivision staging.

Potable water and sewerage for the URA are not included in the scope of this IWCMA.

The URA is located on Moss Vale Road, east of Camberwarra Village and north west of Bomaderry. It has a total area of approximately 266 hectares and comprises 17 separate lots. The URA boundary is shown in Figure 1.

This conceptual investigation is based on a desktop assessment of available information (e.g. flood assessment by Rhelm (2018)) and is not intended to be used for detailed design or construction advice.

Integrated Water Cycle Assessment: Moss Vale Rd North Urban Release Area 2

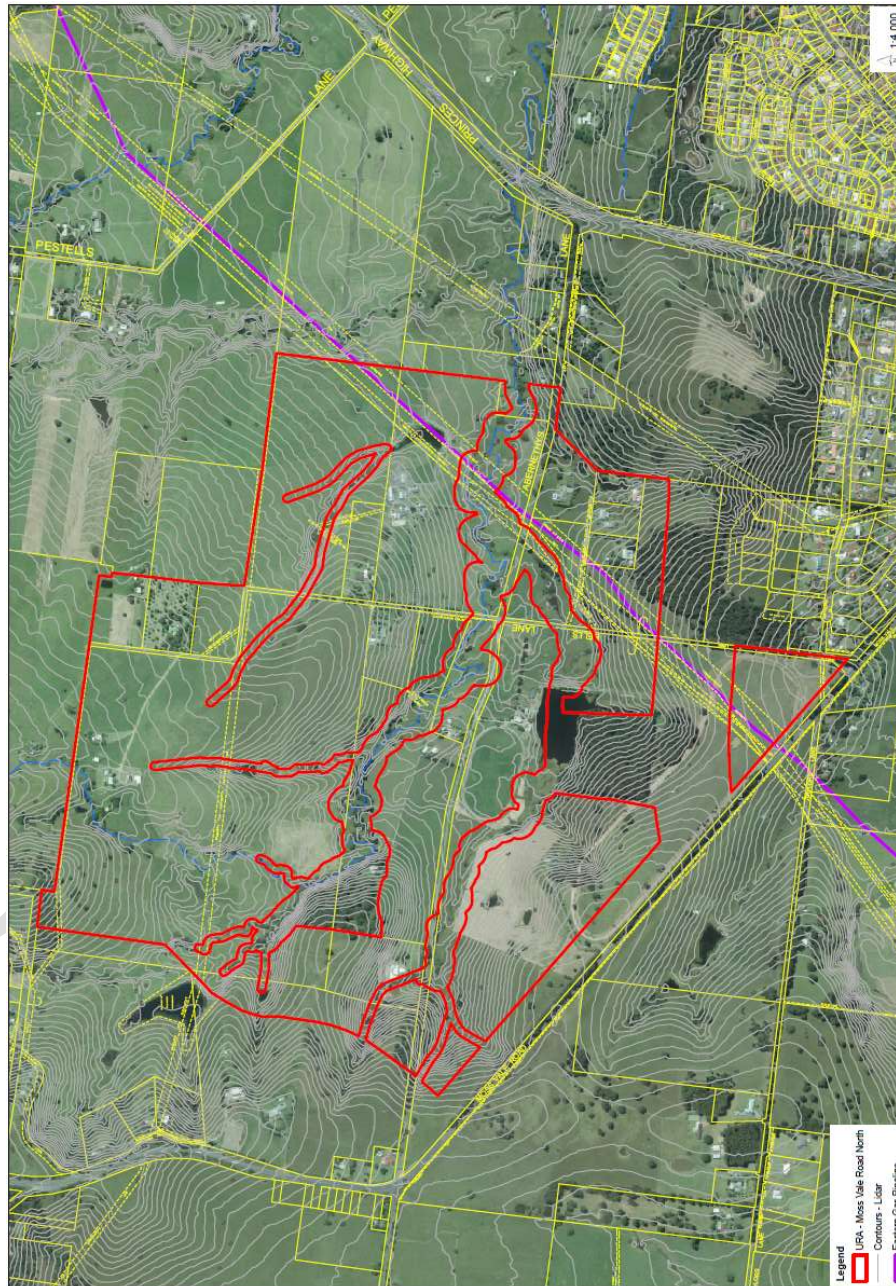


Figure 1 - Site Location

Integrated Water Cycle Assessment: Moss Vale Rd North Urban Release Area 3**2 Data Sources**

Data for the assessment has been sourced from the following

- SLEP 2014, specifically clauses 7.2 Earthworks and 7.3 Flood Planning;
- Chapter G2 of Shoalhaven DCP 2014 and supporting technical guidelines;
- Water Sensitive Urban Design (WSUD) principles as described in Chapter G2: Sustainable Stormwater Management and Erosion/Sediment Control Supporting Document 2: Sustainable Stormwater Technical Guidelines and associated document references;
- Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004) (the “Blue Book”);
- Illawarra – Shoalhaven Regional Plan – Section 5.2.1;
- Council’s Engineering Design Specifications (Chapter G2 of the DCP);
- Australian Rainfall and Runoff Guidelines, 2019;
- Bureau of Meteorology Rainfall Data, 2016;
- Moss Vale Road North Urban Release Area – masterplan and DCP – Flood Study and Riparian Lands Review (2018);
- E-Spade - State of NSW and Office of Environment and Heritage 2017;
- A site visit; and
- Council-provided GIS data.

CL25.319 - Attachment 1

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3 Land Description and Identification of Constraints

3.1 Current Zoning

The subject land is currently largely zoned General Residential (R1) (Figure 2), apart from:

- An area of Environmental Conservation (E2) corresponding to watercourses running through the development area including Abernethys Creek and a number of tributaries;
- Two areas reserved zoned as a Neighbourhood Centre (B1); and a Public Recreation (RE1) area side by side on Abernethys Lane, Cambewerra.; and
- An area zoned as business park (B7) at the intersection of Bells Lane and Moss Vale Road.

The minimum lot size is currently mapped at 500m² corresponding with the R1 General Residential zoned land. A Planning Proposal (PP) has been prepared for the URA to allow for an exception to the minimum lot size to allow for the subdivision of lots as small as 300m² in certain circumstances (generally in accordance with the small lot areas shown in the Indicative Layout Plan (ILP) in Figure 3). Medium density /integrated apartments have been nominated for areas less than 300m². Further information on the proposed subdivision layout is provided in Section 3.2.

Under SLEP 2014, the subject land is partly affected by the following:

- Clause 7.21 – Western Bypass Corridor Sch 1.5 – Additional Permitted Uses

Lot 4 on DP 708356 is partly listed as a biodiversity habitat corridor but the area nominated is within the E2 environmental conservation zoning.

3.2 Indicative Development

To encourage a range of housing types within the URA, Council is seeking to introduce an exception to the minimum lot size that will allow for lots as small as 300m² in certain locations and in certain circumstances. This will be achieved via planning policy to facilitate smaller lots in high amenity locations adjacent to open space areas, main roads and tree lined boulevards proposed for the URA.

An Indicative Layout Plan (ILP) for the URA is shown in Figure 3. It will form part of a relevant Development Control Policy (DCP) Chapter, along with a suite of controls to guide the subdivision layout and residential design. Together, they will support the reduced minimum lot size in appropriate locations. It is anticipated that the planning policy and draft DCP Chapter will be exhibited as a package at an appropriate time. The intended development outcomes for the Moss Vale Road North URA are illustrated by the ILP in Figure 3.

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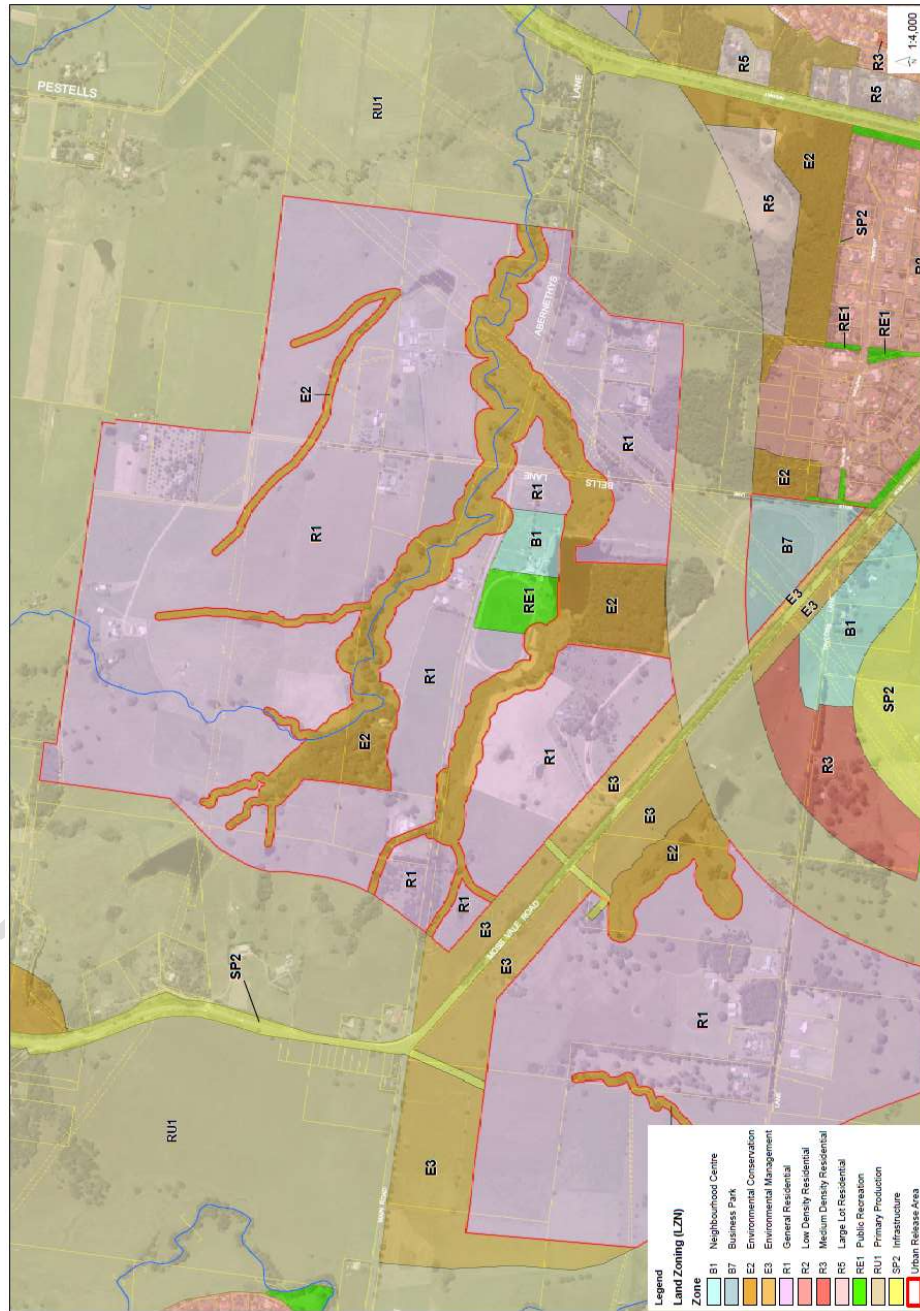


Figure 2 – Zoning under SLEP 2014

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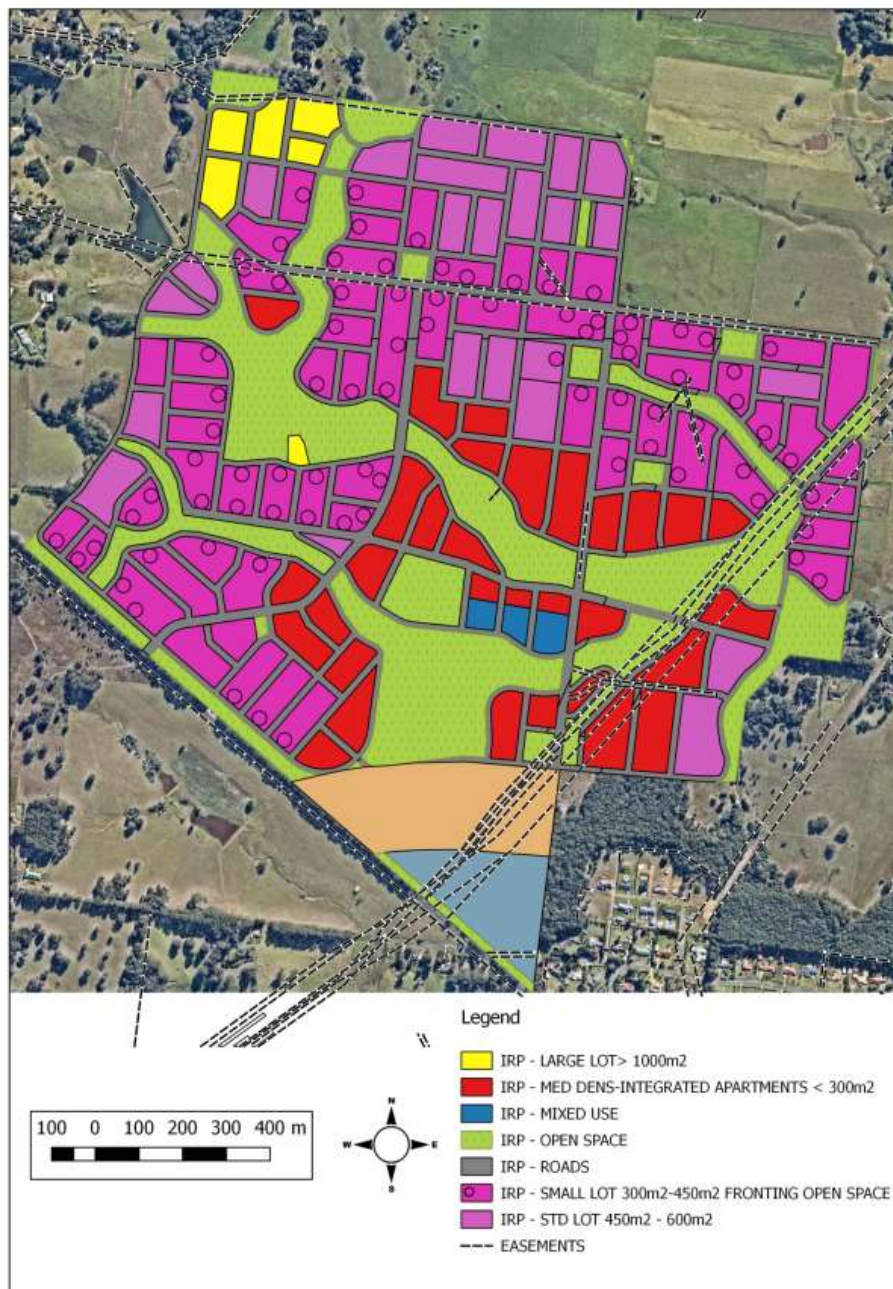


Figure 3 - DRAFT Indicative Layout Plan

(Supplied by Peter Annand and Associates and Allen Price and Scarratts)

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The ILP contains a mix of small to large residential, open space, and medium density /integrated housing density. The relative density / number of dwellings per hectare for each proposed land use, and their respective level of imperviousness (as required by Chapter G2 of Shoalhaven DCP 2014) is provided in Table 1.

Table 1 - Assumed Land use lots per hectare

Density	Lots/ha	% Imperviousness	Average Allotment Area (m ²)
Large Lot Residential	10	60%	1000
Standard Lot Residential	20	70%	500
Small Lot Residential	25	80%	400
Medium Density / Integrated Residential Housing	40.0	80%	250
Public Open Space	1.0	25%	10000
Sealed Road Corridors		60%	
Mixed Use	10.0	80%	1000
Business Park	10.0	90%	1000
Rural Uses	1.0	30%	10000

Using the assumed lots/hectare, the ILP can support 2,916 dwellings. It is expected that the dwellings will include detached houses, town houses, villas or cottages, and terrace housing.

Reticulated water and sewer is proposed to be provided to all parts of the URA. All roads in the development will be sealed.

The public open spaces will be passive recreation / open spaces and will contain limited infrastructure. There will be no sporting grounds and no requirement for the use of stormwater as an alternative water supply.

The site is generally cleared of vegetation but there is a significant pocket of vegetation in the south of the site on the southern side of the large dam and another significant pocket of vegetation in the west on the bank of Abernethy's Creek. These areas of remnant vegetation are within the E2 conservation area and are expected to be protected and enhanced as future development progresses to provide some areas of natural bushland in the urban area.

A number of parks will form linear passive recreation open space which provides pedestrian connectivity and may also aid in providing ecological corridors and links for flora and fauna due to the provision of green inter-connectivity. Natural flow paths and flood-storage would be located within some linear open spaces and any walkways or infrastructure would be located above expected flood levels or designed to withstand expected flood velocities and debris loadings.

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3.3 Catchment Description

The URA is largely cleared and, at the time of writing, was being used for extensive agriculture (e.g. grazing). The development area is predominantly within the Abernethys Creek catchment which has source waters in the upper slopes of Cambewarra Mountain and drains towards the south east and across the Princes Highway. There is a major tributary to Abernethys Creek (a category 2 stream as shown on the SLEP 2014 Riparian Lands and Watercourses Map - Sheet WCL_013D) that traverses the proposed development area originating in the south western area of the catchment and joining with Abernethys Creek near the eastern extents of the development, upstream in the Princes Highway. This tributary is fed by various smaller gullies (category 3 streams) throughout the southern and south western areas of the catchment and has a large permanent dam feature two third of the way down the watercourse.

Moss Vale Road skirts the southwestern and western extents of the catchment along a ridge line, which continues northwards towards Cambewarra Mountain. From Cambewarra Mountain, a ridge line runs in a southeasterly direction to define the northern extents of the catchment connecting with the northern extents of Bells Lane and continuing on towards the Princes Highway.

In the western extents of the catchment there is a short tributary (category 2 stream) which is fed by a number of steep upper catchment gullies (category 3 streams), the largest of which has a dam that captures runoff from the far western extremities of the catchment (immediately east of 370 Moss Vale Road).

In the northern areas of the catchment there is a tributary which runs east to traverse Bell Lane, then south through Bell View Park Stud, where the watercourse is dammed and continues south to join with Abernethys Creek immediately downstream of the dam nearby Abernethys Lane.

The watercourses function as important biodiversity connectors between the top and bottom of the catchment. Maintaining the health of the receiving watercourses, including the lower reaches of Abernethys Creek and the Shoalhaven River, is a key concern and focus of this IWCA.

The total area of the catchment draining through the site is approximately 457 ha. The area that will remain undeveloped is 226.5 ha resulting in the URA area of approximately 230.5 ha or 50.4% of the catchment.

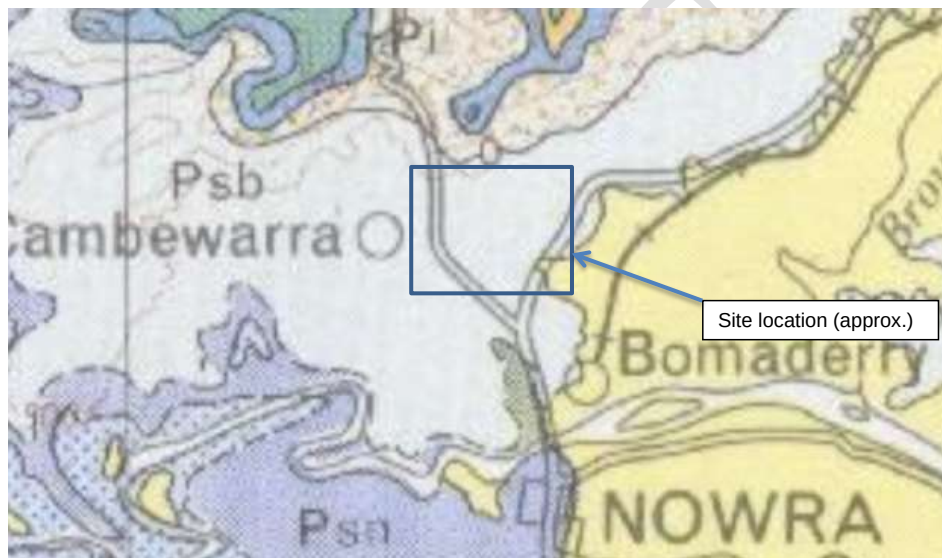
The URA includes existing easements for electrical purposes, transmission lines, future road corridors, water supply, stormwater, sewer and other services that may impact the location of proposed development and associated services.

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3.4 Geology and soils

3.4.1 Geology

The 1:500,000 Sydney Basin Geology map shows the site to be underlain by the Berry Formation (siltstone, shale and sandstone) and, possibly, the Nowra Sandstone in the southern parts (Figure 4).



Gerrigong Volcanics	Psg	Lalite, tuff, tuffaceous sandstone and sandstone
Berry Formation	Psb	Siltstone, shale and sandstone
Nowra Sandstone	Psn	Quartz sandstone
Wandrawandian Siltstone and Conjola Formation	Psc	Conglomerate and sandstone
Yadboro Congl, Pigeon House Ck. Siltstone and Clyde C.M.	Psv	Siltstone, silty sandstone, sandstone and conglomerate
Shoalhaven Group undifferentiated	Ps	Conglomerate, sandstone, shale and coal
	Ps	Sandstone, siltstone, shale conglomerate and tuff

Figure 4 - Geology

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3.4.2 Soil Landscape Mapping

Hazleton P.A. (1992) shows the site to be located on three soil landscapes, the Coolongatta Soil Landscape (on elevated lands), the Shoalhaven Soil Landscape through the central areas of the development and the Nowra Soil landscape in the lower eastern areas (Figure 5). Descriptions of these soil landscapes are included below.

3.4.3 The Coolongatta Soil Landscape

The Coolongatta Soil Landscape exists in the steep elevated western areas of the development and represents approximately one third of the site. It is an erosional soil landscape formed on the Berry Formation. It is characterised by rolling to low hills with slopes ranging from 5 to 20%. Soils typically consist of sandy loam to loam topsoil over sandy clay loam to sandy clay subsoil. Soil texture generally becomes finer on lower slopes and the total soil depth is generally less than 2.0m.

Hazleton P.A. (1992) identifies the soil landscape has some limitations to urban development (Table 2) but, those constraints are only localised and so the overall limitations to development is only moderate.

Table 2 – Soil Landscape Limitations for the Coolongatta Soil Landscape

Limitation	Occurrence
Steep slopes	Localised
Mass Movement	Localised
Shallow Soils	Localised
Rock Outcrop	Localised
Water Erosion Hazard	Localised
Surface Movement Potential	Localised

Other relevant characteristics of the Coolongatta Soil Landscape are:

- Fertility is low
- Soils can be hardsetting
- Soils are weakly structured
- Soils are strongly acidic
- Soils have low to moderate Cation Exchange Capacity
- Topsoil is moderately erodible (K-Factor = 0.02) (Landcom, 2004)
- Subsoil is moderately erodible (K-Factor = 0.038) (Landcom, 2004)
- Soils are Hydrological Group C (Landcom, 2004). Runoff would occur under moderate rainfall events.
- Soils are Type F for the purpose of sediment control (Landcom, 2004); total capture (Type F/D) sediment basins will be required.
- Soils are Type C for basin wall construction i.e. they are aggregated materials that might not hold water, testing is recommended.

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3.4.4 Shoalhaven Soil Landscape

The Shoalhaven Soil Landscape is a fluvial soil landscape associated with the Shoalhaven River and its tributaries. It comprises flood plains, levees, backwater swamps and river terraces that are typically flat to gently undulating with slopes less than 3%. This soil landscape is the predominant one across the central areas of the development site. It has high to severe limitations to urban development (Hazleton P.A. (1992) (Table 3).

Table 3 – Soil Landscape Limitations for the Shoalhaven Soil Landscape

Limitation	Occurrence
Flooding	Widespread
Permanent waterlogging	Localised
Seasonal waterlogging	Widespread
Permanently high watertable	Widespread

Total soil depth is generally greater than 1.0m. Soils typically consist of sandy loam topsoil over sandy clay loam to sandy clay subsoil and have the following typical characteristics:

- Fertility is low
- Soils can be hardsetting
- Soils can have a low water-holding capacity
- Soils are strongly acidic
- Soils have a moderate Cation Exchange Capacity
- Subsoil is moderately erodible (K-Factor = 0.039) (Landcom, 2004)
- Soils are Hydrological Group C (Landcom, 2004). Runoff would occur under moderate rainfall events.
- Soils are Type F for the purpose of sediment control (Landcom, 2004); total capture (Type F) sediment basins will be required.
- Soils are Type C for basin wall construction i.e. they are aggregated materials that might not hold water, testing is recommended.

Based on the URA's topography, the extent of the Shoalhaven Soil landscape is shown to cover significant areas of the proposed development. Care should be taken in the allocation of land uses e.g. positioning/site selection for residential lots and road alignments. As a guide, development should only be allowed on this soil landscape if:

- The development is outside of the floodplain, or can be raised above it.
- Soils are not waterlogged or likely to become waterlogged; unless they can be adequately and permanently drained.
- Sufficient erosion controls are in place to limit soil loss during and after construction.
- Stormwater discharges from the site are at a velocity that does not cause scour during minor rain events.

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3.4.5 Nowra Soil Landscape

The Nowra Soil Landscape is a depositional landscape derived on the Nowra Sandstone. It occupies moderately to gently undulating rises and undulating low hills. Soil profiles commonly consist of sandy to clayey sand topsoil over clay loam to light clay subsoil.

Hazleton P.A. (1992) identifies the soil landscape has some limitations to urban development (Table 4) but, those constraints are localised and so the overall limitations to development is generally low.

Table 4 – Soil Landscape Limitations for the Coolongatta Soil Landscape

Limitation	Occurrence
Steep slopes	Localised
Mass Movement	Localised
Shallow Soils	Localised
Rock Outcrop	Localised
Water Erosion Hazard	Localised
Run-on	Localised

Other relevant characteristics of the Nowra Soil Landscape are:

- Fertility is moderate to high
- Soils can be hardsetting
- Topsoil is weakly structured
- Soils can be strongly acidic
- Soils have low to moderate Cation Exchange Capacity
- Topsoil is erodible (K-Factor = 0.47) (Landcom, 2004)
- Subsoil is moderately erodible (K-Factor = 0.02) (Landcom, 2004)
- Soils are Hydrological Group C (Landcom, 2004). Runoff would occur under moderate rainfall events.
- Soils are Type F or D for the purpose of sediment control (Landcom, 2004); total capture (Type F/D) sediment basins will be required.
- Soils are Type A for basin wall construction i.e. they are suitable for use in dam wall construction.

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Figure 5 – Soil Landscape Mapping (Hazleton P.A. ,1992) and Site Location (approx.)

3.5 Flooding

A detailed flood assessment has been undertaken for the URA by Rhelm (Rhelm, 2018). The study estimated the extent, depth and velocity of flood waters for the 1% Annual Exceedance Probability (AEP) flood (a rare flood) and for the Probable Maximum Flood (PMF) (the largest flood that could conceivably occur) and proposed an in-stream stormwater detention strategy. However given this approach is likely to increase velocities and the existing soil is erodible and sensitive to high velocities a traditional off line approach to storage has been adopted. The 1%AEP event is used for purposes such as the setting of design standards for new dwellings and the PMF is used for emergency management purposes. The study also reviewed the potential Flood hazard which is a function of flood depth and velocity and it is used to aid in evaluating areas where floodwaters pose a greater risk to life and property.

The estimated areas of inundation for the 1% AEP and the PMF are provided in Figure 6.

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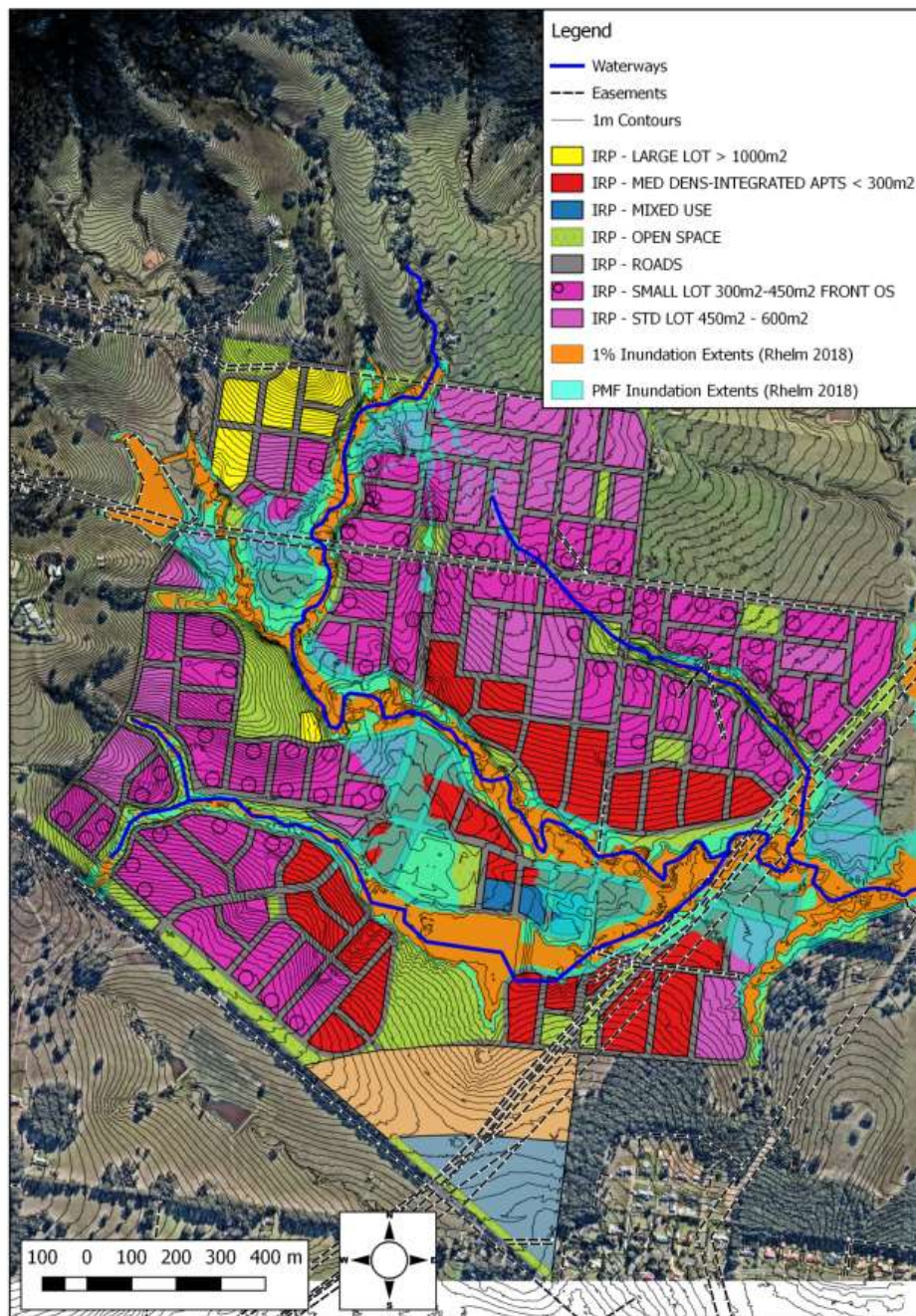


Figure 6 – Flood Extents (Data Source: Rhelm 2018)

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The flood modelling highlights that the 1% AEP flood is contained within the environmental conservation areas and is not expected to impact the proposed development area. During the PMF flow will break out and merge inundating the central region of the development. Some properties at the western and eastern end of the development will also be inundated.

The flood modelling highlights that the 1% AEP flood hazard is intermediate to high within the lower sections of the main flows paths however it is generally low along the areas of inundation. The high hazard area increases during the PMF.

Flood plans and additional information can be obtained in the Rhelm 2018 Flood Study and Riparian Lands Review.

As per the SLEP 2014, any new development must:

- Be compatible with the flood hazard of the land; and
- Not significantly adversely affect flood behavior resulting in detrimental increases in the potential flood affectation of other development or properties, and
- Incorporate appropriate measures to manage risk to life from flood, and
- Not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and
- Not result in unsustainable social and economic costs to the community as a consequence of flooding, and
- Not affect the safe occupation or evacuation of the land.

Clause 7.3 of the SLEP (2014) recommends the Flood Planning Level (FPL) be adopted as the 1% AEP flood level plus 0.5m freeboard. The Rhelm mapping indicates the proposed development area of the URA is higher than the 1% AEP and it is assumed that the 0.5m freeboard can be achieved.

Any filling above the 1% AEP flood level might impact larger, less frequent, events depending on the location of the filling. Detailed flood modelling of any proposed filling would be required to confirm that it does not impact any existing flood levels for adjacent properties for all flood events up to the Probable Maximum Flood (PMF).

Apart from filling low-lying areas, the hydrological regime of the catchment could also be impacted due to changes to land use through an increase in imperviousness and density of development. Potential impacts to local flows and their potential mitigation measures are presented in Section 6.

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The URA includes areas that are outside of the Flood Planning Area but are within the Probable Maximum Flood (PMF) extent. As such the DCP Chapter G9: Development on Flood Prone Land is applicable and should be included as a future design reference.

3.6 Drainage

The study area varies from around RL 79m AHD in the northern section to RL16m AHD in the east near Princes Highway. Slope gradients vary from up to approximately 20% in the western upper areas to 1% in the lower areas to the east. The development area is positioned high within the catchment where various steep Category 3 watercourses are present in the western upper areas and Category 2 watercourses exist through the middle areas of the development. All development areas drain towards Abernethys Creek.

3.7 Climate

The nearest rainfall station to the URA is the Nowra RAN Air Automatic Weather Station (AWS), Station Number 068072 which has been in operation since 2000. The mean annual rainfall is 939.0mm with no distinct wet season. Pan evaporation is relatively high and is approximately 1,670 mm/year. The average monthly rainfall statistics are presented in Table 5 and Figure 7.

Table 5 - Mean Monthly Rainfall - Nowra RAN AWS - Site number: 068072

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
74.9	145.8	116.9	59.7	55.4	108.8	64.7	80.7	41	65.5	81.9	73.7	939

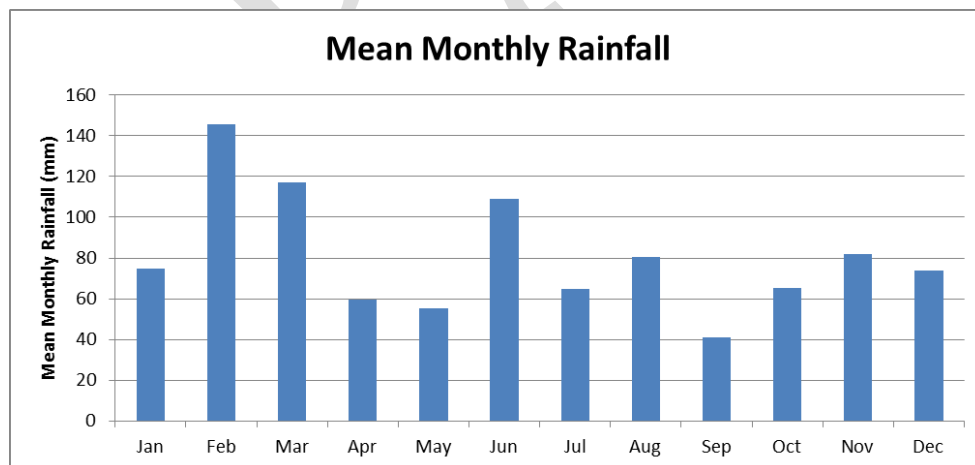


Figure 7 - Mean Monthly Rainfall

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4 Stormwater Management

The URA requires a stormwater management system that can convey nuisance stormwater runoff away from habitable areas in a sustainable manner and that complies with Council's Chapter G2 in the DCP 2014. Key outcomes include:

- Manage stormwater flow paths and systems to ensure the safety of people and property.
- Protect and enhance natural watercourses and their associated ecosystems and ecological processes.
- Maintain, protect and/or rehabilitate modified watercourses and their associated ecosystems and ecological processes towards a natural state.
- Mitigate the impacts of development on water quality and quantity.
- Encourage the reuse of stormwater.
- Integrate water cycle management measures into the landscape and urban design to maximise amenity.
- Minimise soil erosion and sedimentation resulting from site-disturbing activities.
- Minimise the potential impacts of development and other associated activities on the aesthetic, recreational and ecological values of receiving waters.
- Ensure the principles of ecologically sustainable development are applied in consideration of economic, social and environmental values in water cycle management.
- Ensure stormwater systems and infrastructure are designed, installed and maintained so as not to increase the risk to life or safety or people.
- Provide Green and Golden Bell Frog (GGBF) friendly stormwater detention ponds in areas where GGBF are present.

Council's key design objectives are listed in the sections below. It is expected that the URA will comply with all listed controls.

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4.1 Stormwater Quantity Controls

Hydrology controls required to be met are listed in Table 6 with reference to Council's Chapter G2: *Sustainable Stormwater Management and Erosion/Sediment Control*.

Table 6 - Stormwater Quantity Controls

Item	Chapter G2 Section
Minor stormwater system – residential areas - 5 year ARI	5.1.1
Minor stormwater system – mixed residential/commercial areas - 10 year ARI	
Major stormwater system - 100 year ARI Includes trunk stormwater systems e.g. open channels, large conduits and overland flow paths.	
Must ensure a velocity depth product of less than 0.3m ² /s for a 100 year storm event.	
Climate change impacts such as changes to rainfall intensities are incorporated into system design as per relevant policies and/or Australian Rainfall and Runoff (AR&R) Guidelines	5.1.3
OSD is to be sized to match pre-development peak flow rates for the 5, 20 and 100 year ARI rain events.	5.1.4
50% of any retention volume can contribute towards the OSD volume required for the development, provided the systems are interconnected.	

Note that Australian Rainfall & Runoff 2016 contains additional clauses for flood management but they have not been adopted as part of this study apart from those specified above.

4.2 Stormwater Reuse Controls

Council promotes the reuse of stormwater through the controls as listed in Table 7.

Table 7 - Stormwater Reuse Controls

Item	Chapter G2 Section
Residential buildings are encouraged to install rainwater tanks to meet a portion of supply such as outdoor use, toilets, laundry.	5.2.2
Stormwater use within public open space (irrigation, street cleaning, public amenities) is encouraged.	

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4.3 Stormwater Quality and Waterway Protection Controls

Council has specified controls to encourage a decentralised approach to stormwater management that considers the natural hydrological and ecological processes of the surrounding environment. This may include onsite collection, treatment and utilisation of water flows as part of an integrated treatment train provided either in addition to or, in lieu of, conventional stormwater treatment measures. Refer to Table 8.

Table 8 - Stormwater Quality and Waterway Protection Controls

Item	Chapter G2 Section
Develop an erosion and sediment control plan or soil and water management plan.	5.2.1
Stormwater retention – provide adequate retention storage volume where there is an increase in impervious surface area.	5.2.2
Pollutant load reductions: Gross pollutants – capture all litter greater than 40mm for flows up to the 4 Exceedances per Year (EY) event. Total Suspended Solids – 80% Total Phosphorus – 45% Total Nitrogen – 45% The 1.5 year ARI pre-development peak discharge must be maintained. The duration of stream forming flows must be no greater than a stream erosion index of 2.	5.2.4 <i>The adopted pollutant load reduction targets are the revised MUSIC targets proposed for Chapter G2 of the DCP</i>

5 Stormwater Quantity Modelling

The proposed change in land use will increase the level of imperviousness, which will increase stormwater peak flows and volumes. A DRAINS model was set-up using the ILSAX hydrological model to determine the total pre-development and post development flows from the URA. The model simulates all storm events ranging from 1 year ARI to 100 year ARI using the following parameters:

- Paved (impervious) area depression storage (mm) = 1
- Supplementary area depression storage (mm) = 1
- Grassed (pervious) area depression storage (mm) = 5
- Soil Type = 3
- AMC (Antecedent Moisture Condition) = 3
- Bureau of Meteorology 2016 rainfall depths (current at release of report)
- Australian Rainfall and Runoff 2019 temporal patterns (current at release of report)
- Sub-catchment areas
- Sub-catchment slopes

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5.1 Existing Flows

Sub-catchment areas were determined from existing contours and are tabulated below (Table 9), together with key catchment information such as catchment slope and expected Time of Concentration. The sub-catchment break-up for the existing land use is provided in Figure 8.

Table 9 - Existing Sub-Catchment Area Characteristics

Sub-Catchment	Area (ha)	% Impervious	Catchment slope (%)	Adopted Time of Concentration (mins)
1	14.6	4.6%	3.7%	25.7
2	15.3	0.3%	3.7%	25.2
3	7.5	0.0%	6.9%	20.6
4	8.6	0.0%	6.7%	21.3
5	13.8	1.0%	4.5%	24.6
6	8.5	1.5%	3.8%	23.0
7	17.2	4.2%	4.6%	23.6
8	12.4	0.0%	4.5%	23.3
9	14.4	3.6%	8.2%	20.5
10	5.3	2.9%	4.3%	18.9
11	2.1	0.8%	2.3%	16.2
12	8.5	2.9%	7.4%	19.0
13	8.1	5.2%	2.3%	21.9
14	8.0	5.6%	1.9%	21.2
15	7.7	0.0%	3.7%	22.2
16	11.6	0.0%	4.9%	21.9
17	21.7	3.6%	7.6%	24.8
18	32.1	5.1%	3.6%	31.5
19	3.2	0.8%	2.9%	17.5
20	24.6	2.8%	4.7%	29.1
21	5.8	3.4%	1.9%	20.0
22	0.8	0.0%	1.6%	17.9
23	83.3	0.1%	26.4%	32.2
24	4.8	1.5%	4.5%	21.0
25	8.2	7.6%	4.1%	21.4
26	26.9	0.5%	16.3%	22.8
27	51.4	1.3%	22.6%	27.7
28	5.3	1.2%	2.6%	19.6
29	14.5	2.1%	5.2%	24.2
30	3.4	0.9%	10.6%	13.4
31	7.8	0.0%	7.7%	18.8
TOTAL	457.29			

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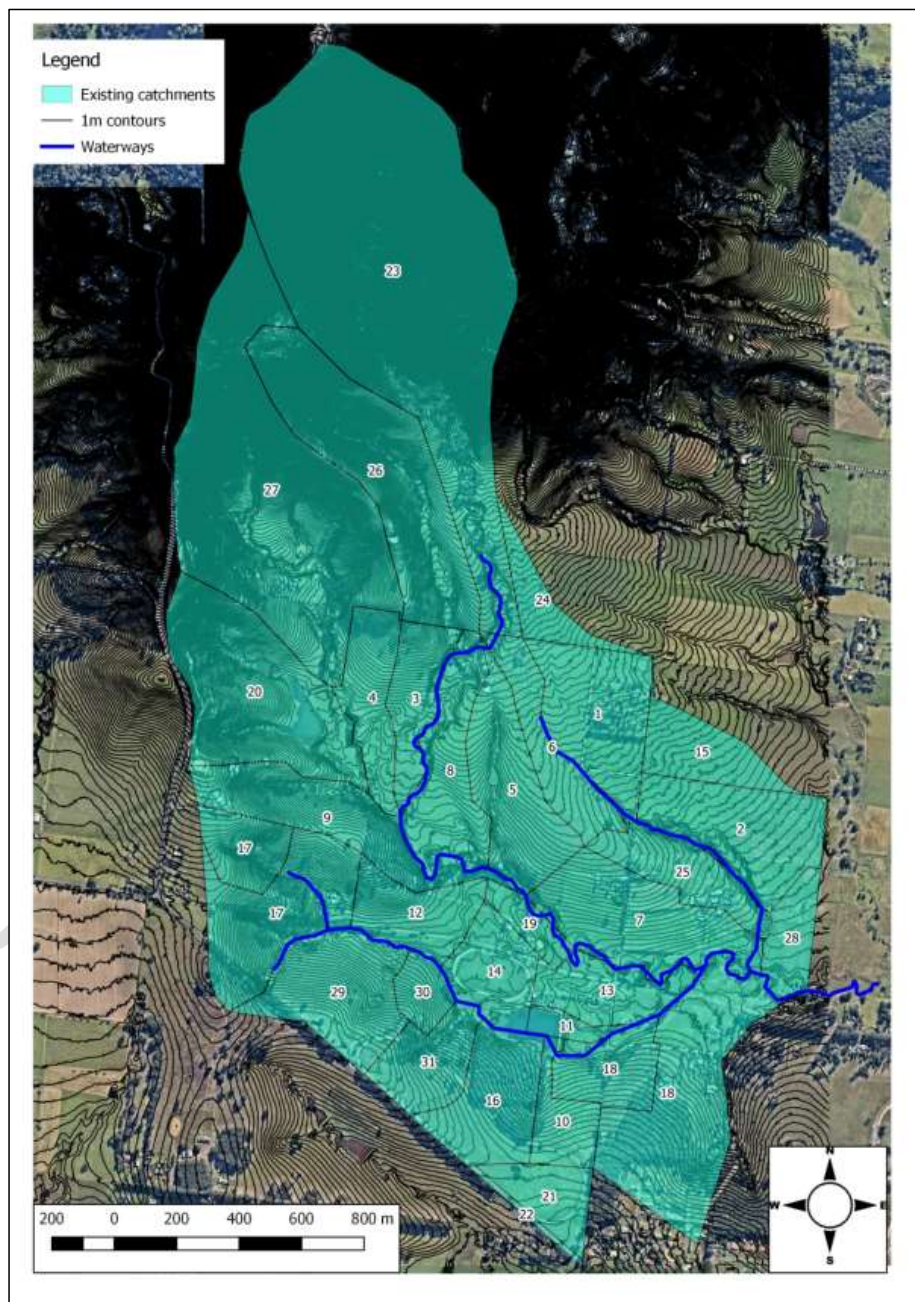


Figure 8 - Existing Catchments

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The model has two discharge locations. The main one is Abernethys Creek which discharges eastward downstream of sub-catchment 28. The other is the discharge from sub-catchments 21 and 22 which drain towards the south.

Table 10 - Existing Catchment Peak Flows

Sub-catchment	Flow (m3/s)		
	0.2EY AEP (5 year)	5% AEP (20 year)	1% AEP (100 year)
Discharge Point East	28.9	47.3	74.3
Discharge Point South	0.662	1.17	1.92

These flows were compared against the Australian Rainfall and Runoff Regional Flood Frequency Estimate to provide confidence in the DRAINS model results. The RFFE estimated the following peak flows for the existing catchment at the eastern discharge point (Abernethys Creek).

Table 11 - RFFE - Discharge Point East

Estimated Flood Quantiles	Flow (m3/s)		
	0.2EY AEP (5 year)	5% AEP (20 year)	1% AEP (100 year)
Expected Quantiles	19.4	43.6	88.1
5% Confidence Limit	7.06	15.8	30.9
95% Confidence Limit	53.2	120	254

The DRAINS peak flows are within the expected flow range predicted by the RFFE. The DRAINS 5% AEP (20 year) peak flow is within 10% of the predicted RFFE flows. The DRAINS 0.2 EY AEP (5 year) peak flow is around 33% higher and the 1% AEP (100 year) peak flow is around 19% lower than the RFFE expected flows. Although the absolute peak flows estimated by DRAINS for these two storm events doesn't match the estimated RFFE flows, the expected impact from development (i.e. increase in peak flows) is expected to be accurate as the same model assumptions are used in the existing and developed models. A summary of the RFFE is provided in Appendix A.

It is worth noting that the detailed flood assessment by Rhelm estimated the 1% AEP peak flow to be 45m³/s at the downstream boundary (discharge point east) which is around 39% lower than the DRAINS estimate. It is expected that this is due to the different hydrological rainfall-runoff models used to calculate flow hydrographs which result in the different models calculating different peak flows. As there is no data to calibrate either model it is difficult to confirm the accuracy of either model and the discrepancy can be further investigated during concept design.

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5.2 Developed Flows

The developed sub-catchments were identified from the indicative layout plan are tabulated below (Table 12) and shown in Figure 9.

Table 12 - Developed Sub-Catchment Areas

Catchment / Pit Name	Area (ha)	Roof - Paved (ha)	Total Mixed Area (ha)	% Paved / Impervious	% Grass / Pervious	Time of Concentration (mins)
Catch_1	14.52	4.94	9.57	60.3%	39.7%	14.4
Catch_2	12.70	4.75	7.95	68.5%	31.5%	13.4
Catch_2 Open Space	2.24	0	2.24	25.0%	75.0%	15.0
Catch_3	5.57	1.56	4.01	69.9%	30.1%	11.8
Catch_4	6.35	1.74	4.60	65.2%	34.8%	12.0
Catch_3&4 Open Space	4.12	0.000	4.12	25.0%	75.0%	15.0
Catch_5	12.90	5.35	7.55	68.5%	31.5%	14.1
Catch_5 Open Space	0.93	0	0.93	25.0%	75.0%	15.0
Catch_6	8.55	2.93	5.63	56.0%	44.0%	14.6
Catch_7	12.06	6.12	5.94	80.6%	19.4%	13.3
Catch_7 Open Space	5.15	0	5.15	25.0%	75.0%	15.0
Catch_8	8.37	3.26	5.11	66.2%	33.8%	12.9
Catch_8 Open Space	4.03	0	4.03	25.0%	75.0%	15.0
Catch_9	3.73	1.296	2.43	70.2%	29.8%	7.8
Catch_9E	5.53	0.000	5.53	0.0%	100.0%	20.5
Catch_9 Open Space	5.10	0.000	5.10	25.0%	75.0%	15.0
Catch_10	5.26	0.16	5.10	38.5%	61.5%	8.7
Catch_11	2.09	0.00	2.09	36.8%	63.2%	15.0
Catch_12 (+ 17B)	14.12	4.27	9.85	58.7%	41.3%	11.9
Catch_13	5.25	1.32	3.93	87.8%	12.2%	10.0
Catch_13 Open Space	2.81	0	2.81	25.0%	75.0%	15.0
Catch_14 Open Space	4.15	0	4.15	25.0%	75.0%	15.0
Catch_14	3.99	1.88	2.11	89.1%	10.9%	8.7
Catch15	7.69	0.00	7.69	0.0%	100.0%	22.2
Catch_16	6.31	0.24	6.07	29.7%	70.3%	10.0
Catch_16 Open Space	5.30	0	5.30	25.0%	75.0%	15.0
17E (100)	5.81	0.21	5.60	0.0%	100.0%	24.8
Catch_17 (B)	10.27	1.73	8.54	27.4%	72.6%	8.8
Catch_18A	3.13	1.42	1.71	40.4%	59.6%	10.0
Catch_18	12.70	5.57	7.14	77.2%	22.8%	12.6
Catch_18E	16.58	0	16.58	25.0%	75.0%	15.0
Catch_19	1.82	0.94	0.88	86.5%	13.5%	8.8
Catch_19 Open Space	1.35	0	1.35	25.0%	75.0%	15.0
Catch_20	1.97	0.576	1.40	65.9%	34.1%	6.7

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Catchment / Pit Name	Area (ha)	Roof - Paved (ha)	Total Mixed Area (ha)	% Paved / Impervious	% Grass / Pervious	Time of Concentration (mins)
Catch_20E	22.63	0.000	22.63	3.5%	96.5%	31.5
Catch_21	5.78	2.91	2.87	76.6%	23.4%	8.9
Catch_22	0.86	0.00	0.86	28.4%	71.6%	5.0
Catch_23	83.27	0.08	83.18	0.0%	100.0%	32.2
Catch_24	4.79	0.07	4.72	0.0%	100.0%	21
Catch_25	6.70	3.00	3.70	58.7%	41.3%	10.6
Catch_25 Open Space	1.15	0	1.15	25.0%	75.0%	15.0
Catch_26	26.89	0.13	26.76	0.0%	100.0%	22.8
Catch_27	51.41	0.67	50.74	0.0%	100.0%	27.7
Catch_28	4.59	1.80	2.79	68.1%	31.9%	10.3
Catch_28 Open Space	0.65	0	0.65	25.0%	75.0%	15.0
Catch_29	11.07	4.51	6.56	65.6%	34.4%	10.7
Catch_29 Open Space	3.56	0	3.56	25.0%	75.0%	15.0
Catch_30	3.05	1.76	1.29	82.7%	17.3%	7.8
Catch_30 Open Space	0.38	0	0.38	25.0%	75.0%	15.0
Catch_31	6.79	3.18	3.61	76.6%	23.4%	9.2
Catch_31 Open Space	1.00	0	1.00	25.0%	75.0%	15.0
TOTAL	457.04					

The roof area and % paved/imperviousness was calculated based on the impervious area provided in Chapter G2 of Shoalhaven DCP as provided in Table 13.

Table 13 - Developed Sub-Catchment Area Assumptions

Land Use	Impervious Area (%) (based on G2)	Average Allotment Area (m2)	House densities (Dwellings / ha)	Nominal Roof Area (m2)
Large Lot Residential	60%	1000	10	300
Standard Lot Residential	70%	500	20	300
Small Lot Residential	80%	400	25	300
Medium Density / Integrated Residential Housing	80%	250	40.0	250
Public Open Space	25%	10000	1.0	0
Sealed Roads	100%			0
Mixed Use	80%	1000	10.0	0
Business Park	90%	1000	10.0	700
Rural Uses	30%	10000	1.0	500

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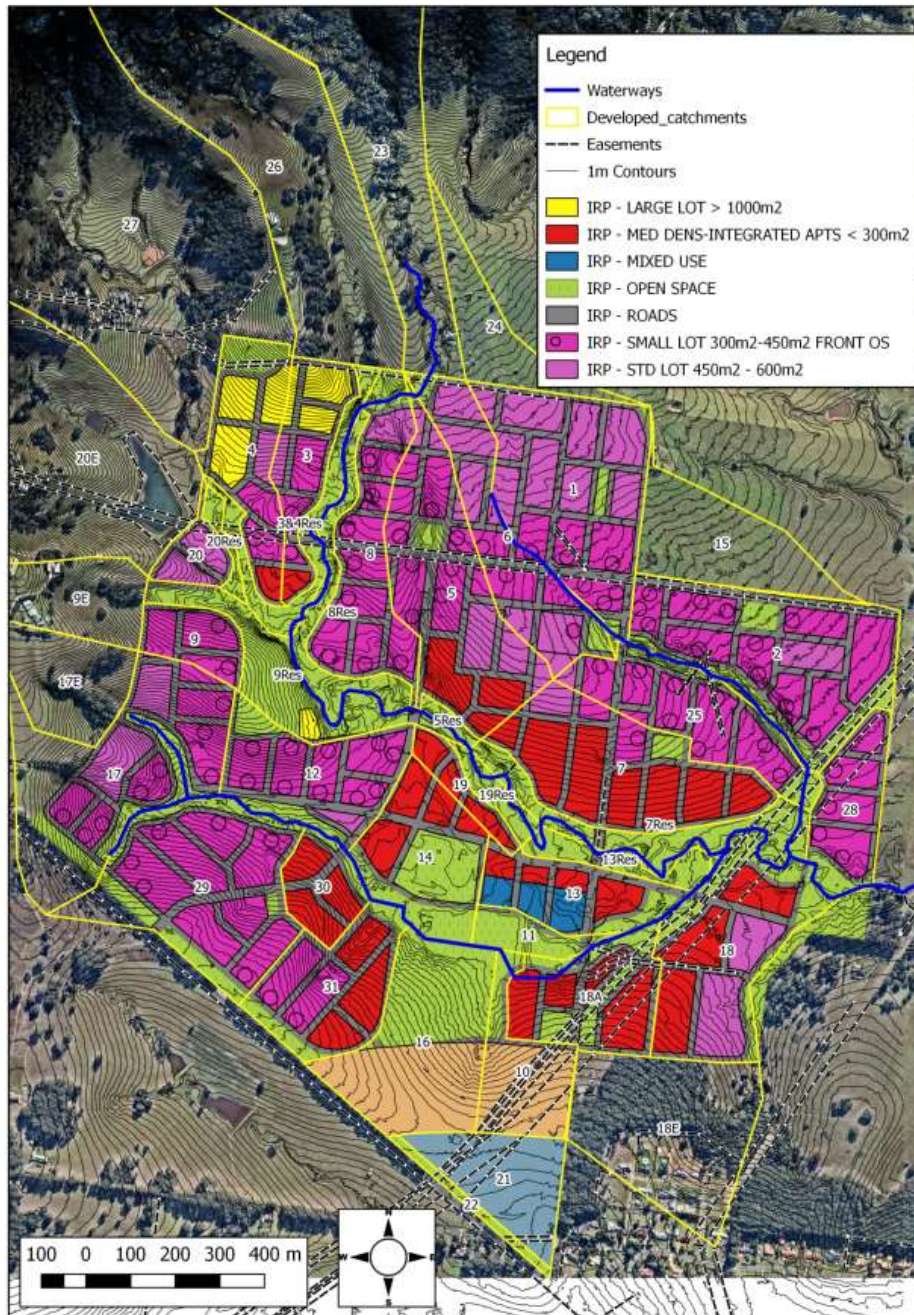


Figure 9 – Estimated Developed Catchments

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The developed DRAINS model included additional storage from rainwater tanks (2kL at each household as described in Section 7.3), extended detention at some bio-filtration basins and the wetlands and their associated sediment forebays. Further discussion on WSUD elements is provided in Section 6. The DRAINS model predicted the following peak flows at each discharge point after development with no mitigation.

Table 14 - Developed Catchment Peak Flows

Sub-catchment	Flow Event		
	0.2EY AEP (5 year)	5% AEP (20 year)	1% AEP (100 year)
Discharge Point East	34.2	57.3	90.9
Discharge Point South	1.55	2.21	3.22

The model indicates that peak flows at both discharge points have increased and require additional On-site Detention as shown by the table below.

Table 15 - Impact to Peak Flows from Proposed Development

Sub-catchment	Flow Event		
	0.2EY AEP (5 year)	5% AEP (20 year)	1% AEP (100 year)
Discharge Point East	18.34%	21.14%	22.34%
Discharge Point South	134.14%	88.89%	67.71%

The increase in peak flows for the eastern discharge point appears low as the modelling includes the upstream catchment that will remain undisturbed. When this area is removed the increase in peak flows will increase as expected in the table below.

Table 16 - Impact to Peak Flows from Proposed Development Without Upstream Catchment Areas

Sub-catchment	Flow Event		
	0.2EY AEP (5 year)	5% AEP (20 year)	1% AEP (100 year)
Existing	16.7	28.4	47.4
Developed	33.1	52.0	77.1
Discharge Point East	98.20%	83.10%	62.66%

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5.3 On-site Detention

The DRAINS model has shown that additional onsite detention is required to mitigate the change in imperviousness associated with the URA. Various storage sizes were modelled until the peak discharges were no greater than the predicted existing peak flows. The required onsite detention storages for each discharge location and the change in peak flows is provided in the tables below. These storage volumes are in excess of the 2 kL rainwater tank allowance for each property. The values in the tables below include the extended detention at some bio-filtration basins and the wetland and their associated sediment forebays. The detention basin was modelled assuming the permanent pool was not available for on-site storage (i.e. it is full at the start of the rain event) with an extended detention of 0.4m above the pool to a spillway.

The actual storage volumes adopted by future development may change slightly depending on the outlet configuration (i.e. outlet pipe, overflow weir size etc.), however it is expected that the storage would be similar to the volumes listed below.

Table 17 - On-site Detention Volumes – 1% AEP Event

1% AEP Flows	Discharge Point East	Discharge Point South
Pre-Development Flows (m3/s)	74.3	1.92
Post-Development Flows (m3/s)	70.2	1.36
Total Change in Peak Flow (m3/s)	-4.1	-0.56
Basin Storage Required (m3)	37,776.9	2,446.7

The location of the basins is provided in Figure 10 and their relative sizing is provided in Table 18.

Table 18 - On-site Detention Volumes

Basin	Storage Volume (m3)		
	1% AEP	5% AEP	0.2Ey AEP
Sediment Forebay of Wetland	5,865.39	4,246.95	3,344.72
Wetland	11,297.08	9,018.09	7,255.03
Detention Basin	16,671.46	13,622.72	10,863.77
Basin D – (bio 5&8)	3,943.00	2,601.31	1,799.73
Total - East	37,776.93	29,489.07	23,263.25
Basin H – (bio 21)	2,446.67	2,039.50	1,318.31
Total - South	2,446.67	2,039.50	1,318.31

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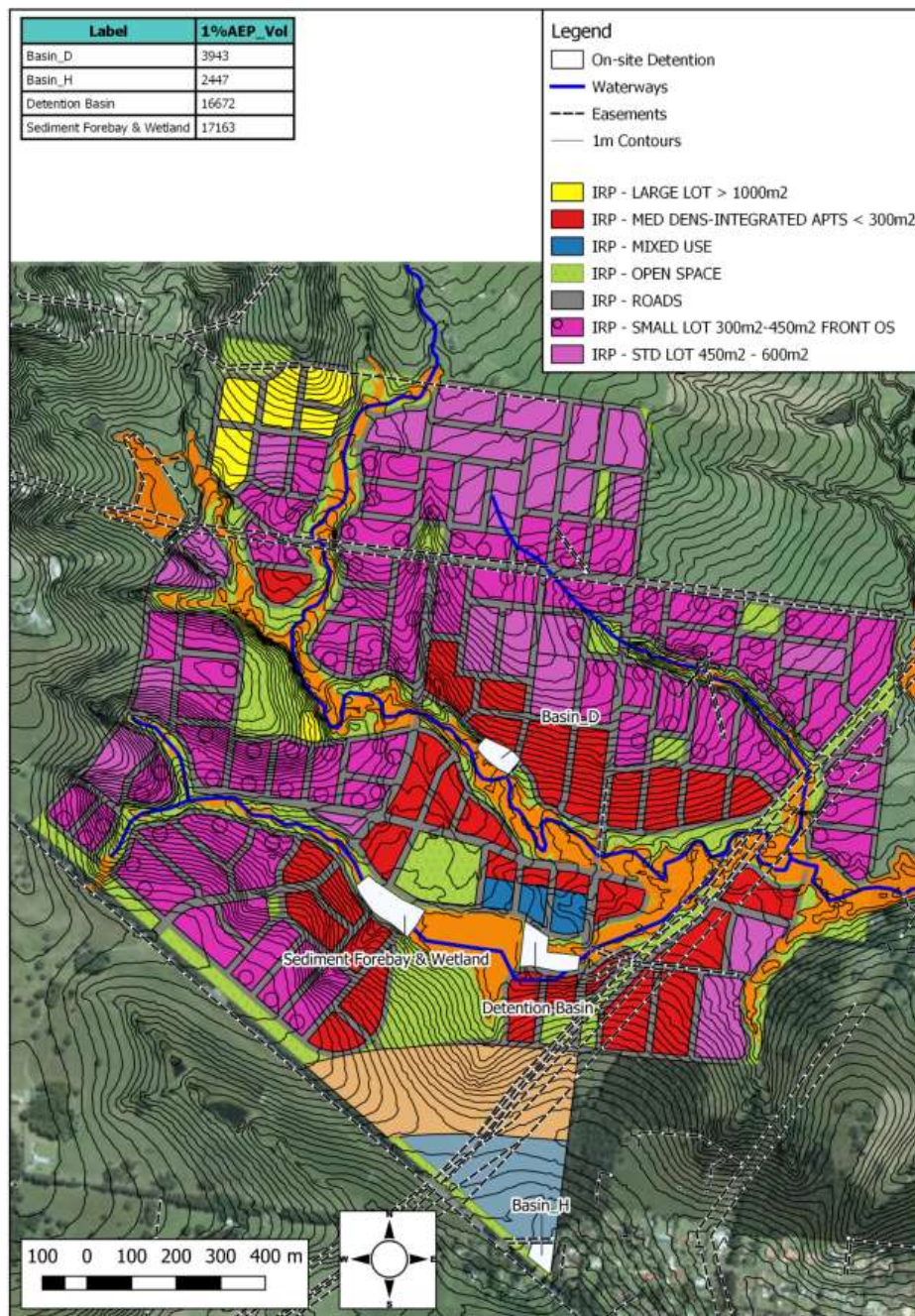


Figure 10 – Proposed Location of On-Site Detention

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A summary of the pre and post development flows for the 5% AEP and the 0.2EY AEP are provided below.

Table 19 - On-site Detention Volumes – 5% AEP (20 year) Event

5% AEP (5 year) Flows	Discharge Point East	Discharge Point South
Pre-Development Flows (m3/s)	47.3	1.17
Post-Development Flows (m3/s)	47.3	0.542
Total Change in Peak Flow (m3/s)	0.0	-0.628
Basin Storage Required (m3)	29,489.1	2,039.5

Table 20 - On-site Detention Volumes – 18.13% AEP (5 year) Event

0.2EY AEP (5 year) Flows	Discharge Point East	Discharge Point South
Pre-Development Flows (m3/s)	28.9	0.662
Post-Development Flows (m3/s)	27.4	0.351
Total Change in Peak Flow (m3/s)	-1.5	-0.311
Basin Storage Required (m3)	23,263.3	1,318.3

The model results indicate that the peak flows from development can be attenuated with the nominated storage volumes for all modelled events.

The proposed on-line detention basin will require an emergency spillway to control overflows in very rare and extreme events. As there is a proposed road immediately downstream of the basin, consideration will be required on how to integrate the spillway with the road and maintain access/limit damage from overflows.

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6 Selection of WSUD Measures

6.1 Introduction

The selection of appropriate WSUD measures requires an understanding of a range of issues to ensure the appropriate measures are adopted. In its simplest form, the selection of WSUD requires an understanding of the types and loads of pollutants and what measures might be effective in reducing the targeted loads. The key issues impacting this include an understanding of the:

- proposed land use of the catchment
- expected soil types and potential erodibility
- catchment topography
- major flow paths and areas of flood inundation
- ecological buffer areas
- safety concerns
- public expectations / concerns
- potential groundwater influences
- desire for centralised or de-centralised systems
- construction, operational and maintenance costs
- experience of maintenance staff
- potential additional benefits such as ecological, aesthetic, social amenity, alternate water supply/reuse etc.
- legislative requirements.

6.2 Pollutants of concern

The pollutant concentrations for typical urban environments are generated from erosion of soils, fertilization of vegetation, vehicle movement and wear, increased runoff etc. They range from gross pollutants to particulate and soluble contaminants. They include:

- gross pollutants and litter
- total suspended solids
- nutrients (phosphorous and nitrogen)
- biological oxygen demand and chemical oxygen demand
- pesticides and herbicides
- heavy metals
- hydrocarbons

Some of these pollutants are not easily modelled using MUSIC stormwater quality modelling but it is widely accepted that if the nutrient and total suspended solids loads are reduced any associated pollutants of concern would also be reduced.

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6.3 Opportunities and Constraints to Urban Development

Table 21 presents the opportunities and constraints to urban development identified for the URA.

Table 21 - Opportunities and Constraints

Item	Opportunity	Constraint
Land use	Diverse range of land uses from large lot to medium density integrated housing. A number of open spaces are included which will provide room for overland flow paths and WSUD treatments.	Small lot and integrated housing will have very little space for disconnection of impervious surface and will rely more on open space networks or regional scale systems. Large lot areas may be more suitable to allotment style treatments
Soil	The soil landscape has overall only moderate limitations to urban development.	- The soils vary from a loam with fine sandy topsoil to silts and clays. - The soils can suffer moderate to severe stream bank erosion. - The soils are moderately erodibility. - The soils are generally fine grained. - soils are infertile
Topography	Gently sloped 1%-5% in most areas. Three main flow paths through the URA.	Steeper sections to the south and east of the area of up to 16%.
Major Flow Paths and Flooding	The site appears to be higher than the 1% AEP Flood Planning Level (FPL). The major overland flow paths have been identified and locked away from future development.	Two of the flow paths join in the Probable Maximum Flood (PMF) inundating the central region of the site. Some properties at the eastern end of the development will also be inundated.
Ecological Buffers	The habitat corridor is zoned E2 environmental conservation and is protected from urban development.	Under SLEP 2014, a small part of the URA is mapped for terrestrial biodiversity (habitat corridor).
Safety Concerns		Any permanent ponded water bodies must be safe and have fencing to prevent access or include appropriate batter slopes.

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6.4 WSUD Selection

The selection of appropriate WSUD elements will depend on the opportunities and constraints of the individual site as listed in Table 22. Potential WSUD elements and their relevance to catchment characteristics are listed in the following tables.

Table 22 – Scale and Effectiveness of WSUD Measures (Source HW, 2006)

WSUD Measure	Allotment Scale	Street Scale	Precinct or Regional scale	Water Quality Treatment	Peak Flow Attenuation *	Reduction in Runoff Volume *
Rainwater tanks	✓			L	M	M
Gross pollutants Traps		✓		L	L	L
Swales and buffer strips		✓		M	L	L
Biofiltration swales		✓	✓	H	M	L
Sedimentation basins			✓	M	M	L
Biofiltration basins	✓	✓	✓	H	M	L
Constructed wetlands		✓	✓	H	H	L
Infiltration measures	✓	✓		H	H	H
Sand filters	✓	✓		M	L	L
Aquifer storage and recovery			✓	H	H	H

H – High, M – Medium, L – Low

* Frequent Events Only

Table 23 – Site Constraints for WSUD Measures (Source HW, 2006)

WSUD Measure	Steep site	Shallow bedrock	Low permeability soil	High permeability soil	High sediment input	Land availability	Acid Sulfate Soils
Gross Pollutant Traps	D	D	✓	✓	D	✓	D
Swales and buffer strips	C	D	✓	✓	D	C	D
Biofiltration swales	C	C	✓	✓	D	C	C
Sedimentation basins	C	✓	✓	✓	✓	C	✓
Biofiltration basins	C	D	✓	✓	C	C	D
Constructed wetlands	C	D	✓	D	D	C	C
Infiltration measures	C	C	C	✓	C	C	C
Sand filters	C	✓	✓	✓	C	✓	✓
Aquifer storage and recovery	C	C	C	✓	C	C	C

C – Constraint may preclude use, D – Constraint may be overcome through appropriate design, , ✓ Generally not a constraint

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Table 24 – Target Particle Size Range of WSUD Measures (Source Lloyd et al, 2002)

Particle Size Gradings	Treatment Measures	Hydraulic Loading $Q_{des}/A_{facility}$
Gross solids > 5000µm	Gross Pollutant Traps	1,000,000 m/yr 100,000 m/yr
Coarse to medium-sized particulates 5000µm - 125µm	Sediment Basins (Wet & Dry)	50,000 m/yr 5,000 m/yr
Fine particulates 125µm - 10µm	Grass Swales & Filter Strips	2,500 m/yr 1,000 m/yr
Very fine colloidal particulates 10µm – 0.45µm	Surface Flow Wetlands	500 m/yr 50 m/yr
Dissolved particulates < 0.45µm	Infiltration Systems Sub Surface Flow Wetlands	10 m/yr

Based on the opportunities and constraints, it is recommended that the following WSUD treatment measures be considered.

- Rainwater tanks;
- Gross Pollutant Traps;
- Sediment basins (during construction); and
- Biofiltration basins

It is expected that any on-site detention basins would also act as sediment basins and assist with improving water quality.

The adoption of rainwater tanks will be decentralised, (i.e. on every allotment); however the remaining treatment measures will be regionalized to allow a more efficient treatment system with fewer treatment measures within easily accessible areas.

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It has been assumed that each new dwelling would be fitted with a rainwater tank to capture roof runoff. Each tank would:

- i. Have a capacity of 4,000 L (minimum).
- ii. Have the top 2,000 L of the tank(s) dedicated to on-site detention.
- iii. Have a first-flush device.
- iv. Be screened to prevent the entry of leaves, twigs and mosquitos.
- v. Be plumbed to toilet and laundry, and at least one outdoor tap.
- vi. Overflow to a nearby kerb and gutter.
- vii. Be topped up from mains supply and that would require a back-flow prevention valve.

The proposed layout of adopted WSUD measures is shown in Figure 11.

We have included only a limited length of vegetated swales (150m) as it was assumed that kerb and channel would be preferred. However, the use of vegetated swales where possible would be encouraged. The swales would provide additional water quality treatment through slowing down velocities, encouraging sedimentation, filtering and encourage infiltration.

¹ The State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 requires a rainwater tank of between 3,000L and 5,000L hence an average total volume 4,000L was adopted for this study. A larger BASIX tank volume may apply to some areas of the development and this could result in a small reduction in the footprint of some stormwater treatment devices. This can be investigated further during a later design stage.

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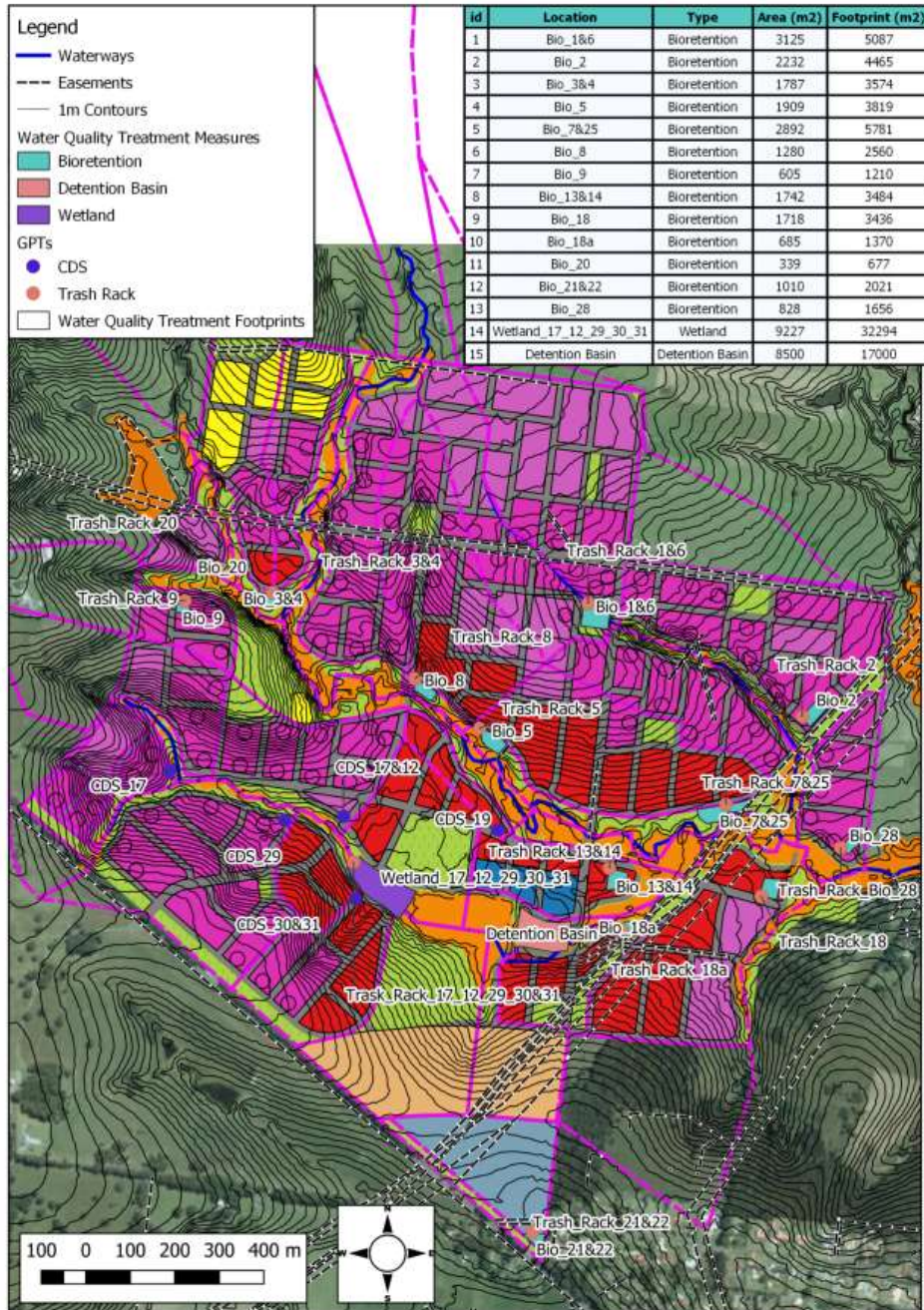


Figure 11 – WSUD Layout

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7 Stormwater Quality Modelling

Pre and post development sediment and nutrient loads were modelled using MUSIC (Model for Urban Stormwater Improvement Conceptualisation), developed by the CRC for Catchment Hydrology (now eWater).

MUSIC contains algorithms based on the known stormwater runoff, pollutant generation from typical land uses and the performance characteristics of common stormwater quality treatment measures. These data are derived from research undertaken by eWater and others in Australia and overseas. To comply with Council's DCP, the models have been developed using MUSIC default parameters from the 2010 DRAFT NSW MUSIC Modelling Guidelines developed by the Sydney Metropolitan Catchment Management Authority. Statistics are produced in MUSIC for the following parameters:

- Flow (ML/yr)
- TSS - Total Suspended Solids (kg/yr)
- TP - Total Phosphorus (kg/yr)
- TN - Total Nitrogen (kg/yr)
- Gross Pollutants (kg/yr).

The MUSIC model does not cater for hydrocarbons or heavy metals. However, it is assumed if the total suspended solids are reduced, then any associated/attached pollutants will also be reduced.

7.1 Climate Data Selection

Creation of a MUSIC catchment file requires an associated meteorological data file. CMA (2010) recommends using data obtained from the Bureau of Meteorology's pluviograph rainfall station at Nowra for the period 1964 to 1970 (Rainfall Station 68076 - Nowra RAN Air). However, that data has a mean annual rainfall value of just 874 mm and so is not suitable². Therefore, Nowra data from 1970 to 1975 was used as that has a higher mean annual rainfall (1,191 mm). Basic rainfall and evapotranspiration statistics are in Table 25 and the time-series graph is in Figure 12.

² Nowra's mean annual rainfall is 901.5 mm

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Table 25 - Rainfall and PET statistics adopted

Meteorological Data Statistics		
	Rainfall/6 Minutes	Evapo-Transpiration
mean	0.014	3.491
median	0.000	2.820
maximum	15.180	6.290
minimum	0.000	1.110
10 percentile	0.000	1.190
90 percentile	0.001	6.100
	Rainfall	Evapo-Transpiration
mean annual	1191	1275
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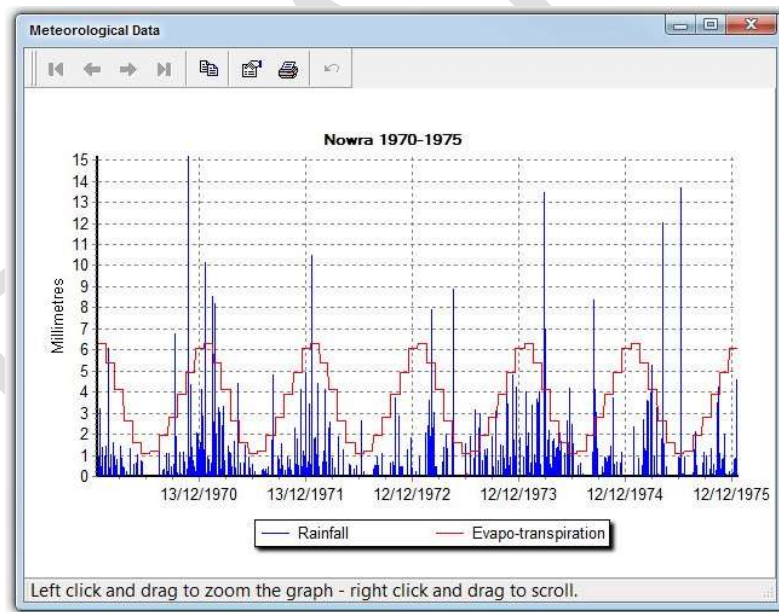


Figure 12 - Rainfall and PET Statistics

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7.2 MUSIC Data

The DRAFT MUSIC modelling guideline states all urban residential lots and urban parklands are to be modelled as residential land use. There are other categories for sealed roads and roofs, both of which will be defined separately in the MUSIC model. The guidelines also include a category for rural residential land but, for this URA, the large lots are not considered big enough to meet the description and so the normal residential pollutant and runoff parameters have been adopted but, the level of imperviousness was reduced appropriately. The following land uses have been adopted in the MUSIC model:

- Large lot residential
- Standard lot residential
- Small lot residential
- Medium density / integrated residential housing
- Open space (reserves)
- Sealed Roads

The adopted level of imperviousness for developed land uses is presented in Table 26.

Table 26 – Determination of % Imperviousness used in MUSIC

Density	Lots/ha	% Impervious (non-roof)
Large Lot Residential	10	7%
Standard Lot Residential	20	25%
Small Lot Residential	25	60%
Medium Density / Integrated Residential Housing	40.0	100%
Public Open Space	-	0%
Sealed Road Corridors	0	60%
Mixed Use	10	33%

Table 27 summarises the adopted stormflow concentration parameters for the various land uses.

Table 27 - Storm flow concentration calibrations used in MUSIC

	TSS mean (log mean)	TSS std dev (log std dev)	TP mean (log mean)	TP std dev (log std dev)	TN mean (log mean)	TN std dev (log std dev)
Residential land	141 (2.15)	2.1 (0.32)	0.25 (-0.60)	1.8 (0.25)	2 (0.30)	1.55 (0.19)
Sealed road	269 (2.43)	2.1 (0.32)	0.5 (-0.30)	1.8 (0.25)	2.19 (0.34)	1.55 (0.19)
Roof	20 (1.30)	2.1 (0.32)	0.13 (-0.89)	1.8 (0.25)	2 (0.3)	1.55 (0.19)

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The pervious area characteristics have been selected based on the soil characteristics (loam – sandy/loam) of the site and are in Table 28. They are based on the method described in Section 3.6.4 of CMA (2010).

Table 28 - Pervious area calibrations used in MUSIC

Parameter	Residential	Roof	Sealed Roads
Rainfall Threshold (mm)	1.5	0.3	1.5
Soil storage capacity (mm)	120	N/A	N/A
Initial storage (% of capacity)	25	N/A	N/A
Field capacity (mm)	87	N/A	N/A
Infiltration capacity coefficient (mm/d)	250	N/A	N/A
Infiltration capacity exponent	1.3	N/A	N/A
Groundwater initial depth (mm)	10	N/A	N/A
Daily recharge rate (%)	60	N/A	N/A
Daily base flow rate (%)	45	N/A	N/A
Daily deep seepage rate (%)	0	N/A	N/A

7.3 Other Assumptions

For the purpose of modelling we have assumed:

- Each new lot will be developed with a house having a roof area of around 300m² and 80% of the roof area will drain to a rainwater tank.
- The remaining land on each lot has an impervious area sufficient to ensure that the total level of imperviousness equals the DCP requirement.
- Each new home would have a 4 kL rainwater tank with 2 kL of that dedicated to domestic use. The other 2 kL is available for on-site detention. The anticipated demands on that 2 kL are:
 - Indoor use at 470 L/day per house (based on a four-bedroom home – toilet and laundry use (SCA, 2012)).
- The bio-filtration filter media will be 500mm deep (excluding the drainage layer), having an initial hydraulic conductivity of 200mm/hr, and an extended detention depth of 0.3m. The bio-filtration basins will be constructed offline with a high flow bypass equal to the peak flow from the 1 EY event.
- Vegetated swales have generally not been modelled (only 150m in catchments 10 and 16). However, if they are to be adopted it is assumed they would be used in open spaces and large lots where possible and have a minimum base width of 1m, side slopes no steeper than 1 in 4, a depth of at least 500mm deep, and vegetation height of around 250mm. They are to have longitudinal grades between 0.5% and 4%.
- The bio-filtration basins should include a coarse sediment forebay to cater for an expected sediment load of approximately 0.6m³/ha/year. It is anticipated that the

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volume of the forebay would be sufficient so that maintenance is restricted to a quarterly basis.

- Each biofiltration basin includes an upstream Gross Pollutant Trap (GPT) or trash rack that is expected to capture gross pollutants and any associated pollutants such as coarse sediment in accordance with DCP G2. The GPT can be combined with the coarse sediment forebay if it is capable of retaining coarse sediment.

The adopted approximate areas and volumes for the bio-filtration water quality treatments are below in Table 29.

Table 29 – Adopted Bio-filter Treatment Area

WSUD Element	Bio-Filter Area (m²)	Bio-filter Pond Area (m²)	Sediment Forebay Area (m²)	Total Bio-filtration Area (m²)
Bio-filtration 1 & 6	2390	2525.0	600.0	3125.0
Bio-filtration 2	1690	1804.0	428.0	2232.0
Bio-filtration 3 & 4	1334	1437.0	350.0	1787.0
Bio-filtration 5	1460	1567.0	342.0	1909.0
Bio-filtration 7 & 25	2259	2392.0	500.0	2892.0
Bio-filtration 8	923	1009.0	271.0	1280.0
Bio-filtration 9	418	475.0	130.0	605.0
Bio-filtration 13&14	1300	1400.0	342.0	1742.0
Bio-filtration 18	1280	1382.0	336.0	1718.0
Bio-filtration 18A	492	556.0	129.0	685.0
Bio-filtration 20	220	264.0	75.0	339.0
Bio-filtration 21	722	798.0	212.0	1010.0
Bio-filtration 28	587	656.0	172.0	828.0

The detention basin was modelled in MUSIC with the following properties:

- Basin area:- 8,500m²
- Extended detention depth:- 0.4.

The wetland was modelled with the following properties:

- Inlet pond volume:- 4,000m³
- Surface area:- 6,150m²
- Permanent Pool Volume:-1,230m³
- Extended detention depth:- 0.4
- Nominal water depth above the macrophyte zone:- 100mm-400mm.

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7.4 Modelling Results

The MUSIC model was run to estimate annual pollutant loads and expected reductions for the key stormwater pollutants; the results are given in Table 30.

Table 30 - MUSIC Results³

	Sources (Unmitigated Loads)	Residual Load (After Treatment)	% Reduction
Flow (ML/yr)	1.97E+03	1.77E+03	10.2
Total Suspended Solids (kg/yr)	3.29E+05	6.450E+04	80.4
Total Phosphorus (kg/yr)	634	234	62.9
Total Nitrogen (kg/yr)	4.27E+03	2.35E+03	45
Gross Pollutants (kg/yr)	3.93E+04	36.7	99.9

The required target pollutant removals of 80% for Total Suspended Solids, 45% for Total Phosphorus and 45% for Total Nitrogen have all been met.

7.5 Wetland Water Levels

As part of the MUSIC modelling, a review of the wetland storage and water fluctuations was undertaken. The MUSIC model results were extracted to provide the daily water storage volume and relative water level in the wetland macrophyte zone. The wetland has been modelled with an average surface area of 6,150m² and a permanent pool volume of 2,500m³, with a nominal average depth of 0.4m.

The Melbourne Water Wetland Design Manual provides the following guidance on the water levels required to sustain wetland plants within the macrophyte zone.

The expected wetland inundation regime must be analysed to determine whether there is a potential risk to the long term health of the emergent macrophytes. The effective water depth (permanent pool depth plus EDD) must not exceed half the average plant height for more than 20% of the time. This must be demonstrated during design using an inundation frequency analysis.

The expected nominal water depth across the macrophyte zone is 100mm to 400mm for the shallow and deep marsh zones. The expected average plant height is at least 1.0m, therefore the allowable water level rise of 0.5m (half the plant height) should not be exceeded more than 20% of the time. A review the data indicates that this level is only exceeded less than 1% of the time.

A plot of the wetland storage and water level fluctuations is provided in Figure 13 and the wetland outflow and water level fluctuations are provided as Figure 14.

³ SEEC internal reference = 17000346-Run 12

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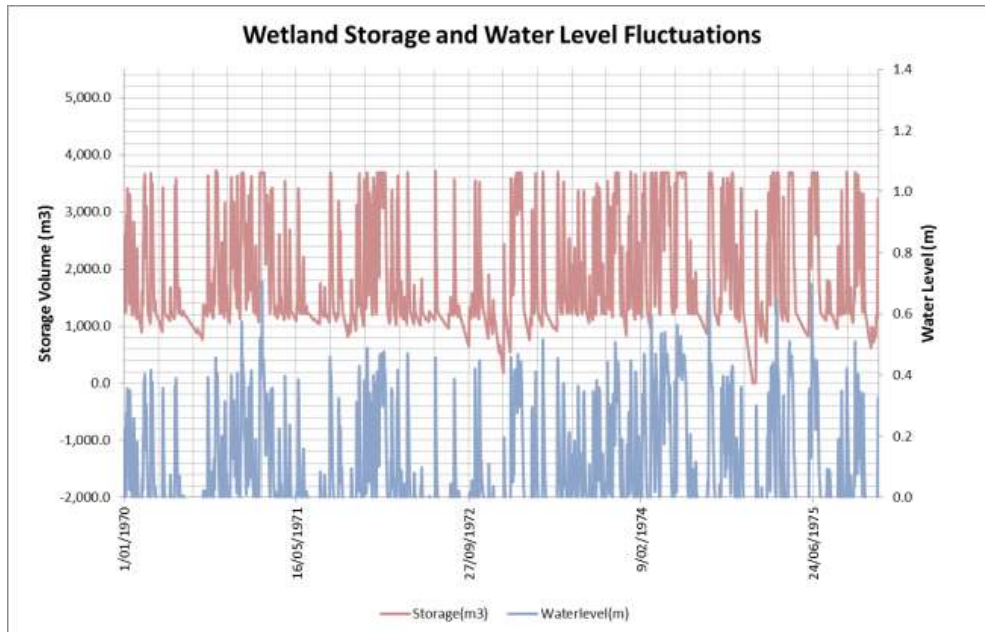


Figure 13 – Wetland Storage and Water Level Fluctuations

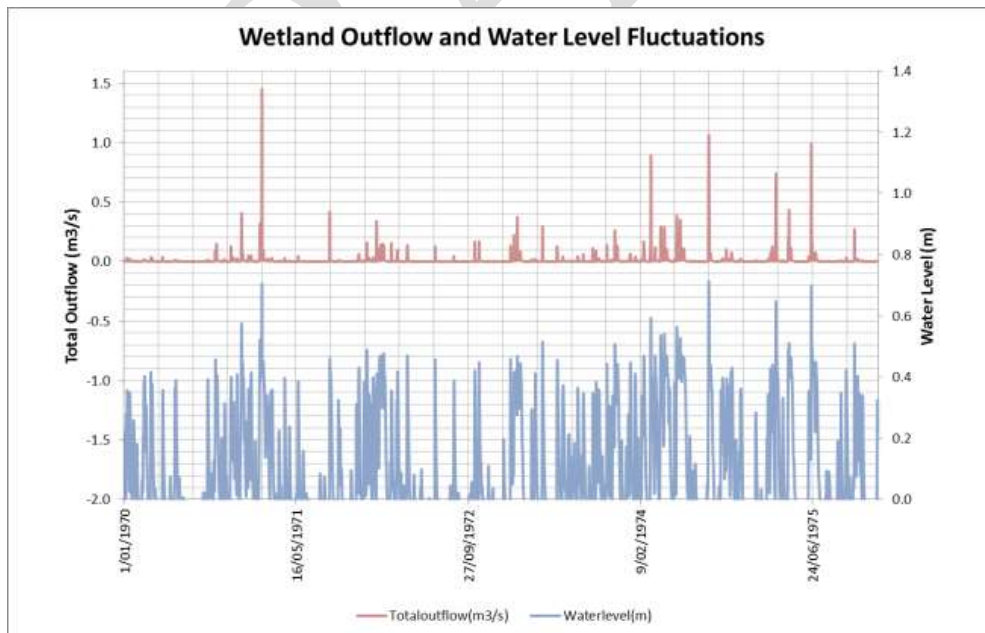


Figure 14 – Wetland Outflow and Water Level Fluctuations



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Further analysis of the results indicates that water is predicted to reach the macrophyte zone 56% of the time i.e. the macrophyte zone will be dry approximately 44% of the time. Water will reach the median elevation of the macrophyte pond i.e. 50% inundation of the macrophyte zone around 34% of the time and the macrophyte zone will be fully inundated around 24% of the time. The model predicts that the nominal water level of 100mm above the highest elevation of the macrophyte zone will be reached or exceed around 17% of the time.

This information (and any updated information from the detailed design) should be provided to an ecologist/landscape designer to ensure that the correct species of wetland plants are adopted for the predicted water level changes.

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8 Life Cycle Costs

All cost estimates are based on available information as documented below. Although SEEC has taken care in the selection and use of the cost estimate formulas and rates, it should be noted the estimates are for planning purposes only and actual costs will vary. SEEC has relied on the available information and has not verified the cost inputs as part of this study. The expected costs of applying WSUD can be classified as acquisition, operational and renewal costs. They can be direct financial costs, indirect financial costs or non-market costs. The following case study provides the following examples.

Table 31 - WSUD costs as identified by the Water by Design Business Case

Item	Description	Distribution
Direct financial		
Total life cycle	The sum of an assets costs over its life span with future costs discounted to a base date. Includes acquisition, annual maintenance, operational, renewal and decommissioning costs	Developers, local government and households
Acquisition	Capital costs of construction and establishment including design, site assessment and acquisition	Developers and households
Annual maintenance	Maintenance during the first two years	Developers, local government or private ownerships
Operation	Running costs e.g. rainwater tank pumps	Local government and households
Renewal	Resetting or rebuilding the WSUD asset once the design life has been reached	Local government and households
Decommission	Decommission if required at the end of the design life	Local government and households
Indirect financial		
Reduction in area for other users	Lost opportunity to use land for other purposes	Developers and ultimately households
Environmental costs	Associated with obtaining raw materials, construction and maintenance	Community
Training and educational costs	Capacity building within government and the development industry	State and local government, developers and households
"Hidden costs" of development	Environmental monitoring, delays in gaining development approvals, environmental permits, insurance etc	Developers
Exposure to risk	An organisations exposure to financial risk if the WSUD asset should fails	Local governments and the development industry
Non-market		
Maintenance burden for residents	Maintenance burden for residents and landowners where WSUD is in private property	Community
Nuisance flooding perception	Inconvenience associated with temporary nuisance flooding associated with some WSUD elements (e.g. biofiltration requires temporary ponding within the asset)	Community
Community health and safety	Impact on the health and well-being of nearby residents who may be affected by potential nuisances such as mosquitos.	Community

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Three documents were used to estimate the costs of WSUD infrastructure:

- Water Sensitive Urban Design Life Cycle Costing data (Melbourne Water online guideline)
- Structural Stormwater Quality BMP Cost / Size Relationship Information from the Literature, Andre Taylor (May 2005).
- Adoption Guidelines for Stormwater Biofiltration Systems Cities as Water Supply Catchments – Sustainable Technologies, CRC For Water Sensitive Cities (2015)

A review of the above literature provided a table of equations for the planning, design, establishment, and construction of WSUD assets. Routine maintenance costs and the costs of major renewal periods were also included. Referring to Table 31, the following rules were applied to estimate costs:

- where applicable the formula was applied to estimate cost (e.g. wetlands and sedimentation basins);
- the costs of the larger bio-filtration basins around 500m² were increased to \$70/m² and basins >1,000m² were increased to \$45/m² from the 2016 literature to be more in line with the latest cost estimates found in MUSIC;
- establishment costs were based on 5 times the average of the routine maintenance cost and reflects 1 to 2 years of maintenance;
- capital costs in Table 32 are the sum of all plan design construct and establishment costs of all WSUD elements within the URA;
- maintenance costs were of bio-filtration basins were increased to \$10/m² to be more in line with the latest cost estimates from MUSIC;
- on-site detention basins and rainwater tanks have not been included in the cost estimates;
- land acquisition costs are not included in the cost estimates; and
- any pump out, removal of unsuitable/contaminated material from an existing dam/detention basin have not been included.

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Table 32 - Cost summary

Asset Type	Plan, Design and Construct	Establishment	Ongoing Routine Maintenance	Ongoing Renewal Maintenance
Wetlands	$1911 \cdot A^{0.6435}$ (\$/asset); Small (500 m ²) = \$210 /m ² Med (5,000 m ²) = \$90 / m ² Large (50,000 m ²) = \$40 /m ²	2 to 5 x routine cost	$1289.7 \cdot A^{-0.794}$ (\$/m²/yr); Small (< 500 m ²) = \$9 to \$10 /m ² /yr Med (5,000 m ²) = \$1.5 /m ² /yr Large (> 50,000 m ²) = \$0.2 /m ² /yr	NA
Sedimentation basins	$685.1 \cdot A^{0.7893}$ (\$/asset); Small (250 m ²) = \$215 /m ² Med (500 m ²) = \$185 /m ² Large (1,500 m ²) = \$145 /m ²	2 to 5 x routine cost	Small (< 250 m ²) = up to \$18/m ² Small (250 m ²) = \$12 /yr/m ² Med (500 m ²) = \$5 /yr/m ² Large (> 1,500 m ²) = \$2 /yr/m ²	Sediment removal and disposal: Dry waste = \$250 /m ³ Liquid waste = \$1,300 /m ³
Biofiltration basin	Construction only: Small (100 m ²) = \$800 /m ² Med (300 m ²) = \$250 /m ² Large (500 m ²) = \$70 /m ² Extra large (> 1000 m ²) = \$45 / m ²	2 to 5 x routine cost	Based on in-house estimates / case studies: \$3 to \$5 /yr/m ² (400 to 700 m ²)	Sediment removal and disposal = ID Minor reset = ID
Grassed swale and buffer strip	Construction only: Seeded = \$8 to 18 /m ² and up to \$25 /m ² (with subsoil drain) Turfed = \$13 to \$22/m ² and up to \$35/m ² (with subsoil drain) Established or native grass = up to \$62/m ²	2 to 5 x routine cost	\$1 to \$3 /m ² /yr *Estimates based on range of industry values	Sediment removal and disposal = ID Reset / returf = ID
Vegetated / biofiltration swale	Construction only: \$130 to \$170 /m ²	2 to 5 x routine cost	\$2 to \$6 /m ² /yr *Estimates based on range of industry values	Sediment removal and disposal = ID Reset (replace filter / vegetation) = ID

ID = Insufficient Data

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Table 33 - Combined estimated costs for WSUD in Moss Vale Road North URA

WSUD Element	Area or Length (m ²)	Capital Cost Incl Establishment	Yearly Maintenance
Gross Pollutant Traps	19	\$ 360,000	\$ 172,000
Bio-retention Basins (filter area)	15,100	\$ 1,600,000	\$ 151,000
Wetlands	8,150	\$ 720,000	\$ 17,000
Sediment Basins	8,500	\$ 1,320,000.00	\$ 17,000
Sub-Total Cost		\$4,000,000	\$357,000
Contingency – 40%		\$1,600,000	\$142,800
Total Cost		\$5,600,000	\$499,800

It should be noted that an appropriate contingency of 30-50% should be applied to the cost estimate in Table 33 given the preliminary nature of the conceptual design. The table includes a 40% contingency.

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9 Operation and Maintenance

The performance of stormwater systems, particularly WSUD elements that are vegetated require maintenance activities to ensure they operate as designed. Poorly maintained WSUD assets can result in:

- failure to achieve the desired objectives
- poor amenity
- healthy and safety concerns such as mosquitos or offensive odours
- reduced value of the asset.

The design of each element must include an assessment of required maintenance activities. Suitable access and clearances to undertake maintenance activities is required to be provided as is a checklist of required maintenance activities and frequency. Typical maintenance activities could include:

- removing silt
- removing litter and debris
- weed control
- replanting vegetation
- mowing grass
- draining and removal of sediment
- cleaning and renewing filter media
- regular inspections.

Regular inspections are required to assess performance and damage after storm events and to guide required maintenance activities. Recommended frequency of inspection and regular maintenance for various stormwater elements are provided in Table 34. Assets should be inspected more frequently during establishment and after major storm events.

Table 34 - Recommended frequency of inspections and regular maintenance

Asset Type	Frequency of inspections - Temperate Climate
Swales	4 months (turf swales will require more frequent mowing)
Biofiltration systems / rain gardens	3 months
Constructed wetlands	3 months
Sediment basins	3 months
Proprietary products (e.g. GPTs)	As directed by the manufacturer

(Source: Water By Design 2012)

Water By Design - *Maintaining Vegetated Stormwater Assets* should be referenced for further advice. However, an example of typical maintenance and inspection checklist for a biofiltration basin is provided below.



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- Surrounds – review safety fencing, signage, bollards, access etc. for damage or risk to public safety
- Inlet – review erosion or subsidence/settlement around the inlet, any damage to structures, sediment/litter or debris
- Sediment forebay – erosion or build-up of sediment/litter that may prevent flow through the system
- Batter slopes and base invert – erosion/short circuiting of concentrated flows, surface crusting, development of depressions or mounds, ponded water not draining freely through the filter media, litter, unusual odours or colours, state of vegetation, algal or moss growth, inspection openings / underdrain clean out points, weeds.
- Outlet – erosion, damaged structures, sediment/litter/debris/vegetation, outlet is free draining

All stormwater assets should be referenced to Council's GIS system to ensure their location is known, and the frequency of routine maintenance activities documented in a maintenance plan. Maintenance is also required for traditional stormwater assets to ensure that they can continue to convey the desired peak stormwater flows.

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10 Erosion and Sediment Control

With regard to Erosion and Sediment Control Design:

- The estimated rainfall erosivity (R-factor) is 5,080 (high)
- The soil erodability (K-Factor) is 0.038 (moderate)
- Slope gradients vary from about 5% to 10%
- The URA will have a high erosion hazard (Figure 4.6 in Landcom, 2004)
- The Revised Universal Soil Loss Equation (RUSLE) estimates the soil loss at this site would be:
 - 298 t/ha/yr (Soil Loss Class 3, Moderate) on a 5 percent slope⁴
 - 704 t/ha/yr (Soil Loss Class 5, High) on a 10 percent slope

Erosion and sediment control plans (ESCP) would be developed for each stage of the subdivision works and would incorporate the following generic principles (Landcom, 2004):

- i. The upslope catchment length of exposed soil areas would be kept below 80 m. Any slope length exceeding 80 m would have a berm installed to intercept flow.
- ii. Construction traffic access is to be limited to the minimum required for efficient construction. Areas not essential for construction purposes are to be protected from traffic entry through the use of barrier and/or sediment fencing.
- iii. Disturbed lands will be progressively and rapidly rehabilitated, rather than leaving it to the end of works.
- iv. Diversion berms would be used to divert “clean” runoff from upslope of any construction areas away. Discharges are to be either onto a stabilised, well-vegetated area or into the existing stormwater system.
- v. Dust Control Measures would be implemented during earthworks. This would include re-using water from sediment basins and spraying exposed areas via water cart.
- vi. Total Capture (Type F/D) sediment basins would be used at the end of catchments to trap dirty water runoff, so that it may be treated before release. The sediment basins would be designed for the 80th percentile 5-day rainfall depth which is 31.8mm and a volumetric coefficient of runoff of 0.51.

The requirements of an ESCP would be implemented until at least 90 percent of the work areas were stabilised with vegetated or hard surfaces.

⁴ Based on slope length 80 m, P-factor of 1.3, C-factor of 1.

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11 Staging

Staging of the proposed URA from a stormwater perspective needs to be considered to ensure:

- Stormwater infrastructure is constructed in an order that supports the expected development stages;
- Under-utilised and inefficient infrastructure is minimised during the establishment of the development; and
- Damage of assets with sediment laden water during future construction activities is minimised (e.g. clogging biofiltration basins).

Of particular concern is the staging of water quality treatment assets that are typically located in the downstream reaches of a developing catchment. Housing construction and bulk earthworks of future stages have the potential to generate large volumes of sediment that can smother water quality treatment measures and prevent them from functioning properly.

Staging of the stormwater assets (pit and pipe network) throughout the URA will be based on the construction sequence of the various development stages. It is expected that development will be staged such that allotments closer to existing infrastructure (roads, services etc.) would be constructed first and could be either upstream or downstream in the catchment.

Development at the downstream portion will allow outlets (pipe outfalls, rock protection, basins etc.) to be constructed early but the infrastructure will be under utilised until the URA is fully developed. This will result in high initial costs and may require additional maintenance and potential remediation of assets once the entire URA is developed.

Alternatively, starting construction at the upstream end of the URA will allow smaller pipe networks to be constructed saving initial costs but temporary downstream channels, basins etc. will be required to direct stormwater through the URA and ensure that peak flows are not increased in downstream receiving environments. This may require several temporary basins, erosion control measures that must be continually relocated throughout the life of the development. Ultimately, the staging of the stormwater system must match the developers' other construction requirements but the impact to the stormwater network should be considered when developing a staging plan.

Staging of the development will impact the type and level of erosion and sediment controls. Earthworks should be staged to limit the exposure of soil that can be washed from the URA into stormwater infrastructure and downstream waterways. Multi-stage Erosion and Sediment Control Plans that reflect each construction stage will be required.

It is recommended to combine the function of construction and operational water quality basins to limit excavation volumes, potential additional clearing extents and costs. Water quality basins can be constructed initially as sediment basins during the bulk earthworks stages then converted to WSUD elements such as bio-filtration basins after bulk

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earthworks stages. Sediment basins will need to be pumped out and de-silted before they can be converted to WSUD elements.

WSUD elements are typically completed by the developer prior to the allotments being sold and the construction of houses. Builders can generate large sediment volumes that will be washed into the WSUD elements via the stormwater network for up to several years after the initial construction of the water quality infrastructure. Sediment can limit the performance of WSUD elements by smothering vegetation, blocking filter media, reducing water clarity, prematurely filling sediment stores etc. Excessive sediment can limit the capacity of conveyance paths, increase the risk of localised flooding and reduce the general amenity.

It is recommended that:

- Staging is intended to be implemented with multiple upstream owners via a contributions plan developed for the URA so the construction and funding of the larger combined WQ/OSD basins can be staged as development comes on line i.e. the full footprint does not need to be constructed upfront.
- No WSUD elements be on line until all bulk earthworks have been completed
- No WSUD elements to be on-line until the catchment is at least 90% developed, unless additional measures are implemented.
- The on line detention basin be constructed within the dry season and that no upstream development occur until it is in place.

Additional measures may include:

- Using water quality basins as sediment basins until all development is completed;
- Use temporary coverings/linings over bio-filtration media until all development is completed e.g. turf or geotextile over bio-filtration media;
- Additional erosion controls within the upstream catchment; and
- Additional sediment controls upstream of WSUD elements to cater for excessive sediment loads.

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12 Development Controls

The following development controls are recommended to encourage the proposed URA to meet the objectives of Councils development planning policy.

12.1 Objectives

- i. Manage stormwater flow paths and systems to ensure the safety of people and property
- ii. Maintain, protect and/or rehabilitate modified watercourses and their associated ecosystems and ecological processes towards a natural state.
- iii. Mitigate the impacts of development on water quality and quantity.
- iv. Encourage the reuse of stormwater.
- v. Minimise soil erosion and sedimentation resulting from site disturbing activities.

12.2 Controls

- i. Stormwater management is to be designed and implemented within the URA.
- ii. Stormwater is to be managed primarily through the street network and is to be designed in accordance with Shoalhaven City Council's Engineering Design Specifications and the Development Control Plan 2014 – Chapter G2: Sustainable Stormwater Management and Erosion/Sediment Control in relation to management of stormwater flows and quality.
- iii. Management of 'minor' flows using piped systems for the 18.13% AEP (5 year) (residential land use) and 10% AEP (10 year) (mixed residential/commercial, commercial land use) shall be in accordance with Shoalhaven City Council's Engineering Design Specifications and the Development Control Plan 2014. Management measures shall be designed to:
 - control stormwater to minimise localised flooding and reduce nuisance flows;
 - provide sufficient on-site storage to match pre-developed peak flow rates for the 50% AEP (1.5 year), 18.13% AEP (5 year) and 5% AEP (20 year) rain events;
 - ensure that the duration of stream forming flows must be no greater than two-times the pre-development duration of stream forming flows at the site discharge point;
 - encourage the installation of rainwater tanks on residential dwellings to meet a portion of supply such as outdoor use, toilets, laundry;
 - provide an erosion and sediment control plan or soil and water management plan for each stage of works;
 - capture and retain a high level of urban water run-off pollutants to protect local watercourses;
 - include sufficient Water Sensitive Urban Design (WSUD) elements to achieve the water quality targets listed in the table below.

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Table 35 –Required WSUD Pollutant Reduction Targets

Pollutant	Reduction
Gross pollutants	Capture all litter greater than 40mm for flows up to the 4 EY event
Total Suspended Solids	80%
Total Phosphorus	45%
Total Nitrogen	45%

- i. Management of ‘major’ flows using dedicated overland flow paths such as open space areas, roads and riparian corridors for all flows in excess of the pipe drainage system capacity and above the 18.13% AEP (5 year) shall be in accordance with Shoalhaven City Council’s Engineering Design Specifications. Management measures shall be designed to:
- Prevent both short term and long term inundation of habitable dwellings;
 - Control localised flooding from storm events to maintain access to lots, maintain the stability of the land form and to control erosion;
 - Habitable floor levels to have a minimum of 0.5m freeboard above the 1% AEP (100 year) flood level;
 - Ensure that any proposed filing does not cause unacceptable afflux to adjacent properties for all events up to and including the Probable Maximum Flood;
 - Provide for the orderly and safe evacuation of people away from rising floodwaters;
 - Provide sufficient on-site storage to match pre-developed peak flow rates for the 1% AEP (100 year) rain event. This will be achieved using detention storage within water quality features and detention basins;
 - Ensure a velocity depth product of less than 0.3m²/s for a 1% AEP (100 year) storm event
 - Provide management measures for minor and major flows (including WSUD elements) must not result in obstruction / redirection of flooding to areas that are not expected to be inundated i.e. habitable areas. In addition, high hazard floodway areas are to be kept free of fill and/or obstructions at all times.

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13 Summary

The proposed URA is expected to support around 2,916 properties ranging in size from less than 300m² to 1,000 m². The expected increase in imperviousness will increase the peak flow, volume, frequency and level of stormwater pollution entering local waterways unless adequate stormwater management practices are adopted.

Stormwater modelling indicates that on-site detention and the adoption of a number of WSUD elements including GPTs, wetlands and bio-filtration basins can mitigate the impacts of the proposed development. It is suggested that the future development adopts the controls identified in **Section 12** (or similar to achieve the same outcomes).

The required WSUD elements to achieve compliance are listed in Table 36. A plan of the proposed measures is presented in Figure 11.

Table 36 – Summary of Required WSUD Measures

Gross Pollutant Traps	Bio-Filtration – Filter Area (m ²)	Constructed Wetlands (m ²)	Rainwater Tanks - No	1% AEP event On-site Detention (m ³) *
14	15,100	8,150	2,916	40,224

* Includes the storage volumes provided by the wetlands and sediment/detention basins.

The proposed WSUD elements are expected to be located within the nominated URA due to constraints outside the URA. However, the location of WSUD elements immediately outside the URA may be possible if the following limitations can be addressed:

- The topography is suitable for the proposed infrastructure
- Soil and groundwater conditions do not limit constructability
- The location provides appropriate access for inspection and maintenance of the proposed infrastructure
- Opportunities to be combined with an adjacent WSUD element
- Water discharged from the URA does not adversely impact the waterway reach between the URA and the offsite WSUD element
- Any WSUD elements are increased in size to cater for the additional catchment.

The design should follow current best practice to ensure effective operation and allow ease of maintenance.

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14 References

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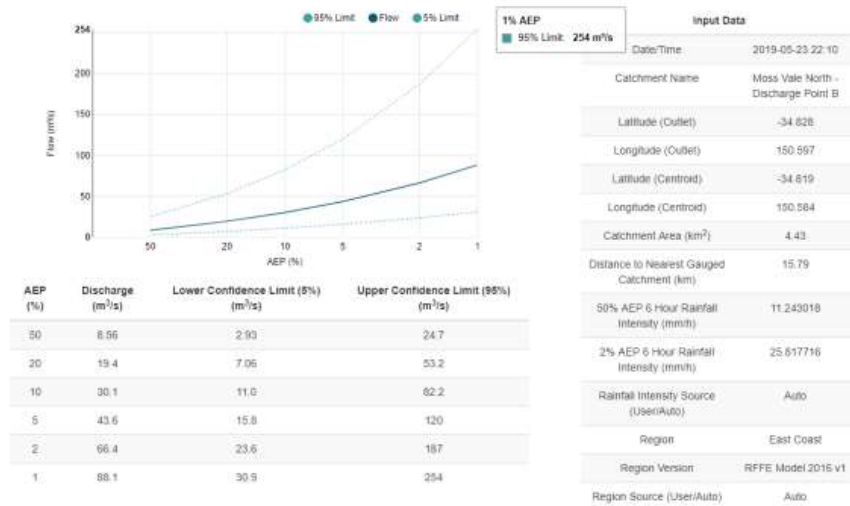
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Appendices

Appendix A – Regional Flood Frequency Estimation

Results | Regional Flood Frequency Estimation Model



RESULTS FROM ARR RFFE 2015 MODEL

Datetime: 2019-05-23 22:10
 Region name: East Coast
 Region code: 1
 Site name: Moss Vale North - Discharge Point East
 Latitude at catchment outlet (degree) = -34.828
 Longitude at catchment outlet (degree) = 150.597
 Latitude at catchment centroid (degree) = -34.819
 Longitude at catchment centroid (degree) = 150.584
 Distance of the nearest gauged catchment in the database (km) = 15.79
 Catchment area (sq km) = 4.43
 Design rainfall intensity, 1 in 2 AEP and 6 hr duration (mm/h): 11.243018
 Design rainfall intensity, 1 in 50 AEP and 6 hr duration (mm/h): 25.817716
 Shape factor of the ungauged catchment: 0.74

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ESTIMATED FLOOD QUANTILES:

AEP (%)	Expected quantiles (m ³ /s)	5% CL m ³ /s	95% CL m ³ /s
50	8.56	2.93	24.7
20	19.4	7.06	53.2
10	30.1	11.0	82.2
5	43.6	15.8	120
2	66.4	23.6	187
1	88.1	30.9	254

DATA FOR FITTING MULTI-NORMAL DISTRIBUTION FOR BUILDING CONFIDENCE LIMITS:

- 1 Mean (loge flow) = 2.165
- 2 St dev (loge flow) = 0.896
- 3 Skew (loge flow) = 0.091

Moments and correlations:

No	Most probable	Std dev	Correlation		
1	2.165	0.646	1.000		
2	0.896	0.162	-0.330	1.000	
3	0.091	0.027	0.170	-0.280	1.000

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Appendix B – WSUD Cost Benefit framework: medium to high density residential developments (Water By Design, 2010)



Example of bioretention systems in medium to high density residential development

LIKELY COSTS FOR TYPICAL DEVELOPMENTS		LIKELY BENEFITS FOR TYPICAL DEVELOPMENTS	
Major quantifiable costs (estimated)		Major quantifiable potential benefits (estimated)	
1. Acquisition (capital + design costs (Note: included in life cycle cost): - \$350-\$1,200/lot (average = \$775/lot) - \$29,680-\$46,180/ha (average = \$37,930/ha). 2. Annual maintenance costs (Note: included in life cycle cost): - \$3-\$40/lot (average = \$22/lot) - \$260-\$520/ha (average = \$390/ha). 3. Life cycle costs (acquisition + maintenance + renewal + decommission): - \$345-\$1,670/lot (average = \$1,110/lot) - \$40,135-\$71,720/ha (average = \$55,930/ha). 4. Annualised life cycle costs (acquisition + maintenance + renewal + decommission): - \$15-\$65/lot (average = \$45/lot) - \$1,615-\$2,870/ha (average = \$2,240/ha).		1. Value of the reduction in TN loads in stormwater: The equivalent wastewater treatment cost to remove annual TN loads: - \$2,470-\$5,930/ha/yr (average = \$4,200/ha/yr) - 150%-205% of the annualised life cycle cost of the WSUD treatment train (average = 185%). 2. Potentially avoided costs associated with downstream waterway rehabilitation and maintenance: - \$8,000-\$60,000/ha (life cycle cost) of development (average = \$34,000/ha of development (value estimated using a low-density residential development case study) - 20%-85% of the life cycle cost of the WSUD treatment train (average = 60%). 3. Potential increased property values (premium): Medium density: - \$35,000-\$70,000/ha (average = \$52,500/ha) - 120%-150% of the acquisition cost of the WSUD treatment train (average = 135%). High density: - \$175,000-\$350,000/ha (average = \$262,500/ha) - 480%-700% of the acquisition cost of the WSUD treatment train (average = 520%). 4. Potential development costs that are avoided (applicable only on flat sites, i.e. <5%): - \$36,000/ha - 95% of the average capital cost of the WSUD treatment train.	
		Major unquantifiable potential benefits	
		Contribution to protecting the numerous values associated with healthy downstream waterways: - ecosystem services - recreational and commercial fishing - tourism - seafood industry - option, existence and bequest values. The monetary value of many of these unquantified benefits is very high (see Table 4.2), but the relationship between the application of WSUD in a catchment and the maintenance of these values in downstream waterways has not been quantified.	
Minor potential costs:		Minor potential benefits	
- Additional development assessment, compliance checking and enforcement costs associated with WSUD assets (relatively minor and reducing over time as WSUD becomes mainstream practice). - Potential increase in maintenance tasks for residents (for at source or streetscape WSUD). - Environmental costs associated with sourcing materials for the WSUD measures (e.g. biofiltration media).		- Increased rate of sales and amenity associated with developments with landscaped WSUD features, such as streetscape bioretention systems (see Lloyd et al., 2002). - Shading and urban cooling (potentially reducing energy consumption). - Some direct and indirect aspects of implementing WSUD will result in changes to the configuration of development that could enhance open space. - Education and research.	
Conclusions regarding the relative magnitude of likely costs and benefits:			
Considering all the costs and all the potential benefits of applying WSUD to achieve the proposed stormwater management design objectives, it is concluded that the benefits are likely to outweigh the costs for typical medium to high-density residential development in Queensland. The estimated acquisition costs of applying WSUD within medium- to high-density residential developments equate to an average cost of approximately \$775 per dwelling. This value is equivalent to 0.2% of a unit or townhouse worth \$350,000. This cost will usually be passed onto the homeowner, so it should not significantly impact the profitability of development. The estimated annual maintenance costs are an average of \$22/year. Where councils undertake the maintenance of WSUD assets in public areas, this cost is likely to be passed onto homeowners via rates. Considering just the quantifiable benefits, on average, the value of TN reduction is worth more than the total life cycle cost of WSUD measures. The potentially avoided waterway rehabilitation costs (expressed as life cycle cost) are worth around 67% of the life cycle cost of WSUD and the potential property premiums are worth around 90% of the acquisition cost of WSUD. Considering the quantifiable benefits in a lumped group, the <i>potential quantifiable benefits are likely to outweigh the costs.</i>			

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1 Introduction

The purpose of the Landscape Specifications is to guide the landscape outcomes of the Moss Vale Road North Urban Release Area (URA).

The Landscape Specifications encompass both hard and soft landscaping elements interspaced between residential development, public open space, a protected riparian corridor and a planted streetscape. A pedestrian and bicycle pathway network links these spaces which maximises connectivity and ambiance throughout the URA.

2 MVRN URA Landscape Principles

- A high quality landscape addresses the road network, riparian corridors, parks, open space, major entryways and Village Centre.
- A streetscape planting hierarchy expresses a strong visual identity, drawing from a planting palette including a dominant tree canopy, medium to small street trees and an attractive shrub understory for year-round appeal.
- Tree planting allows winter sun to reach ground level, provide summer shade and enable a high visibility for pedestrians, cyclists and motorists throughout the streetscape network and green corridor.
- Landscape design includes both a fine grain planting scheme interwoven with amenity trees to create a high-quality planting aesthetic. The planting shall be woven into an urban design palette addressing the major entry points, street network and village centre.
- A robust planting selection integrates into the riparian zones and edges of open space abutting rural zones by including endemic and indigenous native vegetation.
- Plant selection minimises maintenance and water requirements whilst being hardy, resistant to pest and disease and provide high aesthetic value.
- The design of all aspects aims for high quality aesthetic in context to the setting.
- Pathways, planting and infrastructure placement incorporates Safer by Design principles.

3 Major Entry Treatments

The Moss Vale Road North URA has two major entries known as:

- Moss Vale Road primary entry; and
- Moss Vale Road secondary entry (i.e., Bells Lane).

A selection of iconic rural trees are to be used at major entries, in conjunction with exotic and native species, to provide a strong visual identity at a suitable scale to reinforce the road/entry hierarchy (refer to **Table 1**).

The major entry treatment objectives are to:

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- Ensure the planting scheme consists of dominant trees and understory plantings of native and exotic vegetation.
- Establish an appropriate scale of trees to road entrances.
- Deliver bold strong planting arrangements using plants with colour, perfume, foliage definition.
- Ensure road surface treatment and built hard landscape elements provide an appropriate statement announcing the entryway to the URA.
- Ensure pedestrian and cyclist linkages are reinforced by landscape with low planting.
- Ensure sight lines for pedestrians and motorists are factored into landscape design.

The Moss Vale Road primary entry is to consist of:

- An avenue of deciduous trees for a distance of approximately 100m from the Moss Vale Road intersection.
- An entry zone with poplars and paving treatments.

The Moss Vale Road secondary entry (i.e., Bells Lane) is to consist of:

- An avenue of native trees for a distance of approximately 350m from the Moss Vale Road intersection.
- Rural style fence to road corridor edge.
- An entry zone with paving treatments.

Table 1: Primary and Secondary Gateway - Tree and Understory Plant List

Botanic Name	Common Name	Height *	Width*
Tree			
<i>Corymbia maculata</i>	Spotted Gum	30m	10-15m
<i>Corymbia gummifera</i>	Red Bloodwood	20-25m	7-10m
<i>Syzygium smithii</i>	Lili Pily	12m	6m
<i>Ficus rubiginosa</i>	Port Jackson Fig	30m	30m
<i>Magnolia grandiflora</i>	Bull Bay Magnolia	25m	25m
<i>Acer platanoides</i>	Crimson Sentry	7m	4m
<i>Acer freemanii</i>	Autumn Blaze	13m	10m
<i>Prunus cerasifera</i> 'Nigra'	Black Cherry Plum	5m	4m
<i>Populus simonii</i> 'Fastigiata'	Chinese Poplar	8-12m	3m
<i>Pyrus</i> 'Aristocrat'	Aristocrat Pear	5-6m	3-4m
<i>Pyrus</i> 'Chanticleer'	Chanticleer Pear	11m	5-6m
<i>Fraxinus pennsylvanica</i> 'Urbanite'	Ash	15m	8m
Shrub/understory			
<i>Lomandra</i> 'Wingarra'	Lomandra	300mm	300mm
<i>Lomandra</i> 'Variegata Tanika'	Lomandra	600mm	650mm
<i>Lomandra</i> 'Frilly Lace'	Lomandra	450mm	450mm
<i>Lomandra</i> 'Tanika'	Lomandra	500mm	650mm

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<i>Grevillea</i> 'Poorinda Royal Mantle'	Grevillea	250mm	3m
<i>Doryanthes excelsa</i>	Gynea Lily	3-4m	1.2-2.5m
<i>Cordylina australis</i> 'Red Star'	Cabbage Tree	1-5m	500mm
<i>Cordylina australis</i> 'Pink Passion'	Cabbage Tree	1-5m	500mm
<i>Convolvulus cneorum</i>	Silverbush	400mm	400mm
<i>Russelia equisetiformis</i>	Firecracker Plant	1m	1.5m
<i>Abelia grandiflora</i> 'Gold Dwarf'	Abelia	1m	1m
<i>Abelia grandiflora</i> 'Kaleidoscope'	Abelia	1m	1m
<i>Hebe elliptica</i>	Veronica	1m	500mm
* Plant growth habits may vary due to local site, soil and ecological conditions.			

4 Streetscape Planting

The Moss Vale Road North URA internal road network includes the following road typologies:

- Collector Roads – Tier 1 & Tier 2.
- Local and Retail Streets.
- Access Streets – Tier 1 & 2.
- Riparian Street.
- Rear Laneway.

The overarching streetscape planting objectives are to:

- Minimise maintenance, horticultural care and water use through suitable plant selections throughout the URA.
- Provide a green canopy linking streetscapes and open space throughout the URA.
- Provide a landscape which assists in safe wayfinding and informal surveillance throughout the built area.
- Provide canopy shade and protection to pedestrian and recreational areas from hot westerly sun in the hotter months of the year and consider heat island effect in paved and urban zones.
- Maximise solar access and gain to residential dwellings through careful positioning of dominant trees.
- Provide tree management systems to protect underground infrastructure within the verge of streets.
- Utilise permeable surfacing where possible.
- Retain the existing native trees and vegetation throughout the riparian corridor and open space areas.
- Ensure understory planting and landscape treatments at ground level provide clear definition between differing zones within the URA.

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Table 2: Recommended Tree Offset and Spacing

Tree Size	Recommended Spacing	Consider
Small tree = 6m high x 4m wide	5m – 7m	5m offset from light posts, driveways, planted streets and carriageways.
Medium tree = 10m high x 6m wide	7m – 10m	
Large tree = 15-20m high x 8-10m wide	10-20m	

4.1 Collector Road – Tier 1 & Tier 2

The Collector Road objectives are to:

- Reinforce the rural character of the collector roads with cultural markers such as significant tree planting and broad use of ground covers and shrubby drifts.
- Provide interconnecting pedestrian and cycle links between the neighbourhood nodes and the village centre.
- Consider position for future bus shelters.

Table 3: Collector Road Tree and Understory Plant List

Botanic Name	Common Name	Height *	Width*
Tree			
<i>Tristania laurina</i> 'Luscious'	Watergum	4-8m	4m
<i>Brachychiton acerifolius</i>	Illawarra Flame	12m	6m
<i>Lophostemon confertus</i>	Queensland Brushbox	15m	10m
<i>Melaleuca stypheloides</i>	Prickly Paperbark	10-15m	8m
<i>Elaeocarpus eumundii</i>	Quandong	10m	5m
<i>Cupaniopsis anarcardioides</i>	Tuckeroo	6-8m	6m
<i>Acer freemanii</i> 'Jeffsred'	Freeman Maple	13m	10m
<i>Magnolia</i> 'Exmouth'	Magnolia	12m	8m
<i>Magnolia</i> 'Little Gem'	Magnolia	6m	3m
<i>Zelkova serrata</i>	Japanese Zelkova	14m	10m
<i>Ginkgo biloba</i>	Maidenhair Tree	12m	6m
<i>Backhousia citriodora</i>	Lemon Myrtle	8m	2-3m
<i>Eleocarpus eumundi</i>	Quandong	10m	3.5m
<i>Eucalyptus microcorys</i>	Tallow wood	35-40m	25m
<i>Lophostemon confertus</i>	Queensland Brushbox	15m	10m
<i>Tristania laurina</i> 'Luscious'	Watergum	8m	4m
<i>Ulmus parvifolia</i> 'Todd'	Chinese Elm	10-18m	15-20m
<i>Lagerstroemia indica</i> 'Natchez'	Crepe Myrtle	4-6m	6m
<i>Lagerstroemia indica</i> 'Lipan'	Crepe Myrtle	4-6m	4m
<i>Lagerstroemia indica</i> 'Tuscarora'	Crepe Myrtle	8m	4m
Shrub/understory			
<i>Correa pulchella</i> 'Fire Bells'	Correa	250mm	800mm
<i>Westringia fruticosa</i> 'Low Horizon'	Westringia	300mm	700mm

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<i>Grevillea</i> 'Gold Cluster'	Grevillea	300mm	800mm
<i>Grevillea hybrid</i> 'Flat Az'	Grevillea	200mm	2-3m
<i>Rhagodia spinescens</i> 'Aussi Flat Bush'	Rhagodia	400mm	1m
<i>Casuarina glauca</i> 'Cousin It'	Casuarina	150mm	1.5m
<i>Dianella</i> 'Emerald Arch'	Dianella	550mm	450mm
<i>Loropetalum chinensis</i> 'Plum Delight'	Chinese Fringe Flower	1.5m	1.5m
<i>Alternanthera</i> 'Little Ruby'	Alternanthera	400mm	800mm
<i>Rosmarinus officinalis</i> 'Tuscan Blue'	Rosemary	1m	800mm
<i>Raphiolepis</i> 'Cosmic Pink'	Indian Hawthorn	500-800mm	800mm

* Plant growth habits may vary due to local site, soil and ecological conditions.

4.2 Local and Retail Streets

A selection of trees and understory plants is to be used to line the main streets in the town centre and provide a lead into adjoining open space areas and local streets.

The Local and Retail Street objectives are to:

- Protect kerbside infrastructure by deflecting roots with root management systems.
- Provide shade and protection from hot westerly sun and position trees to allow for solar access and street lighting.
- Ensure planting provides year-round interest, summer shade and allows winter sun through to ground cover and lawn areas.
- Ensure that planting is part of the overall setting of lawn and paved areas, furniture groupings, paving and public art.

Table 4: Local and Retail Street Tree and Understory Plant List

Botanic Name	Common Name	Height *	Width*
Tree			
<i>Elaeocarpus eumundii</i>	Quandong	10m	5m
<i>Syzygium leuhmanni</i>	Riberry	7m	3m
<i>Buckinghamia celsissima</i>	Ivory Curl Tree	10m	3m
<i>Lagerstroemia indica</i> 'Tuscarora';	Crepe Myrtle	8m	4m
<i>Zelkova serrata</i>	Japanese Zelkova	14m	10m
<i>Fraxinus pennsylvanica</i> 'Cimmmzam'	Cimmaron Ash	13m	8m
<i>Fraxinus pennsylvanica</i> 'Urbanite'	Ash	15m	8m
<i>Parrotia persica</i> 'Venessa'	Persian Ironwood	7m	5m
<i>Eucalyptus microcorys</i>	Tallow wood	35-40m	25m
<i>Magnolia</i> 'Exmouth'	Magnolia	12m	8m
<i>Magnolia</i> 'Little Gem'	Magnolia	6m	3m
<i>Zelkova serrata</i>	Japanese Zelkova	14m	10m
<i>Ginkgo biloba</i>	Maidenhair Tree	12m	6m
<i>Backhousia citriodora</i>	Lemon Myrtle	8m	2-3m

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<i>Lophostemon confertus</i>	Queensland Brushbox	15m	10m
<i>Tristania laurina</i> 'Luscious'	Watergum	8m	4m
<i>Ulmus parviafolia</i> 'Todd'	Chinese Elm	10-18m	15-20m
<i>Lagerstroemia indica</i> 'Natchez'	Crepe Myrtle	4-6m	6m
<i>Lagerstroemia indica</i> 'Lipan'	Crepe Myrtle	4-6m	4m
<i>Lagerstroemia indica</i> 'Tuscarora'	Crepe Myrtle	8m	4m
<i>Corymbia citriodora</i>	Lemon Scented Gum	20-30m	12m
<i>Eucalyptus eugenioides</i>	Thin Leafed Stringybark	30m	18m
<i>Eucalyptus saligna</i>	Sydney Blue Gum	30m	12m
<i>Eucalyptus tereticornis</i>	Forest Red Gum	45m	20m
<i>Corymbia citriodora</i> 'Lemon Squash'	Dwarf Lemon Scented Gum	6m	4m
<i>Eucalyptus cladocalyx</i> 'Vintage Red'	Eucalyptus dwarf	6m	4m
Shrub/understory			
<i>Rhagodia spinescens</i> 'Aussie Flat Bush'	Rhagodia	500mm	1m
<i>Westringia fruticosa</i> 'Mundi'	Coastal Rosemary	500mm	1.5m
<i>Lomandra</i> 'Frilly Lace'	Lomandra	450mm	450mm
<i>Lomandra</i> 'Tanika'	Lomandra	500mm	650mm
<i>Lomandra longifolia</i> 'Lime Jet'	Lomandra	800mm-1m	800mm-1m
<i>Callistemon viminalis</i> 'Better John'	Callistemon	600mm	600mm
<i>Liriope muscari</i> 'Amethyst'	Liriope	400mm	400mm
* Plant growth habits may vary due to local site, soil and ecological conditions.			

4.3 Access Street – Tier 1 & Tier 2

The Access Street objectives are to:

- Provide shade and protection from hot westerly sun and position trees to allow for solar access and street lighting.
- Ensure planting provides year-round interest, summer shade and allows winter sun through to ground cover and lawn areas.

Table 5: Access Street Tree Plant List

Botanic Name	Common Name	Height *	Width*
Tree			
<i>Syzygium leuhmanni</i>	Riberry	7m	3m
<i>Buckinghamia celsissima</i>	Ivory Curl Tree	10m	3m
<i>Lagerstroemia indica</i> 'Tuscarora'	Crepe Myrtle	8m	4m
<i>Parrotia persica</i> 'Venessa'	Persian Ironwood	7m	5m
<i>Magnolia</i> 'Exmouth'	Magnolia	12m	8m
<i>Magnolia</i> 'Little Gem'	Magnolia	6m	3m
<i>Backhousia citriodora</i>	Lemon Myrtle	8m	2-3m

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<i>Lophostemon confertus</i>	Queensland Brushbox	15m	10m
<i>Tristania laurina</i> 'Luscious'	Watergum	8m	4m
<i>Lagerstroemia indica</i> 'Natchez'	Crepe Myrtle	4-6m	6m
<i>Lagerstroemia indica</i> 'Lipan'	Crepe Myrtle	4-6m	4m
<i>Lagerstroemia indica</i> 'Tuscarora';	Crepe Myrtle	8m	4m
* Plant growth habits may vary due to local site, soil and ecological conditions.			

4.4 Riparian Street

The Riparian Street objectives are to:

- Incorporate a selection of Australian native trees and shrubs to reinforce the remaining natural character of the local area.
- Retain and enhance native tree canopy and existing natural riparian vegetation.
- Ensure drainage and landscape treatment relates to the riparian corridor in a natural and sustainable way.
- Ensure that recreational corridors and pathways along the riparian edge have good sight lines for pedestrians, cyclists and motorists.

Table 6: Riparian Street Tree Plant List

Botanic Name	Common Name	Height *	Width*
Tree			
<i>Tristania laurina</i> 'Luscious'	Watergum	8m	4m
<i>Waterhousia floribunda</i> 'Green Avenue'	Lili Pily	8m	5m
<i>Elaeocarpus reticulatus</i> 'Prima Donna'	Blueberry Ash	10-15m	5-7m
<i>Glochidion fernandii</i>	Cheese Tree	5-7m	3-5m
<i>Cupaniopsis anacardioides</i>	Tuckeroo	10m	5m
<i>Syzygium leuhmanni</i>	Riberry	7m	3m
<i>Melaleuca styphelioides</i>	Prickly Leaved Paperbark	20m	5m
<i>Melaleuca decora</i>	White Feather Honey Myrtle	10m	8m
* Plant growth habits may vary due to local site, soil and ecological conditions.			

4.5 Rear Laneway

The Rear Laneway objectives are to:

- Ensure pedestrian sight lines are not negatively impacted by vegetation planting.
- Consider the location of services to avoid conflict within the service corridor.
- Landscape to provide shade and to soften the hard surfaces and reflectivity of building materials and hardstand.

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- Ensure turfed areas play a role in stormwater management by assisting in slowing surface run off.

Table 7: Rear Laneway Tree Plant List

Botanic Name	Common Name	Height *	Width*
Tree			
<i>Tristania laurina</i> 'Luscious'	Watergum	8m	4m
<i>Waterhousia floribunda</i> 'Green Avenue'	Lili Pily	8m	5m
<i>Elaeocarpus reticulatus</i> 'Prima Donna'	Blueberry Ash	10-15m	5-7m
<i>Prunus cerasifera</i> 'Oakville Crimson Spire'	Prunus	6m	2m
<i>Pyrus calleryana</i> 'Capital'	Pyrus	11m	3m
<i>Quercus palustris</i> 'PrinGreen'	Oak	14m	3m
<i>Pyrus</i> 'Capital'	Ornamental Pear	10m	1-3m
<i>Acer</i> 'Scarlet Sentinel'	Ornamental Maple	11m	5m
<i>Prunus cerasifera</i> 'Oakville Crimson Spire'	Ornamental Plum	6m	2m
<i>Ginkgo biloba</i> 'Lemonlime Spire'	Maidenhair Tree	5m	1m
<i>Banksia integrifolia fastigiata</i> 'Sentinel'	Banksia cultivar	2.5m	1m
<i>Syzygium australe</i> 'Straight & Narrow'™	Lilly Pilly cultivar	5m	1-1.5m
<i>Callistemon viminalis</i> 'Slim'™	Bottle brush cultivar	3m	1.5m
<i>Elaeocarpus reticulatus</i>	Blueberry Ash	9m	4m
Shrub/understory			
Kikuyu – net free	Lawn cover	40mm	4mm stem diameter
<i>Alternanthera</i> 'Little Ruby'	Cultivar	300mm	500mm
<i>Grevillea juniperina</i> 'Gold Cluster'	Grevillea cultivar	300mm	800mm
<i>Westringia fruticosa</i> 'Low Horizon'	Westringia cultivar	300mm	700mm
<i>Callistemon viminalis</i> 'Better John'™	Callistemon cultivar	600mm	600mm
* Plant growth habits may vary due to local site, soil and ecological conditions.			

5 Open Space and Riparian Corridor Networks

The Moss Vale Road North URA open space and riparian network consists of the following main elements:

- Riparian corridors and open space areas adjacent to and within the riparian corridor network, including the pond.
- Large and small parks.
- Active open space area (sports field).

Technology focused recreation, youth facilities, waterplay and children's nature play are integral to the open space parklands. Playgrounds located in local parks shall vary in style in accordance with the space and setting.

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The informal more natural style of wild play or nature play will sit well adjacent to the riparian corridor and rural edge whereas the constructed playgrounds with climbing nets, directed physical play are more suitable when located close to the urban centre.

5.1 Riparian corridor and open space areas adjacent to and within the riparian corridor network

The existing natural bushland within the riparian corridor network is to be improved and upgraded. The linear edges offer opportunities for bushland regeneration and recreational activities in a natural setting and should include cycleways, pathways and landscaping with water retention ponds, large boulders, viewing platforms and picnic facilities.

The remnant bushland set aside for parkland must meet the demands of a growing population within the URA and surrounding area whilst ensuring the biodiversity and ecosystem of the bushland remains viable and intact.

Bushland regeneration and urban weed control are to form part of the overall URA maintenance program.

The objectives are to:

- Ensure the intersection of the constructed drainage and the existing riparian corridor drainage system appears natural, includes natural style drainage channels, is functional and appealing for recreational activities and retains existing high value native vegetation.
- Ensure wetlands and ponds are located and designed to be sympathetic to the local environment and setting using materials that typically express the local aesthetic and appear as 'natural' as possible.
- Retain and enhance the existing ecosystem through preservation of land and vegetation in areas deemed to have primary conservation significance, native vegetation planting and bush regeneration, with follow up weed control and planting in subsequent seasons.
- Provide a vegetation buffer (tree and ground cover) to both sides of sloping riparian channels to assist in bank stabilisation as well as the provision of rock lined pockets to both sides of riparian channel.
- Facilitate people movement alongside and through the riparian corridor by including bridges, shared cycleways and pathways using a range of environmentally sustainable materials with long lifespan.
- Include decks and pontoons over wetlands near still and moving water and cater for people of all abilities and ages, using recycled and sustainable materials.
- Provide recreational spaces along and adjoining the riparian corridor, appropriately distanced for comfort and interest of users.
- Provide a relationship between the natural and built environment through the inclusion of BBQ's, picnic shelters and settings, play space, fitness equipment, viewing platforms and casual seating in the landscaped setting.
- Consider the location and inclusion of interpretive and wayfinding signage.

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- Consider Safer by Design including lighting, landscape, sight lines and location of pathways from formal and informal surveillance.
- Vehicular crossings and pathways to be at appropriate grades with any disturbance revegetated.

Table 8 and **Table 9** presents a planting palette for the riparian corridors and open space areas adjacent to and within the riparian corridor network, specific to the following communities identified in Chapter NB4 Supporting Document 3: Vegetation Management Plan Requirements:

- Riverflat Eucalyptus Forest on Coastal Floodplains.
- Freshwater Wetlands on Coastal Floodplains.

Table 8: Riparian Planting List - Riverflat Eucalyptus Forest on Coastal Floodplains

Botanic Name	Common Name	Height *	Width*
Tree			
Acacia floribunda	White sally	5-10m	3-5m
Acacia parramattensis	Parramatta wattle	2.5m	2m
Angophora floribunda	Rough barked apple	10-20m	10m
Backhousia myrtifolia	grey myrtle	8m	3m
Casuarina cunninghamiana subsp. cunninghamiana	River Oak	10m	6m
Casuarina glauca	Swamp oak	8-20m	4m
Eucalyptus amplifolia	Cabbage gum	30m	10m
Eucalyptus botryoides	Bangalay	10-40m	8-12m
Eucalyptus elata	river peppermint	20-30m	8m
Eucalyptus grandis	Flooded gum	20-50m	12-15m
Eucalyptus longifolia	Woollybutt	35m	8m
Eucalyptus ovata	Swamp gum	30m	8m
Eucalyptus saligna	Sydney blue gum	20-50m	10m
Eucalyptus tereticornis	Forest red gum	30-50m	15-20m
Eucalyptus viminalis	Ribbon gum	50m	12m
Livingstonia australis	Cabbage tree palm	25m	8m
Melaleuca linearifolia	Snow in summer	5-8m	5m
Melaleuca styphelioides	Prickly teatree	10-20m	7m
Melaleuca decora	Paperbark	7m	4m
Melia azedarach	White cedar	6-20m	10m
Syzygium smithii	Lillypilly	5m	3m
Tristanopsis laurina	River gum	10m	5m
Shrub/understorey			
Breynia oblongifolia	Coffee bush	3m+	1-2m
Lomandra longifolia	Matt rush	1.2m	1m
Erchinopogon ovatus		1.2m	3-5m

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Commelina cyanea	Scurvy weed	200mm	1m
Microlena stipoides var stipoides	Weeping grass	70mm	30mm
Hymenanthera dentata	tree violet	2-5m	6m
Imperata cylindrica var major	Blady grass	50mm	50mm
Geranium solanderi	Native geranium	40mm	60mm
Dichondra repens	Kidney weed	20mm	1m
Lomandra filiformis	small lomandra	30mm	30mm
Solanum priniphyllum	Forest nightshade	500mm	500mm
Bursaria spinosa	blackthorn	5-10m	2-4m
Viola hederacea	Native violet	100mm	100mm
Trema aspera	Native peach	3m	2-3m
Rubus parviflorus	Native raspberry	2m	3-4m
Themeda triandra	Kangaroo grass	1-1.2m	40mm tuft
Pteridium esculentum	Bracken fern	1m	50mm
Plectranthus parviflorus	Plectranthus	40mm	50mm
Climbers/Twiners			
Clematis aristata	Old mans beard	3m+	1-5m
Clematis glycinoides	Old mans beard	3m+	1-2m
Hardenbergia violacea	native sasparilla	2.5m	3m
Estrephus latifolius	Wombat berry	3m+	1m
Glycine microphylla	Love creeper	500mm	2m
Stephonia japonica	Snake vine	2m	3m+
Pandorea pandorana	Wonga vine	20m+	3-5m
<i>* Plant growth habits may vary due to local site, soil and ecological conditions.</i>			

Table 9: Riparian Planting List - Freshwater Wetlands on Coastal Floodplains

Botanic Name	Common Name	Height *	Width*
Grasses			
Hemarthria uncinata	matgrass	1m	2m
Paspalum vaginatum	Wetland couch	500mm	5m
Paspalum distichum	Water couch	500mm	2m
Pseudoraphis spinescens	Spiny mud-grass	1m	1m
Herbs			
Eclipta platyglossa	Yellow twinheads	250mm	40mm
Eclipta prostrata	White eclipta	250mm	50mm
Gratiola pedunculata	Stalked brooklime	20-50mm	50mm
Ludwigia peploidea subsp montevidensis	Water primrose	50mm	200mm
Myriophyllum latifolium	Water milfoil	30mm	10mm
Persicaria attenuata	Smartweed	0.5-1m	2m
Persicaria decipiens	Slender knotweed	0.5-1m	2m
Persicaria hydropiper	Water pepper	0.5-1m	2m
Persicaria lapathifolia	Pale knotweed	0.5-1m	2m
Renunculus inundatus	River buttercup	50mm	800mm

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Reeds			
Phragmites australis	Common reed	1-4m	10mm dia
Typha orientalis	Broad leaf cumbungi	1-4m	20mm dia
Sedges and Rushes			
Baumea articulata	Jointed twig-rush	1m	2mm dia
Baumea rubiginosa	Twig-rush	1m	2mm dia
Bolboschoenus caldwellii	Club-rush	1m	3mm dia
Bolboschoenus fluviatilis	Marsh club-rush	1m	3mm dia
Carex appressa	Tall sedge	80mm	50mm tuft
Cyperus lucidus	Leafy flat sedge	50mm	3mm dia
Eleocharis acuta	Common spike sedge	600mm	40mm tuft
Juncus usitatus	Common rush	1.5m	3mm dia
<i>* Plant growth habits may vary due to local site, soil and ecological conditions.</i>			

5.2 Large Parks

Within the URA, two large parks are required; one near the Village Centre (including a 3-4 hectare active and passive open space area, refer to Section 10 of DCP Chapter NB4) and one adjacent to the riparian corridor in the north of the release area.

The large park objectives are to:

- Ensure good sight lines and opportunities for passive surveillance from nearby picnic facilities and pathways/cycleways.
- Allow for increased connectivity via WIFI inclusions into smart furniture or play equipment.
- Provide intergenerational activities including early childhood play, teenage activities and outdoor fitness.
- Provide overhead and up lighting for night-time events in addition to power outlets and Three-Phase power for performance spaces.
- Ensure pathway connections link neighbouring streetscapes with activity zones.
- Ensure excellent walking and cycling connections from the large parks throughout the URA and to the Village Centre.
- Provide of picnic furniture under shelter, seating, BBQ's, bubbler and water refilling station with easy and compliant access for all.
- Provide quality amenities to the park near the Village Centre (e.g. parking, spectator areas, clubhouse storage room, amenities, children's playground facilities).

Refer to **Table 8** for appropriate planting palettes. Refer to the furniture palette at **Section 7**.

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5.3 Small Parks

Four smaller parks (0.5 hectares) also required within the residential areas. These parks offer the opportunity to present differing characteristics which enhance the overall area with a close relationship to the local neighbourhood, family and intergenerational activities.

The small park objectives are to:

- Provide parks which present unique and differing play opportunities for all ages.
- Provide a play equipment selection to reflect all abilities and provide challenge to the users.
- Integrate outdoor exercise circuits within outdoor activity zones.
- Provide circuitous pathways surrounding playgrounds and linking with external cycleways.
- Provide picnic shade facilities and furniture including BBQ's in certain small parks which have sufficient space, carparking, good sight lines and incentives to linger longer in the park such as play or exercise equipment or interesting natural landscape.
- Provide shade trees in landscaped areas which provide a buffer against strong winds and sun exposure.
- Group trees and shrubs in garden beds to reduce maintenance and watering yet provide maximum enhancement to the park.

Refer to **Table 8** for appropriate planting palettes. Refer to the furniture palette at **Section 7**.

6 Village Centre

The Village Centre is an active zone catering to pedestrians, cyclists and vehicles within and around the commercial zone. The parallel on street car parking and centralised parking court provides formal parking within the centre.

It is intended that the built and landscaped spaces within the Village Centre are linked to adjoining open space networks through tree lined streets and pathways. The planting schedule provides a selection of exotic and native trees which help to reinforce these green linkages within and adjacent to the built environment. The provision of generous tree planting also provides comfort and amenity and also will soften areas of hard stand.

The Village Centre objectives are to:

- Provide an outdoor area where quality comfortable furniture, sculpture, paved surfaces and lighting are united by a cohesive planting palette within an urban setting which is slightly different to the recreational areas.
- Integrate retail, commercial, civic functions into a landscaped environment.
- Provide accessibility for all with smooth level transitions on areas of hard stand and pavement which conform to Australian Standards.

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- Optimise spatial arrangement between hard and soft landscaping and infrastructure allowing people to move around comfortably.
- Provide winter sun and summer shade with specimen tree planting and garden bed niches of semi enclosed areas of shelter.
- Provide a semi formal outdoor space to deliver a hub where the community can participate in a variety of activities.
- Integrate public art, wayfinding and interpretive signage connecting urban and rural areas.
- Provide a communication hub bringing WiFi into the village centre.

Refer to **Table 4** and **Table 10** for appropriate planting palettes. Refer to the furniture palette at **Section 7**.

Table 10: Village Centre Tree Plant List

Botanic Name	Common Name	Height *	Width*
Tree			
<i>Fraxinus</i> 'Cimmaron'	Cimzam Ash	13m	8m
<i>Fraxinus</i> 'Urbanite'	Urbanite Ash	11m	8m
<i>Lagerstroemia indica</i> 'Natchez'	Indian Summer Variety	6m	4m
<i>Lagerstroemia indica</i> 'Lipan'	Indian Summer Variety	6m	
Shrub/understorey			
<i>Abelia x grandiflora</i>	Abelia	1.5m	1m
<i>Casuarina glauca</i> 'Cousin It'	Casuarina	150mm	1.5m
<i>Convolvulus cneorum</i>	Silverbush	400mm	400mm
<i>Cordyline australis</i>	Cabbage Tree	1-5m	500mm
<i>Cordyline stricta</i>	Narrow-leaved Palm Lily	1m (to flower)	600mm
<i>Cordyline terminalis</i>	Ti Plant	1m	1m
<i>Correa alba</i>	White Correa	1.5m	1.5m
<i>Cyathea australis</i>	Australian Tree Fern	2-4m	2-4m
<i>Dicksonia antarctica</i>	Soft Tree Fern	3m	2m
<i>Dodonaea viscosa</i>	Purple Hop Bush	3m	1.5m
<i>Dodonaea triquetra</i>	Common Hop Bush	1-2m	1-3m
<i>Doryanthes excelsa</i>	Gynea Lily	3-4m	1.2-2.5m
<i>Indigophera australis</i>	Austral Indigo	2m	2m
<i>Lavandula stoechas</i>	Lavender	300-450mm	450-600mm
<i>Michelia figo</i>	Port Wine Magnolia	3m	2-3m
<i>Murraya paniculata</i>	Murraya Hedge	4m	3m
<i>Nandina domestica</i> 'Flirt'	Sacred Bamboo	300-400mm	400-500mm
<i>Rosmarinus officinalis</i>	Rosemary	1.8m	1.5m
<i>Russelia equisetiformis</i>	Coral Plant	1.8m	600mm
<i>Strelitzia juncea</i>	Leafless Bird of Paradise	2m	1m
<i>Westringia</i> 'Zena'	Native Rosemary	0.9m	0.9m

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<i>Westringia</i> 'Smokey'	Coastal Rosemary	1.2m	1.5m
<i>Westringia</i> 'Wynjabbie Gem'	Coastal Rosemary	2m	2m
Climbers/Twiners			
<i>Parthenocissus tricuspidata</i>	Boston Ivy	4m+	3m
<i>Rosa</i> sp	Rose	3m+	3m+
<i>Trachelospermum jasminoides</i>	Star Jasmine	3m+	3m
<i>Pandora pandorana</i>	Snow Bells	20m+	2m
Grasses/Ground Covers			
<i>Ajuga reptans</i>	Carpet Bugle	350mm	600mm
<i>Alternanthera</i> 'Little Ruby'	Alternanthera Note: not to be planted from autumn through winter.	400mm	800mm
<i>Banksia spinulosa</i> 'Birthday Candles'	Hairpin Banksia	3m	2m
<i>Brachyscome multifida</i>	Break of Day	0.5m	1m
<i>Grevillea</i> 'Bronze Rambler'	Grevillea Bronze Rambler	0.3m	4.5m
<i>Westringia</i> 'Low Horizon'	<i>Westringia</i> 'Low Horizon'	300mm	700mm
<i>Westringia</i> 'Mundi'	<i>Westringia</i> 'Mundi'	500mm	1.5m
<i>Myoporum parvifolium</i>	Boobialla	300mm	3m
<i>Nandina domestica</i> 'Gulf Stream'	Heavenly Bamboo	750mm	750mm
<i>Nandina domestica</i> 'Flirt'	Sacred Bamboo	300-400mm	400-500mm
<i>Scaevola aemula</i>	Aussie Crawl	600mm	1m
<i>Liriope muscari</i>	Evergreen Giant	500mm	500mm
* Plant growth habits may vary due to local site, soil and ecological conditions.			

7 Furniture, Materials, Finishes and Colours

The following materials, finishes and colours seek to promote Moss Vale Road North URA as a desirable and attractive place to live and work.

The colour difference selected for the street and park furniture subtly reinforces the dynamic between the less formal parklands which stretch outside the urban and civic centre of the URA.

The furniture palette is comprised of one suite of furniture suitable for use throughout the entire URA. The furniture has been selected for the following qualities: sustainable, replaceable in the event of damage or wear and tear, long safe useful lifespan, comfort, contemporary and aesthetic appeal for the streetscape, urban precincts and recreational zones.

The Street Furniture Australia Pty Ltd Aria range includes various furniture types which can be combined into settings or for standalone use. Furniture types include benches without armrests, seats with armrests, picnic tables, lookout tables, a bubbler, bin enclosure and bollards.

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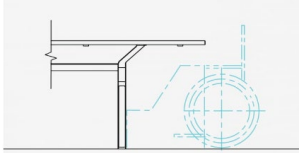
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The furniture general requirements include:

- All furniture, picnic facilities, bubblers to be compliant with Disability Discrimination Act (DDA) and Australian Standard specifications.
- All individual seats shall include arm rests and backs for comfort and DDA compliance.
- All furniture and picnic shelters are to surface mounted on hard stand (in accordance with manufacturer requirements) which links to adjoining pathways, cycleways and shared user paths.
- Seating is to be located throughout the URA in the Village Centre, parks, riparian corridor, in playgrounds and along the pathways which link these parks together in areas throughout the URA.
- Furniture is to be configured to provide group and private seating opportunities in the Village Centre, local parks and urban centre.
- Bins are to have door openings to street, have adjustable feet, rubbish hood to top of bin with side opening shafts.
- Bollards are to be either surface mounted and non-removable or surface mounted and removable depending upon location and requirements for access. Bollards are to have reflector strips mounted.

7.1 Furniture - Village Centre, Parks and Riparian Corridor Areas

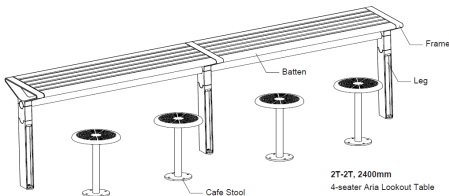
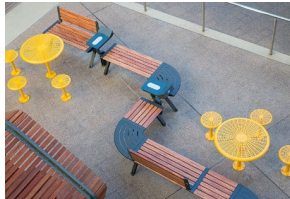
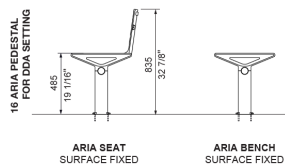
Table 11: Furniture Specifications

Element	Specification and Principles
Picnic setting <i>Aria series by Street Furniture Australia Pty Ltd</i>	Setting to be any combination of table, bench, café stools as listed below: • DDA compliant picnic table: – Code CMA4. – Frame, top batons and baton end cap: Textura Monument (bottom left image). – Pedestal straight leg allowing for fixing surface mounted into concrete slab in accordance with manufacturer's recommendations. • Bench: – To be located as part of picnic setting as above, also in casual arrangement in village centre. – Code 3B. – Frame and front and back baton Textura Monument. – Seat batons and baton end caps Aluminum: ▪ Woodgrain Spotted Gum – Village Centre Core and Activation Precincts (bottom centre image) ▪ Woodgrain Beach Oak (Grey) – Parks (bottom right image) – Pedestal straight leg. – Armrests nil. – Fixing surface mounted into concrete slab in accordance with manufacturer's recommendations.  

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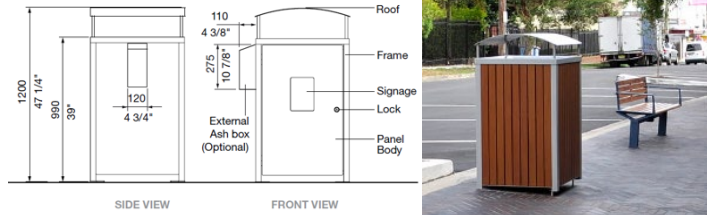
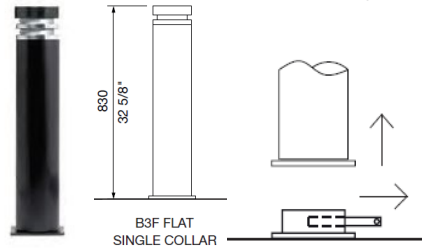
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Lookout Table and Café Stools <i>Aria series by Street Furniture Australia Pty Ltd</i>	<u>Urban area where casual dining opportunities exist</u> - Lookout Table: - CMA4-T. - DDA Compliant: 'Non-Standard' DDA compliant CMA Lookout table. - Fixing: Surface fixed. - Café Stools: - Code S1. - Frame colour selected from Street Furniture Australia standard colour palette. - Fixing surface mounted into concrete slab in accordance with manufacturer's recommendations.  
Seating and benches with arm rests <i>Aria series by Street Furniture Australia Pty Ltd</i>	- Seating with arm rests: - Code 3S. - Frame and armrests and top and bottom baton: Textura Monument. - Batons and baton end cap: - Woodgrain Spotted Gum – Village Centre Core and Activation Precincts. - Woodgrain Beach Oak (Grey) – Parks. - Pedestal: straight leg. - Fixing: surface mounted into concrete slab in accordance with manufacturer's recommendations. - Bench with armrests: - Code 3B. - Frame, armrests, front and back baton and corner frame (if used): Textura Monument. - Batons and baton end cap: - Woodgrain Spotted Gum – Village Centre Core and Activation Precincts. - Woodgrain Beach Oak (Grey) – Parks. - Pedestal: straight leg. - Fixing: surface mounted into concrete slab in accordance with manufacturer's recommendations.  
Dog Bubbler and Refill Pole	- Fully DDA compliant with stepper. Station certified under Water Mark Standard WMTS 105:2016. - Code: Aqua Dog Bubbler DF4 DB, Aqua Refill Pole DF7.

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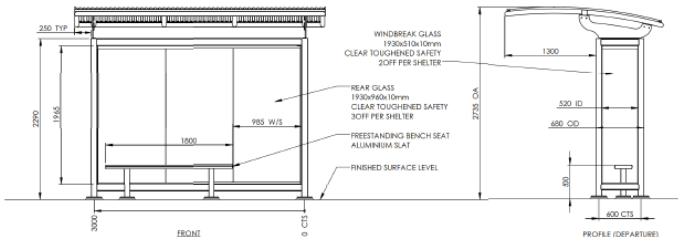
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Street Furniture Australia Pty Ltd	- Fixtures and fittings: Marine Grade Steel fixtures and fittings. - Frame of bubbler and pole body: Textura Monument. - Fixing: surface mounted into concrete slab in accordance with manufacturer's recommendations.  Angusa Dog Bubbler TEA 1.03 Angusa Ruffli Pole D17 Optional for vehicles
240lt Bin enclosure Street Furniture Australia Pty Ltd	240lt bin enclosure to suit 240lt Sulo®: - Code: WBE-nF240-BAT. - Frame: Textura Monument (Textured GL 329A). - Batons: Standard vertical baton with: - Woodgrain Spotted Gum – Village Centre Core and Activation Precincts. - Woodgrain Beach Oak (Grey) – Parks. - Module: single and double as required. - Fixing: surface mounted with adjustable feet placed on concrete slab. - Roof: angled Stainless Steel. - Door lock in accordance with Shoalhaven City Council requirements.  SIDE VIEW FRONT VIEW Roof Frame Signage Lock Panel Body External Ash box (Optional)
Wide Bollard Street Furniture Australia Pty Ltd	- Wide bollard: various lengths to suit requirements: - Code: wide Flat Single Collar. - Pipe: powder coated Textura Monument (Textured GL 329A). - Head and collar finish: polished. - Fixing: surface fixed and removable surface fixed as required.  B3F FLAT SINGLE COLLAR
Streetlamps Schreder	<u>Village Centre</u> - Luminaire: LED Piano by Schreder. - Pole: AS2700 Black Satin.

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	- Installation in accordance with Manufacturer's Specifications. - Lighting to encourage night economy and events in safe and comfortable surrounds. - Lighting style to be in context with overall street furniture and material palette. 
Esplanade Bus Shelter <i>Stoddart</i>	- Frame colour: powder Coat Monument® Satin. - Module single with clear sides. - Fixing: Stainless Steel fixings, galvanized steel posts, surface mounted on concrete slab to manufacturer's recommendations. - Roof: angled Stainless Steel. - Seating: DDA compliant. - Powder coated aluminium, toughened glass. - Fixing: surface mounted.  
Modular Electric BBQ <i>Christies Pty Ltd</i>	- Stainless Steel cook top with low impact corners for all units. - Flat packed ready for assembly. - Single cook top with double bench cutout (bottom left image) - DDA Certified A Series: Code A 2E. - Double cook top with single shared bench cutout (bottom centre image): - Code E3.2. - Colour of panel (the colour panel is shown in green in bottom centre image): Aztec Silver (bottom right image). - Colour of door panel: Standard dark grey (as shown in bottom centre image).

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Picnic Shelters <i>Landmark</i>	• Colorbond roofing colour: Ironstone ®. • Fixings: hot dipped gal turnbuckle bracing and galvanized steel brackets and fixings. • Mounting: bolt below slab. • Village Centre Core and Activation Precincts: Longreach Series hardwood frame with KoppersArch Tanacoat penetrative sealant (bottom left image). • Parks and riparian corridor area: Longreach Series hot dipped galvanised posts and frame (bottom right image). 
Permeable Paving to tree base <i>Stoneset Pty Ltd</i>	• 300mm diameter tree ring around base of tree. • Stoneset applied in accordance with manufacturer's specifications. • Colour of stones: tan (top left image). 

7.2 Footpaths and Slabs

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Note: Quality control requirements for supply and batching of concrete oxide:

- Traceability from the specified oxide supplier to the batching plant in the form of invoice/delivery docket/batching documentation with quantities and materials as ordered and delivered. Documentation to be provided upon request.
- Request 'back to back' warranty and guarantee that the specified colour and quantity of mix in accordance with the manufacturer's recommendations are met along the supply, batching, delivery and installation of concrete oxide to site from original oxide and concrete suppliers.

Table 12: Footpath and Slab Specifications

Element	Specification and Principles
Concrete Path, Furniture and Picnic Slabs which occur on Retail Streets within Village Centre	• Pedestrian pathways to be designed in accordance with Engineering Specifications. • Sealed with penetrative non-slip sealant equivalent to Klen Tuscan Seal® • 125mm depth with SL72 reinforcement placed to centre of concrete slab 50mm depth from top/bottom surface of concrete. • 10mm thick Expansion Joint. • 10mm thick Isolation Joint adjacent between other built structure such as kerb and gutter, concrete pads, buildings. • Construction Joint. • Sawcut Joint. • 50mm minimum compacted metal base. • Minimum 98% compacted sub-base. • Concrete pathway with Oxide: - Lightly broomed - R10 non-slip resistance. - 32mPa concrete with full depth 'Colourmix' oxide Papyrus (image right) in accordance with Manufacturer's recommendations. 
Footpaths within road reserves on Local streets, Access Streets Tier 1 & Tier 2, Village Green, Riparian Corridor and Local Parks throughout Open Space	• Lightly broomed - R10 non-slip resistance. • Pedestrian pathways to be designed in accordance with Engineering Specifications. • Sealed with penetrative non-slip sealant equivalent to Klen Tuscan Seal®. • 125mm depth with SL72 reinforcement placed to centre of concrete slab 50mm depth from top/bottom surface of concrete. • 10mm thick Expansion Joint. • 10mm thick Isolation Joint adjacent between other built structure such as kerb and gutter, concrete pads, buildings. • Construction Joint. • Sawcut Joint. • 50mm minimum compacted metal base. • Minimum 98% compacted sub-base. • Concrete pathway 25mPa concrete.
Paver and Header for Village Centre	• Stradapave® 50 Exposed Aggregate or similar for paving in urban areas - 300mm x 300mm x 50mm Charcoal (bottom left image). • Trihex® 80 Exposed Aggregate Charcoal or similar for driveways, commercial centers where vehicles enter (bottom right image).

Shoalhaven Development Control Plan 2014

Draft Chapter NB4: Moss Vale Road North Urban Release Area

Draft Supporting Document 2: Landscape Specifications



7.3 Public Art and Wayfinding/Interpretative Signage

Public art and wayfinding or interpretative signage are valuable inclusions into the urban and escarpment, rural heritage and creek lines. Inclusion of public art should reflect and reinterpret the surrounding natural environment, whilst the wayfinding signage should stand out and act as key marker for pedestrian and vehicular navigation around the URA.

8 References

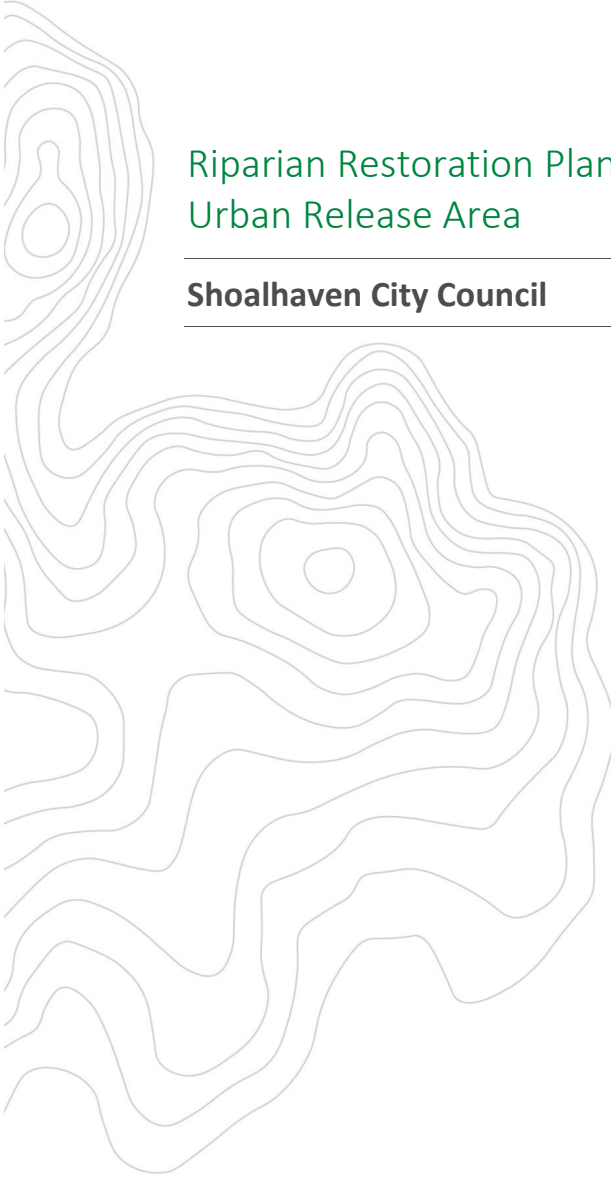
Landscape Study: Moss Vale Road North Urban Release Area (URA) (Taylor Brammer Landscape Architects Pty Ltd, April 2019).

Moss Vale Road North Urban Release Area Traffic Study (Bitzios, July 2020).

Riparian Restoration Planning – Moss Vale Road North Urban Release Area (Ecological Australia, November 2020).

Shoalhaven Development Control Plan 2014, Chapter G17: Business, Commercial and Retail Activities.

Supporting Document 3



Riparian Restoration Planning – Moss Vale Road North Urban Release Area

Shoalhaven City Council

Draft Residential Planting List - Moss Vale Road North Urban Release Area

Addendum - Supporting Document 3 – Riparian Restoration Planning - Moss Vale Road North Urban Release Area

The purpose of this Addendum to Supporting Document 3: Riparian Restoration Planning is to provide an amendment to Table 5 in Appendix A: Revegetation and Cross-section for E2.

Table 5a: Revised recommended revegetation species for corresponding zones shown in cross section

Stratum	Species (as listed)	Common Name (as listed)	revised variant / remove from list	Common Name
*PCT 3271: Shoalhaven Spotted Gum-Blackbutt Moist Forest (Formerly PCT 1206 – Spotted Gum – Blackbutt shrubby open forest on the coastal foothills, southern Sydney Basin Bioregion and northern South East Corner Bioregion)				
*PCT 3153 Illawarra Escarpment Bangalay x Blue Gum Wet Forest (Formerly PCT 1245: Sydney Blue Gum x Bangalay – Lilly Pilly moist forest in gullies and on sheltered slopes, southern Sydney Basin Bioregion)				
Upper	<i>Eucalyptus saligna</i>	(Sydney Blue Gum)	<i>Eucalyptus saligna</i> x <i>E. botryoides</i>	(Sydney Blue Gum)
Riparian / Waterway areas – PCT 3975: Southern Lower Floodplain Freshwater Wetland (formerly PCT 781: Coastal freshwater wetlands)				
Ground	<i>Isachne globosa</i>	(Swamp Mullet)	<i>Paspalum distichum</i>	(Water Couch)
	<i>Blechnum indicum</i>	(Swamp Water Fern)	Remove / replace other fern species	
	<i>Hypolepis muelleri</i>	(Harsh Ground Fern)	Remove / replace other fern species	
	<i>Triglochin microtuberosa</i>	-	<i>Cycnogeton microtuberosum</i>	(Eastern Water-Ribbons)
	<i>Baumea juncea</i>	-	<i>Eleocharis sphacelata</i>	(Tall Spike-Rush)
	<i>Baumea articulata</i>	-	<i>Phragmites australis</i>	(Common Reed)
	<i>Gleichenia dicarpa</i>	(Pouched Coral Fern)	Remove / replace other fern species	
	<i>Persicaria praetermissa</i>	-	<i>Persicaria decipiens</i>	(Slender Knotweed)
	<i>Triglochin procerum</i>	(Water Ribbons)	<i>Cycnogeton procerum</i>	(Common Water-Ribbons)
	<i>Cladium procerum</i>	-	<i>Juncus polyanthemus</i>	(Australian Silver Rush)
	<i>Persicaria strigosa</i>	-	<i>Persicaria hydropiper</i>	(Water Pepper)
*denotes the reclassification of a Plant Community Type (PCT)				

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Template 2.8.1

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Abbreviations

Abbreviation	Description
DA	Development Application
ELA	Eco Logical Australia
SCC	Shoalhaven City Council
LLS	Local Land Services
MVRN URA	Moss Vale Road North Urban Release Area
VMP	Vegetation Management Plan

1. Introduction

1.1 Background

Eco Logical Australia (ELA) was engaged by Shoalhaven City Council (SCC) to provide advice on future planning and development controls in relation to revegetating and rehabilitating existing watercourses and associated riparian corridors (E2 lands) within the Moss Vale Road North Urban Release Area (MVRN URA). The location of MVRN URA is shown in Figure 1.

This report provides advice on suitable development controls for activities across the MVRN URA, specifically, that subdivisions in E2 lands carry a DA condition which requires the implementation of a 5-year Vegetation Management Plan (VMP).

As such this report provides the following guidelines:

- maps and descriptions of areas identified for riparian restoration
- descriptions of vegetation communities to be restored - Plant Community Types (PCTs) and Threatened Ecological Communities (TECs)
- cross section diagram showing by year-5 of the VMP, the structure of the vegetation communities / riparian zone
- minimum requirements for a riparian restoration / VMP, including:
 - planting species list
 - planting densities
 - fencing
 - weed and pest control
 - erosion control
 - performance criteria



Figure 1 Site location

2. Site description

The MVRN URA is located approximately six kilometres from the Shoalhaven City Council chambers (Figure 1). The site is bordered by Moss Vale Rd on its south, Princes Highway to the east, rural lands to the north-east, and Cambewarra Range Nature Reserve to the north-west. Access is via Moss Vale Rd onto Bell's Lane which crosses north to south, with Abernethy's Lane crossing the site east to west.

The MVRN URA was rezoned for residential development and environmental protection under the Shoalhaven Local Environmental Plan (SLEP) 2014.

The majority of the MVRN URA has been previously cleared for agricultural use. The site currently comprises large rural landholdings and smaller lifestyle allotments, generally with each containing a single dwelling plus farm and outbuildings. Cows, horses and alpaca were observed on a number of properties during the field survey.

2.1 Waterways and riparian corridors

Abernethy's Creek is the main watercourse on site, comprising a 3rd order stream, with the three tributaries (south-west, south-east and north-east) on site being 2nd order streams. Other 2nd order streams link off the study area to the north-west off Lot 1 DP1191186. Stream order classifications are mapped as per Figure 2.

The streambank width of Abernethy's Creek varies from two to three metres with steeply incised banks, to 10-30 m top of bank (eg: mid-section west of Bells Lane). The channel is generally well defined and often aggraded with sediment one to three metres deep and one to twenty metres wide. The latter where it braids into two channels around a small island near the existing dwelling on Lot 4 DP708356. There are deep and / or broad pools sporadically from near the north-west limits to its exit off-site, but these are most common from just below high energy section just upstream of the dwelling on Lot 1 DP1191186. Pools increase in depth and frequency within about 50 m west of Bells Lane, with several deep, small pools with tentative connection via a series of incised channels and localised scour pools (latter appear permanent due to depth). An in-stream dam with a pumping station provides the largest pool on Lot 4 DP708356.

The creek is ephemeral and subject to short-term high velocity flood flows. Water quality appears to be good with low to medium turbidity due to fine clay suspensions, but clarity is sufficient to allow diatomic algae, benthic algae and submerged aquatic plants to prosper within the pools from the mid-section down. The substrate varies from bedrock and gravel in the upper mid-section where it cuts a steep slope of the adjacent hill on Lot 1 DP1191186, to soil in the mid and lower reaches and the uppermost reaches.

The north-east tributary on Lot 7 DP618693 has very deeply incised banks along most of its middle and upper length until Bells Rd, and the substrate is soil only. Water is present only in the mid-section above the large dam which dominates this stream. Above the dam is a well-defined, but heavily vegetated channel about two metres wide, which links to a localised broad, shallow wetland that was probably originally a deep pool, subsequently infilled with sediment and now an-instream wetland. Water here is shallow and low quality due to high levels of decaying organic matter (i.e. highly tannin stained,

indications of low dissolved oxygen and low pH, very high bacterial levels) but this may be due to lack of recent rainfall, with conditions improving with flushing.

The south-west tributary which falls on Lot 4 DP268209 has a channel with variable definition, from a near deltaic like structure below the largest dam on the property which bisects this watercourse, to a well-defined channel in its lower and middle to upper middle length. Above the dam, the channel is generally shallow (<30 cm) and about one to three metres wide, and heavily vegetated with grasses and / or sedges. Water at the time of the survey was limited to a few centimetres and appeared highly tannin stained, and probably had an acid pH due to decaying organic matter. The large dam which bisects this watercourse is permanent but had a very high turbidity and hence low clarity. Submerged plants were not noted and floating plants were very limited. Depth is at least 1.5-2 m judging by the height of the dam wall.

All other watercourses on site are dry with no pools, apart from the upper limit of the 2nd order tributary in the north-northwest, which has a deep scour, possibly excavated, near the northern boundary. This pool was highly turbid with very high levels of suspended clay, hence algae growth was minimal, but lack of bacterial surface scum or blue-green algae suggested good water quality otherwise. Some deep scours occur in this watercourse but all were dry at time of survey and with poor channel connectivity, are unlikely to support native fish.

2.2 Vegetation communities

The site vegetation communities in term of distribution, floristics and condition reflect the long-term use of the area for pastoralism. All vegetation remnants contain a simplified assemblage of the original native ecosystems, often dominated by regrowth.

Historically the land appears likely to have been largely dominated by PCT 1206 with Spotted Gum being the dominant canopy tree, with canopy associates and undergrowth varying with soil types. The riparian zones have been highly degraded, with the original associations likely to have been a transition of PCT 1245 *Sydney Blue Gum x Bangalay - Lilly Pilly moist forest*, via a wet sclerophyll forest/rainforest/ecotone, to a swamp forest community, based on remnant species present and occurrence of PCTs in similar situations in the locality.

The Flora and Fauna Assessment (ELA 2018) determined the following vegetation communities (Figure 2):

- 1206 *Spotted Gum - Blackbutt shrubby open forest on the coastal foothills, southern Sydney Basin Bioregion and northern South East Corner Bioregion*
- 1245 *Sydney Blue Gum x Bangalay - Lilly Pilly moist forest in gullies and on sheltered slopes, southern Sydney Basin Bioregion*
- Exotic Pasture / Agricultural woodland / Ornamentals / Lawns - Highly degraded forms of PCT 1206 and 1245 and possibly other PCTs
- Aquatic vegetation - PCT not applicable as vegetation is either in artificial habitat (i.e. dams) or is the vestiges of the original riparian community, although a distinct patch in the north-east tributary could be classed as *PCT 781 Coastal freshwater lagoons of the Sydney Basin Bioregion and South East Corner Bioregion*.

The Flora and Fauna study (ELA 2018), concluded that the following TECs are present:

- Presence of Flooded Gum plus Bangalay x Sydney Blue Gum hybrids on site plus rare occurrences of Forest Red Gum and *Angophora floribunda* localised to the alluvial soil landscape, plus presence of many understorey, groundcover, shrub and vine species listed in the Final Determination suggest that an intergrade form of the TECs *Riverflat Eucalypt Forest on Coastal Floodplains* and *Swamp Sclerophyll Forest on Coastal Floodplains* may have occurred depending on local relief and position in the catchment. Such intergrades are recognised in all the Final Determinations (e.g. NSWSC 2004a, 2004b).
- Applying the Precautionary Principle, therefore, all areas of PCT 1245 on alluvial soil landscapes are mapped as the TEC - *Riverflat Eucalypt Forest on Coastal Floodplains*.
- Currently, the only precisely definable TEC on site is *Freshwater Wetlands on Coastal Floodplains*. This TEC appears to be a derived form – occupying the central channel of the watercourses which have undoubtedly altered via erosion and sedimentation since clearing of the original vegetation. Such changes may have seen shallowing of former channels, with removal of forest allowing colonisation due to increased solar access (such plants are absent where the riparian zone is enclosed by forest and streamflow is permanent due to a rocky substrate). This vegetation is generally restricted to the channel with pasture grasses and weeds dominating most of the habitat. For this reason, the TEC is mapped as low (high weed infestation, very simplistic, highly impacted by stock, low floristic diversity / structural integrity) and moderate (medium weed infestation, medium impact by stock, medium floristic diversity / structural integrity) condition.

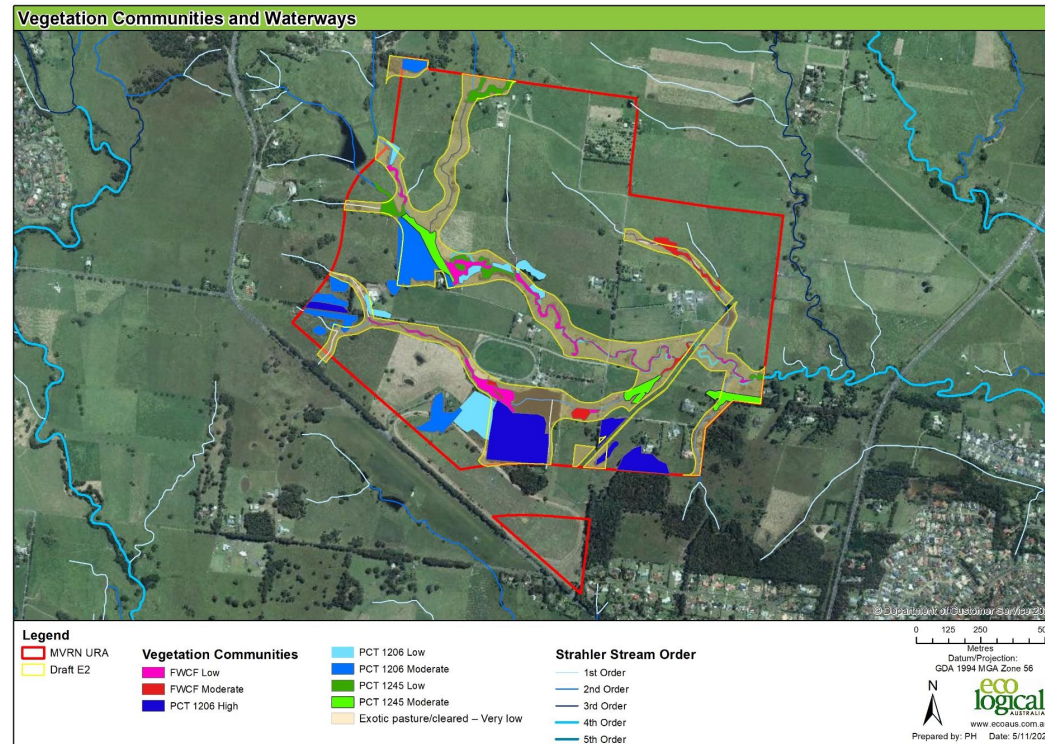


Figure 2 Vegetation communities and waterways

2.3 Resilience potential

The resilience of a site refers to the degree, manner and pace of recovery of species after disturbance or stress, or the potential for such recovery. Resilience is impacted by factors such as vegetation composition, structure and function as well as the amount of biodiversity and presence/absence of key threats (e.g. weeds or pest fauna species).

The study area has low resilience (ELA 2018). Areas of native vegetation are in very low (high content of exotic species over all strata) condition. The dominant weed is Kikuyu due to the fact most of the E2 zones along the creeks and drainage lines have been historically cleared and converted to pasture in all but the channel.

Key weeds such as Lantana and Blackberry are generally localised and relatively amenable to control at their current level of infestation e.g. via herbicide application including initial treatments with strategically timed follow-ups to control regrowth and recruitment. Similarly, Willows are also considered readily controlled and hence these weeds overall are not a major impediment to rehabilitation of the E2 zones.

2.4 Management issues

2.4.1 Priority weeds

Table 1 contains species are listed as Weeds of National Environmental Significance (WoNS) or under the NSW *Biosecurity Act 2015* identified in the South East Regional Weed Management Plan (SELLS 2017). Under the NSW *Biosecurity Act 2015*, eight weeds have been identified to fall under the 'general biosecurity duty'. Where these fall into the E2 zones, they are to be eliminated. Plants outside the E2 zone will eventually be eliminated by development of the R1 and other development zones. Weeds could potentially be introduced via imported road base materials and construction vehicles. Standard hygiene practices in the following section will also control this risk.

Table 1 Key weed species and biosecurity duty

Name	WoNS	Biosecurity Act	Abundance / distribution on site	Biosecurity obligations
<i>Asparagus africanus</i> (Climbing Asparagus)	No	Yes	Small patch and some individuals in northern foot of main remnant on Lot 4 DP268209; and some plants in medium condition remnant on Lot 4 DP 708356.	General biosecurity duty. North Shoalhaven falls into core infestation area outside the exclusion zone. A person must not import into the State or sell.
<i>Ageratina riparia</i> (Mistflower)	No	Yes	Common in patches along Abernethy Creek.	General biosecurity duty to prevent, eliminate or minimise any biosecurity risk.
<i>Salix babylonica</i> (Weeping Willow)	No	Yes	Common in lower sections of Abernethy's Creek and its northern tributary.	General biosecurity duty to prevent, eliminate or minimise any biosecurity risk.
<i>Senecio madagascariensis</i>	Yes	Yes	All pasture.	General biosecurity duty. North Shoalhaven falls into core infestation area outside the exclusion zone.

Name	WoN S	Biosecurity Act	Abundance / distribution on site	Biosecurity obligations
(Fireweed)				Species to be managed in accordance with published weed management plan.
<i>Lantana camara</i> (Lantana)	Yes	Yes	Edges of some forest remnants and riparian zones, and undergrowth of remnants where cattle have access.	General biosecurity duty. Shoalhaven falls into core infestation area outside the exclusion zone. Species to be managed in accordance with published weed management plan. A person must not import into the State or sell.
<i>Salix babylonica</i>	Yes	No	Locally common in lower Abernethy's Creek with a local stand in the north-east tributary.	General biosecurity duty. A person must not import into the State or sell.
<i>Ligustrum sinense</i> (Small-leaved privet)	No	Yes	Few plants in Abernethy Creek	General biosecurity duty to prevent, eliminate or minimise any biosecurity risk.
<i>Ligustrum lucidum</i> (Broad-leaved privet)	No	Yes	Single plant in intact remnant on Lot 4 DP268209.	General biosecurity duty to prevent, eliminate or minimise any biosecurity risk.
<i>Rubus fruticosus</i> aggregate (Blackberry)	Yes	Yes	Common along riparian zones, especially first order streams converted to pasture. Some patches up to 100 m ²	General biosecurity duty to prevent, eliminate or minimise any biosecurity risk. Subject to local management plans. A person must not import into the State or sell.
<i>Zantedeschia aethiopica</i> (Arum Lily)	No	Yes	Middle and lower section of Abernethy's Creek.	General biosecurity duty to prevent, eliminate or minimise any biosecurity risk.

2.4.2 Pest animals

Pest animals can negatively impact natural ecosystems on E2 lands. These impacts can also affect VMP performance criteria. Any adverse impacts by pest animals that are observed will need to be addressed with appropriate pest management measures.

3. VMP Aims and objectives

3.1 Aims

The aims of the report is to:

- Provide guidance for VMPs that will accompany future DAs.
- Provide general management principles that will improve the composition, structure and function of native riparian vegetation.
- Provide consistency with best practice guidelines including the Society for Ecological Restoration Australasia *National Standards for Ecological Restoration, 2016*.
- Be consistent with relevant environmental legislation and policies

3.2 Objectives

The overall objective of individual VMPs is to restore the function of the E2 lands and to provide a stable watercourse which will increase and enhance local native vegetation and habitat whilst improving connectivity of the waterway. The objectives are summarised below in Table 2.

Individual VMPs will be developed to accompany future DAs on land containing the E2 zone. These will outline specific aims, objectives and indicators and will cover a five-year period. Consideration of future land ownership arrangements of the riparian corridors will be undertaken by SCC.

Table 2 VMP objectives

Objectives	Approach
Improve water quality and riparian vegetation	Revegetation of riparian corridor
Improve ecological health and integrity	Control woody weeds and pasture grasses Maximisation of biodiversity and ecological functions Revegetate with appropriate species (See Appendix A) Undertake ongoing maintenance weed control
Maintain and enhance habitat values	Protect existing native vegetation Weed control Increase native plant cover Increase habitat for native fauna

4. Action plan

4.1 Typical management zones

VMP management zones will be prescribed upon receipt of detailed designs during the Development Application stage for the E2 area. Management zones are based on the vegetation community and the predicted natural resilience of each area. Zones are mapped out in Figure 3.

Management zones have been identified as the following:

- **High Resilience (PCT 1206)**
 - Weed coverage approximately 5-24% of area. Revegetation required approximately 5-24% of area
- **Moderate Resilience (FWCF, PCT1206 and 1245)**
 - Weed coverage approximately 25-49% of area. Revegetation required approximately 25-49% of area
- **Low Resilience (FWCF, 1206 and 1245)**
 - Weed coverage approximately 50-74% of area. Revegetation required approximately 50-74% of area
- **Very Low Resilience (Exotic pasture/cleared)**
 - Weed coverage approximately 75-100% of area. Revegetation required approximately 75-100% of area

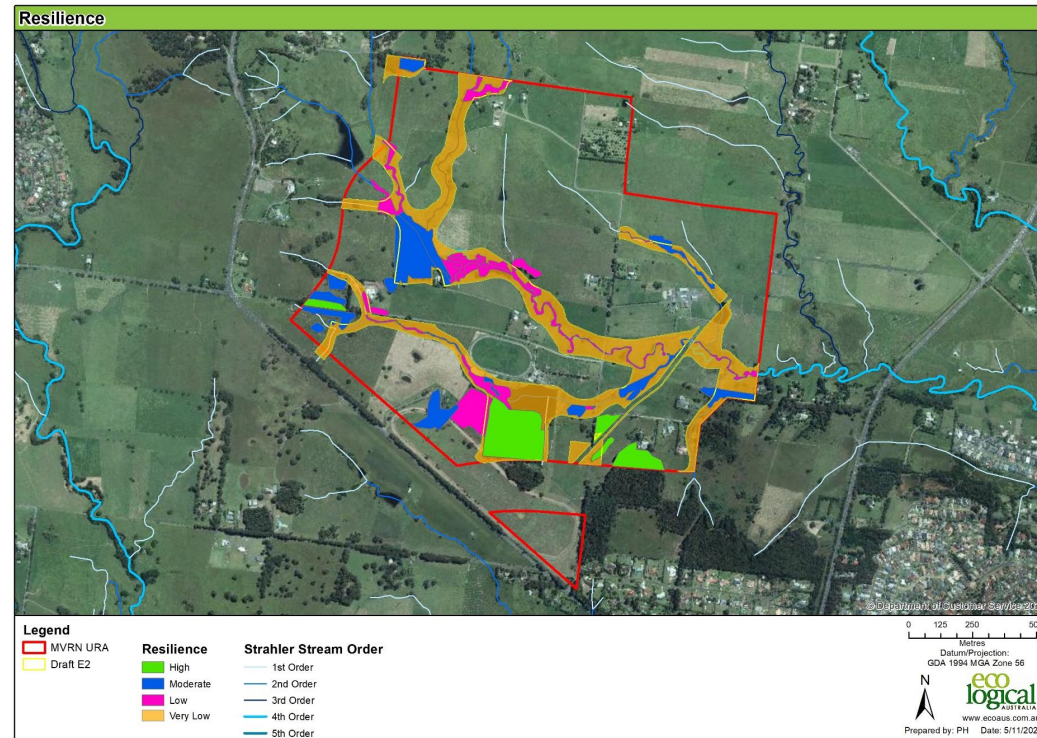


Figure 3 Resilience categories

4.2 Site management principles for VMPs

4.2.1 Temporary construction fencing

The edge of the VMP area where it borders the development footprint is to be fenced with temporary construction fencing to prevent civil construction machinery from entering the VMP area.

Information signage should be installed on the construction fencing that identifies that there is to be no entry into the VMP area without an ecologist or bush regenerator present.

4.2.2 Soil preparation

During all earthworks in the VMP area, i.e. for stormwater connections, the natural soil is to be retained and returned to the area following works. Topsoil will need to be a loose, friable soil free of weed propagules suitable for planting. Topsoil is to be kept free of weed propagules whilst retained on site.

4.2.3 Pest control

The site is to be monitored for evidence of pest species, which will be included in monitoring reports. Negative impacts include:

- Grazing and trampling on native vegetation
- Erosion and bank instability
- Spread weed species

The results of this monitoring will be used to inform whether pest control actions are required in the VMP area. Any damage by pests will require rectification. The report should outline all rectifications works and pest control measures. Pest control and rectification works will need to be completed in the 5-year VMP period.

4.2.4 Erosion and sediment control

General consideration of erosion and sediment control within the VMP area should be considered. Examples of the types of specifications which should be considered for the VMP area are as follows: :

- No storage of plant, equipment and construction materials (including fill) in the VMP area
- No removal of soil/stone from the VMP area
- Where bush regeneration occurs, works will aim to reduce disturbance to topsoil. Weed removal is to be undertaken in a manner which minimises impact to the topsoil and disturbed topsoil will be replaced in its original location or the appropriate soil profile.
- Weed removal should not involve the removal of root ball (along waterways to prevent bank instability)
- Woody weed treatment should be limited to cut and paint and frill/drill techniques rather than removal with excavator or other heavy equipment.
- Pasture grasses should be slashed with a brush cutter or a ride on mower. The use of a ride on mower should be avoided when soil is wet and done when the soil is dry to reduce any disturbance. Grass cutting is allowed (subject to applicable planning and management controls) provided cutting blades are sufficiently raised from the ground to avoid inference with surface stones

- Where mulching is required, mulch will need to be stockpiled outside of the VMP area. Mulch can be spread onsite by a mini skid loader. Spreading mulch should be avoided when soil is wet and done when the soil is dry to reduce any disturbance. If soil conditions are not favourable, then mulch spreading can be done pneumatically.
- Any adverse effects identified, or measures in contravention of the above, will be brought to the immediate attention of SCC and managed in consultation with SCC.
- No work with heavy machinery (eg excavator) should be done in waterways or directly on banks

4.2.5 Revegetation

Complete revegetation is required where there are areas of very low natural resilience (see Section 4.1 and Figure 2). These areas occur where the vegetation is predominantly exotic cover. Revegetation to some degree is also likely to be required in areas of moderate and high resilience, typically referred to as assisted regeneration. Revegetation usually involves two rounds of weed removal followed by replanting of native groundcovers, shrubs and trees either by direct seeding or planting of tubestock once adequate weed control has been achieved.

Appendix A contains information on revegetation species and management works on a typical cross section in E2 lands. The cross section shows:

- zones corresponding to the type of native vegetation that should be planted
- Any erosion control measures in waterways

Additionally, Appendix A contains a revegetation list showing which species should be planted in each zone as per the cross section.

Replanting is typically required at the densities indicated in Table 3. Species for revegetation will be based on characteristic species of the PCT native to that location as indicated in Appendix A. If species are unavailable, others may be substituted but they must be typical species of that PCT and be a 'like-for-like' substitution, i.e. a tree can only be substituted for a tree. All plantings are to be sourced from local provenance stock (wherever possible), as per SCC guidelines and Florabank guidelines (Mortlock, 2000).

Table 3 Revegetation densities for vegetation communities

Vegetation Community	Revegetation densities (plant per m ²)			
	Tree	Shrub	Herbs/scrambler	Sedge
PCT 1206 and 1245	1/25m ²	1/20m ²	1/m ²	3/m ²
Riparian/Waterway, including PCT 781	-	-	-	8/m ²

Revegetation should aim to provide the following species diversity:

- Trees: 5-10 species
- Middle: 7-12 species
- Ground cover & vines: 5-10 species

For the growth of the plants used in the revegetation works, seed must be collected from local provenance species (wherever possible). Groundcovers, shrubs and trees should be collected as within close proximity (e.g. <20km) to the site. However, soil type, climate and aspect of the collection site(s) should also be considered. Native grasses typically have much larger dispersal mechanisms and are to be collected from within the Illawarra Escarpment.

Where species identified cannot be sourced, they may be substituted for other appropriate species. Species must be substituted with species of a similar form, e.g. trees for tree, grasses for grasses, etc. Only wild native species are to be used. Plants are not to be substituted with horticultural varieties under any circumstances.

Record keeping of seed collection and planting locations is to be as per the Flora Bank guidelines (Mortlock 2000). The bush regeneration contractor is responsible for recording this information and providing it to SCC. A Section 132C licence under the NSW *National Parks and Wildlife Act 1974* may be required to undertake seed collection works.

The VRZ / E2 land which falls on alluvial soils will be revegetated as per NRAR (formerly Department of Primary Industries - Water) requirements (DPI 2012). The target community will vary with soil, but are to target the TEC – *Riverflat Eucalypt Forest on Coastal Floodplains* to a coastal floodplain rainforest community which potentially have previously existed in the riparian zones. To minimise bushfire risk and APZs, canopy species of *Eucalyptus*, *Corymbia* and *Angophora* should be planted at low density with a dense rainforest understory aimed to be established where the TEC – *Riverflat Eucalypt Forest on Coastal Floodplains* is desired.

In localised areas where soil is prone to waterlogging and where wetland species currently dominate, this habitat is to be retained, with an ecotonal planting of species suitable for the soils of the location planted. Where suitable conditions occur and native wetland species are absent, exotic vegetation should be replaced by native wetland species.

Areas of the VRZ / E2 land on non-alluvial soils will be planted with species to match PCT 1206 or 1245 where relevant.

4.2.6 Instream aquatic habitat enhancement

Opportunities to enhance the instream aquatic habitat should be explored for 3rd order (Strahler) streams and greater during the design stage and flood modelling. Any modification to the stream alignment, bed or banks will require instream restoration. Aquatic habitat opportunities include:

- Provision of a variety of aquatic habitat types, such as riffle-run-pool sequence (where the gradient allows), with the selection and placement to complement or supplement adjacent habitat types along the reach outside of the development.
- Removal of unnecessary barriers to fish passage (e.g. instream dams, eroded crossings, old weirs).
- Provision of fish passage at new structures, by ensuring they do not:
 - create a drop or step of greater than 100 mm
 - form a slope greater than 1:20
 - increase flow velocity through a constriction
 - percolate water into the substrate (i.e. water must flow over the bed).

- Prevention of erosion at crossings and culverts by using rip rap and avoiding placement on bends
- Prohibition of planting deciduous exotic trees along roads and where leaf drop can't be intercepted from entering the waterway. Leaves from exotic trees decompose rapidly (unlike native trees), so they don't provide a stable food resource for aquatic detritivores (e.g. some fish and invertebrates). Deciduous leaves often accumulate during a short period (unlike native species that shed leaves slowly all-year round), and large amounts of organic material deposited in the water can cause anoxic benthic conditions fatal to aquatic organisms.

All instream works must adhere to guidelines published by DPI Fisheries (for streams identified as Key Fish Habitat) and the Natural Resources Access Regulator (for works within 40 m of a watercourse), including:

- Guidelines for controlled activities (e.g. outlet structures, pipe, cables and crossings), <https://www.industry.nsw.gov.au/water/licensing-trade/approvals/controlled-activities/guide>
- Policy and guidelines for fish habitat conservation and management (update 2013) <https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/fish-habitat-conservation>

4.2.7 Assisted regeneration

Assisted natural regeneration is based on the ecological principles of community succession and is most practical if there are patches of natural vegetation within the cleared area. It involves the natural regrowth of vegetation using the existing seed bank in the soil and of limited supplementary revegetation. It guarantees that vegetation will be a representation of what was previously growing at the site. Due to the varying condition of native vegetation and largely poor resilience across most of the E2 zone, it is anticipated that assisted regeneration will be used only in areas of moderate - high resilience as a complementary method for maintaining the health and integrity of vegetation communities. Supplementary planting over a 5-year timeframe will also be required depending on the level of natural native regeneration (which will need to be monitored during the implementation of a VMP).

4.3 Weed treatment

Weed control will be undertaken across the E2 zone. A selection of the best suited weed control method within the study area depends on several factors including:

- The species or combination of weeds being targeted.
- The density of the weeds.
- Resources available (time, labour, equipment, and finances).
- Weather conditions of the day.

Due to the high density and abundance of weed species in the E2 zone, primary weed control is required. Following primary weed control, maintenance weed control will occur for a period of five years to ensure exotic species do not encroach into the E2 zone.

4.3.1 Weed control techniques

Details of specific weed control techniques to be used such as cut and paint, scrape and paint, herbicide spraying, and hand weeding are given in Brodie (1999). The principles of bush regeneration and techniques to trigger natural regeneration are to be in accordance with the Bradley Method and other techniques described in Buchanan (2000).

4.3.2 Management of weed waste

All exotic vegetation material should be removed from site and composted at a registered green waste disposal facility. Fruiting parts and tubers should be bagged before being removed from site.

4.3.3 Herbicide use

The use of herbicide to control weeds should be carefully considered. Herbicide use should assess potential long-term impacts of the technique including whether the proposed works address the source of the weed infestation. However, herbicide application forms an important and useful component of an integrated weed management approach and can be the most appropriate method to control some weed species.

Herbicide use should occur during the active growing season for plants to encourage the chemical uptake into the plant. The selection of herbicides should also consider the type of weed and the location. Where non-selective herbicides are required for use, glyphosate is the most suitable. If herbicides are required to be used near waterways, a glyphosate-based herbicide formulated for use near waterways will be used (e.g. RoundUp® Biactive™).

Broad-leaf selective herbicide may be used as per the *Noxious and environmental weed control handbook* (DPI 2010). However, this type of herbicide is extremely toxic to aquatic life and must not be used in, or adjacent to, waterways. Registration and records must be kept in accordance with the NSW *Pesticide Regulation 2009*.

4.4 Site maintenance

Maintenance weed control will be completed for a minimum five-year period, to control emergent and encroaching weeds. Maintenance work is to be undertaken by a qualified bush regeneration contractor(s).

Maintenance will be undertaken on a regular basis in the peak growing seasons (spring and summer), with less frequent visits in cooler periods (autumn and winter). Maintenance programs will also comment on other site issues such as pest animal activity and condition of sediment control structures. Maintenance work will include actions to encourage native regeneration where it is not occurring naturally.

4.5 Performance criteria

The progress and compliance with the VMP will be monitored and reviewed annually. This process will involve the bush regeneration contractor, landowners and a staff member from SCC. A report will be prepared by a certified bush regenerator commenting on each performance criteria. If required, reporting will be followed by a site visit.

The performance criteria which will be applied to management zones are described in Table 4.

4.6 Bush regeneration contractors

All vegetation management works in establishment and 5-year maintenance period is to be undertaken by suitably qualified and experienced bush regeneration contractors or individuals. In addition to this, team leaders should have, as a minimum, a Certificate III in Conservation & Land Management or equivalent. The contractor will need to carry out best practice bush regeneration techniques as described by Buchanan (2009). A flexible approach to this site is recommended since techniques may need to be changed or modified to suit site conditions. This approach is consistent with adaptive management and allows the contractor to develop and build on site knowledge. Monitoring will assist in the development of any management actions in subsequent years.

Works in the maintenance period will be the responsibility of the land-owner in accordance with this report.

Table 4 Performance criteria

By end of Year 5
An increase in native cover and diversity and a decrease in exotic cover and diversity
Percentage of total native vegetation cover should be the following: Minimum 15% by end of year 1, 30% by end of year 2, 45% by end of year 3, 60% by end of year 4 and 75% by end of year 5
A minimum of 85% survival rate of each vegetation strata planted in each zone (e.g. tree, shrub and groundcover)
Revegetation is to be undertaken with a minimum of 60% of the benchmark levels for species diversity as provided in the PCT
Native vegetation diversity in no less than 40% of the benchmark levels for species provided in the PCT
Any localised plant failure within planting areas are addressed with no area larger than 2 m x 2 metres without surviving plants
Maintenance replanting is to replace plants by the same species, or where that species is not available, with the same growth form (i.e. tree for tree etc.) and must not decrease species diversity. Any new species to be planted must be from the community being emulated and of local provenance
Complete eradication of noxious weeds from the site and no establishment of new noxious species
Exotic groundcover vegetation no more than 15% of zone.
Native groundcover vegetation no less than 75% of zone.

5. Monitoring, evaluation and reporting

The bush regeneration contractor and the land manager (typically the landowner or developer) will monitor the vegetation for changes over the 5 year maintenance period. VMPs adopt the principle of observing, recording, and monitoring treatments and responses to interventions in order to inform changes and different approaches for future work. Regular assessment and analysis of progress is required to adapt treatments (adaptive management) as required.

5.1 Monitoring

Monitoring is done by assessing the site against the set performance criteria for each year and include:

- Collection of data prior to works commencing and at annual intervals to identify whether objectives, goals and targets are being attained; and
- Collecting data on specific treatments and approximate costs.

A minimum standard of monitoring is the use of photo points (Section 5.1.1), along with species lists and condition descriptions. Management works also monitor the recovery performance using pre-identified indicators consistent with the objectives. These are used to track progress towards full recovery. Formal quantitative sampling methods (e.g. vegetation plots) supported by a condition assessment are preferred mechanism to demonstrate achievement of objectives.

Adequate records of interventions and all monitoring are maintained to enable evaluation. Secure records of the provenance of re-introduced plants should include location, description of site, reference to collection protocols and date of acquisition.

5.1.1 Photo monitoring

Photo monitoring points should be set-up using a permanent reference point to provide a visual reference of changes in the vegetation. Photo monitoring to include:

- set up a minimum of two monitoring points within each VMP zone, with a minimum of six photo points across the VMP area
- place two six-foot star pickets 10 m apart
- record the location (eastings and northings) of the first star picket with a GPS
- as well as the bearing to the second star picket
- take a digital photo from the first star picket looking towards the second star picket, the entire length of the gap
- label each digital image with a unique reference number that indicates where the photo was taken (i.e. the photo monitoring point) and the date it was taken (e.g. 01_190405 for a photo taken at the first photo monitoring point on the 5th April 2019).

5.1.2 Evaluation and reporting

Evaluation of the outcomes of each VMP interventions is carried out, with progress measured against the performance criteria for each year. Evaluation includes asking key questions to adequately assess the results from monitoring. Evaluation results are used to inform ongoing management.

Progress reports are to be provided on an annual basis for five years or until the completion of the VMP project, whichever is longer. This reporting includes the implementation of the monitoring actions specified in Section 4 and a description of the works that have been undertaken. These reports will be submitted to Council and NRAR. Reports will include at a minimum:

- The time period the report relates to.
- Qualifications and experience of contractors.
- A summary of works carried out within the period including.
 - Date and time of site visits.
 - Works completed on the site at each visit.
 - A table detailing total man hours for each task carried out on site.
 - Methods of weeding undertaken and details of herbicide use.
 - Methods implemented for Assisted Natural Regeneration.
 - Photo and quadrat monitoring results to date.
 - Pest animals observed and any adverse impacts
 - A description of any problems encountered in implementing the works recommended in the VMP and how they were overcome.
 - Any observations made, including new plant species recorded (native and weed species), comments on rates of regeneration and any problems which impact on the implementation of the VMP.

If applicable, the results of the implementation works in relation to the relevant performance criteria.

References

Brodie, L et al.1999. Bush regenerators' Handbook, Second Edition. National Trust of Australia, Sydney, NSW.

Buchanan RA. 2000. Bush regeneration: recovering Australian landscapes. 2nd Edition. TAFE NSW, Sydney.

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Eco Logical Australia 2018. *Flora and Fauna Assessment for Moss Vale Rd North Urban Release Area Masterplan and Development Control Plan*. Report to Allen Price & Scarratts Pty Ltd. ELA, Huskisson.

NSW Office of water. 2012. Guidelines for riparian corridors on waterfront land.

Appendix A Revegetation and Cross-section for E2

Table 5 Recommended revegetation species for corresponding zones shown in cross section

Stratum	Species	Common name	Zone		
			A	B	C
PCT – 1206: Spotted Gum - Blackbutt shrubby open forest on the coastal foothills, southern Sydney Basin Bioregion and northern South East Corner Bioregion					
Trees	<i>Corymbia maculata</i>	(Spotted Gum)			•
	<i>Eucalyptus pilularis</i>	(Blackbutt)			•
	<i>Eucalyptus paniculata</i> subsp. <i>Paniculata</i>				•
	<i>Corymbia gummifera</i>	(Red Bloodwood)			•
	<i>Eucalyptus globoidea</i>	(White Stringybark)			•
Middle	<i>Breynia oblongifolia</i>	(Coffee Bush)			•
	<i>Cissus hypoglauca</i>	(Giant Water Vine)			•
	<i>Elaeocarpus reticulatus</i>	(Blueberry Ash)			•
	<i>Eustrephus latifolius</i>	(Wombat Berry)			•
	<i>Hibbertia aspera</i>	(Rough Guinea Flower)			•
	<i>Leucopogon lanceolatus</i>				•
	<i>Macrozamia communis</i>	(Burrawang)			•
	<i>Notelaea longifolia</i>	(Large Mock-olive)			•
	<i>Pandorea pandorana</i>	(Wonga Wonga Vine)			•
	<i>Persoonia linearis</i>	(Narrow-leaved Geebung)			•
	<i>Tylophora barbata</i>	(Bearded Tylophora)			•
	<i>Synoum glandulosum</i>	(Scentless Rosewood)			•
Ground cover	<i>Dianella caerulea</i>	(Blue Flax-lily)			•
	<i>Entolasia stricta</i>	(Wiry Panic)			•
	<i>Lepidosperma urophorum</i>				•
	<i>Lomandra longifolia</i>	(Spiny-headed Mat-rush)			•
	<i>Pteridium esculentum</i>	(Bracken)			•
	<i>Schelhammera undulata</i>				•
PCT 1245: Sydney Blue Gum x Bangalay - Lilly Pilly moist forest in gullies and on sheltered slopes, southern Sydney Basin Bioregion					
Upper	<i>Acmena smithii</i>	(Lilly Pilly)			•
	<i>Livistona australis</i>	(Cabbage Palm)			•
	<i>Synoum glandulosum</i>	(Scentless Rosewood)			•
	<i>Pittosporum undulatum</i>	(Sweet Pittosporum)			•
	<i>Cryptocarya glaucescens</i>	(Jackwood)			•
	<i>Eucalyptus saligna</i>	(Sydney Blue Gum)			•
	<i>Eucalyptus quadrangulate</i>	(White-topped Box)			•
	<i>Eucalyptus pilularis</i>	(Blackbutt)			•
	<i>Syncarpia glomulifera</i>	(Turpentine)			•
Middle	<i>Notelaea venosa</i>	(Veined Mock-olive)			•
	<i>Clerodendrum tomentosum</i>	(Hairy Clerodendrum)			•

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Stratum	Species	Common name	Zone		
			A	B	C
Ground	<i>Eupomatia laurina</i>	(Bolwarra)			•
	<i>Doodia aspera</i>	(Prickly Rasp Fern)			•
	<i>Pseuderanthemum variabile</i>	(Pastel Flower)			•
	<i>Oplismenus imbecillis</i>				•
	<i>Gymnostachys anceps</i>	(Settler's Twine)			•
	<i>Blechnum cartilagineum</i>	(Gristle Fern)			•
	<i>Adiantum formosum</i>	(Giant Maidenhair)			•
	<i>Calochlaena dubia</i>	(Rainbow Fern)			•
Riparian/Waterway areas - PCT 781: Coastal freshwater wetlands					
Upper	<i>Melaleuca ericifolia</i>	(Swamp Paperbark)		•	
Middle	<i>Casuarina glauca</i>	(Swamp Oak)		•	
	<i>Melaleuca ericifolia</i>	(Swamp Paperbark)		•	
Ground	<i>Isachne globosa</i>	(Swamp Millet)	•	•	
	<i>Blechnum indicum</i>	(Swamp Water Fern)	•	•	
	<i>Eleocharis sphacelata</i>	(Tall Spike Rush)	•	•	
	<i>Hypolepis muelleri</i>	(Harsh Ground Fern)	•	•	
	<i>Phragmites australis</i>	(Common Reed)	•	•	
	<i>Triglochin microtuberosa</i>		•	•	
	<i>Baumea juncea</i>		•	•	
	<i>Baumea articulata</i>	(Jointed Twig-rush)	•	•	
	<i>Bolboschoenus fluviatilis</i>	(Marsh Club-rush)	•	•	
	<i>Carex appressa</i>	(Tall Sedge)	•	•	
	<i>Gleichenia dicarpa</i>	(Pouched Coral Fern)	•	•	
	<i>Persicaria praetermissa</i>		•	•	
	<i>Triglochin procerum</i>	(Water Ribbons)	•	•	
	<i>Cladium procerum</i>		•	•	
	<i>Persicaria strigosa</i>		•	•	

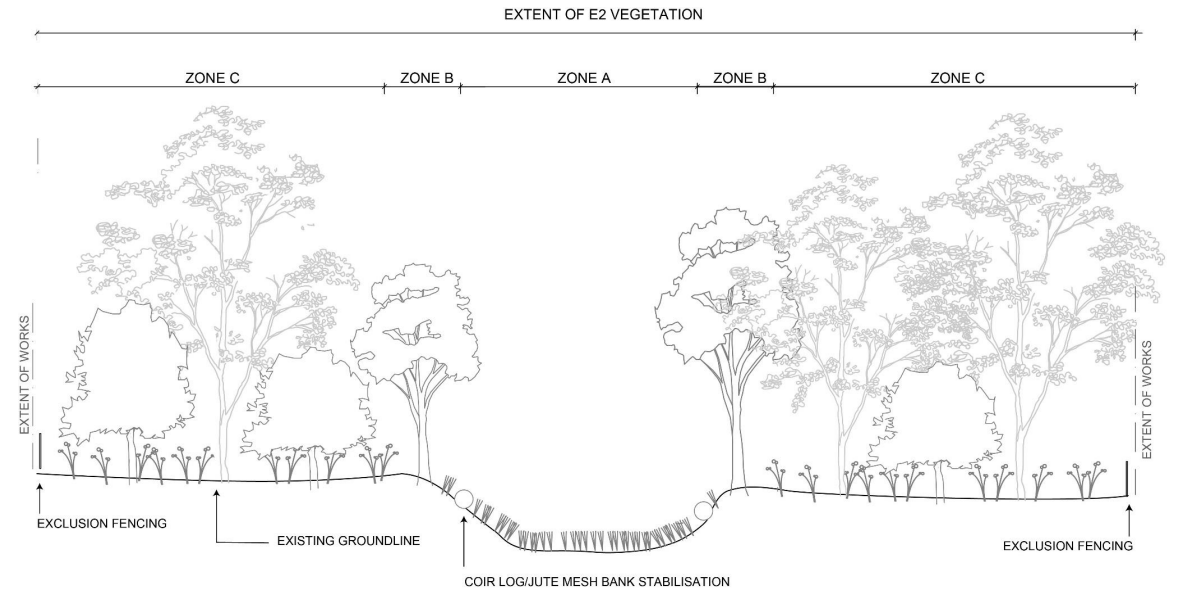


Figure 4 Typical Cross section of final structure by year-5 in E2/VMP zone



CL25.319 - Attachment 1

Draft Residential Planting List - Moss Vale Road North Urban Release Area

Draft Residential Planting List - Moss Vale Road North Urban Release Area

The purpose of this Residential Planting List (Table 1) is to provide planting guidance and inspiration for residential land (private property) in the Moss Vale Road North Urban Release Area (URA). Planting guidance can also be found in the [Cambewarra](#) and [Bomaderry](#) planting lists.

Landscaping detail for land in the public domain in the Moss Vale Road North URA can be found in Chapter NB4: Moss Vale Road North Urban Release Area of Shoalhaven Development Control Plan 2014 here [\[Insert link\]](#).

Table 1: Tree and Understory Plant List - Moss Vale Road North Urban Release Area

Botanic Name	Common Name	Height *	Width*
Tree			
<i>Syzygium leuhmanni</i>	Riberry	7m	3m
<i>Buckinghamia celsissima</i>	Ivory Curl Tree	10m	3m
<i>Lagerstroemia indica</i> 'Tuscarora';	Crepe Myrtle	8m	4m
<i>Parrotia persica</i> 'Venessa'	Persian Ironwood	7m	5m
<i>Magnolia</i> 'Exmouth'	Magnolia	12m	8m
<i>Magnolia</i> 'Little Gem'	Magnolia	6m	3m
<i>Ginkgo biloba</i>	Maidenhair Tree	12m	6m
<i>Backhousia citriodora</i>	Lemon Myrtle	8m	2-3m
<i>Tristania laurina</i> 'Luscious'	Watergum	8m	4m
<i>Lagerstroemia indica</i> 'Natchez'	Crepe Myrtle	4m-6m	6m
<i>Lagerstroemia indica</i> 'Lipan'	Crepe Myrtle	4m-6m	4m
<i>Lagerstroemia indica</i> 'Tuscarora';	Crepe Myrtle	8m	4m
<i>Corymbia citriodora</i> 'Lemon Squash'	Dwarf Lemon Scented Gum	6m	4m
<i>Eucalyptus cladocalyx</i> 'Vintage Red'	Eucalyptus dwarf	6m	4m
<i>Acer rubrum</i> 'October Glory'	Acer cultivar	10m	9m
<i>Pyrus calleryana</i> 'Chanticleer'	Ornamental pear	10m	5-6m
<i>Prunus cerasifera</i> 'Nigra'	Ornamental plum	4m	4m
<i>Cercis canadensis</i> 'Forest Pansy'	Cercis cultivar	5m	5m
Shrub/understory			
<i>Rhagodia spinescens</i> 'Aussie Flat Bush'	Rhagodia	500mm	1m
<i>Westringia fruticosa</i> 'Mundi'	Coastal Rosemary	500mm	1.5m
<i>Westringia</i> 'Grey Box'	Rosemary cultivar	500mm	500mm
<i>Lomandra</i> 'Frilly Lace'	Lomandra	450mm	450mm
<i>Lomandra</i> 'Tanika'	Lomandra	500mm	650mm
<i>Lomandra longifolia</i> 'Lime Jet'	Lomandra	600	600mm
<i>Lomandra</i> 'Variegated'	Lomandra	500mm	600mm
<i>Lorepetalum chinense</i> 'Purple Pixie'	Chinese Fringe	400mm	1-1.2m
<i>Callistemon viminalis</i> 'Better John'	Callistemon	600mm	600mm
<i>Liriope muscari</i> 'Amethyst'	Liriope	400mm	400mm

Draft Residential Planting List - Moss Vale Road North Urban Release Area

<i>Nandina domestica</i> 'Flirt'	Ornamental Nandina	400mm	400mm
<i>Convolvulus cneorum</i>	Silverbush	400mm	400mm
<i>Russelia equisetiformis</i>	Firecracker Plant	1m	1.5m
<i>Abelia grandiflora</i> 'Gold Dwarf'	Abelia	1m	1m
<i>Abelia grandiflora</i> 'Kaleidoscope'	Abelia	1m	1m
<i>Hebe elliptica</i>	Veronica	1m	500mm
<i>Correa pulchella</i> 'Fire Bells'	Correa	250mm	800mm
<i>Westringia fruticosa</i> 'Low Horizon'	Westringia	300mm	700mm
<i>Grevillea</i> 'Gold Cluster'	Grevillea	300mm	800mm
<i>Grevillea hybrid</i> 'Flat Az'	Grevillea	200mm	2-3m
<i>Casuarina glauca</i> 'Cousin It'	Casuarina	150mm	1.5m
<i>Dianella</i> 'Emerald Arch'	Dianella	550mm	450mm
<i>Loropetalum chinensis</i> 'Plum Delight'	Chinese Fringe Flower	1.5m	1.5m
<i>Alternanthera</i> 'Little Ruby'	Alternanthera	400mm	800mm
<i>Rosmarinus officinalis</i> 'Tuscan Blue'	Rosemary	1m	800mm
<i>Raphiolepis</i> 'Cosmic Pink'	Indian Hawthorn	800mm	800mm
<i>Ajuga reptans</i>	Bugle Herb	100mm	400mm
<i>Banksia spinulosa</i> 'Birthday Candles'	Banksia cultivar	400mm	500mm
<i>Brachyscome multifida</i>	Break of Day	150mm	200mm
<i>Grevillea</i> 'Bronze Rambler'	Grevillea cultivar	300mm	500mm
<i>Myoporum parvifolium</i>	Creeping Boobialla	200mm	300mm
<i>Liriope</i> 'Isabella'	Liriope cultivar	400mm	400mm
* Plant growth habits may vary due to local site, soil and ecological conditions.			

List of Adjustments to Publicly Exhibited Draft Development Controls

No.	Ref	Change
1.	6 Key Development Outcomes [...]; 2.a.	Adjust to: <i>Collector Roads (Entry)</i> - provide an attractive entry boulevard characterised by tree lined verges, planted road blisters, and shaded footpaths.
2.	6 Key Development Outcomes [...]; Figure 2 Indicative Layout Plan	Update application of "Small Lot Residential" hatching consistent with published planning controls.
3.	7 Satisfactory arrangements [...]; Table 1	Adjusted to identify all local infrastructure, removing the split between infrastructure proposed to be delivered by the local infrastructure contributions framework and development. Infrastructure list updated to remove Abernethys Lane bridge Description of District Park updated to identify examples of recreation facilities.
4.	7 Satisfactory arrangements [...]; Table 1; Note	Adjust note referencing CP2019 to refer to details on upgrades to established city-wide infrastructure
5.	7 Satisfactory arrangements [...]; Figure 3	Adjustments: - Identify all local infrastructure from infrastructure "long list". - Add note to advise the currently indicative location of roads, bridges, and drainage infrastructure will be confirmed by designs prepared for the local infrastructure contributions framework - Relocate detention basins outside of riparian corridors. - Adjust/Correct bridge locations, including deletion of Abernethys Lane bridge.
6.	8.1 Indicative Layout Plan; Acceptable Solution A1.1; Note	Add to existing note: <i>For example, applications for development consent on land zoned E3 Productivity Support need to address the provisions of Chapter G20 Industrial Development.</i>
7.	8.4 Managing Flood Risk; Figure 5	Update legend in figure to include key for natural/riparian areas.
8.	8.4 Managing Flood Risk; Mandatory Controls, Performance Criteria P6	Adjust to include additional text to clarify infrastructure is protected from more frequent flood events, but not all flood events).
9.	8.6 Bushfire considerations; Figure 6 Bushfire Considerations – Asset Protection Zones	Update Title to include "Indicative"
10.	8.7 Managing Natural Resources and Environmental Heritage; Acceptable Solutions A7.2	Adjust control to provide flexibility noting difficulties in retention in residential subdivision and local open space. Additional flexibility required to exempt areas requiring fill for flood management purposes.
11.	8.7 Managing Natural Resources and Environmental Heritage; Acceptable Solutions A8.1-A8.7	Remove references to buffers to avoid confusion with the Moss Vale Road buffer.
12.	8.7 Managing Natural Resources and	Delete as requirements specified in Supporting Document 3.

List of Adjustments to Publicly Exhibited Draft Development Controls

No.	Ref	Change
	Environmental Heritage; Acceptable Solutions A8.3	
13.	8.7 Managing Natural Resources and Environmental Heritage; Acceptable Solutions A8.4	Delete as requirements specified in Supporting Document 3.
14.	8.8 Landscape Strategy; Acceptable Solution A11.1	Adjust note to confirm bonds for street trees will require deferred planting of trees until 80% of dwellings have received occupation certificates and a 12-month management period.
15.	8.8 Landscape Strategy; Acceptable Solution 12.1	Adjust note requiring perimeter road reserves to be located outside the Vegetated Buffer to: <i>Perimeter road reserves may encroach into the Vegetated Buffer (as a permissible use in the C3 Environmental Management zone) provided related performance criteria are still achieved.</i>
16.	8.8 Landscape Strategy; Figure 7 Vegetated Buffer Typical Section	Update "Riparian Road reserve" label to "road reserve".
17.	8.9 Open Space System; Acceptable Solution A13.4	Update the control to remove the term accessible to avoid confusion with the requirements of disability discrimination legislation.
18.	8.10 Street Network & Hierarchy; Figure 8	Various adjustments to implement outcomes of technical workshop on road network.
19.	8.10 Street Network & Hierarchy; Figure 8	Insert note: <i>"The location of roundabouts and the length of the road profile "Collector Road Entry" are indicative only. The final location and length will be determined by the road and intersection designs prepared for the local infrastructure contributions framework."</i>
20.	8.10 Street Network & Hierarchy; Figure 8	Insert note: <i>"Existing trees and vegetation along and adjacent to identified road corridors may need to be removed to facilitate the delivery of planned roads. These trees and vegetation will be identified in the road designs prepared for the local infrastructure contributions framework."</i>
21.	8.10 Street Network & Hierarchy; Mandatory Control 3 Street design	Insert note: <i>"Indicative parking lanes identified in road profiles are designed to accommodate a range of future uses including parking, safe on-street active transport, increased vehicle movements etc."</i>
22.	8.10 Street Network & Hierarchy; Mandatory Control 3 Street design	Insert note: <i>Shared use pathways are located within the verge or adjacent natural areas and open space.</i>
23.	8.10 Street Network & Hierarchy; Mandatory Control 4 Restricted Access	Delete control and associated note.
24.	8.10.1 Collector Road (Entry	Adjust road profile to provide: • 6.5m travel lanes • Shared path of 2m • Total reserve of 24m

List of Adjustments to Publicly Exhibited Draft Development Controls

No.	Ref	Change
25.	New part; Collector Road Tier 2.	Insert new road profile for <i>Collector Road – Tier 2</i> based on profile in G11 Guidelines but with a 2m wide shared path in the left-hand verge to provide a total profile of 22m.
26.	New part; Local Street	Insert new road profile for <i>Local Street</i> based on profile in G11 Guidelines but with a 2m wide path in the left-hand verge to provide a total profile of 21.1m
27.	8.10.2 Retail Street	Adjust road profile to provide: • 2.3m parking lanes (x2) • Mirror verge widths (4.8m instead of 5m) • Total reserve of 21.2m instead of 21.8m
28.	8.10.3 Access Street – Tier 1	Remove profile from MVRN URA chapter to ensure compliance with G11 Guidelines.
29.	8.10.4 Riparian Street; Table 5 & Figure 12	Adjust width of following components in road profile: • Lane from 8m to 7m, • Carriageway from 11m to 10m, • Path from 2.5m to 2m • Verge from 2.5-17.5 to 2-17m
30.	8.10.5 Laneways; New Acceptable Solution.	Alternative proposals providing access to lots less than 400m ² from primary frontages must address frequency of crossings, impacts on car parking, vehicle manoeuvring, and waste collection services.
31.	8.11 Shared Use Pathway Network; Acceptable Solution A17.2	Adjust to; <i>Shared use pathways are located within the verge or adjacent natural areas and open space.</i>
32.	11 Village Centre [...]; 11.2 Key design Principle – Land Use; Principle 1	Change “1,000-2,000m ² ” to a “minimum of 1,000m ² ”.
33.	12 Low Density Residential Development Controls; Acceptable solution A28.2	Delete.
34.	12 Low Density Residential Development Controls; Table 7 Key development controls [...]	Delete current control governing Maximum Gross Floor Area and replace with: • Control for FSRs scaled to lot size aligned with Codes SEPP. • Control requiring solar access considerations. <i>Direct solar access to living area windows and hardstand private open space areas is achieved for at least 3 hours between the hours of 9:00am and 3:00pm on 21 June (for both the subject development and adjoining development) - where the adjoining land is vacant the proposal over the subject land will be duplicated on the adjoining lot to confirm future development will not be unreasonably impacted.</i>
35.	12 Low Density Residential Development Controls; Table 7 Key development controls [...]	Amend minimum front garage setback for lots 12-15m wide from 6m to 5.5m.

List of Adjustments to Publicly Exhibited Draft Development Controls

No.	Ref	Change
36.	12 Low Density Residential Development Controls; Table 7 Key development controls [...]	Amend minimum front garage setback for lots 15-18m wide from 6m to 5.5m.
37.	12 Low Density Residential Development Controls; Table 7 Key development controls [...]	Amend minimum front garage setback for lots 18+m wide from 6m to 5.5m.
38.	12 Low Density Residential Development Controls; Table 7 Key development controls [...]	Amend side setbacks – ground floor and upper level - to minimum of 0.9m.
39.	12 Low Density Residential Development Controls; Table 7 Key development controls [...]	Amend corner lot – minimum secondary street garage setback for lots 12-15m wide from 6m to 5.5m.
40.	12 Low Density Residential Development Controls; Table 7 Key development controls [...]	Amend corner lot – minimum secondary street garage setback for lots 15-18m wide from 6m to 5.5m.
41.	12 Low Density Residential Development Controls; Table 7 Key development controls [...]	Amend corner lot – minimum secondary street garage setback for lots 18+m wide from 6m to 5.5m.
42.	12 Low Density Residential Development Controls; Table 7 Key development controls [...]	Adjust required height of mature tree from 3-5m height to min. 3m.
43.	Figure 24	Adjust Legend to avoid use of numbers; and adjust drawing to scale the setback to garage.
44.	13 Medium Density Residential Controls; Table 8 Key development controls	Adjust front setback – primary frontage for all other areas from 5m to dwelling to 4.5m and 5.5m to garage to align with Codes SEPP.
45.	13 Medium Density Residential Controls; Table 8 Key development controls	Delete the section of the cumulative impacts control requiring development to be different to other development in the vicinity.
46.	13 Medium Density Residential Controls; Table 8 Key development controls	Adjust required height of mature tree from 3-5m height to min. 3m.
47.	13 Medium Density Residential Controls; Table 8 Key development controls	Adjust control to set a minimum area for each dwelling and set the following criteria for consideration: • Access from living areas • Slope no greater than 1:20 • Setback to boundaries 1.2m • Minimum width 4m

List of Adjustments to Publicly Exhibited Draft Development Controls

No.	Ref	Change
		Retain requirement for open space to not be located forward of the building line.
48.	Supporting Document 3	Addendum prepared and inserted to update the list of species and other requirements to ensure they are contemporary/reflect current best practice.
49.	6 Key Development Outcomes [...]; Figure 2	Adjust pattern/hatching identifying the small lot areas.
50.	6 Key Development Outcomes [...]; Figure 2	Adjust pattern/hatching identifying the vegetated buffer.
51.	6 Key Development Outcomes; Objective 2	Add note clarifying health services facilities are made permissible by relevant SEPP.
52.	7 Satisfactory arrangements [...]; Figure 3	Correctly label district and local parks.
53.	8.1 Indicative Layout Plan; New Objective	Add: <i>Provide buffers to significant remnant vegetation and riparian areas.</i>
54.	8.1 Indicative layout Plan; New Objective	Add: <i>Natural open space is used to promote continuous and connected biodiversity corridors.</i>
55.	8.1 Indicative layout Plan; New Acceptable Solution	Add: <i>Roads are utilised to provide buffers to significant remnant vegetation and riparian areas.</i>
56.	8.3 Aboriginal Cultural Heritage; Acceptable solution A3.2	Add note: <i>Relevant Aboriginal stakeholders include Traditional Owners, Registered Owners, Native Title/Land Rights claimants, Local Aboriginal Land Councils, and relevant government agencies.</i>
57.	8.3 Aboriginal Cultural Heritage; Acceptable solution A3.2	Add note: <i>An Aboriginal Heritage Impact Permit may be required subject to the findings of any Aboriginal Cultural Heritage Assessment.</i>
58.	8.3 Aboriginal Cultural Heritage; Acceptable solution A3.2	Add note: <i>Consultation with a suitably qualified heritage professional or Aboriginal cultural heritage profession may be required.</i>
59.	8.4 Managing Flood Risk	Range of updates to incorporate internal feedback including refinements to the introductory text, Objectives, Mandatory Controls, Performance Criteria and Acceptable Solutions.
60.	8.4 Managing Flood Risk; Acceptable Solution A5.1; New note	Add: <i>Flood risk should be considered and managed in accordance with the above documents and any other relevant flood legislation applicable at the time of lodgement of an application for Council's development consent.</i>
61.	8.9 Open Space System; Acceptable solution A14.1	Adjust the trigger from the issue of a <i>Occupation Certificate</i> to a <i>Subdivision Certificate</i> .
62.	8.12 Subdivision Design; New Mandatory Control	Add: <i>The subdivision layout provides a level building area on each lot that does not require inter-allotment retaining walls. The location of embankments and building envelopes is shown on the subdivision plan.</i>
63.	8.12 Subdivision Design; New performance criteria and acceptable solution	Add: <i>Subdivision layout considers existing residential and rural-residential properties proposed to be retained in their current form.</i> And:

List of Adjustments to Publicly Exhibited Draft Development Controls

No.	Ref	Change
		<i>The subdivision layout considers opportunities to manage impacts on the privacy, amenity, and access arrangements of existing residential and rural-residential properties.</i>
64.	12 Low density residential development controls	Remove controls relating to room depths, ceiling heights, trees in back gardens, calculation of attic space, widow, doors and other openings
65.	12 Low density residential development controls	Amend controls for corner lot garage setbacks and driveway crossovers for dual occupancies.
66.	12 Low density residential development controls	Add a new control to require identification of zero lot line developments at subdivision stage.
67.	Multiple	Amend references to E2 Environmental Conservation to C2 Environmental Conservation.

MVRN URA Draft Development Controls: Alternative Controls for Road Network (7 Satisfactory Arrangements for Local Infrastructure)

Staff Recommendation

7 Satisfactory Arrangements for Local Infrastructure

When assessing a development application, Council will consider whether satisfactory arrangements exist or are proposed by the developer for the provision of good quality local infrastructure essential to support the proposed development, support the orderly and economic development of the URA, and meet the needs of future communities.

Infrastructure includes, but is not limited to, open space, parks, roads and intersections, footpaths, and stormwater drainage. The provision of this essential infrastructure is important as it facilitates the timely delivery of new housing, increases liveability, and meets the ongoing needs of a growing population. New development should not occur in the absence of the provision of or satisfactory arrangements for the provision of such essential infrastructure.

The URA is a large and diverse new urban area which requires a range of infrastructure to support it during the development phase and into the future. The infrastructure listed in **Table 1** is considered essential to support the orderly and economic development of the URA. The essential infrastructure is identified in **Figure 3**.

The provision of essential infrastructure needs to be properly sequenced to result in the best outcome for the MVRN URA. Core infrastructure, services and facilities are to be established at the early phases of each development stage.

Satisfactory arrangement could include, but are not limited to, the addition of infrastructure to the existing *Shoalhaven Development Contributions Plan 2019*, a new development contribution plan specific to the release area, voluntary planning agreements, and Government funding initiatives.

Any proposal for future dedication of land to Council should ensure a suitable mechanism for the dedication is established at Development Application stage in accordance with Council's [Planning Agreement Policy](#).

Note: The indicative location of roads, roundabouts, other intersections, traffic calming measures, bridges, and drainage infrastructure will be confirmed by designs prepared as part of the local infrastructure contributions framework.

Table 1: List of Essential Infrastructure

Road Infrastructure, Intersections & Bridges
The Collector Road network identified in Section 8.10 consisting of approximately 7.7km of road, 15 roundabouts, other intersections, and required traffic calming measures. This network also provides the planned evacuation route to help manage flood risk.
External connections (3) to the existing road network at Moss Vale Road, Bells Lane and Pestells Lane.
New or upgraded bridges (4) on specified parts of the Collector Road Network and identified in Figure 3.
Drainage Infrastructure
[...]
Open Space & Recreation Facilities
[...]
Contributions to Delivery and/or Upgrade of Established City-wide Infrastructure
• [...]

Note: Refer to the *Shoalhaven Contributions Plan 2019* for further detail on established City-wide infrastructure.

Owner Groups Request

7 Satisfactory Arrangements for Local Infrastructure

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Table 2: List of Essential Infrastructure

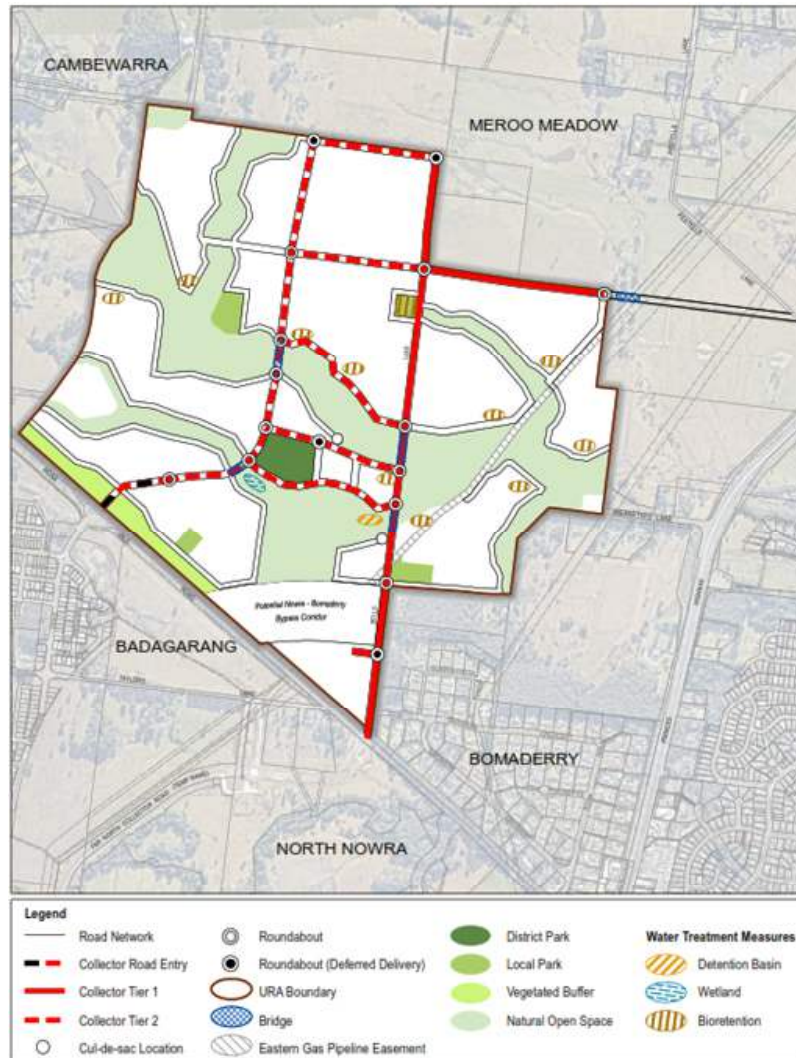
Road Infrastructure, Intersections & Bridges
The Collector Road network identified in Section 8.10 consisting of approximately 7.7km of road, 15 roundabouts and other intersections, and required traffic calming measures. This network also provides the planned evacuation route to help manage flood risk.
External connections (3) to the existing road network at Moss Vale Road, Bells Lane and Pestells Lane.
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MVRN URA Draft Development Controls: Alternative Controls for Road Network (7 Satisfactory Arrangements for Local Infrastructure)

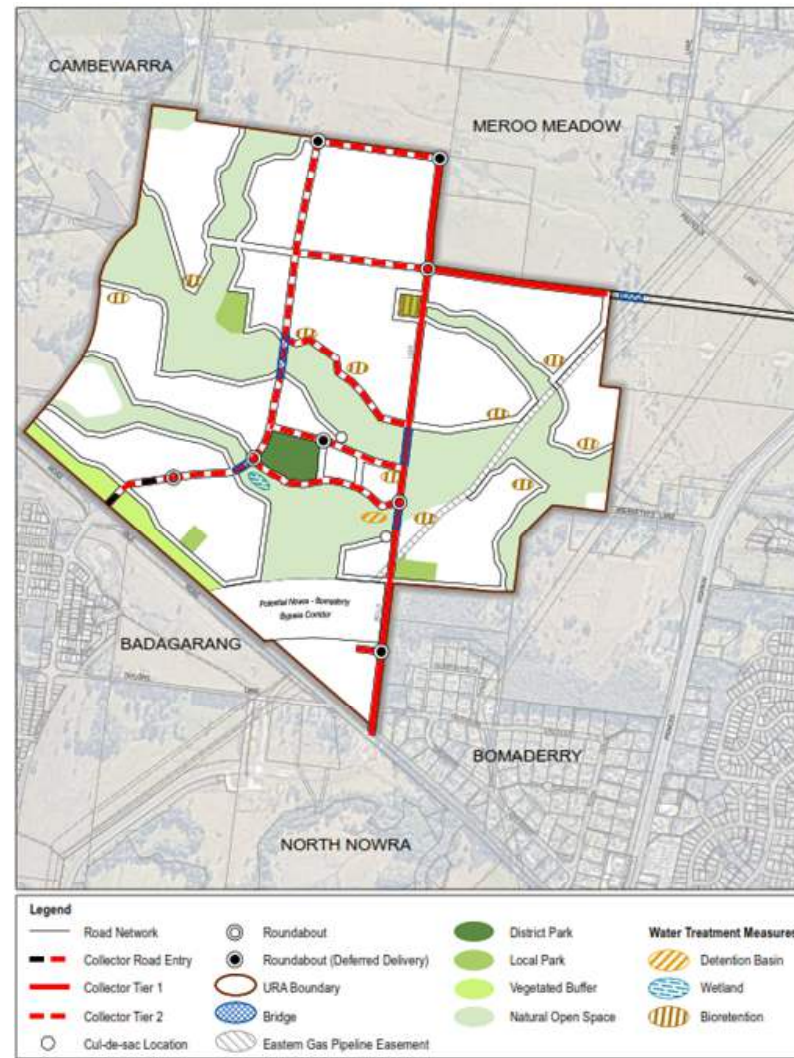
Staff Recommendation

Fig 3



Owner Groups Request

Fig 3

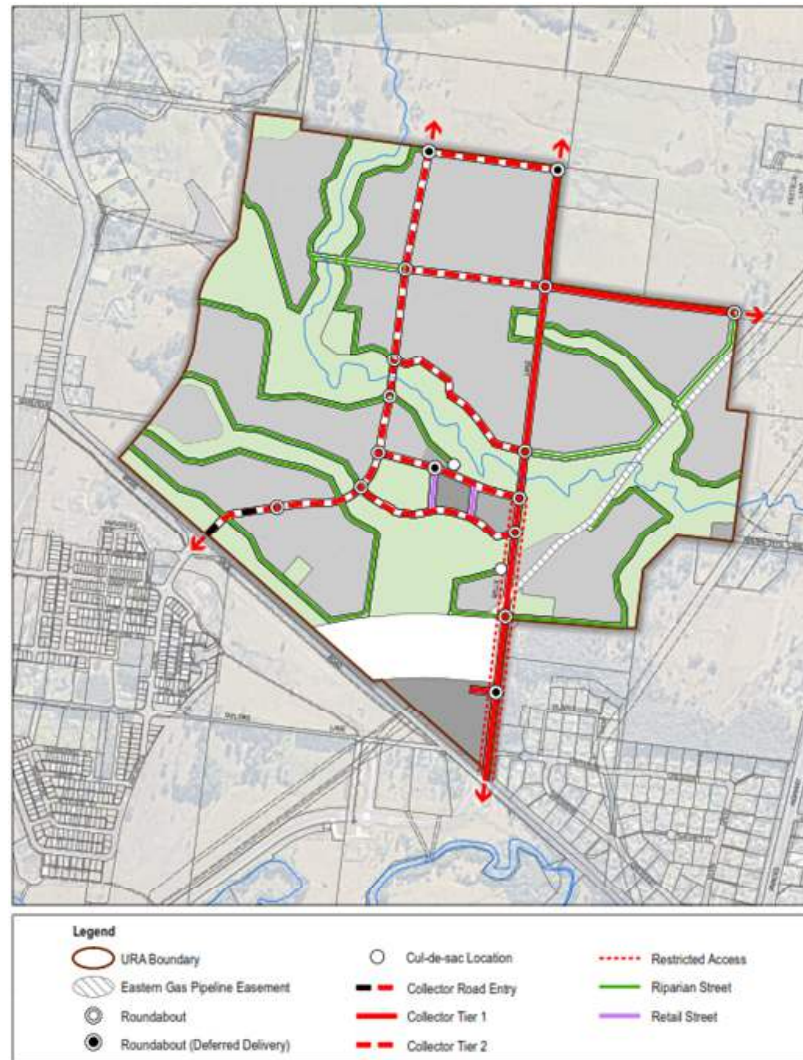


14 Aug '25

MVRN URA Draft Development Controls: Alternative Controls for Road Network (7 Satisfactory Arrangements for Local Infrastructure)

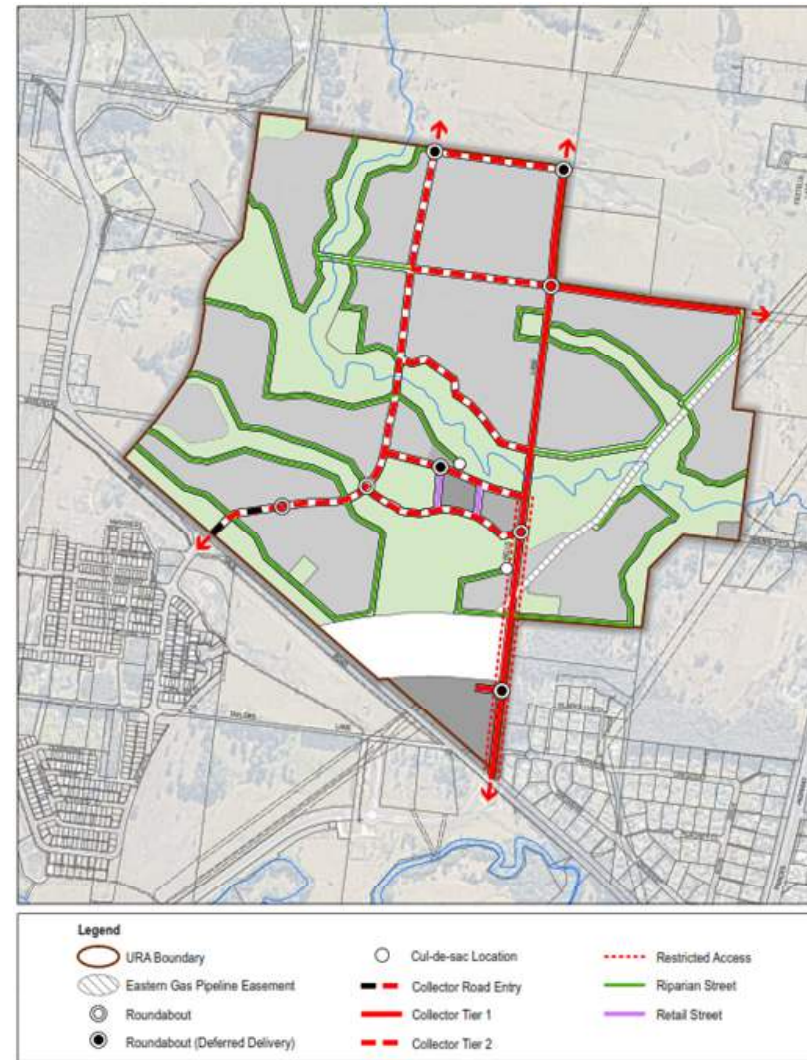
Staff Recommendation

Fig 8



Owner Groups Request

Fig 8



14 Aug '25

MVRN URA Draft Development Controls: Alternative Controls for 8.7 Managing Natural Resources

Staff Recommendation

1 Purpose

The purpose of this Chapter is to guide the [development](#) of the Moss Vale Road North [Urban Release Area](#) (URA) in accordance with the provisions of Part 6 of Shoalhaven Local Environmental Plan 2014 (SLEP 2014).

Advisory Note: In addition to the provisions outlined in this Chapter, you must also refer to:

- Supporting Document 1: Integrated Water Cycle Assessment.
- Supporting Document 2: Landscape Specifications.
- Supporting Document 3: Vegetation Management Plan Requirements.
- Moss Vale Road North Residential Planting List.

In the event of an inconsistency between a provision in this Chapter and a provision in a generic Chapter in this [Development Control Plan](#), the provision in this Chapter will prevail to the extent of the inconsistency.

8.7 Managing Natural Resources and Environmental Heritage

Performance Criteria	Acceptable Solutions
P11 Riparian corridors are protected and improved to: • Improve water quality and riparian vegetation. • Improve ecological health and integrity. • Maintain and enhance habitat values. Note: The riparian corridors are linear tracts of land associated with the Shoalhaven River drainage system. They are important for maintaining biodiversity, water quality and bank stability. They are a significant component of the Nowra-Bomaderry conservation strategy and represent both constraints and opportunities to urban development.	A11.1 Continuous riparian zones are provided along Abernethy's Creek and other unnamed tributary creeks. Note: It is anticipated that the riparian corridor will be dedicated to Council and managed as one continuous natural area. A11.2 Each development application that includes the subdivision of land zoned C2 Environmental Conservation must be accompanied by a 5-year Vegetation Management Plan (VMP) that has been prepared in accordance with Supporting Document 3. A11.3 Flat metal grass edging is required to separate turfed areas and riparian vegetated areas along Riparian Streets. A11.4 Fencing within riparian corridors shall be minimised and is not permitted across watercourses. Where fencing is required for safety purposes, the design must allow terrestrial and aquatic fauna to pass through. A11.5 Waterway crossings are to be designed in accordance with NSW Department of Primary Industries Fish Passage Requirements for Waterway Crossings (see the Council and Developer Toolkit for more information).

Owner Groups Request

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MVRN URA Draft Development Controls: Alternative Controls for 8.6 Bushfire Considerations & 8.10.5 Riparian Streets

Staff Recommendation

8.6 Bushfire Considerations

The MVRN URA is characterised as **bush fire prone land** and this risk has been carefully considered through the planning process for the URA.

The subdivision of land within the URA must comply with *Planning for Bush Fire Protection 2019* (PBP), especially (not exclusively):

- Provision of **asset protection zones (APZs)** to comply with Table A1.12.2 for residential **development** and Table A1.12.1 of PBP for Special Fire Protection Purpose (SFPP) developments.
- Access is to be provided in accordance with Table 5.3b of PBP which will include, but not limited to, a staging plan that demonstrates more than one access **road** in and out of the development at each subdivision stage (where that stage includes three or more **allotments**).

Note: Residential subdivision on **bush fire prone land** requires an approval from the NSW Rural Fire Service, known as a Bush Fire Safety Authority. Applications for the NSW Rural Fire Service's approval must address the extent to which the subdivision complies with Planning for Bushfire Protection, including the preparation of a bushfire assessment. For full requirements, refer to Appendix 2 of PBP *Submission Requirements, Performance based Solutions, and Bush Fire Design Briefs*.

Indicative **APZ** requirements have been established based on residential **development** and potential future bushfire fuel loads (**Figure 6**). Greater **APZs** will be required for Special Fire Protection Purpose developments. **APZs** may increase or decrease depending on the **development** outcomes of the bushfire assessments that will be required at the subdivision stage.

Note: Asset protection zones along Riparian and Vegetated Buffer Streets are to be located within the road reserve where possible (except where adjacent to the large lot areas). The entire road reserve should provide the APZ. The verge (riparian and buffer side) is to be widened as required. Where there is a transition between APZ widths, a smooth transition is preferable (i.e., not stepped).

Note: Short-fire run modelling results endorsed by the NSW Rural Fire Service should inform reduced APZs.

8.10.5 Riparian Street

Verge (m)		Carriageway (m)		Verge (m)			Total Reserve
Grass *	Path / Shared Path	Lane	Parking	Plant	Path	Offset	
0 - 17	2	7	3	2	1.5	1	17–36m
2 – 19		10		4.5			

Note: Asset protection zones along Riparian Streets are to be located within the road reserve where possible (except where adjacent to the large lot areas). The entire road reserve should provide for the APZ. The verge (riparian side) is to be widened as required*. Where there is a transition between APZ widths, a smooth transition is preferable (i.e., not stepped). Refer to indicative APZ requirements in **Figure 6**.

Owner Groups Request

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The MVRN URA is characterised as **bush fire prone land** and this risk has been carefully considered through the planning process for the URA.

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Note: An alternative solution for providing asset protection zones includes the provision of Inner Protection Areas on residential lots. Proposals for inner protection areas must comply *Planning for Bush Fire Protection 2019*. Any Inner Protection Areas will be secured with a restriction (Section 88B Instrument) on property title.

Note: Short-fire run modelling results endorsed by the NSW Rural Fire Service should inform reduced APZs.

8.10.5 Riparian Street

Verge (m)		Carriageway (m)		Verge (m)			Total Reserve
Grass *	Path / Shared Path	Lane	Parking	Plant	Path	Offset	
0 - 17	2	7	3	2	1.5	1	17–36m
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Note: An alternative solution for providing asset protection zones includes the provision of Inner Protection Areas on residential lots. Proposals for inner protection areas must comply *Planning for Bush Fire Protection 2019*. Any Inner Protection Areas will be secured with a restriction (Section 88B Instrument) on property title. **The width of the road reserve – the grass verge – will be reduced by the width of the Inner Protection Area.**

Moss Vale Road North Urban Release Area

Public Exhibition: 26 Aug to 23 Sept 2024

**Review and Consideration of Submissions and Feedback
received on:**

- 1. Draft Development Controls (Development Control Plan)**
- 2. Proposed Local Infrastructure Contributions Framework**

February 2025

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1. Introduction

Council is planning a new residential area known as the Moss Vale Road North Urban Release Area (URA) that will be part of the suburb of Badagarang. The URA was initially identified for future residential development in the *Nowra-Bomaderry Structure Plan 2008* and will ultimately provide between 2,000-2,500 new homes, a local shopping centre, and open space. The future community will be supported with a range of infrastructure, including parks, playgrounds, and roads.

The URA was initially rezoned in 2014 with a range of planning controls included in the Shoalhaven Local Environmental Plan 2014. Council updated these LEP controls in late 2023 to ensure a range of new land use planning and environmental considerations are managed.

Two additional local planning documents need to be finalised to complete the release planning for this URA and enable the consideration of detailed development applications for its actual development. These are **Development Controls** (in the Development Control Plan) and a **Local Infrastructure Development Contributions Framework**. These documents must be in place before Council can consider any development applications for residential subdivision and subsequent dwellings.

Council exhibited draft documents from 26 August to 23 September 2024. This document summarises the submissions Council received in response to the exhibition.

Council received 14 submissions from community members (including landowners within the area), 5 submissions from the Moss Vale North Owners Group (a group with ownership/development interests in the majority of the URA), and the following relevant NSW Government Agencies:

- Transport for NSW.
- NSW Rural Fire Service.
- NSW Department of Climate Change, Energy, and the Environment.

Consultation with the Rural Fire Service, Transport for NSW, and the Owners Group will most likely continue as the development controls and Local Infrastructure Development Contributions Framework are settled.

The submissions have been themed into categories:

- Objections to the delivery of the URA.
- Infrastructure selection and the funding and delivering local infrastructure.

- Sustainable development.
- Dwelling diversity.
- Acquisition and dedication of riparian corridors.
- Managing flood risk.
- Managing the impact on existing communities, including the notification of future development activity.

2. Background

2.1 Development Controls

Development controls are the detailed controls which support planning controls that are in the LEP. They aim to guide the design of subdivisions and dwellings, the street network, protect the environment, and manage flooding and bushfire.

The draft development controls are informed by a range of technical documents including landscape specifications, requirements for vegetation management plan, and a water cycle assessment setting out measures to manage the quality and quantity of water from the new development. The development controls for the URA will ultimately be contained in a new chapter in the *Shoalhaven Development Control Plan 2014*.

2.2 Infrastructure Planning and Delivery

The area requires a range of future infrastructure to enable development and support the future community. Identified infrastructure and facilities include:

- Connections to the existing (external) road network.
- Significant internal roads (Collector Roads) connecting parts of the URA.
- A drainage network to manage stormwater run-off.
- Recreation areas and open space.
- A network of natural areas along watercourses.
- The upgrade of existing regional and district community facilities including libraries, swimming pools, and art galleries.

This infrastructure will ideally be delivered prior to or at the same time as development occurs. The significant infrastructure – the items enabling development – such as new connections to Moss Vale Road and water/sewer projects, will ideally be delivered upfront to enable the timely delivery of new housing, increase liveability, and meet the needs of the emerging community.

The Local Infrastructure Contributions Framework for this URA could take several forms. An important consideration in settling the framework is the NSW Government's local infrastructure contributions policy. This currently sets a \$30,000 per dwelling threshold for contributions in areas such as this one. The analysis of a variety of development scenarios demonstrates the essential infrastructure needed to support the URA significantly exceeds the contributions able to be collected with this current threshold that is in place.

Acknowledging this funding constraint, the following potential options for a local infrastructure contributions framework have been identified:

- **Reduce the infrastructure to lower the cost beneath the threshold:** This requires an exercise to identify and prioritise infrastructure. It will however ultimately lead to the undersupply of infrastructure, either to enable development or support the community.
- 3. **Apply to increase the threshold to deliver all the identified infrastructure:** This requires an application to the Independent Pricing and Regulatory Tribunal (IPART) to vary the current cap, a process which can potentially take 12-18 months. An application of this nature also does not guarantee the requested amount or secure all the required infrastructure.
- 4. **Federal and State Government funding:** Several funding initiatives have been foreshadowed however none are currently open for applications or relevant for the URA. These initiatives are accessed through competitive application processes and there is no guarantee the necessary funding can be secured.
- 5. **Development funds and delivers all identified local infrastructure:** This relies on the developers of the URA proposing to deliver the necessary infrastructure and/or make the required contributions (secured via a voluntary planning agreement or agreements). This is considered the most “complete” option at this point to secure the delivery of all local infrastructure but is a solution which must be supported/proposed by the developers.
- 6. **Council leads the delivery of infrastructure below the threshold, with the responsibility for delivering remaining infrastructure borne by development:** This would be a collaborative approach where Council leads and coordinates the delivery of key infrastructure to enable development, such as road and bridges, and development delivers the infrastructure directly related to development, such as drainage and local parks. This option could possibly be prepared/facilitated in a short timeframe (around 6 months).

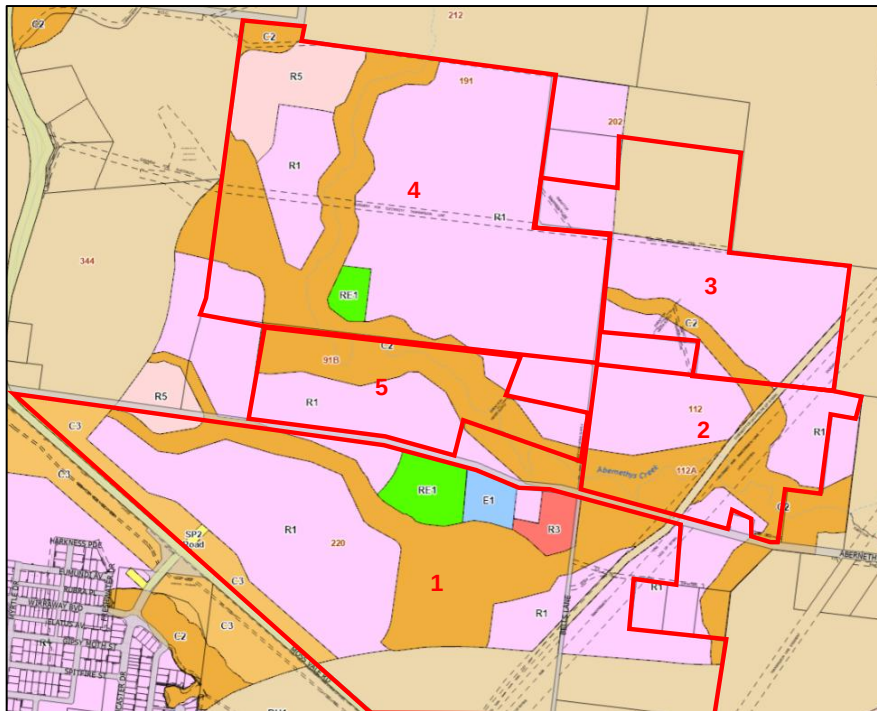
In the exhibition material, the final option was identified the potentially preferred option as it works with the NSW Government’s threshold on development contributions and can potentially be delivered quickly to “release” the area for development, allowing development activity to commence in a timelier manner. Requiring development to dedicate the land for roads, drainage and open space to Council at no cost removes potential land acquisition costs of over \$10m.

The proposed approach also retains previously supported arrangements for development to fund the restoration of natural areas, maintain them for a period of 5-years, and dedicate them to Council at no cost. This will be secured in the development controls.

2.3 Moss Vale North Owners Group

The Moss Vale North Owners Group is a group of five owners/developers who have an interest in the majority of the URA (approximately 200-hectares of the 240-hectare site).

No	Current Ownership Interest	Site	Legal Description
1	Cavi Property Group/Cambewarra Park P/L	220 Moss Vale Road	Lot 4 DP 268209
2	Arissa Group	112 Bells Lane	Lot 22 DP 1284124
3	H&M South Coast Pty Ltd/Haverton Homes	Bells Lane	Lot 7 DP 618693
4	Mayrin Group	191 Bells Lane	Lot 1 DP 1191186
5	Cambewarra Developments	91b Bells Lane	Lot 4 DP 708356



3. Community Submissions

3.1 Objections to Delivery of Urban URA

Submissions - 1

Feedback

One submission objected to the delivery of the URA, citing experiences with damage to road infrastructure and slow repairs and upgrades.

“Strongly object to the proposal, I live in Cambewarra Village and for the past numerous years have had to put up with having our roads ruined by water upgrades, roundabouts, and road works that were extremely slow.”

Consideration of Feedback

The planning and delivery of the URA is well advanced and supported with a significant history of land use planning activity and documents. The URA will provide a significant supply of new homes in the Nowra-Bomaderry area helping meet housing needs. Council engaged the community during the preparation of planning documents relating to the URA.

Council first identified the URA as a “New Living Area” in its *Nowra Bomaderry Structure Plan* (adopted by Council in 2006). This Structure Plan identified several new residential areas in the Nowra-Bomaderry area for development over a 25-year period. The NSW Government endorsed the Structure Plan in 2008. The URA is now a regionally significant release are identified in the *NSW Illawarra-Shoalhaven Regional Plan 2041* (2021).

Council introduced initial planning controls for the URA in 2014, in the *Shoalhaven Local Environmental Plan 2014*. These controls were updated at the end of 2023 in response to contemporary information and policy positions on managing flood risk and biodiversity values.

The recently completed exhibition provided opportunities for feedback on draft development controls and a proposed Local Infrastructure Contribution Framework for the URA. These two documents are essential to provide further guidance on the delivery of the planned development and fund and deliver the infrastructure necessary to support the future community.

Recommended Response

Nil.

Note: The strategic and policy decisions related to this URA were implemented in 2014.

3.2 Funding and Delivering Local Infrastructure

Submissions - 4

Feedback

Several submissions raised the need for new and upgraded infrastructure to service the future community including schools, roads, and health facilities.

Now with the Badagarang subdivision our local infrastructure isn't coping. We need schools, shops, medical facilities, better roads etc. to be in place before adding another 2000-2500 homes.

The submissions raised infrastructure delivery responsibilities, especially for new roads within the URA, noting the potential cost to communities and access during natural disasters.

"[...] I asked [...] about responsibilities for new roads - i.e. the ones in this 'development'. The man said 'the Council'. A hugely important issue in relation to cost to the ratepayers and access/egress in the event of disasters."

The submissions raised concerns about Council's ability to deliver the infrastructure required to service the URA, in full or in part, expressing support for the options requiring developers to fund infrastructure or for Council to apply to the Independent Pricing and Regulatory Tribunal (IPART) to increase the amount of local infrastructure contributions Council can levy development.

"I strongly support the application to IPART to increase the cap to meet all infrastructure commitments as the most centralised way to deliver on Council's commitments."

Consideration of Feedback

Infrastructure Planning

The new community requires a wide range of infrastructure, facilities, and services. This includes transport infrastructure such as roads, pathways, cycleways and public transport, community facilities such as open space, parks, and playgrounds, and services such as schools, hospitals, and health facilities.

Council identified and zoned a new local centre for the URA. The permissible land uses and other planning and development controls allow the market and businesses to deliver a mix of commercial and retail uses, child care centres, and local health facilities in the URA.

Council is responsible for planning, funding, and delivering local infrastructure such as roads, pathways, cycleways, open space, parks, playgrounds, and drainage infrastructure. The proposed Local Infrastructure Contributions Framework outlines options to deliver these items.

Council has recently delivered new and upgraded road, water, and sewer infrastructure projects. These works include new pipe networks, pumping stations, and a roundabout on Moss Vale Road to provide access to the URA. Council has also completed the Far North Collector Road Network (Bannada Way), providing a new connection between Moss Vale Road and Illaroo Road.

The NSW Government is responsible for planning, funding, and delivering relevant infrastructure such as upgrades to State-owned and managed roads, health services, and education establishments. Council is continuing to advocate to the NSW Government agencies and other organisations to plan and deliver infrastructure which meets the needs of the future community. The identification of the URA in relevant strategic planning documents since 2008 ensures it is considered in the service planning activities of these agencies and organisations. In this regard it is noted the NSW Government is currently delivering a \$438 million upgrade to Shoalhaven Hospital, taking into account forecast population growth.

Development Contributions

Development contributions towards the delivery of local infrastructure are an essential part of the planning and delivery of the URA. These contributions are made by developers and collected by Council to help fund the cost of new infrastructure and services required by new development. Council's ability to levy new development is an important mechanism to ensure existing communities do not bear the cost of new infrastructure.

The proposed Local Infrastructure Contribution Framework identifies the local infrastructure needed to enable development of the URA and support the future community. The identified infrastructure includes parts of the road network within the URA and the connections to the existing road network, which together provide an evacuation route during flood events. Other infrastructure and facilities include open space, drainage, and the upgrade of existing district- or regional-community facilities (libraries, swimming pools etc.). The Framework also sets out potential options to fund the identified infrastructure.

The NSW Government's local infrastructure contributions policy is an important consideration for the URA. The *Environmental Planning and Assessment (Local Infrastructure Contributions) Amendment Direction 2021*, currently sets a \$30,000 threshold (or cap) for contributions per dwelling. Comparing scenarios of different development outcomes or dwelling yields against the infrastructure cost and the threshold

identifies a gap in infrastructure funding for the URA should the preparation of a Development Contributions Plan be selected as the contribution mechanism for the URA.

One of the options examined in the proposed Local Infrastructure Contributions framework paper is an application to the Independent Pricing and Regulatory Tribunal to increase the threshold/cap.

Although the Tribunal has favourably considered applications to increase contributions thresholds recently, examples of experiences with the application process of other councils suggests significant time (12-18 months) is required to complete the application process which will inevitably slow the delivery of the URA and the homes it is planned to provide.

However, an application to the Tribunal could provide significant benefits including facilitating Council's ability to levy development accordingly to provide the required infrastructure. It also reduces the extent of increased Council financial commitments when indexing of the contribution occurs, construction costs increase etc. A single, comprehensive contribution plan for the URA also provides the significant benefit of coordinating infrastructure delivery, lessening Council's administrative burden of coordinating delivery by development, managing alternative proposals, and striking voluntary planning agreements (to govern infrastructure delivery).

Transport for NSW also supports an application to the Tribunal to increase the contributions threshold to secure the delivery of road connections between the URA and existing network.

Recommended Response

7. Council continues to advocate with:
 - a. *Transport for NSW* for it to plan and deliver the upgrade of Moss Vale Road, including intersections with the local road network and the Princes Highway, and shared pathways to expand the current active transport network.
 - b. *The NSW Department of Education* for new and upgraded school facilities.
 - c. *Endeavour Energy* for the delivery of a new electricity distribution network.
8. Council continues to refine and cost the local infrastructure deemed necessary to support the URA to inform a future decision on the most appropriate funding mechanism(s).

3.3 Road Infrastructure

Submissions - 1

Feedback

This submission noted the large increase in traffic associated with the new URA's (Moss Vale Road South and Moss Vale Road North) and asked about measures to upgrade Moss Vale Road, its intersections with local roads, and improve the safety of the intersection of the Princes Highway and Moss Vale Road.

"Has the State Government been approached to improve the safety of the Princes Highway and the Moss Vale Road roundabout? There will be an increase in children attending the Bomaderry High School and this roundabout does not provide for any safe crossing. A serious accident waiting to happen."

The submission also asks how the proposed local road network would interact with the proposed Nowra-Bomaderry Bypass.

"Does this mean that the bypass will have to have a flyover of Collector Road, which will add to the cost. What arrangements have been made or is the bypass just going to disappear?"

Consideration of Feedback

Moss Vale Road Upgrades

The NSW Government, through Transport for NSW, is responsible for the management and upgrade of Moss Vale Road and intersections on the Princes Highway in response to planned growth. Potential upgrades of Moss Vale Road include a widening of the road and upgrades to intersections with local roads, such as Main Road, and the Princes Highway.

The need for an upgrade of the intersection between Moss Vale Road and Main Road has previously been identified to service both the southern and the northern URAs as they are developed. Council has also settled plans to connect to the new intersection once it has been delivered. The current roundabout on Moss Vale Road which provides access to the southern URA meets the current needs of that URA. There have been several investigations into the early delivery of this upgrade using grant funding and developer-led delivery, but delivery responsibility currently remains with Transport for NSW.

Council is continuing to advocate for Transport for NSW to meet the needs of the future community, with an upgraded road network. Identifying the URA in relevant strategic planning documents ensures it is considered in the service planning activity of this agency.

In 2022, Transport for NSW installed new traffic lights and signs at the intersection of the Princes Highway, Moss Vale Road and Cambewarra Road. The traffic lights activate when the traffic volumes are high to help drivers on Moss Vale Road access the Princes Highway. Transport for NSW is currently planning further upgrades to this intersection.

Delivery of Nowra-Bomaderry Bypass

Transport for NSW is leading the planning and delivery of the proposed Nowra-Bomaderry Bypass and is currently progressing the planning work for the Bypass (traffic modelling and preliminary environmental investigations).

The existing potential corridor for the future bypass in this location has been identified in the early planning work associated with the URA's in this location and largely kept free of additional development.

The planning and delivery of the URA is much more advanced than the work required to deliver the Bypass. Council has informed and sought feedback from Transport for NSW on the proposed local road network. Transport for NSW's bypass planning work will need to manage interactions with both existing and future local roads.

Recommended Response

Captured in recommendation No. 1 – Council's advocacy activities with *Transport for NSW* for it to plan and deliver the upgrade of Moss Vale Road including intersections with the local road network and the Princes Highway, and shared pathways to expand the current active transport network.

3.4 Community Infrastructure

Submissions - 1

Feedback

This submission supports the provision and embellishment of local parks but requests a greater range of facilities such as a skate park and pump track to meet the needs of the future community of the URA and other adjacent developments.

"[...] it is essential provisions are made for children activities including high standard equipment (e.g. Berry), BMX pump track, and a skate park. This will provide children with healthy outdoor activities [...]. Currently children must travel to Shoalhaven Heads for the nearest pump track and into Nowra for a skate park."

The submission also flags the need for Transport for NSW to contribute to the provision of active transport along Moss Vale Road to link the URA to nearby centres.

Consideration of Feedback

Open Space, Parks and Playgrounds

The exhibited documents identified indicative embellishment costs for open space (informed by Council's current Community Infrastructure Strategic Plan). The exhibited information did not confirm the actual range of facilities to be delivered.

The detailed or final planning for the open space areas still needs to occur and provides the opportunity to deliver a range of facilities.

Council is currently reviewing its Community Infrastructure Strategic Plan to identify the recreation needs of current and future communities and set out the response to meet those needs. The findings of this review will inform the embellishment of new open space.

Active Transport

Council is continuing to advocate for Transport for NSW to provide new and upgraded shared pathways to expand the active transport network.

Recommended Response

Open Space, Parks and Playgrounds

9. That Council use the contemporary findings in its updated Community Infrastructure Strategic Plan to inform the selection of facilities for the open space areas in the URA.

Active Transport

Captured in recommendation No. 1 – Council's advocacy activities with *Transport for NSW* for it to plan and deliver the upgrade of Moss Vale Road including intersections with the local road network and the Princes Highway, and shared pathways to expand the current active transport network.

3.5 Sustainable Development

Submissions - 1

Feedback

One submission raises concerns about urban heat and the management of stormwater.

“My concerns are the creation of heat sinks with so many houses packed on to tiny blocks which also impacts rain run off due to the loss of vegetation and open ground.”

Consideration of Feedback

Managing Urban Heat and Vegetation

The URA consists of cleared land used or previously used for agricultural activities such as grazing and agistment, with some minor stands of remnant vegetation. There are several watercourses flowing through the URA functioning as biodiversity corridors.

The draft development controls attempt to manage biodiversity values, protect existing and secure new vegetation, and manage water quality and quantity. These controls identify 70 hectares (about one third) of the URA to be restored, including revegetated riparian corridors and a landscaped buffer to Moss Vale Road. The open space and large-lot residential areas have been planned around the retention of existing trees.

Other opportunities to increase urban vegetation will be provided by future plantings in road verges and other open space (such as parks and playgrounds). The draft development controls also recommend minimum front, rear, and side setbacks, landscaped areas, and tree planting requirements for residential lots to ideally provide space between buildings and landscaped outcomes.

Managing Stormwater

Existing development controls require drainage infrastructure and water sensitive urban design to manage water quality and ensure no increased risk from flooding downstream of the URA. Additional development controls are proposed to increase the standard and performance of drainage infrastructure (see *Outcomes of Internal Review* section).

The proposed Local Infrastructure Contributions Framework broadly identifies the drainage infrastructure necessary to achieve this. The range of detention and bio-retention basins and wetlands confirmed in this framework were identified in the *Integrated Water Cycle Management Strategy* prepared for the URA in 2022.

Recommended Response

Nil.

3.6 Dwelling Diversity

Submissions - 1

Feedback

One submission provides observations on the development outcomes being delivered in the Moss Vale Road South Urban URA, raising concern about small lots and poor dwelling design. The submission recognises a range of lot sizes are proposed for the Moss Vale Road North URA but suggests larger lots on the edge and adjacent to the URA are required to increase dwelling diversity.

"[...] Unfortunately, the range of lot sizes is very limited. I would envisage a buffer around the [...] URAs of very much larger blocks. And a range of block sizes. People are prepared to pay for larger lots giving a range of lifestyles."

Consideration of Feedback

The majority of the URA is zoned *R1 General Residential* to provide for a range of dwelling outcomes including detached dwellings, dual occupancies, and secondary dwellings. This zone is supported with a minimum lot size for subdivision of 550m², with opportunities to provide smaller lots down to 300m². There are no controls setting maximum lot sizes. The existing controls provide the market/development industry a level of flexibility and the opportunities to deliver a diverse range of lot sizes and dwellings.

Further opportunities for dwelling diversity are provided by the medium density residential zone around the local centre and the 8.5 hectares of large lot residential land in selected locations on the periphery of the URA. These large lot areas provide the potential for approximately 75, 1,000m² lots (excluding the land required for local roads).

Council has committed to review the City-wide *Shoalhaven Growth Management Strategy* which includes the possible preparation of a Local Housing Strategy and Rural Lands Strategy. These documents provide the opportunity to confirm strategically important agricultural land, investigate the need for larger lots, and consider opportunities for rural-residential subdivision across Shoalhaven.

Recommended Response

Nil.

3.7 Acquisition & Dedication of Riparian Corridors

Submissions - 1

Feedback

A submission was received from the owner of a 2.8-hectare site within the URA objecting to the proposed requirements for the restoration and dedication of riparian corridors to Council (at no cost). The submission identifies that a large part of the site is zoned C2 Environmental Conservation to protect a watercourse and associated corridor which limits development opportunities. It also suggested that Council acquired land in the Moss Vale Road South Urban URA and should be adopting a similar approach for this URA.

"We strongly object to Council's proposal to take away our land and offer no compensation whatsoever. If Council cannot afford to pay a fair remuneration, then the development should be postponed, until an equitable outcome can be reached."

Consideration of Feedback

The planning for the URA occurred at a precinct scale to identify a logical and orderly master planned development which manages environmental features such as watercourses, biodiversity values, and flood risk. This approach means, on occasions, development opportunities may be limited on smaller properties and/or properties with significant or large areas with biodiversity values.

The planning controls set for the URA in December 2023 applied the C2 Environmental Conservation zone to significant watercourses and associated corridors. Approximately 2.1 hectares of this (2.8-hectare) site (75%) is zoned C2 Environmental Conservation.

The draft Development Controls require future development to fund and carry out the restoration of the corridor. The proposed Local Infrastructure Contribution Framework identifies the preference for the dedication of riparian corridors to Council, at no cost. This ensures Council is responsible for the ongoing management of these sensitive areas. It is noted that part of the original approach from the previous owners group when requesting that the planning for this URA be brought forward involved the rehabilitation and management of the riparian corridors that are a feature of the area.

There are no current opportunities/proposals to acquire the land zoned C2 Environmental Conservation as this would increase the amount of local infrastructure contributions, exacerbating the problem of setting/maintaining contributions for the URA at a sustainable level. In addition, the acquisition and revegetation of natural areas are not listed on the NSW Government's *Essential Works* List outlined in its Local Infrastructure Contributions

Policy. This prevents Council from including acquisition and revegetation activities in any future development contributions plan.

The land Council has acquired and continues to acquire in the Moss Vale Road South Urban URA is to provide for roads, drainage, and open space. It is also noted that the riparian corridor extent within the southern URA is much more limited than the within the Northern URA.

The R1 General Residential zone and associated planning controls apply to about 7,000m² of the site and provide a range of development opportunities. Although some of this area is required to provide asset protection zones to manage the bushfire risk from the riparian corridor, opportunities include standard residential lots (5-6 at 550m²), small lots (10 at 300m²), or a medium-density development due to the site's proximity to the local centre. There are also opportunities to consolidate with adjoining properties or retain the existing property.

Recommended Response

Nil.

3.8 Managing Flood Risk

Submissions – 6 (Form Letters).

Feedback

These submissions raise concerns about the increased rate and volume of stormwater run-off likely to flow from the developed URA into Abernethys Creek and potential, associated increases in flood risk affecting downstream properties, particularly the ones east of the South Coast Rail Line, adjacent to Abernethys Creek, and close to the confluence of Abernethys Creek with the Shoalhaven River.

The submissions request confirmation that the proposed drainage infrastructure solution will manage flood risk (to current levels) during localised flash flooding and larger flood events across the Shoalhaven River's catchment. The submissions note the challenge and the need to consider:

- The area of hard surface (roads, driveways, roofs etc) to be developed across the URA.
- The performance of the proposed drainage infrastructure.
- The effect of other infrastructure projects, such as the Berry to Bomaderry Highway upgrades, on flood risk.
- The mechanisms to release water after rainfall events and after any downstream flooding has resided.

The submissions request a meeting with Council staff to allow concerned residents to share the details and experiences of recent flood events. The submissions also call for rain gauges to be installed throughout the Abernethys Creek Catchment and for the increased maintenance of Abernethys Creek.

Consideration of Feedback

Managing Flood Risk

The area east of the railway, adjacent to Abernethys Creek, and close to the confluence of Abernethys Creek with the Shoalhaven River has an identified level of flood risk. The Lower Shoalhaven River Flood Study, which includes flood modelling based on current development and infrastructure, demonstrates the area is at risk from 1% annual probability and greater flood events.

The technical studies and flood modelling prepared to inform the planning of the URA confirms the:

- **rate** of run-off from the URA will be controlled to pre-development levels with drainage and stormwater detention infrastructure constructed throughout the URA.
- increased **volume** of run-off from proposed impervious surfaces in the URA does not create adverse downstream impacts (+/- 10mm in currently identified flood water levels).

The delivery of the future drainage and stormwater detention infrastructure for the URA will be secured through the development controls, local infrastructure contributions framework and ultimately development approvals. Together, these two planning/development control documents will set the location, size, development standard, and funding mechanism for the infrastructure. Council also administers the sign-off, or certification, of the construction of the infrastructure to ensure it meets applicable and required standards.

The flood modelling undertaken included and compared pre- and post-development scenarios for a range of flood events up to and including the 1% annual exceedance probability flood event (or 1 in 100-year event). It also considered the influence of recently delivered infrastructure such as the Berry-Bomaderry Highway upgrade.

The lack of downstream impacts from the future development (+/- 10mm) are due to the comparative size of the URA, which is much smaller than the larger catchment of Abernethys Creek and assumed saturated catchments and soils providing similar run-off volumes as hard surfaces.

The technical study – known as the Integrated Water Cycle Assessment - and flood modelling report will be made available on Council's Get Involved webpage about Planning for Growth in Nowra-Bomaderry:

(<https://getinvolved.shoalhaven.nsw.gov.au/planning-for-growth-nowra-and-bomaderry>).

Council's broader work preparing the Lower Shoalhaven River Floodplain Risk Management Study and Plan is investigating the feasibility of a potential upgrade and/or realignment of Abernathy's Creek flood mitigation drain.

Maintaining Watercourses

It is not the role or function of development controls to program regular maintenance activities for watercourses, especially for watercourses located outside of the URA. These are scheduled and undertaken through Council's maintenance programs.

Resident Meeting

Council has been engaging with the group of landowners who made these submissions since late 2022. This engagement started with a meeting where the landowners

presented their concerns to some Councillors and Council staff about flood risk and the potential impacts from the URA (during an earlier planning exercise for the URA). Council has subsequently exchanged correspondence on at least 12 occasions since the meeting on a range of matters including:

- Evidence and details of flood events.
- Identification and management of flood risk associated with the URA.
- Maintenance of Abernethys Creek.
- Planned upgrades of bridge infrastructure over Abernethys Creek.

Council's correspondence has confirmed:

- The current level of flood risk will not be adversely increased by the URA,
- Maintenance activities planned for or underway in Abernethys Creek, and
- Opportunities to participate in Council's broader flood risk management work, namely the preparation of the *Lower Shoalhaven Flood Risk Management Study and Plan*. This document will investigate the consequences of flooding on the community and measures to mitigate flood risk and impacts.

It is also not reasonable or practical to assert or require that the planning for the release of this URA will resolve and manage all the issues associated with Abernethys Creek.

The landowners have been provided with adequate access to Council staff through the above meetings and exchanges of correspondence.

Recommended Response

Nil.

3.9 Managing Existing Properties within the URA

Submissions - 1

Feedback

This submission raises concerns about the potential for future subdivision design and new homes to impact on the privacy, amenity, and access arrangements for property owners not looking to sell or develop their sites. For example, the location of multiple back-yards and fencing along the side boundaries of existing properties. The submission suggests a potential solution of requiring local roads along the boundaries of existing properties.

Consideration of Feedback

The URA is made up of a core of 6-8 large landholdings ranging in size from 18 to 83 hectares. There are also numerous smaller sites (or in holdings) scattered throughout the URA resulting from earlier rural-residential subdivisions, most likely concessional lots and these are typically 1 to 2-hectares.

The planning for the URA largely assumes all owners, current and future, will ultimately participate in the delivery of the URA and either sell or redevelop their properties, essentially incorporating them into larger subdivision precincts and planning activities. This is what has previously occurred in the development of similar areas in the longer term. The draft development controls therefore do not attempt to fully manage the integration of existing properties into the remainder of the URA.

However, it is recognised some existing owners may choose to retain their properties in their current state. The draft development controls can be adjusted to manage potential impacts on the privacy, amenity, and access arrangements of existing properties. Requiring subdivision proposals to consider this matter ensures it is also further considered and managed through the development application process.

The draft development controls do not set the location of all local roads (other than perimeter roads for bushfire management purposes) to provide flexibility for subdivision designs. This reduced prescription allows developments to more plan efficient lot layouts, safer road networks and also consider particular circumstances (like existing properties).

Recommended Response

10. Add a development control which requires the consideration of existing properties in subdivision planning activities. The control will include objectives for managing impacts on the privacy, amenity, and access arrangements of existing properties.

3.10 Notification of Future Development Proposals

Submissions – 6 (Form Letter).

Feedback

These submissions are critical of Council's notification of the exhibition of local planning documents for the URA and request further efforts to notify more of the community before any further decisions are made in this regard.

"I do not believe all community have been given the opportunity to voice their concerns regarding the MVRN URA Development. [...] I therefore propose, Council make a further effort to ensure as many residents as possible are informed of this project before any further decisions are finalised [...]."

Consideration of feedback

The public exhibition of the local planning documents was notified on Council's main website with a Public Notice and on its community engagement website (Get Involved). Notification letters were sent to relevant Community Consultative Bodies, affected and adjoining owners, and other community members registered to receive updates on the delivery of the URA. Updates were also posted on Council's social media channels and in its Community Newsletter. These activities exceeded the requirements of relevant planning regulations governing notification of public exhibitions.

Council is currently updating its Community Engagement Strategy and Community Participation Plan – key documents setting out how Council will engage the community on its decisions. Any future exhibition processes will comply with the commitments made in these documents.

It is noted that this URA and others have had a long planning and related community notification and engagement history, starting with the work on the Nowra-Bomaderry Structure Plan that was completed in 2008. Throughout this Council has attempted to ensure that landowners and the broader community have the opportunity to provide input and comment.

Recommended Response

Nil.

3.11 Miscellaneous

Submissions - 1

Feedback

One submission enquired about how to purchase a property in the URA.

Consideration of Feedback

The enquirer was advised that Council's current work will facilitate the delivery of the URA, making it ready for subdivision and construction activity. The advice confirmed Council is not responsible for selling land or homes within the URA.

Recommended Response

Nil.

4. NSW Government Agency Submissions

4.1 NSW Rural Fire Service (RFS)

Feedback

Securing Access for All Stages of Development

The RFS notes that the draft development controls adequately address its previous feedback on an earlier exhibited version of the controls which required the provision of suitable access to each of the identified development stages of the URA.

Asset Protection Zones

The RFS considers the note referencing the opportunity to use Short Fire Run methodology (Section 8.5 of the draft development controls) to identify alternative sizes of Asset Protection Zones does not add value and that performance-based solutions should be avoided in strategic planning documents.

Consideration of Feedback

Securing Access for All Stages of Development

Although the location and route of proposed access roads meet the RFS's requirements, further advice has been sought on the width of the "perimeter roads" proposed to service the URA.

Asset Protection Zones

The note referred to in the submission states the following with regard to short fire run modelling:

"Short-fire run modelling results endorsed by the NSW Rural Fire Service should inform reduced APZs."

Section A1.11 *Assessing remnant bushland and narrow vegetation corridors* of Planning for Bushfire Protection 2019 notes:

"The size and shape of small areas of vegetation influences the behaviour of bush fires and the associated risk to the built environment. Small or narrow parcels of vegetation have less opportunity to support fully developed bush fires because of their limited size."

Short fire run assessment is noted in Planning for Bushfire Protection as an appropriate approach for small or narrow parcels of vegetation. Due to the narrow nature of parts of the riparian corridors, a short fire run assessment approach may be appropriate to apply

to review the size of identified Asset Protection Zones, which are based on a methodology in line with large scale hazards. Reference to the need for this methodology to be utilised for any proposal to reduce the size of Asset Protection Zones, and that it must be endorsed by RFS, is therefore considered appropriate.

Any short fire run assessment would occur during the preparation of development applications. The development controls, the key guidance document for preparing development applications, is therefore considered to be a suitable location for the information to be referenced.

Recommended Response

11. Council incorporate the RFS's advice on the appropriate width and design of perimeter access roads into the development controls.

4.2 Department of Climate Change, Energy, the Environment, and Water

Feedback

Water Licensing and Approvals

This submission acknowledges the proposed preservation of identified riparian corridors along watercourses in the URA, and the requirements for development to rehabilitate the corridors. The submission notes rehabilitation and revegetation management plans are not included in the proposed local contributions framework.

The submission supports the provision of Bushfire Asset Protection Zones on road reserves as opposed to any encroachment of them into the riparian corridors.

Conservation Programs, Heritage & Regulation

The submission recommends four minor amendments to the draft development controls:

- Delineate more clearly between colours applied to the Vegetated Buffer and Natural Open Space areas.
- Identify that a Biodiversity Development Assessment Report may be required at development application stage.
- Expand the Indicative Layout Plan objectives to include an objective to secure buffers to significant remnant vegetation and riparian areas.
- Correct references to the C2 Environmental Conservation zone.

The submission also confirms that previous feedback (provided by the Department's Water, Floodplains, and Coast Team) has been incorporated into the draft development controls.

Consideration of Feedback

Water Licensing and Approvals

The support for the identified riparian corridor and bushfire management measures are noted. There are no current opportunities to include rehabilitation and revegetation activities in the approach to infrastructure contributions as this would increase the amount of local infrastructure contributions, exacerbating the problem of keeping contributions for the URA to a sustainable level. Additionally, such activities are not listed on the NSW Government's *Essential Works* List outlined in its Local Infrastructure Contributions Policy.

Conservation Programs, Heritage & Regulation

The requested amendments are considered reasonable/appropriate.

Recommended Response

12. Council amend the exhibited draft development controls to:

- a. Update Figure 2 to more clearly delineate the Vegetated Buffer and Natural Open Space areas.
- b. Add a 'Note' against Acceptable Solution A7.1 regarding the potential need for Biodiversity Development Assessment Reports to support development applications.
- c. Add the following to Section 8.1 Indicative Layout Plan:
 - i. New objective *'Provide buffers to significant remnant vegetation and riparian areas.'*
 - ii. New Acceptable Solution *'Roads are utilised to provide buffers to significant remnant vegetation and riparian areas.'*
- d. Amend all references to *E2 Environmental Conservation* in the development controls to *C2 Environmental Conservation*.

4.3 Transport for NSW

Feedback

Transport for NSW provided feedback on the following matters:

1. Road Infrastructure: The submission:
 - a. Highlights the importance of the Pestells Lane connection to secure access to the Princes Highway and provide a flood evacuation route and queries the likely timing for the delivery of the connection. It recommends:
 - i. Triggers (like number of lots) for the delivery of the connection, and
 - ii. Mechanisms to acquire the necessary land, within and outside the URA to deliver the connection.
 - b. Seeks clarification on the suitability of the current intersection of Pestells Lane with the Princes Highway to service the URA.
 - c. Suggests an additional connection from the URA to the Princes Highway via Abernethys Lane be considered.
 - d. Requests the provision of a minimum 2.5m wide shared path on Collector Roads and sufficient space for bus infrastructure.
 - e. Requests that the note about bus capable infrastructure be strengthened and included as a Development Control.
2. Development Staging: The submission raises concerns that the fragmented ownership of the URA and the flexible controls for development staging will facilitate alternative staging and delivery outcomes which may ultimately impact the delivery of infrastructure. It recommends additional mechanisms to adjust the timeframes and funding mechanisms for the delivery of identified road connections should development stages be adjusted.
3. Local Infrastructure Contributions Framework: The submission raises concerns about the adequacy of estimates of future road connections and whether the necessary funds will be available during the early stages of development to deliver the initial or enabling infrastructure. It is recommended that Council use the opportunity to apply to increase the current cap on contributions to secure the funds for the identified infrastructure.

4. Business Park: The submission advises there should be:
 - a. No direct access provided between the part of the URA zoned E3 Productivity Support and Moss Vale Road.
 - b. Adequate separation between any access servicing this area and the intersection of Moss Vale Road, Bells Lane, and Bannada Way.
5. Draft Development Controls: The submission provides a range of feedback on various components of the draft controls.
6. Vegetated Buffer to Moss Vale Road: The submission confirms the Agency's support for the proposed buffer as the land may be required for future upgrades and widening of Moss Vale Road. The submission requests controls which restrict delivery of local roads in the buffer.
7. Nowra-Bomaderry Bypass: The submission supports the preservation of the land identified for a potential corridor for the proposed Nowra-Bomaderry Bypass, requesting development is managed so as not to encroach on the corridor.

Consideration of Feedback

Road Infrastructure

Pestells Lane Connection: The timing or trigger for the delivery of the connection between the URA and Pestells Lane is still to be determined but early delivery has been identified if Transport for NSW's upgrade of Moss Vale Road are delayed. The acquisition and/or dedication of land required for the connection will potentially be secured through the final local infrastructure contributions framework.

Pestells Lane & Princes Highway Intersection: Transport for NSW's is responsible for this intersection. The original designs of this intersection responded to planned growth and included paths on both sides of the bridge and roundabouts on both sides of the interchange. Transport for NSW removed components during delivery due to budget constraints. Council's Transport Study confirms the current intersection will accommodate and service the traffic generated by the URA. It also highlights an upgrade will be required to service further planned growth in the Meroo Meadow Long-term Investigation Area (located to the north of the URA). The planned connection to Pestells Lane can be designed in a way which will not jeopardise future upgrades of the intersection.

Abernethys Lane Connection: Council's Transport Study identifies this connection as a possible future connection but one that is not initially essential to service the URA. Earlier planning work also demonstrated that the residents of Abernethys Lane object to the

concept of an additional access using this road. The delivery of the Nowra-Bomaderry Bypass provides a future opportunity to revisit the delivery of this optional connection.

Shared Paths: The draft development controls require 2.5m wide paths for all Collector Roads in the URA.

Bus Capable Infrastructure: The transfer of this note to a development control is reasonable.

Development Staging

The exhibited development controls include a staging plan to manage the orderly development of the URA and timely provision of infrastructure. The proposed controls also allow Council to consider variations to the staging plan if the orderly delivery of the development and infrastructure is not compromised. The controls also require alternative staging proposals to demonstrate they will deliver the required infrastructure.

The planning and development controls provide a level of flexibility to allow the market to respond with a diversity of lot sizes and house types. This flexibility makes it hard to identify the exact or final number of lots or dwellings which could be delivered. It is also impossible for Council to accurately predict, and therefore confirm, development timeframes as the market will lead subdivision and construction activity. The development of some stages of the URA also rely on the delivery of significant enabling infrastructure for which the delivery timeframe is currently unknown.

The local infrastructure contributions framework will coordinate the delivery of infrastructure, for example, by identifying the timing or “development triggers” requiring the delivery of infrastructure.

Local Infrastructure Contributions Framework

Early delivery of enabling infrastructure could be achieved through several mechanisms with costs recouped throughout the life of the development. These mechanisms include delivery by development as “works-in-kind”, low-cost loans, or the use of Federal and State Government infrastructure funding initiatives.

Section 3.2 of this report examines the funding and delivery of infrastructure and recommends Council continue to identify the infrastructure cost for the URA to identify the most appropriate mechanism to secure infrastructure funding.

Business Park

The development controls for the part of URA zoned E3 Productivity Support are provided in *Chapter G17 Business, Commercial and Retail Activities*. The Indicative Layout Plan

(Figure 2) in the exhibited controls suggests an access point from this land to Bells Lane. The suggested location meets Transport for NSW's request.

Development Staging Information:

Vegetated Buffer to Moss Vale Road

The development controls, through *Figure 2 Indicative Layout Plan*, confirm the proposed location of the local roads outside of the long identified (and zoned) vegetated buffer. Supporting controls for the street network and hierarchy require the road network to be delivered in accordance with indicative layout plan, with roads minimised in the vegetated buffer.

Nowra-Bomaderry Bypass

The corridor identified for the proposed Nowra-Bomaderry Bypass is identified and protected through planning controls in *Shoalhaven Local Environmental Plan 2014*. This includes a rural zone and a specific provision preventing development from comprising the future Bypass.

Recommended Response

7. Council continue its advocacy and collaboration efforts with Transport for NSW to:
 - a. Understand its planning and delivery timeframes for the upgrade of Moss Vale Road, including intersections with the local road network and the Princes Highway, and shared pathways to expand the current active transport network.
 - b. Confirm delivery timing/trigger for the Pestells Lane connection.
 - c. Provide further input into the preparation of the local infrastructure contributions framework for the URA.
8. Council adjust the current "note" about the need to deliver bus capable infrastructure to a full "Development Control".

5. Moss Vale North Owners Group Submission(s)

The Owners Group made a total of four submissions consisting of:

- Joint Landowner Submission, supplemented with additional information in December 2024.
- Mayrin Group's submission specific to 191 Bells Lane.
- Cambewarra Development's submission specific to 91b Bells Lane.
- H&M South Coast Pty Ltd/Haverton Homes submission specific to Lot 7 Bells Lane.

The submissions addressed the following general matters, providing detailed feedback for each:

- The proposed local infrastructure contributions framework.
- Road network.
- Drainage infrastructure.
- Riparian corridors.
- Managing bushfire.
- Managing flood risk.
- Relocation of open space.
- Vegetated buffer to Moss Vale Road.
- Development staging.
- Draft development controls.

Proposed Local Infrastructure Contributions Framework

The submissions identify this framework as the most significant issue for the Owners Group but also confirmed a level of support for Option 5 (Council and Developer Collaboration) and generally with the items of essential infrastructure identified. Concerns raised related to the amount and cost of infrastructure, the risk of delaying development as planning agreements are struck, and an inequitable framework for all landowners.

However, the offered support for Option 5 is subject to there being a collaborative working group to resolve the final framework. The Owners Group request that their involvement in the working group be as an active and equal stakeholder and contributor. The Group has also offered to undertake, fund and share updated engineering and design costings

for the infrastructure based on updated flood modelling it has prepared. The requested aims of the working group are to:

- Identify the types and amounts of infrastructure to be delivered through a future Development Contributions Plan, requesting that such a plan include all Collector Roads (an increase on the proposed),
- Reduce the identified shortfall in monetary contributions, and
- Determine a fairer apportionment and allocation for any remaining shortfall.

The submissions identify the following opportunities to address the contributions shortfall:

- Dwelling yield assumptions.
- Opportunities to increase dwelling yield, both within the currently proposed controls and other strategic mechanisms.
- Appropriateness of the proposed infrastructure (claim it is over-engineered with excessive road widths, bridge widths, and over stipulation of roundabouts).
- Alternative infrastructure delivery models.
- Potential design and cost savings, including the use of more accurate flood modelling.
- Equitable allocation of contributions to landowners.

The submissions also ask for other matters to be added to the contributions framework, including dedication of land for open space and riparian corridors and the revegetation of the riparian corridors.

Road Network

The submissions identify several concerns with the proposed road network including the requirement for certain collector roads, widths of roads and road reserves, number of roundabouts, need for bus capable infrastructure, and requirements for rear lane access. The submissions query if the current road designs are consistent with Council, State, and National design guidelines and highlight potential impacts on development yield.

Drainage Infrastructure

The submissions request the finalisation of the drainage strategy for the URA to confirm the final location and design of the various pieces of infrastructure, noting the potential impacts on developable area and dwelling yield. They also request the investigation of opportunities to reduce the overall footprint of infrastructure through the use of underground treatment devices and detention basins which, when dry, can function as open space.

Riparian Corridors

The submissions request a review of the riparian corridor boundaries and their adjustment to a “top-of-bank” measurement and to exclude areas currently included to help manage flood risk. They also request a range of development types and activities be permitted in the riparian corridors, including roads, asset protection zones, drainage basins, and parks.

The submissions state that the proposed revegetation of corridors or creation of newly vegetated corridors is unnecessarily burdensome and raises urban design and safety issues. For example, it will create areas unable to be supervised close to dwellings causing a reduction in safety. It is proposed that the corridors be re-established on a site-by-site basis with outcomes guided by the NSW Government’s guidelines only, indicating they should not be heavily treed and should include passive open space.

Managing Bushfire

The submissions claim that the changing bushfire impacts of future riparian corridors and potential positioning of drainage infrastructure have not been properly considered and may impact development footprint.

Managing Flood Risk

The Owners Group has commissioned a ground level survey and updated flood risk modelling using the survey outcomes. The submissions raise concerns about the amount of fill required to manage flood risk, the retaining infrastructure required at the edges of areas of fill, and the need to raise roads and open space.

The submissions also identify the priority of delivering the flood evacuation route and recommends Council apply for any Federal and/or State Government infrastructure funding initiatives to assist.

Relocation of Open Space

The submissions request the relocation of currently proposed parks to the areas of the URA zoned for Environmental Conservation and Environmental Management.

Vegetated Buffer to Moss Vale Road

The submissions request the removal of the prescribed width from the vegetated buffer to Moss Vale Road.

Staging

The submissions request the deletion of the proposed staging plan from the development controls, allowing each development application to address the applicable criteria regardless of the sequence in which other stages progress.

Draft Development Controls

The submissions highlight the importance of the development controls in supporting and streamlining the orderly submissions and processing of future development applications. The removal of what the Owners Group consider to be prescriptive controls for low and medium density housing and the village centre is requested. The submissions also identifies several inconsistencies in the figures in the draft development controls and requests all controls which duplicate the NSW Government's legislation and guidelines be deleted and instead referenced in the controls.

Consideration of Feedback

The number and scope of the matters raised by the current Owners Group with both the draft development controls and proposed local infrastructure contributions framework is significant and complex.

As a result, there is clear benefit in a series of meetings or collaborative workshops with the Owners Group to discuss and potentially resolve a range of matters. These can occur on the understanding that the currently identified outcomes:

- Earlier and consistent strategic outcomes that were identified and agreed to through earlier planning stages, such as the buffer along Moss Vale Road.
- Were essentially proposed by the previous Owners Group and form the basis for Council's earlier decision to bring forward and progress the detailed planning for release of the URA for development.
- Reflect the recommendations of the suite of technical studies Council has commissioned to inform its planning of the URA. These have totalled approximately \$500,000 to date and include an Integrated Water Cycle Assessment and Traffic Studies.
- Respond to NSW Government Agency policy or advice, for example, the width of riparian corridors, the width of the buffer to Moss Vale Road to assist with future road widening, or the measures required to manage flood risk (land zoning to remove development opportunities, areas of fill, and provision of an evacuation route).

Some of the matters raised in the submission were resolved or set in the planning controls in December 2023. This includes minimum lot sizes, the width of riparian corridors, and location of significant open space. These matters can only be adjusted or reconsidered in the LEP through the preparation of a Planning Proposal recommending adjustments to the planning controls. This requires a repeat of the Gateway process which requires a public exhibition and agency consultation and it would take 12-18 months to complete.

Other matters can be addressed through the adjustment of the draft development controls or the flexible application of any final controls as development applications are prepared and assessed. Development controls are considered as guidance and provide multiple opportunities for flexible application.

More work is needed to identify, design, and cost all essential infrastructure necessary to support the URA at an acceptable level. This proposed work includes collaboration with the Owners Group and Transport for NSW to provide a forum to address their concerns and keep them informed of infrastructure projects and costs. Once settled, this information will help inform the selection of an appropriate local contributions framework for the URA.

Recommended Response

9. Council collaborate with the Moss Vale North Owners Group to identify reasonable opportunities for further adjustments of the draft development controls and inform the preparation of the local infrastructure contributions framework.



ABN:59 855 182 344

Payment Advice

This document will be a Tax Invoice for GST when full payment is made to Shoalhaven City Council.

Date: 7-Aug-2023
Council File: DS23/1250
Ref. No: 21088553
Date Due: 7-Aug-2023
Payment Advice: 120070

Particulars	Qty	Amount	GST	Total
Advertised in press	1	\$393.00	\$0.00	\$393.00
Advertised by letter in accordance with Council's Community Consultation Policy	1	\$232.50	\$0.00	\$232.50

170 Riversdale Rd, ILLAROO - Lot 1 DP 1232368

GST: \$0.00
Total (inc GST): \$625.50
Amount Paid: \$0.00
Amount Due: \$625.50

Payment Options

Credit Card*
Please call 1300 004 431
Or log on to:
www.shoalhaven.nsw.gov.au
*Note: A 0.5% surcharge applies

Personal Payment
Present to Cashier at SCC offices or
post to PO Box 42 Nowra NSW 2541.
Cheques made payable to Shoalhaven
City Council.



Biller Code: 4366
Ref: 21088553

Telephone & Internet Banking – BPAY
Contact your bank or financial institution to
make this payment from your cheque,
savings, debit or transaction account.
More info: www.bpay.com.au

CL25.320 - Attachment 1

Justin Lamerton

From: SQLExec <sqlexec@shoalhaven.nsw.gov.au>
Sent: Saturday, 30 September 2023 6:31 AM
To:
Subject: Payment received for MICR 21088553

Payment received for MICR: [21088553](#)

Name:
Address:
ContactNumber:
Email:

Council Reference: DS23/1250

Receipt Date: 30 September 2023
Amount Received: **\$625.50**
Receipt Number:
Receipt Source:

MICR Balance: **\$0.00**

CL25.320 - Attachment 1



ABN:59 855 182 344

Bundanon Trust

Payment Advice

This document will be a Tax Invoice for GST when full payment is made to Shoalhaven City Council.

Date: 10-Jul-2023
Council File: Q115054
Ref. No: 21070568
Date Due: 10-Jul-2023
Payment Advice: 119173

Particulars	Qty	Amount	GST	Total
S96(2) - Estimated cost of Development more than \$10,000,000 + additional fee per\$1,000 (or part of \$1,000) by which the estimated cost exceeds \$10,000,000	1	\$5,943.00	\$0.00	\$5,943.00
S96(2) - Estimated cost of Development more than \$10,000,000 - per \$1,000 (or part of \$1,000) by which the estimated cost exceeds \$10,000,000	19647	\$5,304.69	\$0.00	\$5,304.69

PAN-344674

Please ensure payment within 7 days

GST: \$0.00
Total (inc GST): \$11,247.69
Amount Paid: \$0.00
Amount Due: \$11,247.69

Payment Options

Credit Card*
Please call 1300 004 431
Or log on to:
www.shoalhaven.nsw.gov.au
*Note: A 0.5% surcharge applies

Personal Payment
Present to Cashier at SCC offices or
post to PO Box 42 Nowra NSW 2541.
Cheques made payable to Shoalhaven
City Council.



Biller Code: 4366
Ref: 21070568

Telephone & Internet Banking – BPAY
Contact your bank or financial institution to
make this payment from your cheque,
savings, debit or transaction account.
More info: www.bpay.com.au

CL25.320 - Attachment 2

Justin Lamerton

From: SQLExec
Sent: Friday, 4 August 2023 6:31 AM
To:
Subject: Payment received for MICR 21070568

Payment received for MICR: [21070568](#)

Name: Bundanon Trust
Address:
ContactNumber:
Email:

Council Reference: Q115054

Receipt Date: 4 August 2023
Amount Received: **\$11,247.69**
Receipt Number:
Receipt Source:

MICR Balance: **\$0.00**

CL25.320 - Attachment 2

BUNDANON

23 July 2025

Mr James Ruprai
Chief Executive Officer
Shoalhaven City Council
P.O. Box 42
NOWRA, NSW, 2541

Shoalhaven City Council

Received 29 JUL 2025

File No. _____

Referred to: _____

Dear Mr Ruprai,

Council Reference: DS23/1250

Contact Person: Justin Lamerton

**RE: Modification Application – DS23/1250 (PAN-344674) 170 Riversdale Road,
Illaroo – Lot 1 DP 1232368**

Thank you for Shoalhaven City Council's continued support for Bundanon and thank you for your response to our letter requesting reimbursement of application fees paid for the lodgement of the above application order of \$11,873.19, inclusive of the following fees:

- \$11,247.69 paid on 3 August 2023 (Council Ref No. MICR21070568); and
- \$625.50 paid on 28 September 2023 (Council Ref No. MICR21088553).

As requested in your letter dated 3 July 2025, please find enclosed the additional information you have requested in order to meet the requirements of Clause 2.19(c) of the Council's Policy 'POL23/6 – Refund of Development Application fees and other fees for Charitable Organisations and Community Groups'.

- Evidence of Bundanon being a registered charity – please find attached Bundanon's application renewal of its Charitable Fundraising Authority. Bundanon is also a registered charity with the Australian Charities and Not-for-profits Commission (ACNC) and we have also included Bundanon's ACNC registration details.
- Balance sheets – please find enclosed Bundanon's 30 June 2024 Annual Report, which includes its 30 June 2024 and 30 June 2023 balance sheets.
- Please find following an explanation of how the refunded fees will continue to be returned to and benefit the local Shoalhaven community:

Each year Bundanon hosts thousands of school children from across the region and Australia through its unique creative learning programs. Residential and day learning programs, inspired by Bundanon's cultural, environmental and architectural heritage, fulfil Arthur Boyd's vision of a place for people of all ages to become immersed in the arts. By providing free and subsidised visits for economically disadvantaged schools, schools with high First Nations enrolments and those that cater to students with special needs in the Shoalhaven region, Bundanon ensures that its creative learning programs remain equitable and accessible to all.

Bundanon also provides a wide range of opportunities for Shoalhaven community groups and individuals to experience learning programs and social engagement in an



bundanon.com.au

PO Box 3343, North Nowra NSW 2541 Australia
ABN 72 058 829 217 | T +61 2 4422 2100

CL25.320 - Attachment 3

U

inclusive and nurturing environment, including special free access for Shoalhaven residents and local community partnerships including First Nations organisations.

Bundanon's expanded offer as a world class cultural destination positions it to reach new visitors, communities, and external collaborators. Bundanon is a powerful economic driver in the Shoalhaven region that attracts visitors to the wider NSW South Coast, helping to boost the local Shoalhaven economy through increased visitor spending, promotion of local products and businesses, and by raising the area's profile for further tourism growth. Bundanon is also a significant employer in the region employing 50 full-time equivalent employees across a broad spectrum of skills and specialisations including education, hospitality, culture and community, First Nations, land management, food and beverage, housekeeping, security and technical and operational.

As you are aware, Bundanon has and will continue to make a significant contribution to the local Shoalhaven economy and community, and we now seek your support under Council's Policy POL23/6 for reimbursement of the above application fees.

Should you require further information please do not hesitate to contact me.

Yours sincerely,



Rachel Kent
Chief Executive Officer

Cc David Willcocks, Chief Financial Officer



Fair Trading

Ref: CFN/25106
SR Ref: 1-8839220582

15/10/2024

Bundanon Trust
David Willcocks
6 ROSE PDE
MOUNT PLEASANT NSW
2519

Dear David Willcocks

Your application to renew your Charitable Fundraising Authority has been approved and is enclosed with this letter along with the conditions of your authority.

As a holder of an authority, you are authorised to appeal to the public for funds, subject to the obligations set out in the *Charitable Fundraising Act 1991* (the Act), the *Charitable Fundraising Regulation 2021* and the conditions attached.

Compliance with these requirements support the overarching objects of the Act, which are:

- (a) to promote proper and efficient management and administration of fundraising appeals for charitable purposes
- (b) to ensure proper keeping and auditing of accounts in connection with such appeals
- (c) to prevent deception of members of the public who desire to support worthy causes.

To assist with compliance, please refer to the current *Charitable Fundraising Guidelines* at www.nsw.gov.au/money-and-taxes/charitable-fundraising, or more generally, search for Charitable Fundraising on the website for more information.

Prior to the expiry of your authority, we will notify you to renew. For Charitable Fundraising forms, including the Renewal form, please view our webpages at <https://www.nsw.gov.au/money-and-taxes/charitable-fundraising>.

Yours sincerely

NSW Fair Trading

Please note that this document has been finalised but not reviewed. NSW Fair Trading undertakes randomised reviews of documents processed automatically and may, if necessary, request further information or remove the document from its records. You will be notified of any action Fair Trading may require or take as a result of a review.

PO Box 22, Bathurst NSW 2795 | 1800 502 042 | fairtrading.nsw.gov.au | ABN 81 913 830 179

CL25.320 - Attachment 3

CHARITABLE FUNDRAISING AUTHORITY

Charitable fundraising number **CFN/25106**

This document certifies that **Bundanon Trust**

holds an authority to fundraising under section 13A of the *Charitable Fundraising Act 1991*, subject to compliance with the Act, the *Charitable Fundraising Regulation 2021* and the conditions attached as Annexure A.

This authority is in force from **03/12/2023**

until **02/12/2028**

unless surrendered or revoked earlier.

This authority is approved under delegation from the Minister administering the *Charitable Fundraising Act 1991*.

Important information

Please ensure you read the conditions attached.

You must inform us of any change to your charitable fundraising authority within 28 days.

Please contact us at charity.inquiries@customerservice.nsw.gov.au for further information.

Bundanon Trust

✓ Charity is registered.

✓ Charity reporting is up to date.

Charity details

ABN:

72058829217

Address:

Po Box 3343
North Nowra
NSW, 2541, Australia

Email:

accounts@bundanon.com.au

Address For Service email:

david.willcocks@bundanon.com.au

Website:

bundanon.com.au

Charity Size:

Large

Who the charity helps:

Adults - aged 25 to under 65
Adults - aged 65 and over
Children - aged 6 to under 15
Early childhood - aged under 6
General community in Australia
People from a culturally and linguistically diverse background
People in rural/regional/remote communities
Youth - 15 to under 25

Date established:

1 January 1993

Last reported:

4 November 2024

Next report due:

31 December 2025

Financial year end:

30/06

Summary of activities

Bundanon provided access to the creative and educational opportunities of the Bundanon properties and collection and continued work to preserve the natural and cultural heritage of Bundanon.

Charity programs

Artists in residence program
Artist services

Education Program
Education support

Bundanon
Art galleries and art museums

Using the information on the Register

Information on the Charity Register has been provided to the ACNC by charities. If information is not shown, this may be because it has not yet been provided. The ACNC may also approve information be withheld from the Charity Register in certain circumstances. [Read more about information on the Charity Register.](#)

People

Responsible people

The role of a 'Responsible Person' is an important one for registered charities. Generally, a charity's Responsible People are its board or committee members, or trustees.

Benedict Maguire

Role: Board Member

[Associated charities](#) →

Bruce Solomon

Role: Board Member

[Associated charities](#) →

Courtney West

Role: Committee Member

[Associated charities](#) →

Elizabeth Pakchung

Role: Board Member

[Associated charities](#) →

Ezekiel Solomon

Role: Director

[Associated charities](#) →

Gerald Moore

Role: Board Member

[Associated charities](#) →

Laura Jones

Role: Board Member

[Associated charities](#) →

Navleen Prasad

Role: Board Member

[Associated charities](#) →

Philip Bacon

Role: Board Member

[Associated charities](#) →

Samuel Edwards

Role: Chairperson

[Associated charities](#) →

William Gammage

Role: Board Member

[Associated charities](#) →

Yasmeen Shahin

Role: Board Member

[Associated charities](#) →

Documents

Annual reporting

Title	Due date	Date received	Download
Annual Information Statement 2026	31 December 2026	Not yet submitted	—
Financial Report 2026	31 December 2026	Pending	—
Annual Information Statement 2025	31 December 2025	Not yet submitted	—
Financial Report 2025	31 December 2025	Pending	—
Annual Information Statement 2024	31 January 2025	4 November 2024	 View AIS
Financial Report 2024	31 January 2025	4 November 2024	 Download
Annual Information Statement 2023	31 January 2024	28 April 2024	 View AIS
Financial Report 2023	31 January 2024	28 April 2024	 Download
Annual Information Statement 2022	31 January 2023	10 August 2023	 View AIS
Financial Report 2022	31 January 2023	10 August 2023	 Download
Annual Information Statement 2021	31 January 2022	27 January 2022	 View AIS
Financial Report 2021	31 January 2022	27 January 2022	 Download
Annual Information Statement 2020	31 January 2021	18 March 2021	 View AIS
Financial Report 2020	31 January 2021	18 March 2021	 Download
Annual Information Statement 2019	31 January 2020	10 December 2019	 View AIS
Financial Report 2019	31 January 2020	10 December 2019	 Download
Annual Information Statement 2018	31 March 2019	11 December 2018	 View AIS
Financial Report 2018	31 March 2019	11 December 2018	 Download
Annual Information Statement 2017	31 January 2018	30 January 2018	 View AIS
Financial Report 2017	31 January 2018	30 January 2018	 Download
Annual Information Statement 2016	31 January 2017	13 December 2016	 View AIS
Financial Report 2016	31 January 2017	13 December 2016	 Download
Annual Information Statement 2015	31 January 2016	7 December 2015	 View AIS
Financial Report 2015	31 January 2016	7 December 2015	 Download
Annual Information Statement 2014	31 January 2015	20 January 2015	 View AIS
Financial Report 2014	31 January 2015	20 January 2015	 Download

Title	Due date	Date received	Download
Annual Information Statement 2013	31 March 2014	3 March 2014	 View AIS
Financial Report 2013	31 March 2014	3 March 2014	 Download

Documents

Title	Date	Reporting year	Download
Annual Report	10 December 2019	2019	 Download
Annual Report	11 December 2018	2018	 Download
Governing Document	20 January 2015	2014	 Download

History

The charity's subtype history

Purpose	Start date	End date
Advancing culture	1 January 2014	—
2012 Another purpose beneficial to the community	3 December 2012	31 December 2013

Registration status history

Effective date	Status
3 December 2012	Registered

Bundanon Trust
Statement of Financial Position
As at 30 June 2024

	Notes	2024 \$'000	2023 \$'000
ASSETS			
Financial assets			
Cash and cash equivalents	3.1A	2,787	2,223
Trade and other receivables	3.1B	196	139
Financial investments	3.1E	2,060	1,089
Total financial assets		5,043	3,451
Non-financial assets			
Land and buildings	3.2A	51,067	50,692
Collection assets	3.2A	46,533	46,517
Plant and equipment	3.2A	1,374	1,283
Right-of-use assets	3.2A	-	92
Intangibles	3.2A	-	17
Inventories	3.2C	129	35
Prepayments		78	50
Total non-financial assets		99,181	98,686
Total assets		104,224	102,137
LIABILITIES			
Payables			
Suppliers		593	259
Other payables	3.3F	362	360
Total payables		955	619
Interest bearing liabilities			
Leases		-	15
Deposits		114	107
Total interest bearing liabilities		114	122
Provisions			
Employee provisions	4.1A	466	357
Total provisions		466	357
Total liabilities		1,535	1,098
Net assets		102,689	101,039
EQUITY			
Reserves		53,523	54,037
Retained surplus		49,166	47,002
Total equity		102,689	101,039

The above statement should be read in conjunction with the accompanying notes.



Metered Standpipe and Bulk Water Filling Station Policy

For more information contact
Shoalhaven Water

City Administration Centre
Bridge Road (PO Box 42)
Nowra NSW Australia 2541
P: 1300 293 111

water@shoalhaven.nsw.gov.au
www.shoalwater.nsw.gov.au

Adoption Date: 23/05/2000
Amendment Date: 21/12/2004, 24/03/2009, 29/01/2013, 20/09/2022
Reaffirmed: 18/07/2017
Minute Number: MIN00.711, MIN04.1655, MIN09.334, MIN13.35, MIN17.631,
MIN22.650
Next Review Date: 1/12/2024
Related Legislation:
Associated Policies/Documents:
Responsible Owner:
Policy Number: POL24/9



CL25.321 - Attachment 1

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1 Policy Purpose

- To regulate and manage the extraction of water from mains in the Shoalhaven by hydrant standpipes and bulk water filling stations.
- To provide a fair and equitable system for measuring and charging hydrant and filling station water use, thereby maintaining appropriate water management practices in the Shoalhaven.
- To provide guidance and service to [customers-businesses](#) who wish to use metered standpipes and bulk water filling stations for extraction of water from mains in the Shoalhaven.
- To protect drinking water quality by preventing potential contamination of mains from inappropriate use of standpipes.
- To monitor and review water consumption patterns and assist in the planning of water supply infrastructure.

2 Objectives

2.1 Policy Statement

This policy was adopted by Council Minute 00.711 on 23rd May 2000, Minute 04.1655 on 21st December 2004, Minute 09.334 on 24th March 2009 and Minute 13.35 on 29 January 2013.

3 Definitions

Term	Meaning
Bulk water filling station	A fixed facility that enables water to be transferred from the water mains direct to water tankers safely and efficiently.
Hydrant	A fitting on a water main specifically designed for connection of a standpipe to extract water from the main.
Standpipe	A device to connect to a hydrant for extraction of water. The device is fitted with a control valve and meter for measuring water extracted.
Backflow prevention	The methods and devices used to prevent the undesirable reversal of the flow of water into the potable (drinkable) water supply. This is crucial to avoid contamination or pollution of lean water sources. It may be in the form of a fixed air gap or testable backflow prevention device (eg, Reduced Pressure Zone Device (RPZD) or Double Check Valve (DCV)).

Commented [MW1]: Inclusion of new definition

4 Roles & Responsibilities

4.1 Provisions

4.1.1 Exemption Circumstances

Under Pursuant to the Local Government Act 1993, the NSW Fire Service, State Emergency Service and the Australian Defence Force will be permitted to use unmetered standpipes for provision of emergency ~~s~~Services only.

Shoalhaven Water Operations Department will be permitted to use unmetered standpipes ~~exempt~~ for essential maintenance of water mains to ensure water quality standards.

4.1.2 Terms of Use – Standpipes

Access Requirements-Use of standpipes is subject to a Hire Agreement

Businesses Customers who wish to extract water from hydrants in the Shoalhaven are required to hire a metered standpipe from Shoalhaven Water and will be required to enter into an agreement for their use. Application for standpipe hire is made using the Metered Standpipe Hire Request. The hirer is to maintain a standpipe in proper working condition at all times throughout the hire period.

The agreement specifies the conditions governing the use of the metered standpipes and payment of fees, charges and security deposit. Metered standpipes remain the property of Shoalhaven Water.

Tanks being filled from a reticulated supply using a removable standpipe must have a backflow prevention device that complies with the Plumbing Code of Australia and AS/NZS3500 Part 1.

The hirer is required to prevent backflow in accordance with the requirements of the Plumbing Code of Australia ('PCA') and AS/NZS3500.1, and Council's policy on the Backflow Prevention and Cross Connection Control. Prevention may be in the form of fixed air gap or a testable backflow prevention device (eg. PRZD or DCV).

Persons found in breach of the agreement approval may have their approval agreement to use portable standpipes revoked and/or be subject to prosecution and any associated costs.

Hire Period

Standpipes will be available for hire on an ongoing basis and will be charged on a quarterly basis.

Fees, Charges and Security Deposit

Fees, charges and security deposits will be set annually under Council's adopted Delivery Program and Operational Plan – Fees, Charges and Rentals.

Note: The fees and charges are based on full cost recovery of the ~~capital~~ metered standpipe and maintenance cost of the ~~metered~~ standpipe over 10 years plus administration costs for each hire period. The security deposit is set at 30% of the standpipe cost to encourage security and return of the device by hirers.

The water uUsage charge is based on the maximum usage charge for water adopted by Council in a the financial year.

Commented [MW2]: Changes to wording only in 4.1.1

Commented [MW3]: New sentence on application process.

Commented [MW4]: New statement defining the requirement to apply backflow prevention to a standpipe.

Commented [CB5]: Should we be specifying the water carter requirements, they aren't our requirements and are not something that we advise/keep track of changing requirements? A more blanket statement about they needing to comply with NSW health's requirements might be better?

Commented [MW6R5]: Agreed. If we are not required to receive their certification, this section is not required in the Policy.

Commented [MW7R5]: Reference to public health regulatory requirements has been removed as it is not something that we require evidence of prior to hiring a standpipe or entering into an agreement for use of bulk water stations.

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Penalties, Costs, and termination of Agreement

The hire agreement will include clauses for the imposition of penalties in the event of damage, loss or destruction of the standpipe. The security deposit will be forfeited should such loss or damage result from negligent use by the hirer and additional costs recovered where applicable.

Council may apply a late fee for failure to present quarterly standpipe meter reading.

If the hirer fails to provide readings for three periods, the hire agreement will be terminated, and the hirer must return the standpipe immediately on receiving a termination notice. A termination fee will apply. In the event the standpipe is not returned upon termination, the termination fee will include the cost of standpipe replacement.

or pay the current replacement costs of the standpipe.

The value of the fee will be included in Council's Annual Fees and Charges schedule.

Appropriate safeguards have been incorporated in the agreement to discourage misuse.

Commented [CB8]: and a termination fee will apply. In the event the standpipe is not returned upon termination, the termination fee will include the cost of standpipe replacement.

Commented [MW9R8]: Wording changed to make penalties more explicit in the policy.

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Ownership of Standpipes

All metered standpipes for extraction of water will be owned exclusively by Shoalhaven Water, Council's Water Utility. The use of private standpipes not owned by Shoalhaven Water in Council's mains is prohibited.

Commented [MW10]: Changed wording to provide clarification on use of our standpipes only.

Identification of Standpipes

Standpipes will be numbered and coloured for easy identification.

Types of Standpipes

Standpipes are available in two sizes:

- 65mm: For larger volume users (Max Flow Rate: 8.3 L/sec)
- 25mm: For smaller volume users (Max Flow Rate: 1.5 L/sec)

Penalties, and Costs, and termination of Agreement

The hire agreement will include clauses for the imposition of penalties in the event of damage, loss or destruction of the standpipe. The security deposit will be forfeited should such loss or damage result from negligent use by the hirer and additional costs recovered where applicable.

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immediately on receiving a

The value of the fee will be included in Council's Annual Fees and Charges schedule.

Appropriate safeguards have been incorporated in the agreement to discourage misuse.

Commented [MW11]: This section moved higher up in this section.

Meter Readings to be provided by the hirer

Hire and water usage charges will be levied each financial quarter (March, June, September and December) based on readings provided by the hirer. The readings ~~can must be emailed-submitted~~ with photographic evidence, via the online meter reading form, or by presenting the standpipe. Accounts will be issued at quarterly intervals and/or at the end of the hire period.

~~Standpipes Currently in Use~~

~~To encourage the removal of unmetered standpipes in the region, a rebate of \$50 will apply upon surrender of these standpipes.~~

Commented [MW12]: Removed. No longer applicable.

4.1.3 Terms of Use – Bulk Water Filling Stations

To address water quality issues that are occasionally experienced throughout the water distribution network which arise from the use of hired standpipes operated at high flows, Shoalhaven Water operate Bulk Water Filling Stations ~~at Kangaroo Valley and Tomerong.~~

Use of Bulk Water Filling Stations

Customers wishing access to the Bulk Water Filling Stations must apply to Council for an account and access key using the Metered Standpipe Hire Request.

Access Requirements – All users

As part of the agreed terms of use, all hirers must:

- Adhere to the [NSW Health Guidelines for Water Carters](#).
- Either have installed an approved Reduced Pressure Zone Device (RPZD) or ensure a fixed air gap is installed on their tanker.

~~Access requirements – Bulk Water Carters supplying potable water~~

~~The Public Health Act 2010 and the Public Health Regulation 2012 require drinking water suppliers to:~~

- ~~have a quality assurance program (QAP) that complies with the Regulation~~
- ~~comply with (i.e., implement) its QAP~~
- ~~provide a copy of the QAP to the local Public Health Unit~~
- ~~keep records relating to managing the safety of its drinking water supply.~~
- ~~Notify us of their business details and be placed on a food business register~~

~~This requirement applies to potable Water Carters. Please refer to the [NSW Guidelines for Water Carters](#) on the NSW Health website. NSW Health may request water carting data from Shoalhaven City Council.~~

Commented [MW13]: Reference to public health regulatory requirements has been removed as it is not something that we require evidence of prior to hiring a standpipe or entering into an agreement for use of bulk water stations.

4.2 Implementation

The Water Business Service Department (Shoalhaven Water) has responsibility to implement the policy through processing of an application.

5 Related Legislation, Policies or Procedures

6 Risk Assessment

Financial	Not providing suitable guidance for the hiring of standpipes increases financial risk where appropriate revenue is not collected for the hire of standpipes as well as cost to Council where standpipes are not used as intended. A clear policy provides direction for procedures and guidelines to be developed to properly support customers in need to appropriate levels.
Operational	A lack of clear policy can lead to inconsistent service delivery, inefficiencies, and increased administrative burdens. When our customers and staff struggle to interpret vague policies, service delivery standards are diminished. Strong policy statements ensure proper service delivery to the high standards we expect and are expected to deliver.
Reputational	Shoalhaven Water is widely acknowledged as a leader in our industry. A comprehensive policy around the hire and maintenance of standpipes solidifies our position as a leader in the industry and within our community. Management of our brand is an important area of our overall business, and a robust policy ensures a uniform approach to our customer base, projecting high level customer service standards.
Legal & Regulatory	Shoalhaven Water acknowledges the regulatory framework in which we operate is crucial to ensure a consistent service delivery for all of our customers. Non-compliance with laws, regulations or conditions within service agreements can lead to fines, litigation, and reputational damage.
Strategic	Shoalhaven Water is widely acknowledged as a leader in our industry. Our long-term goals are to maintain this leadership position and continue to be recognised for our service standards. The development and maintenance of service-oriented policies help to meet these goals.

Commented [MW14]: Mandatory section for risk management included

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7 Data and Reporting

87 Monitoring and Review

~~In accordance with~~ Pursuant to S 165 (4) of the Local Government Act 1993, this policy will be reviewed within one year ~~of the election of every new Council~~ after the declaration of the poll of a Council election.

98 Ownership and Approval

9.18.1 Public Policy

Responsibility	Role
Directorate Shoalhaven Water	Unit Water Business Services Department
Endorser	EMT or Director Director Shoalhaven Water
Approver	Council

CL25.321 - Attachment 1



Non-Urban Water Supply Connection Policy

For more information contact
Shoalhaven Water

City Administration Centre

Bridge Road (PO Box 42)
Nowra NSW Australia 2541
P: (02) 4429 3214
F: (02) 4429 3170
water@shoalhaven.nsw.gov.au
www.shoalwater.nsw.gov.au

Adoption Date: 27/01/1998
Amendment Date: 21/12/2004, 28/07/2009, 14/12/2012, 18/07/2017, 09/05/2022
Minute Number: MIN98.18, MIN04.1655, MIN09.957, MIN12.1403, MIN17.631,
MIN22.332
Next Review Date: 1/12/2024
Related Legislation:
Associated Policies/Documents:
Responsible Owner:
Record Number: POL25/3

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9.1 — Public Policy	5
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1 Policy Purpose

- To detail the circumstances in which non-urban properties may be considered for connection to town water supply.
- To detail the circumstances in which non-urban properties will be exempt from the water availability charge.
- To provide direction to property owners making application for the connection to town water supply.
- To provide direction to staff assessing applications for connection of properties to town water supply.

2 Objectives

2.1 Policy Statement

This policy statement is based on Council Minutes 93.290 of 16 February 1993 and 98.18 of 27 January 1998.

[This policy does not apply to major extensions relating to rezoning's and other major developments.](#)

[This policy should be read in conjunction with Councils' Non-Urban Wastewater Connection Policy, Backflow Prevention and Cross Connection Control Policy and Liquid Trade Waste Discharge to the Sewerage Scheme Policy.](#)

3 Definitions

Term	Meaning
Non-Urban	any rural zone, environmental zoned or other zones specified in the current Shoalhaven Local Environment Plan (RU1-RU5) which are not currently within the existing water service area
Property/Land	A parcel of land comprised of a lot in a DP.
Easement	Legal restriction placed over a parcel of land to benefit another property/s or authority/s.
Availability Charges	Annual charge levied by Council for the provision of a water supply or wastewater service under the Local Government Act.

4 Roles and Responsibilities

4.1 Provisions

4.1.1 Exemption Circumstances for Water Availability Charge.

Non-Urban properties shall be exempt from the water availability charge in the following circumstances:

- The property is beyond 225m of a town water main and is not connected to the town water supply.
- The property (not currently connected) cannot be supplied to the current levels of service.

Non-Urban properties will not be exempt from the water availability charge in the following circumstances:

- The property is connected to the town water supply.
- The property can be connected to the town water supply by a standard long or short water service and the dwelling on the property is within the serviceable limit.

Consideration for exemption from the water availability charge will be given, upon written application in all circumstances not included above. The determination of an application shall be at the discretion of the [General Manager/Director](#) (Shoalhaven Water).

4.1.2 Criteria for Determination of an Application for a Non-Urban Property to Connect to Town Water Supply

4.1.2.1 Application

Applications for a water supply ~~in non~~ non-urban areas must be made in writing [to Shoalhaven Water's Development & Regulatory Team](#), providing the following information and proposed water use(s).

- i. Details of the property/s to be served including all owner names,
- ii. What infrastructure is required,
- iii. Copy of building entitlement (if vacant and required),
- iv. Description of the development that exists upon the land/s (if developed),
- v. Copy of Occupation Certificate where granted for the existing development,
- vii. A scaled plan showing the location of the property and nearest existing Council infrastructure and which infrastructure the applicant seeks connection to,
- viii. Any other information that is pertinent to the application.

4.1.2.2 Town water supply will only be made available to non-urban properties upon written application in the following circumstances:

- Where capacity exists in the existing system, and
- Where the current levels of service can be provided, and

- Where it can be demonstrated that the water supply will be of positive economic benefit (at the time of application) to the city by applying the following formula.

Benefit = (Income from usage + Availability Charge) – Operating cost

- Where the income from usage is based on the expected annual water usage (provided from Shoalhaven Waters' data) in kL times the cost per kL (per Council's current Management Plan)
- The annual water availability charge (per Council's current Management Plan)
- Operating cost is the latest available at the time of the application (per the Performance Report and asset register). See worked examples below.

Example 1

An applicant requests consideration for a water main extension to serve their property. The length of extension required is 100m and their expected annual water usage is 200kL. Assuming the application has satisfied all other criteria, and the application is for a 20mm meter.

Using the Delivery Program/Operation Plan figures:

Income from usage	=	200kL x \$ 4,802.75 per kL
	=	\$ 960,550
Availability Charge	=	\$ 84,160
Operating Cost per metre	=	$\frac{\text{Mains operation cost} + \text{Mains maintenance cost}}{\text{Total length of mains (m)}}$
	=	$\frac{\$3,542,035.99 - \$2,500,000}{1,634,000,000}$
	=	\$ 1,562.17 per metre meter

~~Therefore~~Therefore, total annual operating cost for a 100m extension = \$ ~~217,456~~

Benefit = Income – Operating Cost
= \$~~444,710~~ - \$~~156,217~~
= \$ ~~288,493~~

~~Therefore~~Therefore, ~~main~~the main extension would be approved in this case.

Example 2

Applicant requests 200m extension and proposes 100kL usage through a 20mm meter. Assuming all other criteria satisfied.

Income	=	usage + availability
	=	\$ 480,275 + \$ 84,160
	=	\$ 264,435
Total operating cost	=	$-200 - 200 \text{m} \times \$1,562.17$
	=	\$ 312,434
Benefit	=	\$ 264,435 - \$ 312,434
	=	\$ -48,1 > < 0

~~Therefore~~Therefore, ~~main~~the main extension would **not** be approved in this case, as the benefit is negligible.

4.1.2.3 Other Conditions

- The applicant(s) shall meet all costs associated with the provision of the water supply including;
 - Preparation of water supply design and any environmental assessment.
 - Necessary construction extension of the reticulation system.
 - Service connection including meter assembly.
 - Provision of access and necessary easements.
 - Separate system connection fees or Developer ~~contribution~~-Contribution charges,
 - Any other conditions considered applicable for the application, and
- One 20mm service only will be provided as a standard. A larger or additional service may be provided upon application and if capacity is available. Other special conditions may apply to larger services. Charges per Council's current Fees & Charges apply, and
- Mains shall only be extended in a road reserve and where "all weather" access is available. Mains are to be installed at the standard property offset and to be outside the road formation. A hydrant shall be located at the end of the main for flushing, and
- Connection to trunk water mains will only be permitted in exceptional circumstances, at the discretion of the ~~Executive Manager~~Director, Shoalhaven Water.
- A backflow prevention device may be required and be subject to Council's Cross-Connection Control / Backflow Prevention Policy.
- In special circumstances a supply by agreement may be necessary. Such cases will require Council resolution.

4.1.2.4 Private Service extensions from the end of a main may be approved subject to:–

- not passing another property; and
- the nearest boundary of the property is within 225m of the end of the water main; and
- there is no likelihood of further development (~~eg~~ eg, land locked); and
- approval is obtained by the applicant from ~~Assets Custodian~~Council's Assets & Works Group (and Council or any other authority) to locate the meter assembly and private extension within the road reserve. Alternatively, the applicant will need to acquire legal access via services easement(s) through private property(s).
- Levels of service can be achieved at the frontage of the property.

Note: Construction and maintenance of the pipe extension ~~from~~ downstream of the meter will be the responsibility of the applicant/owner.

4.2 Implementation

Shoalhaven Water Group's Water Asset Planning & Development Section has responsibility for processing an application.

5 Related Legislation, Policies or Procedures

6 Risk Assessment

<u>Risk Category</u>	<u>Risk</u>	<u>Notes</u>
<u>Reputation</u>	<u>Poor handling of connection applications for non-urban areas may result in perceived inequity or inconsistency, potentially leading to public dissatisfaction or complaints to media or Council.</u>	<u>This policy outlines clear criteria and processes for assessing applications, helping to ensure transparency and fairness, and protecting the Council's reputation by maintaining service standards.</u>
<u>Financial</u>	<u>Failure to follow cost-recovery guidelines or approving uneconomical extensions could lead to financial loss for Council.</u>	<u>The policy provides a cost-benefit formula ensuring that town water supply extensions are economically justified. It also outlines responsibilities for applicants to bear associated costs, thereby reducing financial risk to Council.</u>
<u>People</u>	<u>Inconsistent access to water services or unclear eligibility could result in confusion or community dissatisfaction, particularly in rural or environmentally zoned areas.</u>	<u>The policy establishes clear exemption and eligibility criteria, helping both staff and property owners understand when access to water services is available and how to apply.</u>
<u>Environment</u>	<u>Unplanned or excessive expansion of the water network could impact local ecosystems, land use planning, or resource sustainability.</u>	<u>The policy aligns with ESD principles and includes environmental considerations in the planning and extension of water supply services, thereby protecting water sources and surrounding environments.</u>
<u>Property and Infrastructure</u>	<u>Poorly planned private service extensions or unauthorized connections may result in infrastructure damage, difficult maintenance, or system inefficiencies.</u>	<u>The policy restricts connections to within 225m of existing mains and requires approval and access easements, ensuring infrastructure integrity and proper maintenance access.</u>
<u>Governance (probity, transparency, resilience to scrutiny)</u>	<u>Lack of a formal policy or inconsistent application could lead to legal disputes, internal inefficiencies, or challenges during audits.</u>	<u>This policy provides a structured and consistent process for assessing and approving connections, ensuring decisions are made with proper documentation, oversight, and transparency.</u>

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7 Data and Reporting

87 Monitoring and Review

In accordance with S 165 (4) of the Local Government Act 1993, this policy will be reviewed within one year of the election of every new Council.

98 Ownership and Approval

9.18.1 Public Policy

Responsibility	Responsible Owner
Directorate	"Enter Directorate – Department – Unit" Shoalhaven Water – Water Asset Planning & Development
Endorsement	"Enter Director &/or ELT – include Advisory Committee name (if relevant)" – CEO
Approval/Adoption	Council