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Lake Munmorah Urban Release Area Development Control Plan

425 Pacific Highway, Crangan Bay & 405 Pacific Highway, Lake Munmorah

October 2022





Acknowledgement of Country

The Department of Planning and Environment acknowledges the Traditional Owners and Custodians of the Darkinyung lands on which we live and work and pays respect to Elders past, present and future.

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1 Introduction

1.1 Name of Development Control Plan

This plan is known as the Lake Munmorah Urban Release Area Development Control Plan and supplements the *Central Coast Development Control Plan 2022* (CCDCP) for future development requiring consent in the Lake Munmorah Urban Release Area.

1.2 Relevant Planning Authority

The relevant planning authority is the Planning Secretary of the NSW Department of Planning and Environment.

1.3 Adoption and commencement

This DCP plan will commence on **DD MM 2022**, being the date that a public notice of its approval by the Secretary was placed in the NSW Planning Portal.

1.4 Purpose of the DCP

The purpose of this development control plan is to provide development controls for quality development and sound environmental outcomes within the Lake Munmorah Urban Release Area.

This DCP provides supplementary provisions to the controls within *Central Coast Development Control Plan 2022* for development in the Lake Munmorah Urban Release Area that will contribute to the growth and character of the local area and protect and enhance the public domain.

Under section 4.15 (previously s79C) of the *Environmental Planning and Assessment Act 1979*, the assessment and determining authority is required to take into consideration the relevant provisions of this DCP in determining any application for development (except for State Significant Development).

1.5 Objectives of the DCP

- To provide for a high quality and varied residential neighbourhood with accessible open space and community facilities.
- To allow for an appropriate mix of lot sizes to provide for a mix of housing types and business opportunities.
- To provide information on the expected standards of subdivision design and encourage subdivision design of high quality, which controls and mitigates the potential environmental impacts arising from subdivision which may be detrimental to the proper use of the land.

- To promote development that uses, conserves and enhances the community's resources so that ecological processes are maintained and the quality of life for both present and future generations is enhanced.
- To protect and appropriately manage any threatened species, populations, endangered ecological communities and their habitats.

1.6 Relationship to other planning instruments and policies

The DCP has been prepared in accordance with the provisions of the *Environmental Planning and Assessment Act 1979* (EP&A Act 1979) and the Environmental Planning and Assessment Regulation 2021 (the EP&A Reg 2021).

This DCP supplements *Central Coast Development Control Plan 2022* and should be read in conjunction with other relevant chapters of that development control plan and other policy documents of Central Coast Council, including but not limited to:

- Chapter 2.1 Dwelling Houses, Secondary Dwellings and Ancillary Development
- Chapter 2.2 Dual Occupancy and Multi Dwelling Housing
- Chapter 2.3 Residential Flat Buildings
- Chapter 2.4 Subdivision
- Chapter 2.13 Transport and Parking
- Chapter 2.17 Character and Scenic Quality
- Chapter 3.1 Floodplain Management and Water Cycle Management
- Chapter 3.5 Tree and Vegetation Management
- Chapter 3.6 Heritage Conservation
- Chapter 5.47 Northern Conservation Areas
- Council's Civil Works Specification

Provisions of this DCP prevail in the event of any inconsistency with provisions of the CCDCP and Council's policies and codes.

1.7 Land to which this DCP applies

This DCP applies to the land identified in Figure 1 as Stage 1 of the Lake Munmorah URA.

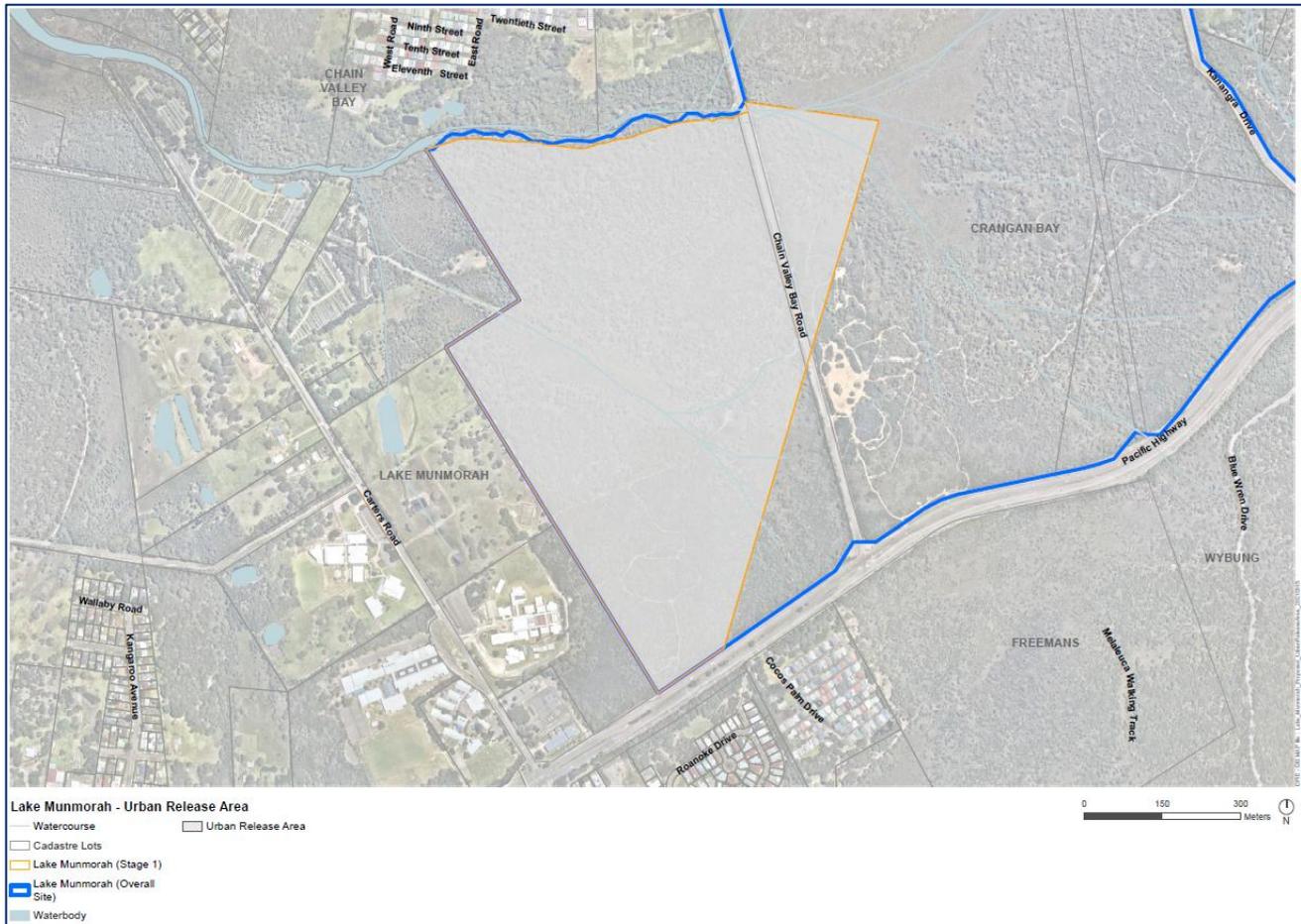


Figure 1: Lake Munmorah Urban Release Area

1.8 Variations to DCP controls

Variation of any control in this plan may be acceptable where an application demonstrates its conformity with the objectives that are specified by this plan, or where design excellence has been satisfactorily demonstrated.

Any variation to the controls must be supported by a written statement demonstrating how the objectives of each relevant chapter of the DCP are fully satisfied.

Where, in the opinion of the assessment and determining authority, an application satisfies the objectives set out in this plan or a design review panel reviews and supports a development, the authority may grant consent to the application notwithstanding that one or more of the controls are not complied with.

2 Place and character

2.1 Character statement

The Lake Munmorah URA features an environmental and community-oriented character that integrates it within the surrounding natural landscape. Projects must start with nature, culture and public space. This is important to:

- respond to the unique characteristics of place and enable the potential of place to be realised;
- provide green and blue spaces and networks as a key hallmark of liveability in urban areas;
- integrate natural landscapes into public life;
- support and express the natural qualities of places in development;
- increase and strengthen continuous green infrastructure networks;
- provide scenic amenity and opportunities to restore, connect and enhance urban ecosystems;
- ensure biodiversity, bushland and waterway regeneration.



Figure 2: Blue and green networks are connected and frame urban form

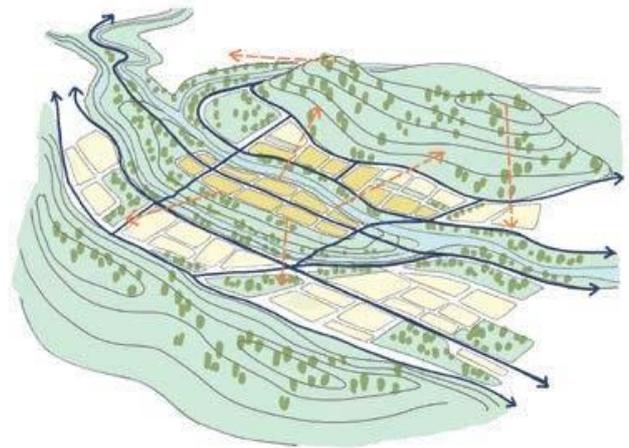


Figure 3: Natural elements structure new development.

Streets and housing lots are designed to be woven into the landscape, with lots sold individually and developed in harmony with the bush context.

Low and medium density residential development with a mix of housing types permissible within the general residential and medium density residential zones. Residential allotments will be partially surrounded and bisected by nature and landscaping to create a healthy built environment.

Scale and massing of built form responds to desired local character to:

- balance built elements within the wider urban form;
- increase the quality of human experience of urban places;
- provide appropriate transitions to neighbouring areas; and
- ensure different built forms are available to suit a range of uses, functions and activities.

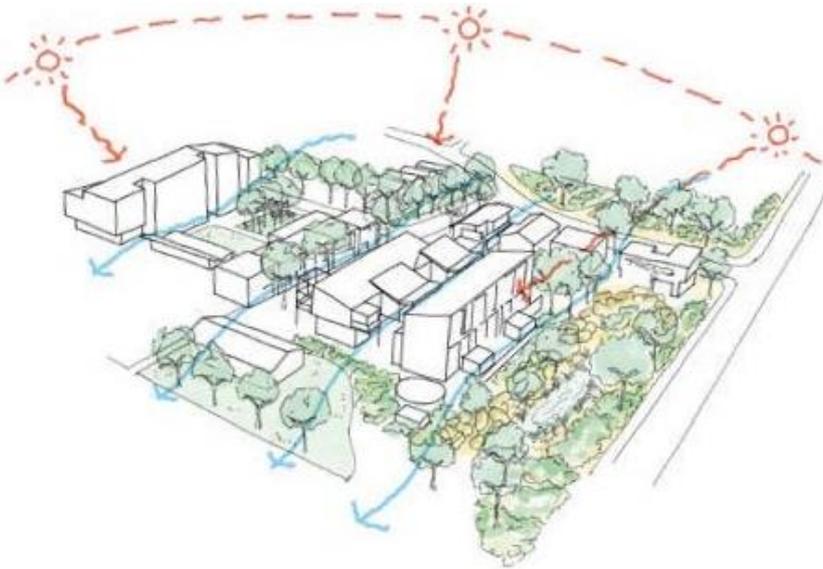


Figure 4: Scale and massing of built form responds to desired local character.

The site contains a regional biodiversity corridor to the north, as well as being traversed by a riparian corridor which crosses the site in a north-south axis. These important biodiversity values have been protected within environmental conservation zoning. The primary use of these lands will be for conservation purposes. Their ongoing protection and maintenance will enhance the ecological and visual qualities of Greater Lake Munmorah.

An area of public open space will provide for the recreation needs of the community and support social interaction and connectedness. It will create a sense of community by facilitating opportunities for socialising and meeting others.

The site is located near several schools on Carters Road and the Lake Munmorah shopping centre on Tall Timbers Road, which offers a range of services to support the local community. Bicycle and pedestrian paths within the site will connect residents to these facilities reducing the need to travel by car on the Pacific Highway.

The site's direct frontage to the Pacific Highway will provide access to the broader region by car or by public transport including the local bus network connected to train services between Sydney and Newcastle.

2.2 Structure plan

The structure plan (Figure 5) provides a plan showing the likely development outcomes including the key transport connections within the site and to adjoining land. The structure plan should guide the assessment of future development applications ensuring that the strategic opportunities identified are achieved. This includes:

- Securing the protection of a regional biodiversity corridor within the north of the site.
- Facilitating an east-west collector road between Chain Valley Bay Road and Carters Road reducing local and school-based traffic on the Pacific Highway.
- Facilitating future road connections to land east of the Lake Munmorah URA should future investigations determine the land may be developed.
- Ensuring larger lots and low-density development is provided on the northern edge of the general residential area to minimise potential impacts on the regional biodiversity corridor.
- Utilising the medium density residential area adjoining the future public open space area to offer a diversity of housing choices for the future community.
- Facilitating open space green links to integrate the blue and green network with active transport links and to provide a buffer to the Pacific Highway for noise amenity purposes.

The structure plan is based on an understanding of the place informed by:

- extensive technical studies prepared over 10 years to identify opportunities and constraints;
- recognising the existing cultural, social, natural, environmental, built and economic factors that underpin the place;
- identifying strategic planning priorities including the protection of a regional biodiversity corridor; and
- a project vision and place-based design principles that look beyond site boundaries to make a positive contribution to place and prevent negative impacts to place.

The structure plan shows indicative locations for internal infrastructure such as local internal roads and detention basins and the actual locations will be determined following more detailed assessment as part of a future development application. There may also be other design and development approaches, including incorporation of Connecting with Country and Recognise Country principles that can be led by Darkinjung Local Aboriginal Council.

The provision of active RE1 Public Recreation land will be in accordance with the Detailed Provision Framework for Public Open Space for Recreation and Sport in the Central Coast Council Active Lifestyles Strategy (November 2021).

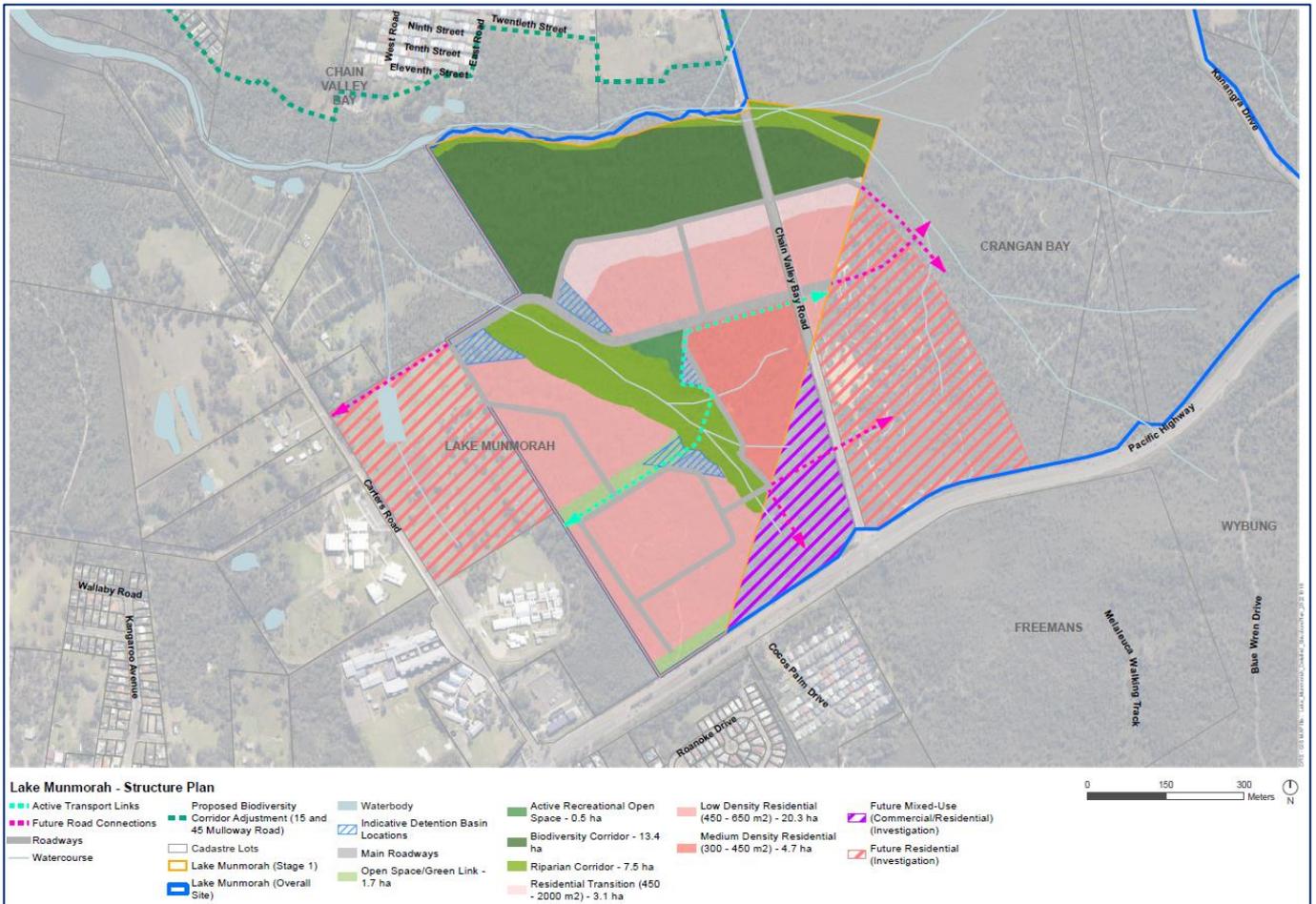


Figure 5: Structure plan

2.3 Infrastructure contributions

Several items need to be provided to achieve the environmental and development objectives of the site. These include:

- road and transport infrastructure;
- stormwater management infrastructure;
- public open space and social infrastructure; and
- biodiversity conservation lands.

There are several options available to deliver these items, including:

- conditions of consent;
- dedication of land;
- planning agreement;
- biodiversity stewardship agreement;
- contribution plan; and
- works in kind.

3 Development controls

3.1 Natural ecology

Objectives

- To protect natural ecology as a system.
- To contribute to the mitigation of the urban heat-island effect.
- To maximise the amenity and attractiveness of urban environments, including creating more shade and producing cleaner air.
- To contribute to an integrated and connected network of green infrastructure.
- To protect soil networks.

Requirements

- a. Provide larger residential lots adjoining the regional biodiversity corridor to enable the retention of mature trees and transition between conservation and urban areas.
- b. Set subdivision patterns to enable contiguous retention / planting of vegetation to enhance habitat and ecology.
- c. Improve interconnections between urban areas to minimise use of conservation areas and support ecological resilience (see Figure 6).
- d. Create a tree canopy that supports a sustainable, liveable and cool neighbourhood (see Figure 7).



Figure 6: Improve interconnections between urban habitat areas to support ecological resilience.

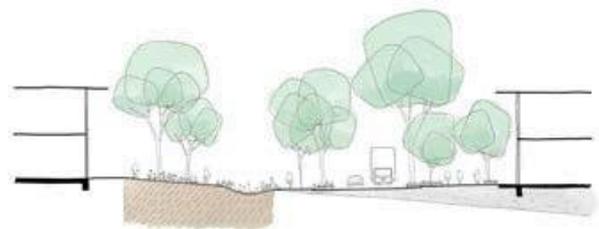


Figure 7: Tree canopy coverage.

3.2 Walkability

Objective

- To create a walkable neighbourhood.

Requirements

- a. The maximum length of any block is 160–220 m (see Figure 8).
- b. Mid-block connections and through-site links for pedestrians are provided no more than 130 m apart within walking catchments of key destinations such as the central public open space area, bus stops and the schools on Carters Road (see Figure 9).
- c. Dedicated footpath are provided on both sides of the east-west collector road.

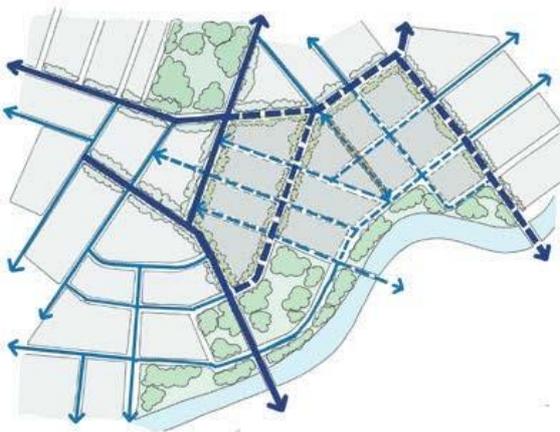


Figure 8: Blocks lengths are limited between 160-220 m to support walking

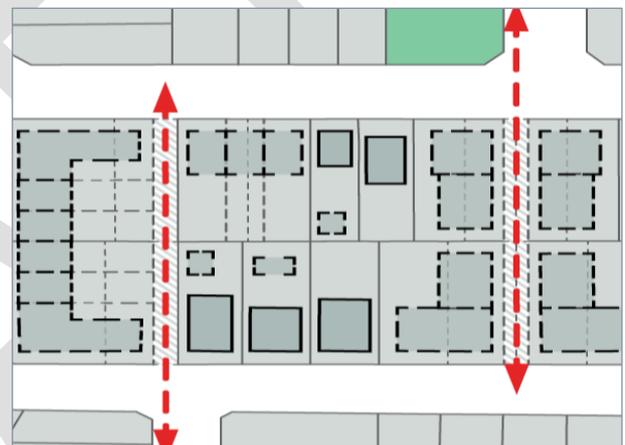


Figure 9: Mid-block connections for pedestrians are provided no more than 130 m apart.

3.3 Lot pattern and layout

Objectives

- To provide a mix and diversity of lots and buildings creating greater housing choice within the community.
- To design lots that support desired character and topography.

Requirements

- a. Align lot pattern with the intended development density and character of the general residential and medium density residential areas as shown on the structure plan (see Figure 5).
- b. Include a range of appropriate lot sizes, orientations, and access arrangements to deliver a mix of building types and tenures within each block (see Figure 10).

- c. Design the lot layout to accommodate the appropriate building type and respond to place and climate by:
- i. minimising earthworks and retaining walls on sloping sites;
 - ii. minimising overlooking and overshadowing;
 - iii. including setbacks to the public open space area, regional biodiversity corridor, riparian corridor and streets to enable appropriate landscape planting and to contribute to urban tree canopy;
 - iv. maximising the ability of lots to deliver efficient and sustainable built-form massing (such as appropriate setbacks, minimising site cover, lot orientation, and deep soil provision) (see Figure 10); and
 - v. minimising impacts of vehicle access, and the dominance of vehicle parking in the streetscape, such as providing rear-lane access to lots facing the public open space area, or on-street parking to lots along streets with cycle priority.
- d. Use the location of built form to facilitate safe and efficient vehicle access without street frontages being dominated by garages, multiple wide driveways or parked cars (see Figure 11).

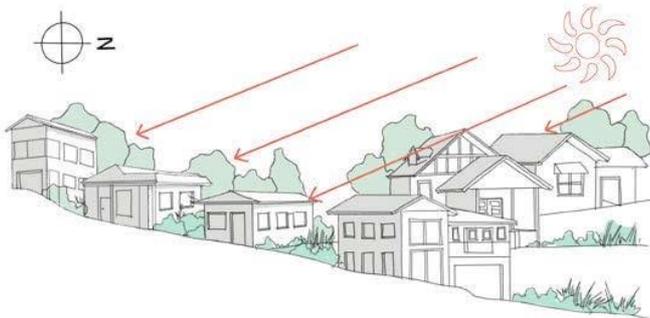


Figure 10: Maximise the ability of lots to deliver efficient and sustainable built-form massing



Figure 11: A mix of lot sizes, orientations, and access arrangements to deliver a mix of building types

3.4 Open space

Objectives (Locational)

- To create a vital network of high-quality public open space throughout Greater Lake Munmorah that connects shops, bus stops, and residential areas including the Lake Munmorah URA.
- To enhance the appearance and amenity of urban development through integrated open space and landscape design.
- To ensure inclusive and equitable provision of public open space.

Requirements (Locational)

- a. Local open space shall be provided in accordance with the location identified in Figure 5. Minor variations in the location and configuration of open space, as a result of subdivision design may be acceptable, subject to an assessment that the above open space objectives are achieved.
- b. The location of public open space entrances should be protected from the proposed east-west collector road connecting Chain Valley Bay Road and Carters Road given the likely future traffic carried on the road.
- c. The public open space area should be visible from the street and optimise the opportunity for car-free frontages.

Objectives (Design)

- To create a sense of community and to encourage interaction and social cohesion.
- To ensure inclusive and equitable provision of public open space.
- To support the needs of the community by providing spaces for outdoor recreation and exercise, play, organised sport, nature and heritage appreciation, socialising, picnicking, walking and informal activities.
- To ensure the public open space area is designed to be safe and accessible for all people.
- To use nature to provide delight.
- To provide for landscaping and enhance tree canopy in the public open space area.

Requirements (Design)

- a. The public open space area shall be designed:
 - i. with an appropriate interface in response to the adjoining urban or conservation area
 - ii. to optimise key views and vistas to and along natural assets.
 - iii. to use green infrastructure to mediate poor sensory experiences, such as integrating landscape features and planting to absorb noise and manage air quality (see Figure 12).



Figure 12: Use green infrastructure to mediate poor sensory experiences

- b. Any public / community facilities intended for the URA are to be co-located with the public open space area, supporting community and place identity (see Figure 13).
- c. Any public / community facilities are designed:

- iv. to include people of all cultures and abilities
 - v. with flexibility to cater for multiple uses and activities and for adaptability over time
 - vi. to contribute to local character and sense of place.
- d. The public open space area shall be embellished to:
- i. ensure the public open space area is inclusive and available to all (such as play spaces, youth plazas, and exercise equipment for diverse age groups);
 - ii. provide toilets and amenities located in areas of high visitation;
 - iii. provide adequate shade (see Figure 14);
 - iv. integrate natural soundscapes and scents, such as flowing water or wildflower gardens; and
 - v. provide suitable lighting for safety and character.



Figure 13: Integration of public open space and public / community facilities with other development

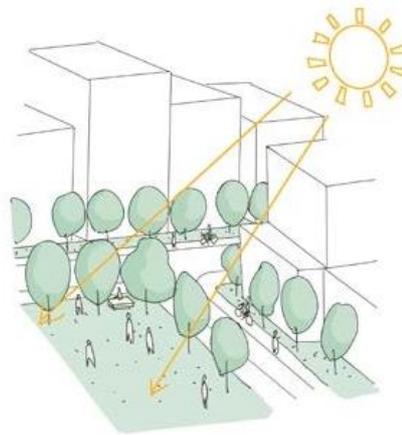


Figure 14: Adequate shade is provided to the public open space area.

- e. Landscaping shall:
- i. prioritise repair, restoration and regeneration for ecological systems and green infrastructure corridors; and
 - ii. utilise winter flowering trees and shrubs endemic to the local area.
- f. Protect the location of entrances and key pedestrian edges to public open space from busy roads.
- g. Ensure public open spaces are visible from neighbourhoods and streets, and optimise the opportunity for car-free frontages where appropriate.
- h. Positively address varying interfaces between public open space, urban edges and other natural systems.

3.5 Road layout and hierarchy

Objectives

- To establish a hierarchy of varied streets which maximises convenience, amenity and safety for vehicles, pedestrians and cyclists.
- To provide a legible, connected and permeable grid of local streets that are sympathetic to the topography and natural assets.
- To ensure streets adjoining the regional biodiversity corridor and the public open space area minimise the risk of vehicle strike to wildlife and increases pedestrian amenity.
- To create comfortable streets that are visually pleasing and designed to encourage social interaction.
- To provide for street tree canopy in road design.

Requirements

- a. Future streets are to be designed to respond to:
 - i. the strategic network;
 - ii. the land use and nature of development; and
 - iii. the hierarchy and role – including movement and place functions.
- b. The future east-west collector road proposed between Chain Valley Bay Road and Carters Road as shown in Figure 5 is to be designed as a potential future local bus route and cater for large and rigid vehicles, having regard for grade, sight-lines and avoidance of lane departure during turning movements.
- c. Slow-traffic streets are to be provided along the perimeter of the:
 - i. regional biodiversity corridor to provide adequate urban interface and reduce risk of vehicle strike to wildlife; and
 - ii. central public open space area to maximise the public amenity and accessibility.
- d. Slow-traffic streets are to be designed to:
 - i. integrate behavioural traffic calming within streets e.g. yield streets, narrow lanes, street trees or indented street parking bays;
 - ii. Where possible, adopt speed limits that minimise the risk of fatality for vulnerable road users (e.g. 30 or 40 km/hour or less).
 - iii. integrate alternative materials in low-speed streets to aid pedestrian legibility and reinforce pedestrian priority; and
 - iv. where possible, adopt speed limits that minimise the risk of fatality for vulnerable road users (e.g. 30 or 40 km/hour or less).
- e. Provide a safer street environment by ensuring appropriate lighting and using crime prevention through environmental design principles.
- f. Street trees integrated with the road design (see Figure 15) are to be provided by to enhance urban tree canopy by:

- i. prioritising the retention and protection of existing tree canopy over removal and replacement of trees to achieve canopy cover; and
- ii. providing supportive conditions for vegetation and tree canopy to thrive, including contiguous deep soil and water-sensitive urban design (see Figure 16).

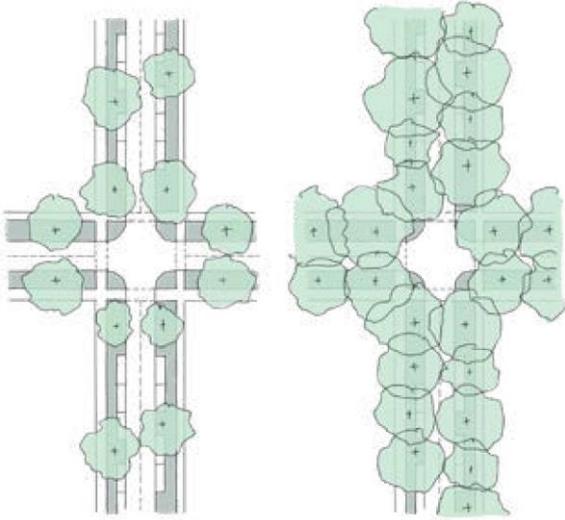


Figure 15: Examples of streets with minimal tree canopy and sufficient tree canopy.

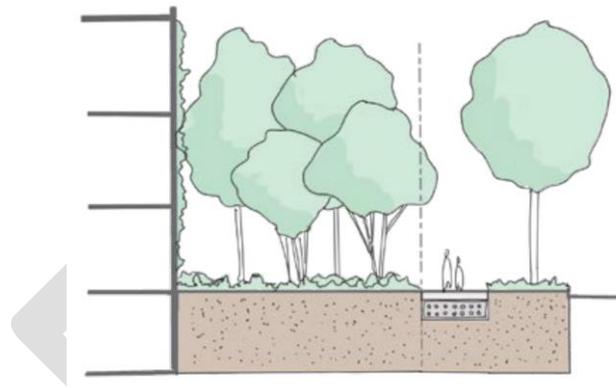


Figure 16: Support trees with sufficient deep soil and complementary greening.

3.6 Pedestrian and cycleway routes

Objectives

- To provide efficient, effective, safe, and comfortable pedestrian and cycling access and connection to the surrounding network, both existing and planned.
- To provide linkages between the public open space area, streets and drainage features to create a distinguishable public domain.
- To provide safe and convenient pedestrian and cycleway networks with clear internal links within the site, to allow connections to external regional network and places of importance within Greater Lake Munmorah such as shops, schools and sports fields.
- To reduce car dependency and support healthy lifestyles.
- To make streets and places safe, walkable, and accessible.
- To ensure provision of active transport infrastructure aligns with the Central Coast Bike Plan and Pedestrian Access and Mobility Plan (PAMP).

Requirements

- a. Shared paths/footpaths and cycleways are to be designed and constructed in accordance with the Central Coast Council's Civil Works – Design Guideline and Construction Specification.
- b. Walking and cycling is prioritised, safe and comfortable for people of all abilities

- c. New streets are to give priority to pedestrian movement over cars.
- d. Incorporate benches as rest points at appropriate locations, such as every 100 m along the key pedestrian route identified in the structure plan (see Figure 5).
- e. Shared paths/footpaths and cycleways are to be designed and constructed in accordance with the Central Coast Council's Civil Works – Design Guideline and Construction Specification.
- f. All park edge streets are to have the cycleway/shared footpath located on the park side of the road.
- g. The provision of a shared path / cycleway that:
 - i. facilitates an east-west connection from Chain Valley Bay Road to Carters Road providing direct access to local schools as shown in the structure plan (see Figure 5); and
 - ii. links key areas within the site, such as the public open space area, to the surrounding regional cycle network (see Figure 17).



Figure 17: Shared paths / cycleways are designed to link key areas in the site to surrounding cycle network.

- h. Streets and pathways are to be designed to:
 - i. ensure legibility and ease of wayfinding with clear sightlines;
 - ii. be well-lit for safety, particularly along the future east-west collector road (see Figure 5), while avoiding glare into private residences and minimising light pollution;
 - iii. maximise opportunities for incidental surveillance of the street from adjacent land uses;
 - iv. proactively cater for walkers of all ages and abilities through measures such as level pavements, pram ramps and tactile markers at crossings, shorter crossing distances, frequent pedestrian crossings, pedestrian-prioritised traffic signals that cater for slower walk speeds, raised transitions and thresholds to minor roads, and landscape buffers to slow traffic and facilitate walking;
 - v. limit crossing stages and carriageways without medians to 20 m, to support people of all ages and abilities.

3.7 Public transport

Objectives

- To facilitate efficient bus routes and safe pedestrian access to bus stops.
- To make provision for convenient local transport links and stops
- To consult with local public transport providers to ensure optimum delivery of public transport infrastructure.

Requirements

- a. Any development application for subdivision is to provide evidence documenting the outcomes of discussions with local public transport providers, specifically local bus service providers regarding proposed routes to and within the subdivision development.
- b. The provision of a local bus route along the future east-west collector road to allow connection between Chain Valley Bay Road and Carters Road (see Figure 5).
- c. Bus stops are to be provided along approved bus routes, no greater than 400 m apart.

3.8 Vegetation management

Objectives

- To protect and enhance biodiversity values on land identified as environmental conservation.
- To ensure no adverse direct or indirect impacts occur on native vegetation and fauna habitat on land identified for environmental conservation
- To ensure long term management of land identified for environmental conservation occurs.

Requirements

- a. Works for the purposes of (or ancillary to) residential subdivision are to be conducted outside the environmental conservation area, this includes but is not limited to, access for works, services, bushfire asset protection zones, stormwater quality control structures, and drainage works.
- b. Development for subdivision incorporating the environmental conservation areas must be supported by a Vegetation Management Plan (VMP) ensure that potential construction impacts and edge effects are mitigated.
- c. Edge treatments and management measures are to be used to reduce short term and ongoing impacts as well as ongoing management costs at the interfaces between the environmental conservation area, and developed areas. The preferred edge treatment is a perimeter road or hard edge, other than where a water quality control structure is proposed. The management of the interface edge of water quality control structures to the adjoining environmental conservation area is to be detailed and may include landscaping. Private residential lots directly adjoining the environmental conservation area is not preferred.

- d. Where possible, large logs generated from clearing of land should be relocated to adjacent retained environmental conservation areas as supplementary fauna habitat.
- e. Native trees and other vegetation are to be retained where possible by subdivision design that incorporates this vegetation into areas such as road reserves and public and private open space areas. The selection of trees and other landscaping plants is to utilise locally indigenous drought tolerant species and include winter flowering trees and shrubs.
- f. No fencing which would prevent movement of ground dwelling mammals, including ground dwelling medium sized mammals, should be erected within the identified environmental corridors.
- g. There is to be minimal use of overhead lighting in or within proximity to the regional biodiversity corridor (to ensure nocturnal movement of native species along fauna corridors is not interrupted by lighting).

3.9 Bushfire

Objectives

- To ensure that bushfire risks are mitigated and ecological values sustained to support a resilient community.
- To establish an integrated approach to building long-term resilience.
- To consider cumulative place-based risks.
- To ensure land-use planning considers resilience and the risks of vulnerable land.

Requirements

- a. Future subdivision/development of the land should demonstrate compliance with *Planning for Bush Fire Protection 2019* (PBP 2019).
- b. Future development must provide asset protection zones (APZs) in accordance with Table A1.12.1 or Table A1.12.2 of PBP 2019 as appropriate.
- c. Development applications for subdivision of the Lake Munmorah URA will need to be supported by a vegetation management plan and ecologist report (or similar) that demonstrate that vegetation within the regional biodiversity corridor zoned C2 Environmental Conservation can be considered Tall Heath for the life of the development and in order that the appropriate minimum APZs can be provided within the subject site.
- d. Future access roads must comply with Section 5.3.2 Access of PBP 2019. This includes the provision of perimeter roads between future residential development and the surrounding bush fire hazard including the C2 Environmental Conservation corridor.
- e. The provision of services to development must comply with 5.3.3 Services – Water, electricity and gas of PBP 2019.

3.10 Water quality management

Objectives

- To ensure ecologically valuable land and associated watercourses are protected.
- To ensure the stormwater drainage system is designed to maintain the natural watercourse and to minimise environmental impacts.
- To reduce consumption and depletion of natural resources.
- To increase water quality for human health, the environment and the recreational value of our inland and coastal waterways and wetlands.
- To assist in cooling urban environments.

Requirements

- a. Development for subdivision must include a water cycle management strategy at the neighbourhood scale (see Figure 18):
 - i. to retain more water in the landscape and to manage stormwater and water quality;
 - ii. retains natural topography and stormwater flow paths;
 - iii. slows down the flow of stormwater and provides for cleaning of water on site in preference to piped stormwater infrastructure that can disrupt stream habitats and lead to erosion;
 - iv. that considers a network of interconnected measures such as wetlands, detention, bioretention and water-sensitive urban design measures including urban swales and passive filtration; and
 - v. that reduces water consumption and contributes to water security by providing water systems that minimise use of potable water for non-potable uses and maximise water re-use in areas such as public open space (see Figure 19).
- b. The design of drainage systems must provide both retention and water quality controls.
- c. Stormwater management infrastructure and devices must not occur within environmental conservation areas and should generally be located in accordance with the structure plan (see Figure 5).
- d. Any large structures, such as retention basins, should generally be located in accordance with the structure plan (see Figure 5) and be designed to add amenity to the subdivision and be multifunctional, cost-effective, and require only straightforward maintenance that does not place an inappropriate burden on future residents

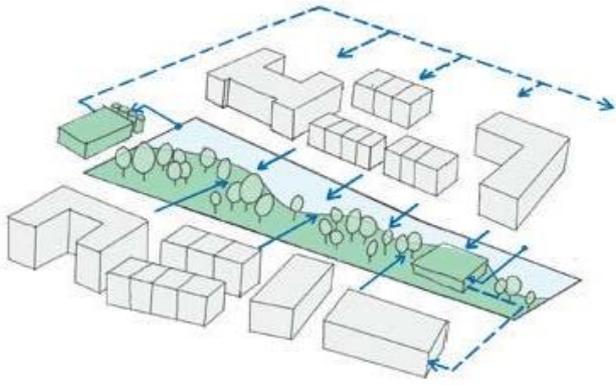


Figure 18: Neighbourhood-scale water cycle management strategies are integrated.

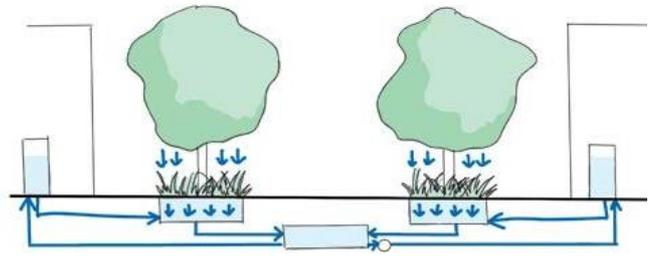


Figure 19: Stormwater detention, capture and re-use.

3.11 Contaminated land

Objective

- To reduce the risk of harm to human health and the environment by ensuring that contamination and remediation are considered.
- To provide proponents with information that can be used to supplement the requirement to consider potential site contamination in preparing a development proposal

Requirements

- a. Compliance with the Report on Land Capability Assessment for Rezoning at Lake Munmorah and Crangan Bay by Douglas Partners 2017.
- b. Consideration of the impact of historic and current land use practices at the time of assessment of development and subdivision applications.

Note: This is supplementary information provided for applicants and landowners. All development proposals must consider all relevant Council and State Government Policy including Chapter 4 – Remediation of land of the *State Environmental Planning Policy (Resilience and Hazards) 2021*.