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ITEM 1 WEST DAPTO VISION IMPLEMENTATION: PLANNING CONTROLS REVIEW

The West Dapto Vision 2018 was endorsed by Council at its meeting of 10 December 2018.

The Vision sets the framework for a review of those provisions in Wollongong Development Control Plan 2009 (DCP) relevant to the urban release area and subdivisions in general.

The review has resulted in proposed amendments to Chapter D16 West Dapto Release Area and Chapter B2 Residential Subdivision. It is also proposed to introduce the draft West Dapto Open Space Design Manual and draft West Dapto Open Space Technical Manual. This report recommends Council endorse these documents for public exhibition.

RECOMMENDATION

1 Council endorse the draft DCP Chapter D16: West Dapto Urban Release Area, draft DCP Chapter B2: Residential Subdivisions, draft Open Space Design Manual and draft Open Space Design Technical Manual for public exhibition for a minimum 28 days.

2 A further report outlining the submissions received from the public exhibition process with recommendations regarding progression of the draft DCP amendments be prepared for Council's consideration.

REPORT AUTHORISATIONS

Report of: Chris Stewart, Manager City Strategy
Authorised by: Mark Riordan, Director Planning and Environment - Future City and Neighbourhoods (Acting)

ATTACHMENTS

1 Draft Chapter D16: West Dapto Release Area
2 Draft Chapter B2: Residential Subdivision
3 Draft West Dapto Open Space Design Manual
4 Draft West Dapto Open Space Technical Manual

BACKGROUND

West Dapto is the Illawarra region's largest urban release area with a development timeframe of 50 years. A framework of planning controls is in place to guide development across the urban release area.

In December 2018, Council adopted a revised West Dapto Vision. The revised document includes eight key vision statements including principles relating to transport, water management, conservation, open space, community facilities, town centres, housing and employment. A detailed review of the DCP provisions was identified as part of the next step in implementing the principles in the West Dapto Vision. The DCP review process has highlighted the following issues:

Chapter D16 West Dapto Urban Release Area

Part D of the DCP relates specifically to localities within the local government area. Chapter D16: West Dapto Urban Release Area commenced on 17 December 2010. A key element of the Chapter is the requirement for Neighbourhood Plans to guide the assessment of future applications for land release.

The Chapter has been modified several times since its commencement to include Neighbourhood Plans as they have been developed and adopted by Council. There are currently 11 Neighbourhood Plans with the last one adopted on 20 December 2018 with other amendments made to the Chapter.

Based on a working knowledge and stakeholder feedback gained over the past 10 years, there are a number of improvements and efficiencies that can be made through the D16 Chapter to better meet the intended outcomes adopted in the West Dapto Vision.

There is opportunity to improve the Neighbourhood Planning process to address the varied scale and quality, which would allow for improvements in achieving strategic planning outcomes and efficient infrastructure delivery, and better align with infrastructure planning such as the West Dapto Development Contributions Plan. Consideration of larger scale neighbourhood planning aligned with water catchments has tangible benefits.

Council staff working knowledge has also identified opportunity to improve efficiency in the development assessment processes via contemporary DCP provisions with clear and consistent guidance for land development.

Chapter B2 Residential Subdivisions

Part B of the DCP relates specifically to land use requirements. Chapter B2 Residential Subdivisions commenced on 1 March 2010. A key element of the Chapter is the requirement for the subdivision of land not restricted to the West Dapto area.

A number of inconsistencies have been identified when Chapter B2 is compared to other sections of the DCP including the subdivision provisions contained in Chapter D16 for West Dapto. As it stands, the content in Chapter B2 relating to road network and design differs from the guidance provided in the section of the DCP relating specifically to West Dapto.

A consolidated and updated set of requirements would better serve the development industry in terms of understanding Council's land release guidelines.

Draft West Dapto Open Space Design and Technical Manuals

The West Dapto Vision 2018 contemplates a review of the DCP to include "*more focused and detailed network planning for open space*".

The Open Space Design Manual will provide guidance at subdivision planning stage and detail the requirements and scale of each of the park categories on the open space hierarchy (ie Sports Parks, Neighbourhood Parks and Local Parks).

The Open Space Technical Manual is a companion reference document to provide the needed technical specifications for proposed open space infrastructure, detailing model types, materials and finishes to guide the detailed design and costing of subdivision open space provision appropriate to the category of park being provided.

PROPOSAL

Chapter D16 and B2 of the DCP have been amended to align with strategic principles in the West Dapto Vision 2018. The Open Space Manuals have also been introduced to implement the adopted Vision. The draft documents are attached to this report.

The key changes to the DCP are detailed as follows:

Document Structure and mapping

- Restructure Chapter D16 of the DCP around principles established in the West Dapto Vision 2018.
- Strengthen connection and consistency of Chapter D16 and B2 with other Chapters of the Wollongong DCP.
- Include new maps in Chapter D16 reflecting the West Dapto Vision Structure Plan 2018 and additional information informing road networks, stormwater and open spaces

Precinct Planning

- Remove Neighbourhood Planning process and introduce Precinct Planning to improve the guidance of strategic planning outcomes.
- Precincts boundaries to align with water sub-catchments.
- Provide clear information requirements to guide precinct plan applications.

Water Management

- Align water management requirements with contemporary Coastal Management Program outcomes.

Town centres

- Guiding provisions for Town Centre master planning, including walkability modelling and plans that demonstrate public and employment access to active and public transport.

Conservation

- Provide clarification of Heritage Study requirements.

Community Facilities

- Promote the planning of community hubs at precinct planning stage and provide guidance in terms of desired location and alignment with open space and supporting services.

Subdivision and Road design

- Minor updates and changes to Chapter B2 to improve guidance in subdivision planning and development assessment including updated references to legislation and policy to reflect the current planning setting. Revision to the contents layout to simplify navigation for the end users.
- Updated road cross sections, objectives and details relating to each type is increased.
- Bring the subdivision chapter in line with preferred subdivision requirements for cut and fill, pedestrian and cycleways, open space (including update to planning hierarchy), traffic, bushfire and servicing.

Open Space

- Introduce specific open space requirements in the West Dapto Open Space Design Manual (OSDM) and West Dapto Open Space Technical Manual (OSTM).
- The manuals clearly set Council's design expectations for natural and riparian areas, stormwater management and open space, equal access, and maintenance within each park category.
- The OSDM details the requirements and scale of each of the park categories on the open space hierarchy – Sports Parks, Neighbourhood Parks, and Local Parks when the subdivision open space is first being conceived, laid out, and costed.
- Specific design guidelines are provided for open space functions such as play spaces, car parking, public art, furniture, pathways, off road cycling trails, waste collection, and signage.
- The OSTM is a companion reference document which will guide developers and provides technical specifications for open space infrastructure, equipment required materials and finishes, etc. This guides the design and costing of subdivision open space appropriate to the category of park being provided.

- The focus of the OSDM and OSTM is primarily the West Dapto Urban Release Area and is referenced by the draft Chapter D16: West Dapto Urban Release Area.

CONSULTATION AND COMMUNICATION

If the draft amendment to the DCP is endorsed by Council for public exhibition the process will entail:

- Notification in local newspapers of the exhibition dates (minimum 28 days)
- Exhibition website with the draft material for viewing, downloading and comments
- Physical copies made available in the Wollongong Library and Dapto Library
- Collating comments and feedback provided from the community and summarising

Following the exhibition period, submissions will be reviewed and reported to Council with further recommendations regarding progression of the guiding documents.

PLANNING AND POLICY IMPACT

Aligning policy and planning to deliver the desirable outcomes for the West Dapto contributes to the delivery of Our Wollongong 2028 goals *"1. We value and protect our environment", "2. We have an innovative and sustainable economy", "6. We have affordable and accessible transport."* It specifically delivers on the following:

Community Strategic Plan		Delivery Program 2018-2021		Annual Plan 2018-19
Strategy		3 Year Action		Annual Deliverables
1.3	The sustainability of our urban environments is improved	1.3.1.2	Develop planning controls and Town Centre and Neighbourhood Plans with regard to the economic, social and environmental impacts	Continue the review of the West Dapto Land Release area including the Vision, Structure Plans and Local Infrastructure Plans
2.1.5	West Dapto urban growth is effectively managed to balance employment and population growth	2.1.5.1	In collaboration with key agencies, facilitate the West Dapto Taskforce to deliver the first stages of the West Dapto Urban Release Area	Continue to implement the Infrastructure Delivery Program to support the West Dapto Urban Release Area
6.3	Provide connected and accessible places and spaces	6.3.1.1	Plan and implement projects to improve connectivity	Develop a Community focused Active Transport Program

Ecological Sustainability

The Wollongong DCP 2009 already includes Chapter A2 Ecologically Sustainable Development (ESD) which is applicable to the whole LGA. Amendments to Chapter D16: West Dapto Release Area, includes a section of conservation principles including environmental conservation, heritage conservation and riparian corridors.

RISK ASSESSMENT AND FINANCIAL IMPLICATIONS

The introduction of Precinct Planning is expected to improve efficiencies in the development assessment phase by providing more informed guidance to the development approval process.

The Open Space Manuals will provide important guidelines and specifications for developers when designing and costing subdivision proposals. Developers will be able to price open space provision more accurately, and ensure that the features and infrastructure proposed are appropriate to the relevant park category, and reduce the likelihood of unnecessary maintenance burdens being passed on to Council.

CONCLUSION

The West Dapto Vision 2018 sets the framework to update the DCP as it relates to the release area, and to bring planning policy documents into alignment. The draft Chapter D16 West Dapto Release Area, draft Chapter B2 Residential Subdivision, draft West Dapto Open Space Design Manual and draft West Dapto Open Space Technical Manual will facilitate implementation of West Dapto Vision 2018. This report recommends Council endorsement of the documents for public exhibition. Following the exhibition period, submissions will be reviewed and reported to Council with further recommendations regarding progression of the guiding documents.

Contents

FIGURES

Document Control

Document ID: Wollongong DCP 2009 – D16 West Dapto Release Area

Rev No	Adoption Date	In force date	Revision Details
1	14/12/10	17/12/12	Adopted
2	27/7/11	3/8/11	Incorporate Shone Ave Neighbourhood Plan
3	26/11/12	8/12/12	Update Wongawilli North Neighbourhood Plan
4	27/5/13	1/6/13	Incorporate Sheaffes Rd Neighbourhood Plan
5	9/12/13	14/12/13	Incorporate Reddalls Rd Industrial Neighbourhood Plan
6	24/3/14	2/4/14	Incorporate Darkes Rd South West Neighbourhood Plan and updated road network diagrams
7	3/8/15	12/8/15	Incorporate Avondale Road North, Huntley Neighbourhood Plan
8	24/8/15	9/9/15	Incorporate Shone Avenue / West Dapto Road Neighbourhood Plan
9	19/10/15	24/10/15	Incorporate West Dapto Rd / Sheaffes Rd (south) Neighbourhood Plan
10			Draft May 2018
11	19/11/18	20/12/2018	Incorporate Bong Bong South Neighbourhood Plan
12	10/12/18	20/12/2018	Incorporate the West Dapto Vision, Structure Plan 2018 and planning principles
13			**Whole document review and new precinct process**

1 INTRODUCTION

This chapter of the Wollongong Development Control Plan 2009 (DCP) is intended to implement the development structure of the West Dapto Release Area as outlined in the West Dapto Structure Plan (**Figure 2**) and to provide guidance on the future development of the land at West Dapto. It is aimed at achieving the vision for West Dapto which is:

> *West Dapto will grow and develop as a series of integrated and connected communities. Set against the spectacular Illawarra Escarpment and a landscape of riparian valleys, these communities will integrate the natural and cultural heritage of the area with the new urban form.*
>
> *The communities will be healthy, sustainable and resilient with active and passive open space accessible by walkways, cycleways and public transport. To support these new communities, local centres will provide shopping services, community services and jobs while employment lands will facilitate further opportunities for the region.*
>
> *West Dapto will be supported by a long-term strategy to oversee the timely implementation of infrastructure to deliver sustainable and high-quality suburbs with diverse housing choices.*

Other parts of this DCP continue to apply to the West Dapto Release Area in conjunction with this chapter. Part A of the DCP contains the Introduction and Part B Land Use Based Planning Controls. Part C provides Specific Land Use Controls and Part E General (City Wide) Controls.

2 LAND TO WHICH CHAPTER APPLIES

This chapter applies to all land within the West Dapto Release Area (**Figure 1**).

Figure 1. West Dapto Urban Release Area

3 OBJECTIVES

The principles are designed to set out expectations around elements for consideration while planning for development of the West Dapto Release Area. The principles, objectives and any applicable controls will guide the growth of new suburbs and neighbourhoods, protect the environment and integrate with existing communities.

The objectives of this chapter are to:

(a) enable the development of the West Dapto Release Area for residential, employment, industrial and environmental conservation areas in a manner consistent with the Wollongong LEP 2009 the West Dapto Vision 2018 and the West Dapto Structure Plan (Figure 2).

(b) ensure the development of the West Dapto Release Area is carried out following the principles of Ecologically Sustainable Development, promoting retention and enhancement of the release areas unique environmental features to shape desired future urban setting outcomes.

(c) support the provision of safe and efficient road networks that promotes long term sustainability and active transport, with public transport services which link the surrounding areas to and throughout the release area.

(d) implement Water Sensitive Urban Design (WSUD) for effective water management and protect development in the area from flooding.

(e) recognise existing environmental and landscape qualities and establish future urban characteristics desired for and shaping the ongoing development of the release area.

(f) protect, conserve and enhance riparian and environmentally sensitive areas and only allow for development compatible with the conservation values of these areas.

(g) protect areas of high scenic value, notably the Illawarra Escarpment and Lake Illawarra with developments that contribute and promote the areas visual and aesthetic values.

(h) conserve and enhance the environmental, cultural and built heritage of West Dapto.

(i) guide the development of open space to meet future community needs and facilitate a network of open space connected by off road cycleways and shared paths throughout the release area.

(j) ensure that development in the Darkes Road, Bong Bong and Marshall Mount town centres contributes to the creation of retail, business, commercial and community hubs and provides significant local employment and community service opportunities.

(k) provide village centres with localised businesses and higher density residential opportunities at key places / intersections were bus stops, community facilities and open space come together as local urban focal points.

(l) ensure the community social and cultural needs are met through the provision of a range of community facilities across the release area (co-located with other facilities in 'hubs', creating urban focal points).

(m) guide planning and development of well-located schools, childcare centres, and adult education facilities to support the communities educational needs.

(n) stimulate diversity in development types and styles to provide a range of different dwellings to increase housing choice and design quality in the Illawarra region.

(o) ensure the creation of safe, secure, liveable and resilient urban environments are established considering future climate and other potential environmental vulnerabilities.

(p) improve employment opportunities and economic growth in the Illawarra region whilst ensuring that commercial and industrial development is of a high design standard, ecologically sustainable and energy efficient.

4 STRUCTURE PLAN

The West Dapto Structure Plan (**Figure 2**) shows the landuse setting which will house the future urban structure and guide the development of the release area.

It is characterised by a series of residential precincts estimated to generate around 19,500 dwellings. The precincts come together to form five distinct stages, separated by riparian corridors connecting through the release area from the Illawarra Escarpment framing the western extent to Lake Illawarra in the east. The release area will also include protection and integration of heritage landscapes and items into the urban structure.

The Structure Plan identifies the following features:

- Town and village centres
- Conservation land
- Heritage items and potential curtilages
- Transition land (environmental constraints exist but may be appropriate for some appropriate developments)
- Development land
- Employment land
- Large open space facilities (neighbourhood parks 2-5 ha, and district 5-8 ha)
- Structural road network
- Creeklines and flood extents (1% AEP)

The Wollongong LEP 2009 has Stages 1 & 2, a portion of Stage 3 and all of Stage 5 of the release area zoned for existing and potential residential development (see Figure 3). There is also 175 hectares of employment land zoned at Kembla Grange (in Stage 1, see Figure 3).

STAGE 1 and 2

Stages 1 & 2 are located in the northern extent of the release area. There are a number of unique features to these stages of the release area including:

- Potential development of around 6700 dwellings.
- Employment land (industrial zones) located within close proximity to Unanderra light industrial area and well connected to Dapto Regional Centre along the Princes Highway, the Port of Port Kembla and the M6 Motorway.
- South of the employment lands will be home to Darkes Town Centre with approximately 7500m2 of commercial/retail floor space providing for a range of shops and services as well as community facilities and active open space for community recreation.
- Protection and rehabilitation of riparian corridors and conservation areas (vegetation and heritage conservation depending on site features and opportunities) to improve water quality, recreational opportunities and connectivity of remnant vegetation along these structural spurs through the release area.
- Structural road network that will connect from outside the release area, through stages 1 and 2 and into the southern reaches of the release area.
- Active transport facilities (cycleways/shared paths) connecting residential areas with open space provisions via riparian corridors and along the structural road network.
- Two village centres (Wongawilli and Jersey Farm) that will provide local convenience shops and urban focal points within the residential areas of stage 2.
- Two primary schools, one located close to the Darkes Town Centre and one located in the Wongawilli/Jersey Farm Road area to service the future residential families.
- Bong Bong Town Centre, at the southern extent of stage 2 on the south side of Bong Bong Road will provide retail needs, local services and community facilities with employment

opportunities in the local context. It will be the urban focal point supporting opportunity for denser housing products located convenient to public and active transport links.

Stage 5

Yallah-Marshall Mount precinct is characterised by:

- Potential development of around 4,000 new dwellings.
- Marshall Mount Town Centre comprising approximately 3,500 sqm floor space in a traditional main street format to provide for retail shops, local convenience needs, local services, community facilities and the like.
- Connection of the precinct into Avondale and Cleveland, with access via an extension of Yallah Road (Road No. 8) as part of the overall West Dapto road network.
- Protection of significant vegetation and unique landscape features of the area.
- Utilisation of Duck Creek as a focal feature of the community.
- A primary school located near Marshall Mount Town Centre to meet the educational needs of the future residential families.

The Yallah-Marshall Mount precinct will utilise traditional urban design principles, with relatively high densities around the town centre and concentrated along the main access roads. The precinct will have a diverse range of housing types and densities.

Stages 3 & 4

Stages 3 and 4 are located in the existing rural suburbs of Cleveland and Avondale, in the middle of the release area south of Horsley and well connected to Dapto Regional Centre to the East via Fowlers Road into Cleveland Road. Part of Stage 3 has been rezoned and combined with the remainder of Stage 3 and 4 will ultimately include:

- Potential development of approximately 8,800 new dwellings.
- Community facilities including a district level recreational centre and youth services facility.
- Two primary schools meet the educational needs of the future residential families.
- Three well connected village centres (Fowlers, Huntley and Avondale) that will provide local convenience shops and urban focal points within the residential areas
- Unique Mullet Creek Catchment environmental features providing the riparian corridor spur supporting and defining the surrounding urban form
- Structural road network that will connect from the southern extent of Stage 2 at Bong Bong Town Centre down to the southern extent of Stage 4 and into Stage 5 of the release area. There will also be road connections spanning from Dapto Regional Centre into the release area along the east, branching into the village centres supporting surrounding residential development.
- Active transport facilities (cycleways/shared paths) connecting residential areas with open space provisions via riparian corridors and along the structural road network.
- High School and primary school facilities for the future population of the stages. Ideally the School will be located near Bong Bong Town Centre (in either Stage 2 or 3) to create a relationship with the town centre to provide education services for the future children and youth population residing between stage 1, 2 and 3 of the release area.

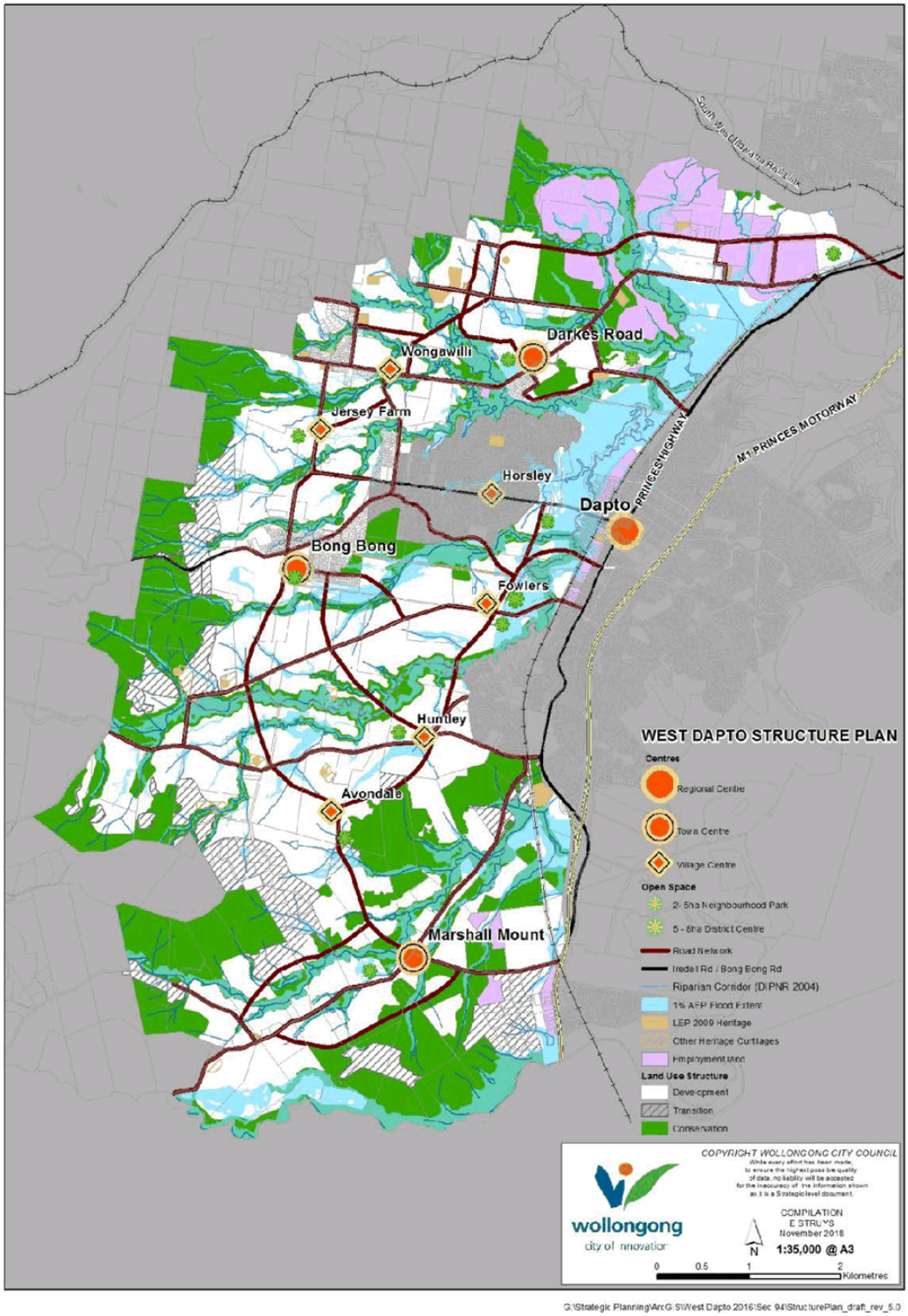

Figure 2. West Dapto Structure Plan 2018

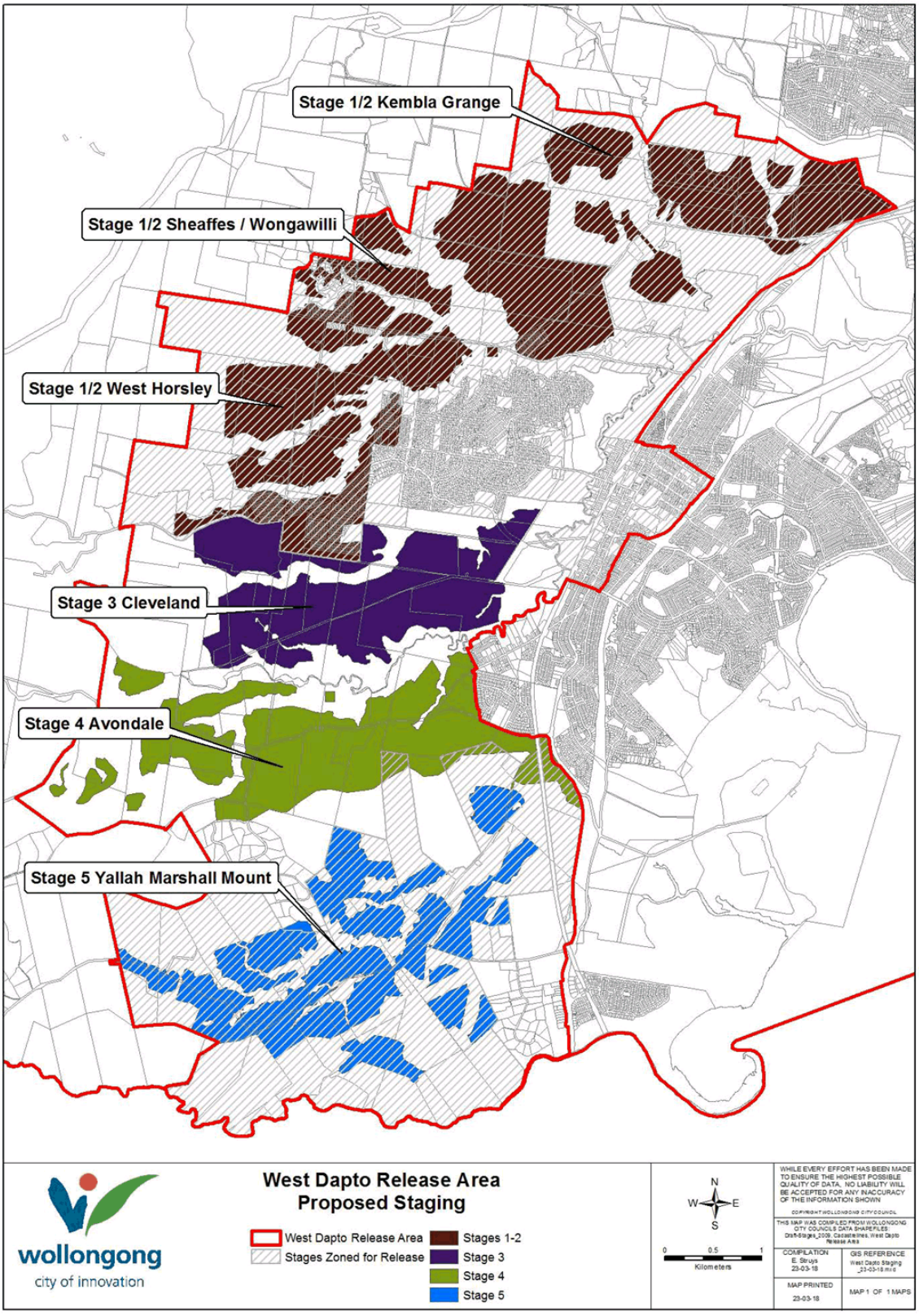

Figure 3. Stages of West Dapto Urban Release Area

5 PLANNING PRINCIPLES

The West Dapto Planning Principles are intended to guide landuse planning decision associated with the release area. They provide a statement of a desirable outcome for the development of the release areas and provide a basis of reasoning to support making planning decisions. Principles are important considerations when there may be more than one interpretation or contradictions between any qualitative requirements or development controls defined in other chapters of the DCP.

There are eight groups of principles originally outlined in the West Dapto Vision document 2018. This chapter is structured in a similar way building on principles with some additional requirement details. **Figure 4** outlines the key components and how they relate to Council planning policies.

The group of principles include:

- Transport
- Water management
- Conservation
- Open space
- Community and education
- Town centres
- Employment
- Housing

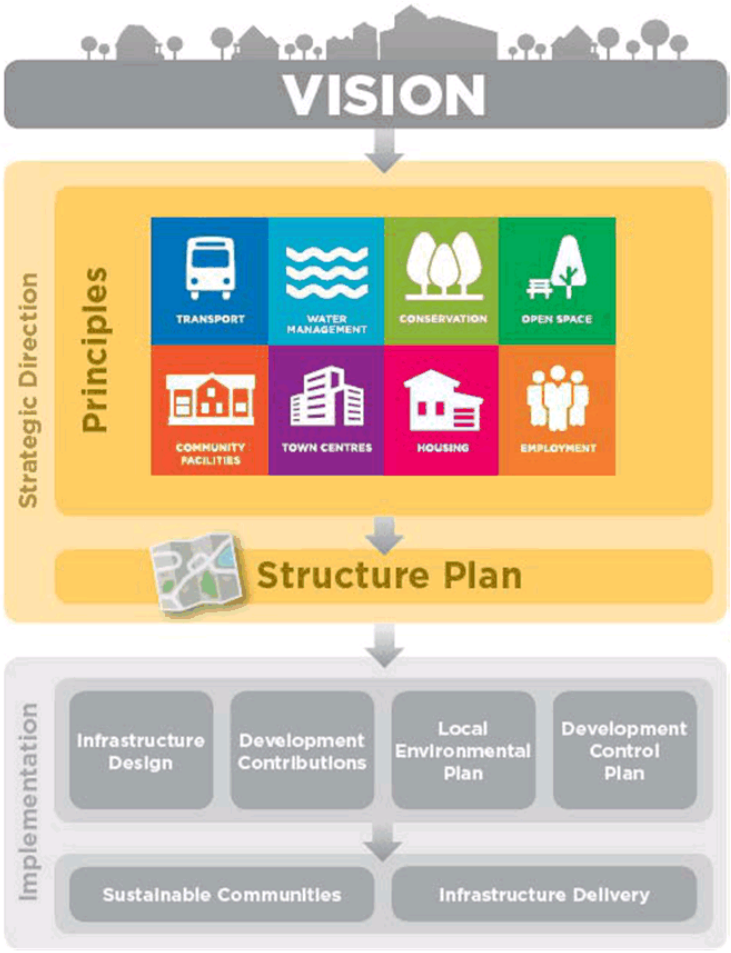

Figure 4. Structure and relationships of principles to planning tools

6 TRANSPORT

6.1 The road network

The future road network for West Dapto will be the 'backbone' of the community, providing for all types of access and movement through the release area. The road network form and provision contribute significantly to achieving the vision of long-term sustainability.

An integrated transport system is proposed that caters for the private car, freight, public transport, pedestrians and cyclists. Road types have been developed based on a functional hierarchy, where the road designs support the transport modes in various ways. The road network has been developed to cater for future urban land uses and deliver a safe, connected and legible transport framework that compliments the natural environment and facilitates sustainable transport outcomes.

The Structure Plan (**Figure 2**) outlines the structural road network through the release area. The Road network structure was modelled in TRACKS to understand the demand and supply requirements to service the release area. The modelling informed road typology requirements for the structural road network as shown in **Figure 5** and **Figure 6**. The road typology for the release area is informed by road hierarchy and cross sections which detail how the roads are configured for designs. Road Hierarchy and cross sections are covered in DCP Chapter B2 Residential Subdivision.

In accordance with the following road network principles (specifically 2 and 3), the release area needs to be accessible in emergency situations. Flooding events present a specific challenge to urban development in a flood plain area and specific design response is needed provide safe and connected residential areas. **Figure 7** illustrates which structural roads or sections of road within the release area are required to provide some flood immunity and designed to account for 1% Annual Exceedance Probability (1% AEP).

Principle 1 - Supportive land use patterns

1.1 Plan higher residential densities and mixed land use in & adjacent to town and village centres and major public transport nodes, to reduce reliance on the private car and reduce overall road network requirements and costs.

1.2 Plan the co-location of compatible land uses to reduce reliance on the private car and reduce overall road network requirements and costs.

Principle 2 - A safe, connected and legible road network for all users

2.1 Provide a road network based on the modified grid layout to maximise accessibility and efficiency.

2.2 Implement a clear hierarchy of road types (see **DCP Chapter B2 Residential Subdivision**) that responds to relevant transport requirements and road function, creating a highly legible road network for all users (**Figure 5** Road Typology and **Figure 7** Flood access roads of the structural road network).

2.3 Implement intersection designs appropriate to the road types (**Figure 5**), surrounding land uses and environments.

2.4 Ensure the structural road network supports the town and village centres hierarchy within West Dapto.

2.5 Ensure the integrated road system, caters for all road users including private cars, freight, public transport (buses), pedestrians and cyclists.

2.6 Implement driveway access restrictions and manage on-road parking on the higher-order roads (access-denied roads) to improve traffic efficiency and pedestrian/cyclist safety and amenity.

2.7 Ensure built form controls on adjacent properties to roads deliver active frontages to maximise passive surveillance and personal safety in the road environment. For example, road layouts that include lanes, service roads and so on to ensure houses front the primary road.

2.8 Ensure roads and intersections are designed to meet requirements of the Wollongong DCP 2009 B2: Residential Subdivision, AustRoads and Australian Standards.

Principle 3 - Design roads to compliment the environment

3.1 Ensure roads fit with the landform (topography), compliment local character/land use and

minimise visual, ecological & noise impacts.

3.2 Ensure road alignments take advantage of views and visual stimuli for the motorist to enhance legibility, sense of place & create a positive experience in movement.

3.3 Consider the role of road networks in structuring precincts, including both transport and community needs to maximise liveability and quality urban outcomes.

3.4 Incorporate Water Sensitive Urban Design (WSUD) into transport infrastructure design and consider options to increase permeability of hard surfaces.

Principle 4 - Quality infrastructure

4.1 Use robust and durable materials, quality finishes and ancillary infrastructure, with neat, uncomplicated designs that minimise maintenance requirements and discourage vandalism.

4.2 Consider the use of innovative technologies in road & transport infrastructure design, construction and operation.

Principle 5 - Road network to support sustainable transport outcomes

5.1 Staging of additional car based infrastructure to encourage public/active transport and maximise use of existing infrastructure.

5.2 Use an established 15% transport mode shift target when planning for road network requirements within West Dapto, to encourage a shift towards reduced car dependence.

5.3 Ensure that roads are designed to provide a high level of safety, access and amenity for pedestrians, cyclists and public transport (bus services).

6.2 Bridge and culvert design

Bridges and culverts form important structural components supporting the road network as it traverses the flood plain landscape. While there are design limits and prefabrication conditions the infrastructure are built to, it is also important that design decisions on materials, placements, modification to standards and any other specifics take into account desired outcomes for the areas they are in and who they will cater to.

Principle 1 – Good design is context sensitive design

Design that is sensitive to context is valued by communities. Bridges/culverts that are functional and fit the landscape are good for community pride and local identity.

1.1 Consider influence of locational context and functional requirements in the design process. For example, if the crossing is traversing land that is zoned E2 or E3 and there are known ecological communities or fauna groups recorded there, fauna crossings should be a component of design and construction must be done sensitive to these outcomes.

1.2 Bridge/culvert alignment should integrate with environmental features.

1.3 Construction over or within waterways should have regard to the Fish Passage Guidelines developed by NSW Fisheries.

1.4 Ensure storm immunity standards are met and design/construction provides longevity and minimises maintenance requirements.

1.5 Design and finishes and overall appearance should respond to and incorporate character of the area.

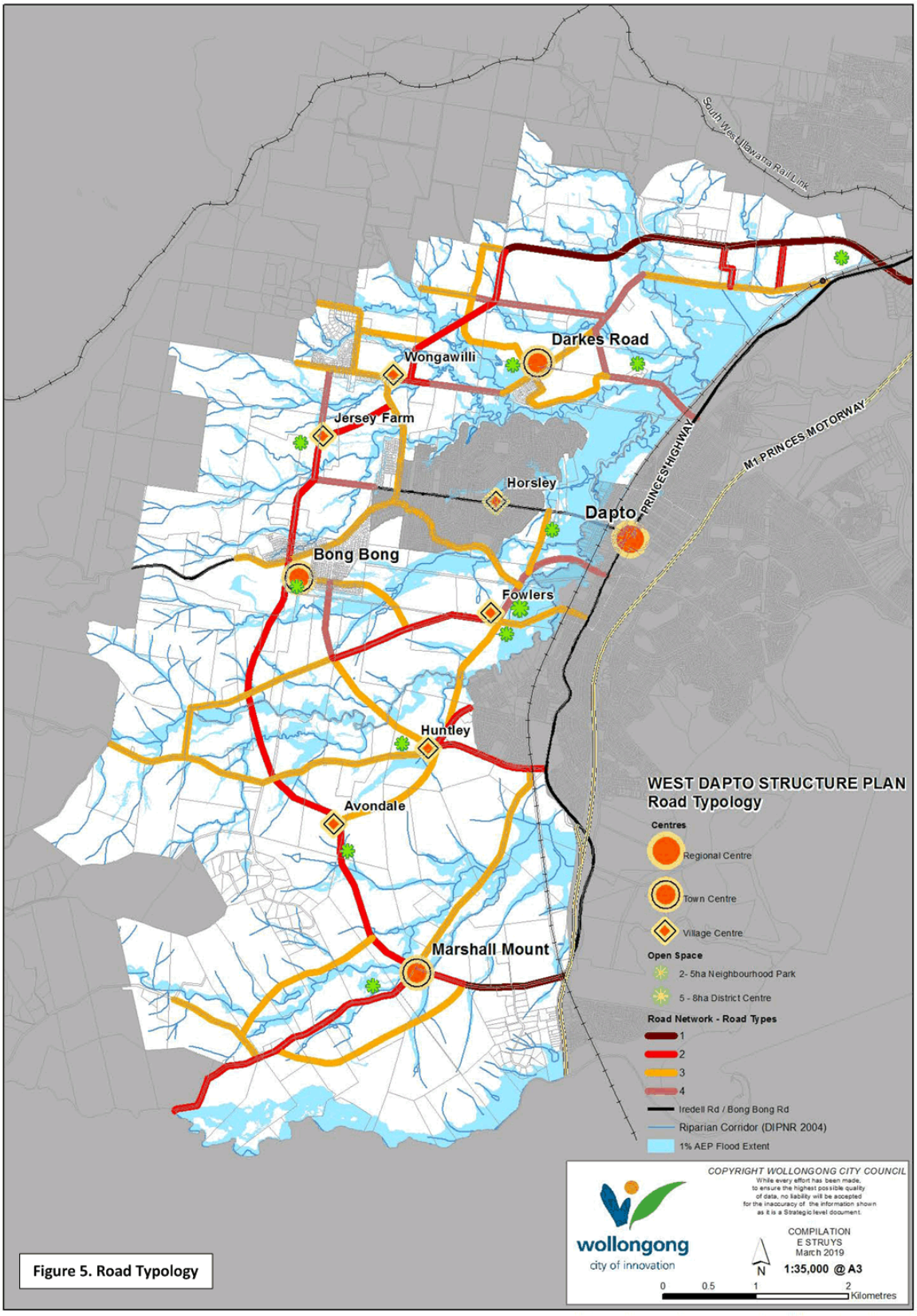

Figure 5. Road Typology

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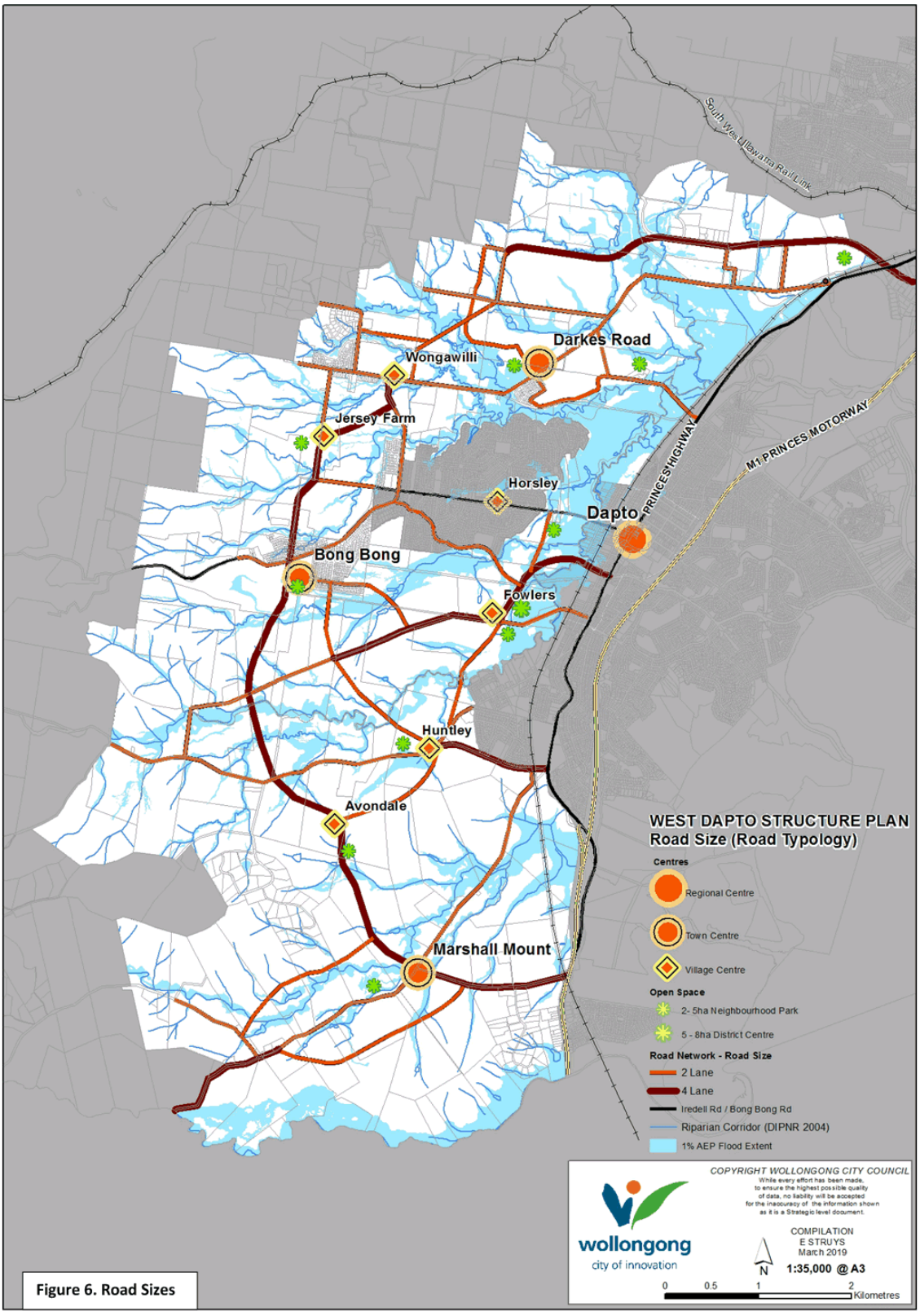

Figure 6. Road Sizes

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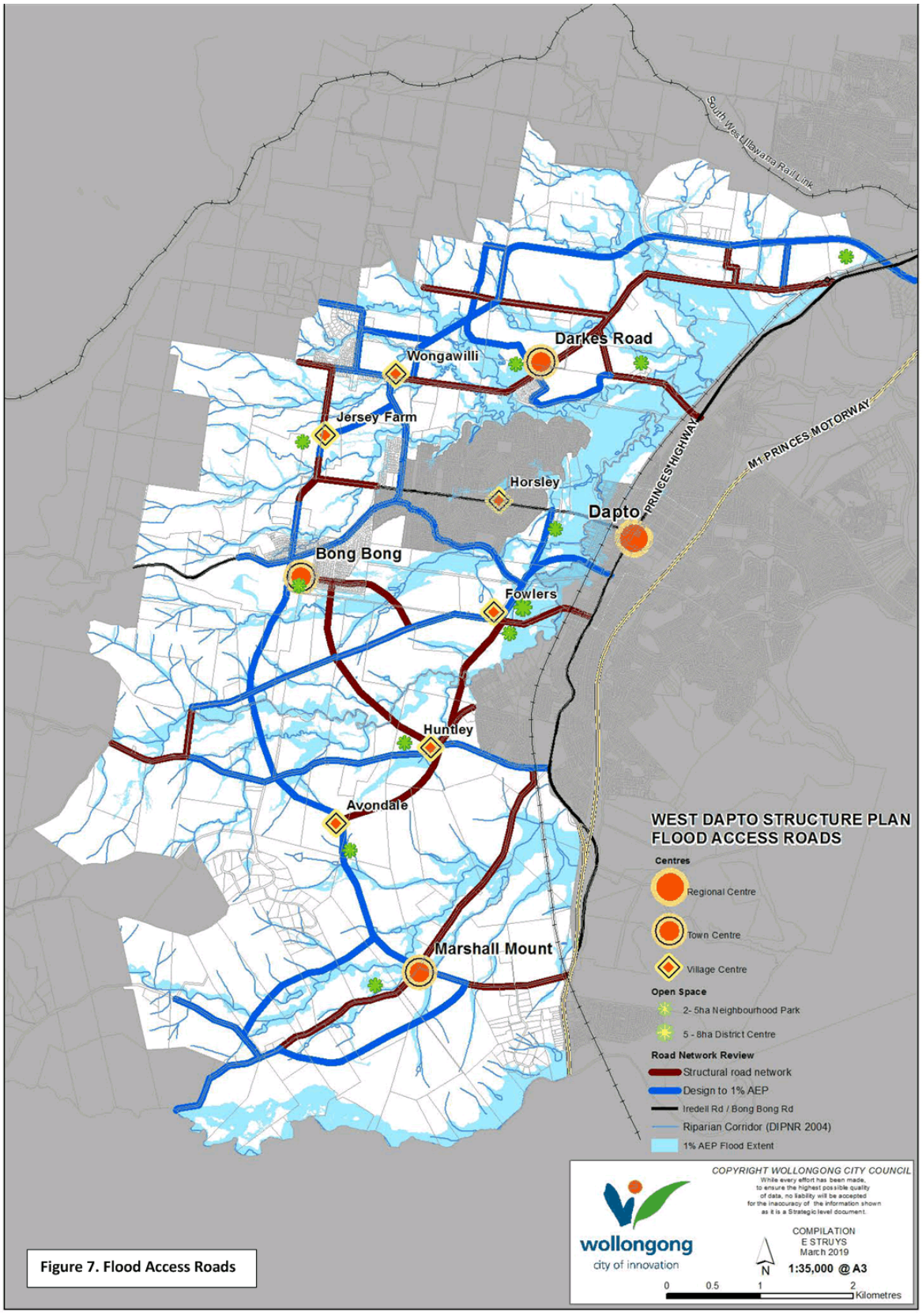


Figure 7. Flood Access Roads

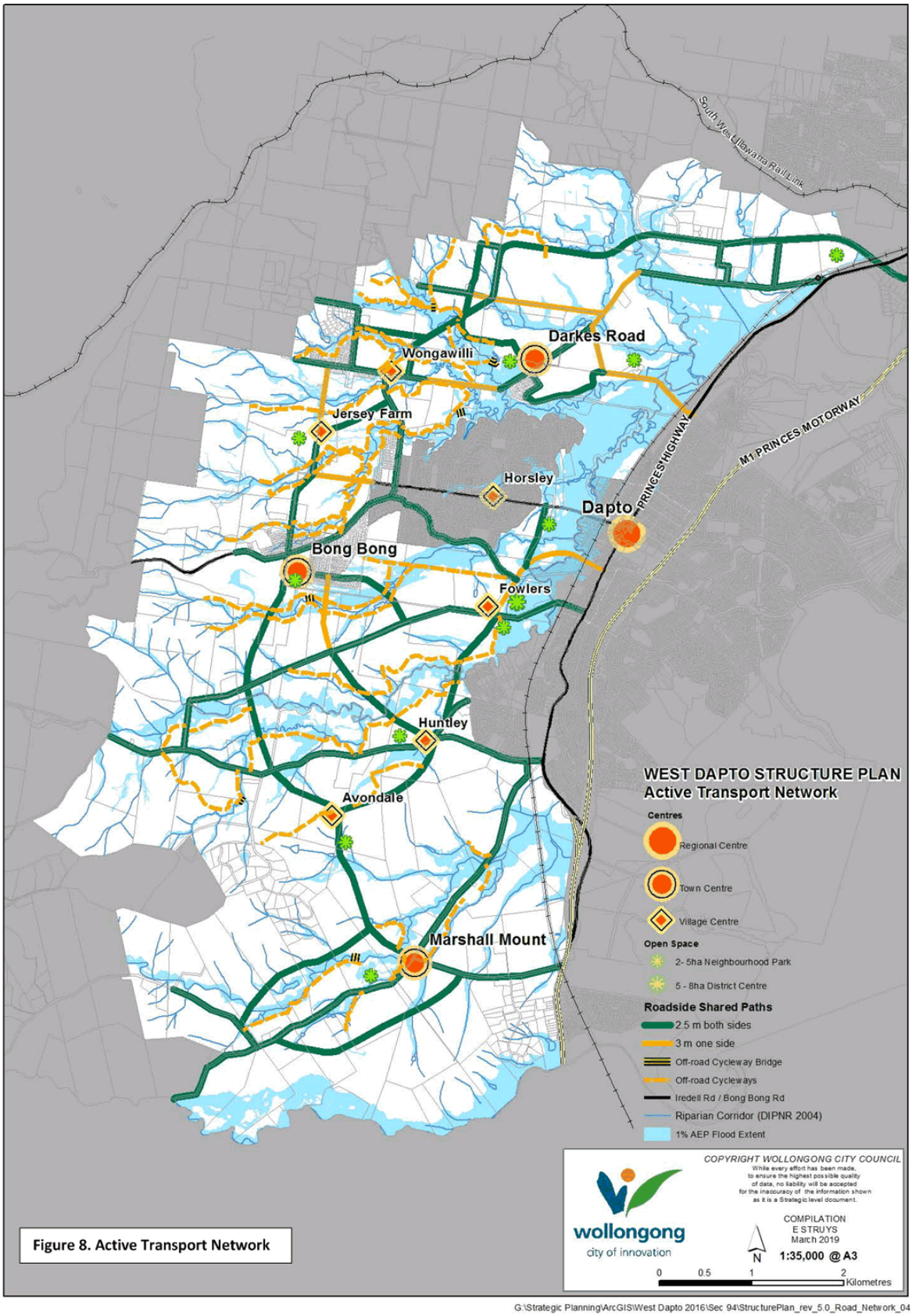


Figure 8. Active Transport Network

6.3 Active transport

Walking and cycling (referred to as Active Transport) will be an important component of the future West Dapto transport system, contributing significantly to achieving the vision of a 'sustainable' community. An emphasis on the design and planning for West Dapto has been the notion of walkable communities which enable sustainable living to occur. Walking is also an important factor in the success of public transport.

Active transport at the local level will deliver convenient and attractive travel options especially for short trips, which will not only assist in reducing the reliance on, and impacts of private car use, but will contribute to the health and resilience of the community.

The riparian corridors will be structural open space areas, as a 'spine' to convey water and connect ecology, to promote walking and cycling with a series of pathway systems clearly linking key destinations such as schools from residential areas to promote walkability.

Map shown in **Figure 8** identifies routes for off-road cycleways, as well as links for active travel on shared paths as part of the road network (road cross sections include roads with shared paths as part of their cross section in DCP B2 Residential Subdivision) connecting neighbourhoods and residential areas to parks and town centres. The shared paths and cycleways should be located outside of the 'core' riparian areas with selected cycleway bridges spanning riparian core land connecting key destinations through an open space network (see active transport map **Figure 8**).

Principle 1 – Supportive land use patterns

2.1 Plan residential land use close to town and village centres and major public transport nodes, with higher residential densities adjacent to these locations to maximise walking and cycling catchments

2.2 Promote shared parking across uses in town/village centres to encourage walk trips when undertaking multiple activities in these centres. Avoiding fragmented parking will also improve utilisation of spaces and improve walkability through more compact town centre layouts and fewer driveway crossings.

Principle 2 – Connected, functional pedestrian & cycle network

2.1 Provide a convenient and legible movement network for pedestrians (including those with disabilities) and cyclists, ensuring excellent connectivity and directness between residences and attractors such as schools, shops, public transport nodes, sports ovals and employment centres.

2.2 Include footpaths/shared paths on all roads in the road types hierarchy except laneways and minor access streets (refer to Road Network Principles and DCP Chapter B2: Residential Subdivision)

2.3 Take advantage of easements, riparian areas and open space areas to create convenient pedestrian and cycle links (or "short-cuts") that maximise accessibility between different precincts /land uses.

2.4 Implement a wayfinding strategy to provide clear and coordinated information for access to facilities and services within the West Dapto land release area and surrounding areas.

2.5 Provide safe and secure bicycle parking or storage facilities at key destinations in town & village centres, sports ovals, community facilities, transport interchanges and key open space areas.

2.6 Include bicycle parking and end-of-trip facilities as part of the development of employment sites, business and commercial sites particularly those in town and village centres.

2.7 Ensure that the West Dapto cycleway network integrates with the wider surrounding regional cycle routes.

Principle 3 – Attractive and safe environment

3.1 Design streets to provide a high level of pedestrian and cyclist amenity and safety, creating public space where people want to be.

3.2 Provide convenient and safe road crossing points, traffic calming (where appropriate) and tree planting to enhance the pedestrian and cycle environment.

3.3 In high pedestrian demand areas such as town and village centres, further increase

pedestrian amenity and safety through path widening, driveway access controls and other site specific actions to improve pedestrian priority.

3.4 Incorporate Crime Prevention Through Environmental Design (CPTED) principles in the planning of walking and cycling facilities.

3.5 Consider innovative technologies for lighting key off-road paths, including solar lighting and luminescent pathway materials etc.

3.6 Construct pedestrian and cycle infrastructure according to AustRoads and Australian Standards, with attractive & durable materials and well-designed landscaping treatments.

3.7 Incorporate supporting infrastructure such as seats, bike rails, shade structures, bubblers and viewing/rest areas into the active transport network where appropriate.

As part of Council's commitment to the transport principles and active transport outcomes, additional initiatives will be explored that will help promote and encourage the take up of active transport in our community.

6.4 Public transport

The establishment of efficient and attractive public transport options for West Dapto is imperative to achieve sustainable growth outcomes. West Dapto Release Area presents an opportunity to promote 'best practice' in public transport and non-motorised modes, reducing reliance on the private car, contributing to a mode shift target and creating a more resilient, interesting and liveable community.

These high level principles inform & guide public transport planning for the new growth area, to ultimately ensure that the vision for sustainable transport in West Dapto is achieved. This will also require partnerships beyond council, with public transport providers and Transport for NSW.

Precinct Plans, Neighbourhood Plans and Development applications must demonstrate they have planned to facilitate public transport by responding to these principles at each level of development planning.

Principle 1 – Accessible public transport

1.1 Major public transport nodes located in town and village centres where the greater residential densities and employment opportunities are centred.

1.2 Ensure that major generators of travel are well serviced by public transport.

1.3 Promote co-location of different destination assets around public transport nodes and in centres, to enable multiple trip purposes.

Principle 2 – Effective bus network, service provision & integration

2.1 Provide coordinated, frequent & reliable bus services to destinations within and surrounding West Dapto.

2.2 Create an efficient, seamless travel experience through integrated ticketing, minimising transfer times, and intuitive and easily accessible service information.

2.3 Ensure street networks are interconnected and allow permeability for buses.

2.4 Ensure the bus network is highly accessible and services the majority of residences (with bus stops every 400m, see DCP B2 Residential Subdivision), town and village centres, employment areas, sporting facilities and Dapto Station.

2.5 Incorporate bus priority measures as necessary to ensure highly efficient, prioritised bus transport.

Principle 3 – Quality infrastructure

3.1 Provide comfortable, attractive, safe and secure buses and bus related infrastructure with clear timetable/service information and cater for all users including disabled/elderly.

3.2 Ensure pedestrian and cycle links to bus stops are of a high standard (refer also Active Transport Principles).

3.3 Encourage the use of innovative and efficient public transport technology.

7 WATER MANAGEMENT

This section outlines the guiding principles, objectives, outcomes and development controls relating to Water Management across the entire West Dapto Urban Release Area.

The approach behind 'water management' is to consider both floodplain and stormwater principles in an integrated way in order to achieve a better overall 'water management' strategy for the West Dapto Urban Release Area.

West Dapto is bisected by a series of watercourses that form part of the Mullet Creek and Duck Creek catchments. During heavy rain they can experience intense floods of short duration (rapid rise & fall of the creek levels). The residential areas of West Dapto will be designed to be above the 1% Annual Exceedance Probability (1% AEP) flood level.

Principle 1 - Integrate floodplain and stormwater management into the urban development process.

Objectives

- Adopt a 'water management' approach by integrating floodplain and stormwater management, which meets the needs for hydraulic capacity, managing floods and maintaining water quality.
- Develop an overall 'water management' strategy for the urban release area by integrating both stormwater and floodplain management strategies, to guide progressive development within West Dapto without causing adverse impacts to downstream areas by way of flooding or reduction in water quality.
- Manage stormwater runoff such that flood damage and adverse effects on both development and the natural environment is minimised.

Outcomes

- The creation of a water management strategy for West Dapto with consideration of but not limited to existing and new urban development, flooding, stormwater runoff, minimising impact of flooding and stormwater, water sensitive urban design, the environment, and water quality in receiving waters including Lake Illawarra.
- The successful implementation of a water management strategy for West Dapto.

Principle 2 - Improve the management of water quantity relating to urban development inclusive of stormwater, wastewater, water supply and recycled water.

Objectives

- Maintain or minimise changes to natural hydrology of catchments which drain to waterways or neighbouring catchments.
- Manage stormwater runoff at the source rather than using end-of-line treatment.
- Minimise stormwater run-off volumes.
- Incorporate Water Sensitive Urban Design principles in managing stormwater quantity.
- Mitigate potential stormwater impacts from future urban development.
- Reduce the probability and impact of downstream flooding to a level acceptable to the community.
- Manage stormwater discharge in a manner that minimises impacts on downstream receiving waters.
- Ensure that stormwater runoff is treated as a valuable resource and that its use for non-potable purposes is encouraged.
- Encourage stormwater reuse and harvesting.
- Reduce potable water consumption.

Outcomes

- Any retention/detention basins, if required, are strategically located within the neighbourhood, precinct and/or regional scale to attenuate flows to pre-development conditions for events between the 1 year and 100 year storm events.
- Developments which use re-use water, infiltration, retention and/or detention strategies to limit the increase in runoff volume.
- Limiting the increase in stormwater runoff volume from urban development through the use of water sensitive urban design measures.
- Minimised impervious areas on individual lots to promote infiltration and reduce peak flows downstream.
- Grassed swales incorporated at the subdivision scale to promote infiltration and reduce peak flows downstream.
- Rainwater tanks utilised on a large scale on individual lots for house and garden reuse to reduce runoff volume and reliance on potable water supplies.
- The use of buffers such as landscaping, detention and retention structures between impervious surfaces and receiving waters.
- The use of landscaped features to direct runoff from impervious areas into vegetated areas.

Principle 3 – develop the floodplain and surrounding areas in a sustainable way.

Objectives

- Develop strategies that will cater for progressive development within West Dapto without causing adverse impacts to downstream areas by way of flooding or reduction in water quality.
- Identify the extent of the floodplain based on post flooding conditions to enable key planning for sustainable urban development.
- Prevent the intensification of the use of floodways, watercourses and overland flow paths for residential/commercial/industrial development use.
- Promote multifunctional and appropriate land use of the floodplain.
- Address the potential impacts of climate change.
- Increase the public awareness of flooding within the West Dapto Urban Release Area and existing urban catchment of Dapto.
- Ensure that flood fringe areas are sustainably managed.

Outcomes

- Urban developments which are located in the release area and are resilient to flooding in both the short and long term.
- Developable areas that are located outside and above the post 1% Annual Exceedance Probability (AEP) extents plus 500mm freeboard based on detailed catchment wide flood investigations for the ultimate development scenarios.
- Urban developments which are designed with minimal disturbance to the natural land form.
- Recreational open space areas which are located adjacent to riparian areas and/or within the natural floodplain storage areas.
- Development which has been controlled by specific guidelines to ensure sustainable development in the floodplain.
- Increased public awareness of the hazard and extent of land affected by all potential floods, including floods greater than the 1% AEP event and to ensure essential services and land uses are planned appropriately in recognition of all potential floods.
- No adverse impacts to downstream areas from either flooding or reduction in water quality.

Principle 4 - Preserve the natural function of the floodplain, natural waterways and riparian corridors.

Objectives

- Ensure that the natural function of the floodplain to convey and store floodwaters during flood events is preserved and enhanced where possible along with any associated flood dependant ecosystem.
- Prevent any filling and/or development within high hydraulic hazard areas.
- Ensure no net loss of floodplain storage capacity within West Dapto.
- Protect key creeks and riparian corridors from degradation and improve their environmental function where possible.
- Ensure that rehabilitation of key riparian corridors is consistent with the adopted 'water management' strategy for West Dapto and the Riparian land management chapter in the Wollongong DCP.

Outcomes

- All residential/commercial/industrial development is located outside of the identified flood conveyance and flood storage areas.
- The revegetation of riparian corridors does not increase flood risk to the surrounding urban areas.
- Natural drainage paths and infiltration basins utilised as much as possible.
- Revegetation of key riparian areas is undertaken in accordance with the Riparian land management chapter in the Wollongong DCP.
- Waterways are protected by providing a vegetation buffer to urban development.
- Potential increase in developable land within the shallow floodplain (< 0.5m depth in a 1% AEP event and of low hydraulic hazard) by way of implementing a local cut/fill strategy only where compliance with all relevant floodplain management controls can be demonstrated.
- The natural functions of flood dependant ecosystems are preserved where possible.

Principle 5 - Protect people and property from flooding in a strategic way.

Objectives

- Minimise the risk to human life and property damage caused by flooding through appropriately locating urban development.
- Ensure flood risk and flood impacts to both existing and future development within West Dapto and surrounding catchment areas are minimised.
- Minimise the risk to human life by ensuring the provision of safe vehicular access/egress for residents and emergency services in times of flood.
- Develop practical floodplain and stormwater management guidelines for future urban development and associated infrastructure within West Dapto.
- Urban development areas are located outside and above the post 1% Annual Exceedance Probability (AEP) extents plus 500mm freeboard based on the ultimate development scenarios.
- Ensure new development does not increase the flood risk to existing development areas.

Outcomes

- Specific guidelines which have been created to locate development within West Dapto without putting people and property at flood risk.
- Urban development is located outside of the 1% AEP floodplain extents based on the ultimate development scenarios.
- Floor levels for all buildings are set at or above the flood planning level corresponding to the 1% AEP flood level plus 0.5 metre freeboard plus a pre-determined factor for climate change.

- Specific roads (identified on the map in **Figure 7**) are designed to connect urban development and provide safe vehicular flood access to higher ground in times of flood up to and including the 1% AEP event, or where feasible the Probable Maximum Flood (PMF) event;
- Identification of potential flood risks to people and property in West Dapto through the undertaking of a detailed Floodplain Risk Management Study.
- Sheltered refuge areas are incorporated into dwelling designs, with the floor level of the refuge set above the PMF where applicable to protect residents from extreme floods.

Principle 6 - Protect water quality of surface and groundwater from urban development and avoid any adverse effects on water quality to downstream watercourses and Lake Illawarra.

Objectives

- Enhance the long term environmental protection of the receiving waters and Lake Illawarra.
- Manage stormwater quality at the source, where possible, rather than using end-of-line treatment.
- Incorporate best practice Water Sensitive Urban Design (WSUD) and proven innovative solutions to ensure there is no adverse impact on water quality discharging from the site or to natural streams.
- Utilise higher stormwater quality targets through best practice stormwater treatment systems, as proposed by the stormwater risk management framework being developed for the Lake Illawarra catchment.
- Prioritise stormwater quality management strategies to meet load reduction targets for nitrogen, the limiting nutrient for water quality issues in the receiving waters.
- Manage stormwater in accordance with the Lake Illawarra Coastal Management Program.

Outcomes

- The use of locally appropriate WSUD measures at the source of subdivision runoff to minimise the water quality impacts downstream.
- The use of a treatment train approach including systems such as bio-retention, swales, wetlands and raingardens which exceed current stormwater quality targets.
- No reduction in water quality in Lake Illawarra related to stormwater quality issues in the release area.
- A water quality monitoring system that monitors the effectiveness of stormwater treatment systems within the urban release area, the quality of water entering receiving waters and agreed systems and processes for addressing any inadequate water quality issues.
- Stormwater quality reduction targets are verified through focussed monitoring, evaluation and reporting activities.
- The flood risk to existing development is not increased.

Principle 7 - Integrate stormwater management into the natural and urban land form in an unobtrusive way.

Objectives

- Manage the flow of stormwater from the urban release area using both natural and man-made drainage networks to a formal point of discharge.
- Integrate Water Sensitive Urban Design (WSUD) into roads, landscape and open space to collect and treat runoff prior to discharge into receiving waters and Lake Illawarra.
- Identify, manage and enhance the function of existing natural trunk drainage paths where possible.
- Make provision in the master planning phase of the urban release area for adequate proportion of land that serves stormwater management functions.

- Avoid locating 'hard engineering' stormwater infrastructure within existing vegetation or riparian corridors where possible.
- Minimise the use of hard engineered stormwater infrastructure.
- Ensure stormwater systems are safely integrated with parks, conservation areas and riparian buffers in a visually appealing way to achieve quality environmental and social outcomes.
- Promote the community acceptance of places which integrate stormwater systems with the environment.

Outcomes

- A network of interconnected multi-functional drainage corridors within West Dapto which act as watercourses, floodways, flora and fauna habitat and water quality treatment areas.
- Stormwater treatment systems which are integrated within public open spaces and streetscapes to enhance visual amenity.
- Online stormwater basins only where environmental impacts are minimised and development benefits maximised.
- Man-made drainage infrastructure which has been designed and landscaped to mimic natural ponds and waterways, and also provides public amenity.
- Places which are safe, visually appealing and encourage active passive use by the community.
- Places that provide access to and awareness of the total stormwater system for the community.
- Native vegetation used within stormwater management infrastructure.
- Road corridors located above the 1% Annual Exceedance Probability (AEP) which have incorporated WSUD measures.

Principle 8 - Provide efficient and sustainable stormwater infrastructure for the urban release area.

Objectives

- Ensure that the stormwater infrastructure is practical, cost effective and maintainable, with preference given to options achieving the lowest lifecycle costs.
- Ensure stormwater infrastructure is designed to remain viable for the long term and under the widest range of probable climate futures.
- Ensure that lifetime maintenance costs are factored into decision making processes and strategies are in place to ensure adequate maintenance over the life of the system.
- Incorporate best practice stormwater management principles and strategies in developments, including monitoring regimes that can demonstrate the effectiveness of the system.
- Discourage interim stormwater management solutions unless it can be replaced with an ultimate strategic solution.
- Ensure that stormwater management systems applied within West Dapto achieve aesthetic, recreational, environmental and economic benefits and avoid introducing social risks;
- Achieve a uniform standard of stormwater drainage design for all urban developments.
- Increase public convenience and public safety as well as protection of property.
- Ensure stormwater infrastructure is designed with consideration to blockage and maintenance access.

Outcomes

- The overall number of stormwater systems is tailored for the neighbourhood, precinct and regional zones to detain or retain as much of the catchment runoff as possible.
- Infrastructure such as swales, basins, wetlands and gross pollutant traps which have been designed with consideration to maximum functionality and longevity, minimal construction and ongoing maintenance costs, infrequent maintenance periods and low potential for attracting

mosquitos and algal blooms.

- Stormwater infrastructure such as open channel trunk drainage and basins that is designed to fit within the existing topography, with minimal impact upon the environment.
- Reduced capital costs due to implementation of soft engineering treatments.
- Installation of stormwater infrastructure which has been designed with consideration to climate change in a practical, sustainable and cost effective manner.
- Stormwater infrastructure designed and constructed with consideration to the ultimate strategic stormwater plan for West Dapto.

Principle 9 - Preserve the natural environment and enhance where possible in keeping with stormwater quantity and quality management objectives and targets.

Objectives

- Protect and enhance the habitat value of the surrounding environment and downstream waterways, by controlling water quality and water quantity.
- Improve key riparian corridors and ensure the ecological values of the creek systems are enhanced without flooding impact on existing development.
- Protect and enhance where possible natural watercourses, riparian corridors and wetlands;
- Reduce the impacts typically associated with urbanisation on receiving waterways and wetlands, including a reduction in streamflow erosion potential.
- Adopt the treatment of all watercourse corridors including widths according to the Riparian land management chapter in the Wollongong DCP.
- Maintain riparian connectivity of category 1 and 2 watercourses by using piered deck structures where road crossings are proposed.
- Minimise the number of road crossings across category 2 watercourses to preserve riparian connectivity.
- Minimise the edge effects at the riparian corridor / urban interface by the provision of a suitable riparian corridor width and integrated transition at the urban and riparian interface (for example, perimeter roads with houses fronting, gentle batters if needed otherwise avoid batters and retaining walls).
- Protect and rehabilitate existing waterways into 'living' waterways.
- Enhance urban areas by applying Councils 'Urban Greening Strategy'.
- Enhance the appeal of the natural environment to the community by introducing adjacent open spaces.

Outcomes

- Key watercourses within development precincts which have been enhanced with natural bed stability and sympathetic re-vegetation to minimise erosion and promote habitat without causing adverse impacts to surrounding urban development in times of flood.
- Watercourses protected by providing a buffer of natural vegetation to urban development.
- Urban development which has minimal disturbance to soils and vegetation by maintaining the natural landform.
- Waterways that are rehabilitated and provide fish habitat, pools and riffles, adequate riparian buffers and community access to the waterbody.
- Appropriate monitoring systems in place to demonstrate the habitat value of downstream waterways is being protected including agreed systems and processes to manage stormwater quality and/or quantity if the habitat values are shown to not be protected.
- Community open space areas located adjacent to riparian buffers that provide a natural visual backdrop.

- Clear connectivity between riparian corridors and residential areas / roads by avoiding steep batters and retaining walls or opaque fences.

Principle 10 - Promote liveability and amenity for the community by using water in all environments.

Objectives

- Promote the community acceptance of places which integrate stormwater systems with the environment.
- Protect and rehabilitate existing waterways into 'living' waterways.
- Enhance the appeal of the natural environment to the community by introducing adjacent open spaces.

Outcomes

- Places which are safe, visually appealing and encourage active passive use by the community.
- Places that provide access to and awareness of the total stormwater system for the community.
- Waterways that are rehabilitated and provide fish habitat, pools and riffles, adequate riparian buffers and community access to the waterbody.

Other General requirements

1. A water cycle management report is to be submitted with Development Applications for subdivision in accordance with the Water Cycle Management Study (URS, 2004) and the Floodplain Risk Management Study and Plan (Bewsher Consulting, 2010). The report must address water cycle management, water quality management, watercourse and corridor management, conservation and rehabilitation of aquatic habitat, and floodplain management. It must also address the requirements of the NSW Office of Environment and Heritage (OEH) within the Planning, Industry and Environment cluster.
2. Land that remains below the post 1% AEP flood level after flood management works inclusive of riparian corridor enhancement as approved by the consent authority is not suitable for urban development.
3. Subdivision of land is not to create any additional flood affected residential allotments. A flood affected allotment is defined as being wholly or partly below the post Flood Planning Level (FPL) - (i.e. the post 1% AEP flood level plus a freeboard of 500mm).
4. There is to be no net removal of flood plain storage capacity.
5. There is to be no filling or development within the high hydraulic hazard areas.
6. Enhanced riparian corridors cannot be used to offset any floodplain storage in the flood modelling.
7. The minimum habitable floor level of dwellings to be set at the post climate flood planning level (FPL) - (i.e. the 1% AEP flood level plus a freeboard of 500mm plus an allowance for climate change).

   Note: the allowance for climate change is determined from the Mullet Creek Flood Risk Management Study and Plan or the Duck Creek Flood Risk Management Study and Plan.
8. Subdivisions are to be design according to Water Sensitive Urban Design principles. Development applications are to include a statement indicating how the proposed design complies with these principles. Refer to Chapter E15: Water Sensitive Urban Design.
9. Detention basins are required for each precinct to control the increase in runoff. Consideration will be given to proposals for larger basins that serve multiple precincts and sub-catchments or other innovative design. The location of basins needs to be agreed to by adjoining land owners as part the Precinct Plan. Where a basin is on an adjoining property, owners consent and the creation of an easement is required. The design of detention basins shall enable the colonisation by native fish species moving upstream from Mullet and Duck Creeks.
10. Developments to have reliable access in a 1% AEP event to Council's designated flood reliable roads within the West Dapto Urban Release Area.

11. Development Proposals must consider flood events larger than the 1% AEP event.

12. The Lake Illawarra Risk Based Framework water quality targets shall be used as a minimum for all water quality modelling. Note: This general requirement is subject to the outcome of the Office of Environment and Heritage Project: *Applying the OEH / EPA Risk Based Framework in the Lake Illawarra Catchment*.

13. Refer to Chapter E13: Floodplain Management and Chapter E14: Stormwater Management and Chapter E15: Water Sensitive Urban Design for additional controls relating to floodplain and stormwater management.

8 CONSERVATION PRINCIPLES

8.1 Environment conservation

In adopting the concept of ecologically sustainable development (ESD, also see DCP Chapter A2), regionally significant releases, such as the West Dapto Urban Release Area, present opportunities to preserve remanent vegetation and enhance its ecological connectivity (structural and functional). This section identifies the strategic environmental priorities to guide planning and development of the West Dapto Urban Release Area integrating conservation priorities with opportunity for a future West Dapto Biodiversity Conservation Strategy (BCS) and Biodiversity Conservation Strategy Structure Plan (BCSSP).

A BCS provides opportunity for Council to achieve biodiversity certification (bio certification) in a coordinated approach for the whole release area, improving the overall conservation outcomes beyond what would be achievable developing site by site. Council will continue to work closely with the NSW Office of Environment and Heritage and Department of Planning and Environment to achieve this strategic outcome. The principles should also be used to guide site by site considerations.

Principle 1: Prioritise areas that offer high environmental value for conservation

Consider information that identifies areas of threatened ecological communities or stands of habitat greater than 4 ha (considered to present high environmental value in terms of habitat size and area) and avoid impacts as a result of land use changes to these areas.

Principle 2: Connectivity of habitat areas

Connecting patches of habitat that have high biodiversity value will provide opportunity for ecological migration over time as well as opportunity for improvement to habitat quality and values. These are more commonly known as biodiversity corridors providing strategic connection of larger and better condition patches of vegetation either by re-establishing continuous native vegetation cover in one or more stratums over an alignment or designing stepping stones of habitat that traverse local corridors recognised in planning instruments and studies.

Principle 3: Protect Environmental Values

Community values of environmental function in a landscape are aided by planning and providing complimentary land uses alongside conservation sites to assist in improving and protecting the ecological function of the site and enhancing its resilience.

Secure areas that present high environmental value as areas for conservation and long term management (ideally through a bio certification process).

Main development interfaces with the escarpment on the western edge of the release area are considered environmentally sensitive and zones reflect E2 Environment Conservation. Environment Conservation land will form a transitional development edge with lower densities of development adjacent to these areas. Increased opportunity for planting will be accommodated to complement the wooded slopes and riparian corridors.

Development interfaces with the predominantly west-east running riparian corridors which are considered to be where revegetation and ongoing management is required, or will be, zoned E3 Environmental Management.

Environmentally sensitive design and siting will be required for development in the E4 Environmental Living zone.

Refer to Chapter E17: Preservation and Management of Trees and Vegetation, Chapter E18: Threatened Species, Chapter E23: Riparian Land Management.

8.2 Heritage conservation

Understanding and conserving the heritage values of the West Dapto Area presents an opportunity to enrich the social values of the release area and to promote cultural understanding of our shared heritage.

The Australian Heritage Commission (2000) states the aim of both natural and cultural heritage conservation is to retain the significance of place and in the case of West Dapto the natural and cultural heritage values are deeply entwined and cannot be separated. (Australian Government, Department of Environment and Energy, 2017). Impacts to heritage significance are a key consideration for

development of the release area at each planning stage. Land use changes should retain, integrate and enhance heritage values. The principles for West Dapto aim to promote heritage conservation and meaningful consideration of the significance of place to ensure future development enhances the heritage values of West Dapto.

Principle 1: Prioritise the Conservation of Heritage Items and sites of Aboriginal Heritage Significance

Local Heritage items listed in Schedule 5 of the Wollongong LEP 2009, sites of Aboriginal Cultural Heritage significance as well as areas of potential archaeological significance should be retained and conserved within new development areas and appropriate curtilages and visual settings established. Development planning should account for the significance of sites and places and their visual relationships to each other or key landforms and key sites that contribute to the historic setting or cultural significance of newly developing neighbourhoods should be retained.

Principle 2: Respect the Cultural Landscape

The West Dapto Release Area has a rich and diverse history of Aboriginal and non-Aboriginal occupation. The area retains a range of key landscape elements, landforms, natural features such as creeks and ridgelines, important views and visual connections, and historic road and transport corridors that are important and unique aspects of the local area, and contribute to the character and significance of West Dapto through connection to Dreaming stories and by telling the story of the development of the area. Proposed development should be guided by an understanding of, and respect for significant features of the natural landform and historic setting, and assist new communities in understanding and appreciating the unique visual and physical connections between places and features within and outside of their development areas.

Views and Vistas

Generally land in the release area around and above the 50-60 metre contours is considered to be of High Scenic Quality. There are high levels of concern for visual resource based on visual quality assessment of the release area. Development within these areas of high scenic quality must be sympathetic to that visual quality as the ability of the area to absorb change is low.

Principle 3: Embed Local History and Character in New Communities

Developments should strive to feature historic sites and places of significance within development areas to provide a unique sense of identity and character for developing neighbourhoods. The adaptation and re-use of historic buildings in an appropriate manner that provides for their conservation and integration into new developments is encouraged. The retention and integration of significant Aboriginal sites as well as significant trees and landforms into natural area reserves, parks and as conservation areas is also encouraged. The use of historically relevant street names, integration of interpretation and the celebration of aspects of a site's Indigenous and post settlement history, are encouraged to ensure that the rich history of the area is celebrated and recognisable in the identity of developing communities.

Other Requirements

There are additional responsibilities of developers to complete various **heritage studies** to understand the significance of Indigenous and European heritage sites and the potential impacts of the proposed for development in order to determine further conservation management requirements and approval needs.

Neighbourhoods within precincts of the release area will include visual character and cultural landscapes and will ensure:

1. Design of subdivision patterns and road layouts are to have regard to the retention of view corridors and vistas through, and to, areas of high scenic quality.
2. Primary Street planting is to be undertaken and established prior to the commencement of individual lot development or housing construction to minimise the visual impacts of proposed development.
3. A **visual impact assessment** is to be prepared by the applicant and submitted with any Development Application in areas of high scenic quality (at or above 50-60m contours). The visual impact assessment is to assess any potential impact to the visual quality and how the design will respond to this. The assessment will include recommendations for the development design. The development application will demonstrate how the visual quality of the visual catchment will be protected and incorporated through design responses.

4. An **Aboriginal Cultural Heritage Assessment Report** (ACHAR) is to be prepared for any proposed development where the site has been identified having moderate to high archaeological potential or cultural significance, where an Aboriginal site or object has been recorded in the vicinity, or if an area of potential archaeological deposit (PAD) has been identified through a Due Diligence Assessment or other study undertaken on the site, The recommendations of the ACHAR should inform the development outcomes.

Wollongong LEP 2009 identifies a number of heritage items within the West Dapto Release area. In addition to the statutory controls contained under the LEP the Wollongong DCP 2009 contains requirements in relation to these items.

1. Refer to Chapter E10: Aboriginal Heritage and Clause 5.10 of the Wollongong LEP 2009 for specific controls relating to Aboriginal Heritage.
2. Refer to Chapter E11: Heritage Conservation, Clause 5.10 of the Wollongong LEP 2009, The NSW Heritage Act 1977 and The Burra Charter.

8.3 Riparian Corridors

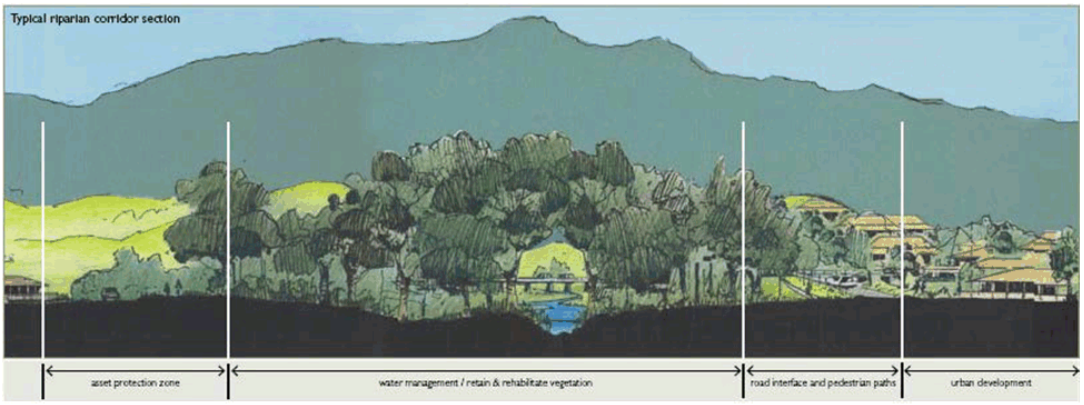


Figure 9. Typical riparian corridor cross section

West Dapto is dissected by fast flowing creeks and extensive areas of flood prone land, the riparian corridors. These areas offer an opportunity for recreation, visual separation and conservation. The corridors will result in significant amounts of open space creating wider landscapes within easy reach of all parts of the new development areas, meaning walking, cycling, recreation and nature will form a part of daily life. These riparian corridors have been, or will be, zoned for Environment Protection with limited development being allowed in these areas.

The riparian corridors will link the escarpment to Lake Illawarra through the release area. They will be vegetated with avenues of intensive planting and water management running through the urban street pattern to create a connected web of open space. This will encourage walking and create a sense of nature interacting with urbanity (see cross section in **Figure 9**).

Land between the watercourse and the 1% Annual Exceedance Probability flood level can either be:

1. Retained in private ownership and used for grazing, recreational activities or other permissible uses, or
2. Dedicated to Council at no cost to Council, for use as bushland, agricultural purposes or recreational purposes. There are no development contributions off-set for the dedication / transfer of this land.

Controls:

1. Precinct Plans will identify proposed land use and ownership of the riparian land.
2. Revegetation of riparian corridors shall not increase the flood risk to surrounding residential land.
3. Refer to Chapter E23: Riparian Land Management for controls relating to riparian lands.
4. The Riparian Land Management Area can include land used for bushfire mitigation activities.

9 OPEN SPACE PRINCIPLES

This section establishes the open space principles for the West Dapto Urban Release Area. This section should also be read in conjunction with Community and Education Facilities principles and at a landscape structure level, will contribute to delivering against the Urban Greening Strategy. An overarching framework with four inter-related principles is designed to achieve the open space objective for the West Dapto Urban Release Area. Open spaces need to be considered places that are designed responding to principles to ensure they provide for a resilient community.

There are more details regarding Council's specific requirements for each open space facility and subdivision requirements provided in the **West Dapto Open Space Design Manual and the West Dapto Open Space Technical Manual.**

Principle 1: Functionality

- Open space needs to be of an appropriate size and flexible footprint for multiple functions and uses (Hierarchy of facilities).
- Open space and recreation outcomes are not compromised by other competing functional elements. For example, flooding and water management, traffic and road infrastructure, cultural heritage and biodiversity.

Principle 2: Accessibility

- Walkable distances from residential areas, universal design principles used for facilities with a focus on 'play' and diverse experience (resident catchments).
- There is a well-distributed network of accessible (in both location and design), attractive and useable public open spaces and natural areas within the existing and future neighbourhoods of West Dapto.

Principle 3: Connectivity, movement and flow

- Open space must be connected spaces with shared paths and trails to other facilities or places of interest including centres, heritage sites (if not sensitive), riparian areas, natural areas, employment centres, transport nodes community facilities and the like.
- The open space areas are highly connected to create a network of open space with a range of functions to complement the existing landscape features and provide opportunities for ecological connectivity.

Principle 4: Value and amenity

- Future uses complement and add to existing values for example open space may present opportunities to preserve remanent vegetation or support regrowth of bushland vegetation (avoid conflicting landuse outcomes. For example, an active play facility may jeopardise a threatened ecological community, water management may restrict active use etc.).
- That public open space and natural areas will provide opportunity for interaction filling a variety of recreational, sporting, play, the physical and social needs of the community.

9.1 Hierarchy and catchments

Based on the principles of functionality, accessibility, connectivity and values, there are some guides to the level of open space based on size and characteristics of projected population and its recreational needs. **Table 1** categorises relevant population catchment distances for each level of open space provision (hierarchy) and how it generally relates to size requirements in the future urban and residential areas based on NSW Recreation and Open Space Planning Guidelines for Local Government (2010).

It is important to emphasise that any benchmark standards cannot be used as a 'one size fits all' assessment tool. Through analysis of local context and community needs, these standards can and should be varied if based on sound evidence.

Table 1. Open space provision standards (based on NSW Recreation and Open Space Planning Guidelines for Local Government (2010) and the Elton Report (2007) recommendations).

Function and service	Size	Catchment radius (distance)
Local Passive	0.5-2 ha	400-600m
Local Active	1-2 ha	400-600m
Neighbourhood Passive	2-4 ha	2km
Neighbourhood Active	3-5 ha	2km
District Active	5-8 ha	Southern ward of LGA
City wide Active	8 + ha	Facility to serve the whole LGA

Note: If stormwater infrastructure is proposed to be co-located with open space the general size requirements in **Table 1** should be considered with reference to Council's **West Dapto Open Space Design Manual.**

The relationship can also be understood in catchments for community populations. **Figure 10** shows proposed open space catchments of West Dapto (based on methods established in NSW Recreation and Open Space Planning Guidelines for Local Government, 2010). These catchments will be developed further for Stages 3 and 4 and are shown for illustration purposes only.

Catchment refers to the area and resident (or future resident) population the open space facility is intended to provide for. As part of the open space network for the West Dapto Urban Release Area, open space will need to be provided at all hierarchy and catchment levels.

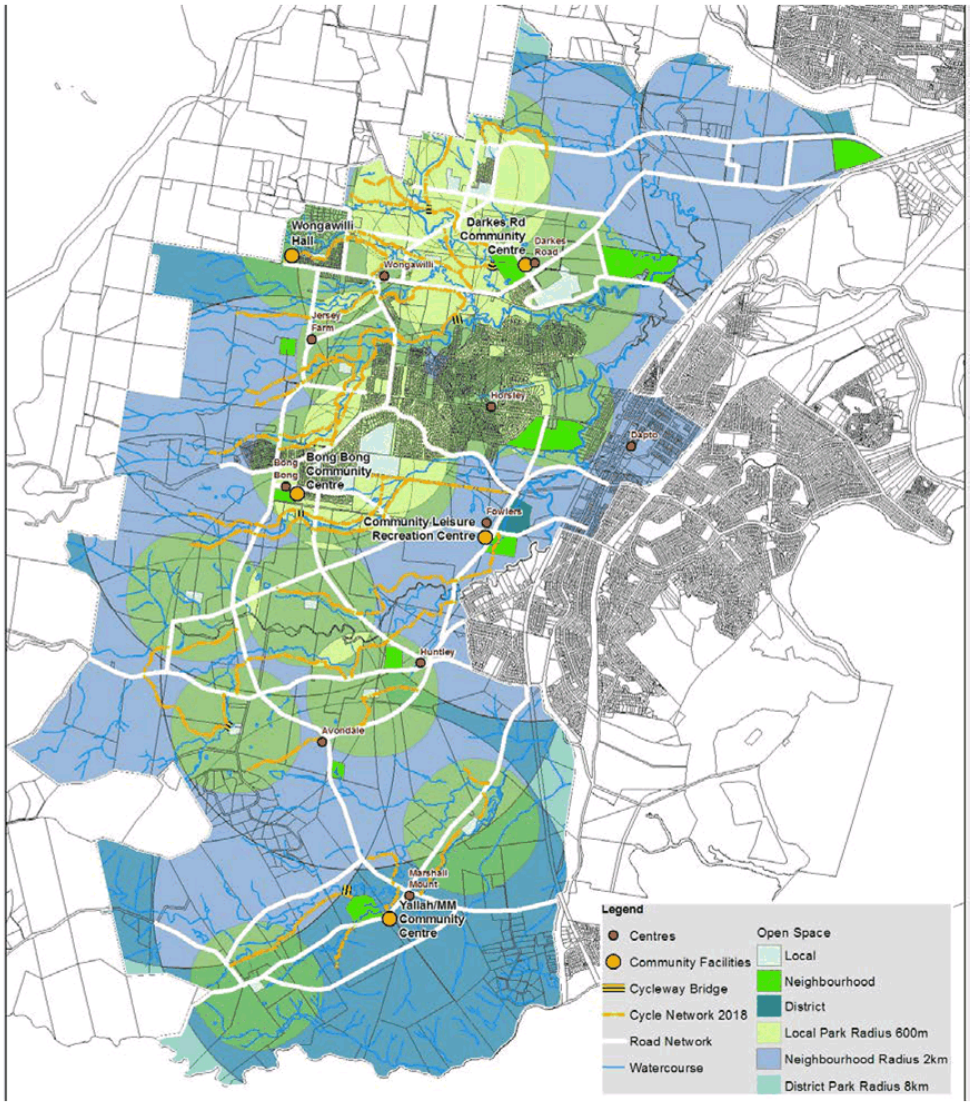


Figure 10. Planning for open space in West Dapto Urban Release Area

10 COMMUNITY AND EDUCATION PRINCIPLES

Community facilities are an increasingly important component of local service provision across a range of areas in the public and private sector. For example, there is a clear trend in public health and alternative education to use local community facilities for regular and specialist community services rather than develop individual facilities. Council understands this increases the importance of flexible design, location and efficiencies to be achieved by these facilities for them to make the best contribution to community outcomes.

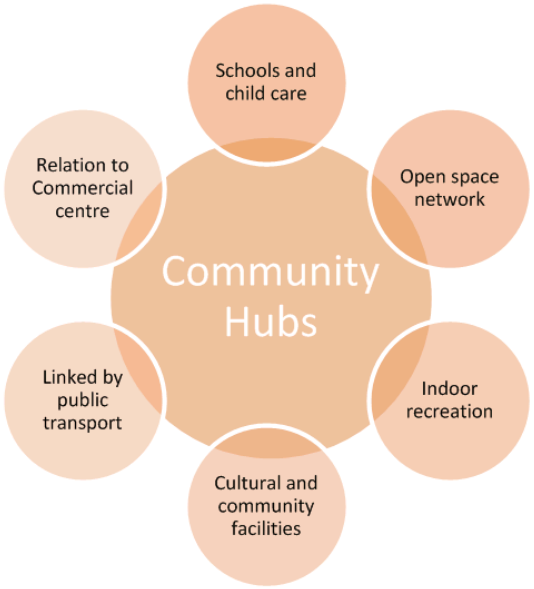


Figure 11. Community hub concept – co-location, joint use and multi-purpose centres

Principle 1: Healthy, diverse and resilient

Community facilities contribute to quality of life to support healthy, diverse and resilient community.

Principle 2: Efficient

Making efficient use of resources through shared or co-located facilities and multiple use agreements (multi-purpose community hubs) with flexible design that can respond, expand and adapt as needs change.

Principle 3: Safety, security and adding to civic identity and sense of place

Promote safety, security and provide focal points adding to civic identity and sense of place through clustering community facilities.

Principle 4: Self-sufficient and resilient community

Community facilities provide opportunity for self-sufficiency to build capacity and social capital and to actively contribute to community resilience.

Principle 5: Vibrant and accessible

Placing facilities in convenient, central locations, adjacent to open space. Promotes access and contributes to the vibrancy of the development, and allow for overflow activities such as children's play.

Principle 6: Equitable

Provide equitable access for all sections of the population, through the distribution, design and policies of facilities.

Principle 7: Diversity

Community facilities promote diversity and encourage people from culturally and linguistically diverse

backgrounds to participate in the social and economic life of the community.

Principle 8: Viable and sustainable

Developing sustainable funding, ownership, governance, management and maintenance arrangements, including private partnership arrangements where community benefit is achieved.

Principle 9: Coordination

Council will work with the State Government and non-government schools sector to promote best-practice education outcomes for the community of West Dapto. This will include sharing data and integrating asset solutions, such as opportunity for shared and joint-use facilities.

Planning for the provision of education is important for West Dapto's growing community. In NSW, the Department of Education provides funds and regulates education services for NSW students from early childhood to secondary school. The Department of Education provided previous support for the six primary schools and two high schools based on the projected housing provision and related future population estimates.

Figure 12 shows some indicative school locations in developing or future residential areas within the release area.

The distribution pattern for the schools ideally would include two primary schools one being the current Dapto Public School plus two new schools in the vicinities of Darkes Road and Wongawilli Village.

In Stage 3 of the release area, a new secondary school in proximity to Bong Bong Town Centre supported by three primary schools potentially Jersey Farm Robins Creeks, Bong Bong/Cleveland and Avondale/Moorland.

A third secondary school potentially located in Calderwood Urban Release Area has been approved and will service a primary school in Marshall Mount area as well as the required primary schools in Calderwood.

A special needs school should be either co-located with or separate to a mainstream school in the release area.

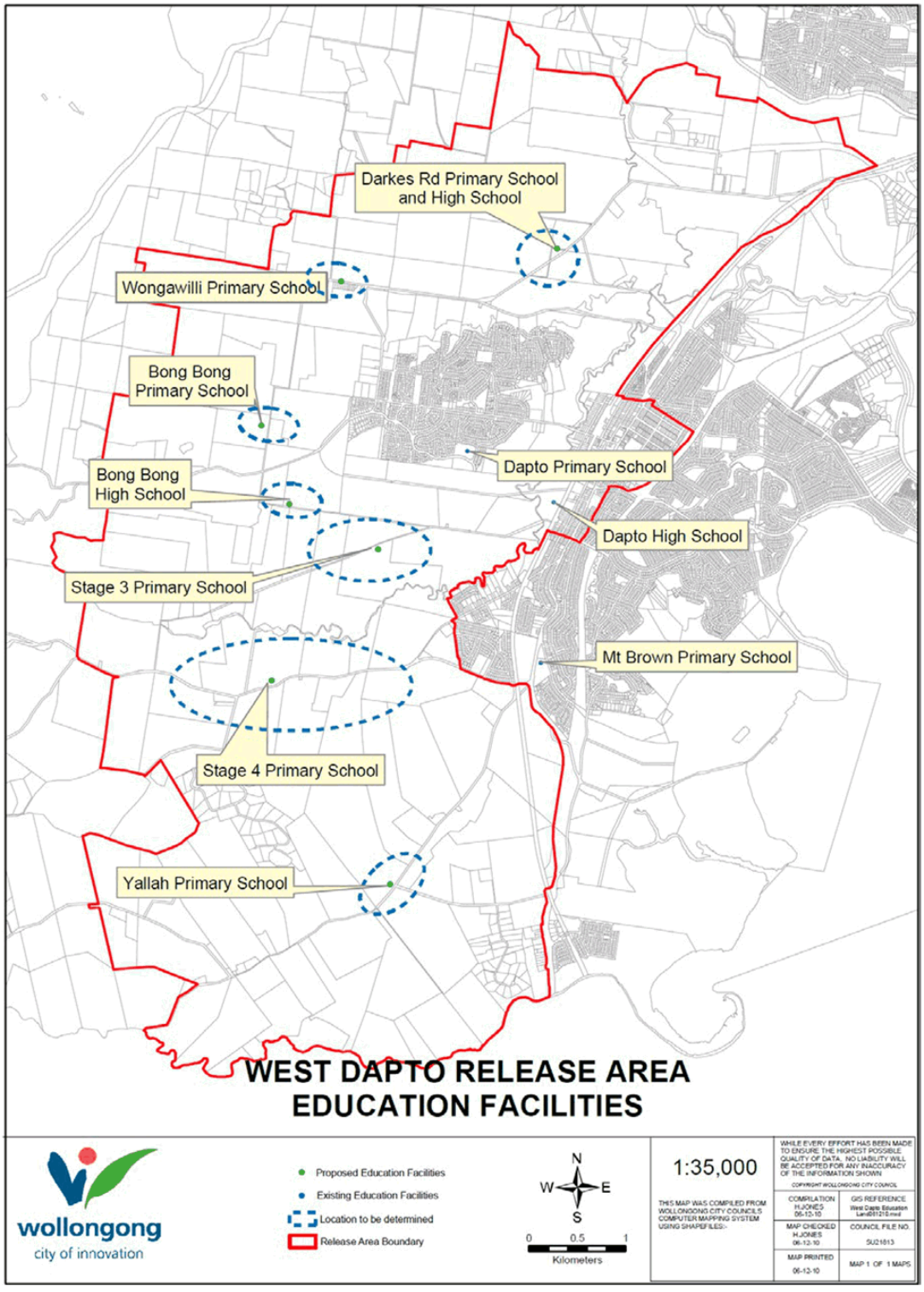


Figure 12. Potential school locations (Council Work with NSW Department of Education)

11 TOWN CENTRE PRINCIPLES

As a new release area, there is an opportunity to ensure that the ideal treatments are made to establish sustainable, appealing and functional residential living as well as commercial and light industrial areas providing employment, social and cultural opportunities with sufficient flexibility to cater for the future populations needs. As with other previous principles the town centre principles should not be considered in isolation.

The town centres of West Dapto will fill diverse roles, functions and mixed uses. The key objective of town centre principles is to help identify centre locations, function and existence. Configurations will reflect the town centre hierarchy with a focus on pedestrian priority. Supported with a decision process (zoning, precinct planning, etc.), appropriate locations will promote the social and economic functions and outcomes sympathetic to character and 'place'.

There are three principles to be considered in planning of town centres to meet the objectives for West Dapto Urban Release. Council expects the town and village centres of West Dapto to be:

1. Master planned with the plan responding to the release areas planning principles.
2. Walkability modelling and plans that demonstrate public and employment base access to active and public transport.

Principle 1: Hierarchy

Hierarchy provides a basis for which to establish functions, order, and visions as well as allowing the protection of these. Hierarchy is not the only way to understand or to set direction in planning for centres, we understand that the centres are also a connected network, which can support each other in an interlocking way.

Each level of the hierarchy represents the size and general characteristics of the centres commercial, retail and business roles (see **Figure 13**). The Hierarchy reinforces role and function, supports the Wollongong City Centre and higher order centres and provides certainty for investment decisions. Hierarchy reinforces character and identity as well as provides direction around appropriate residential density sympathetic to community facilities and service locations.

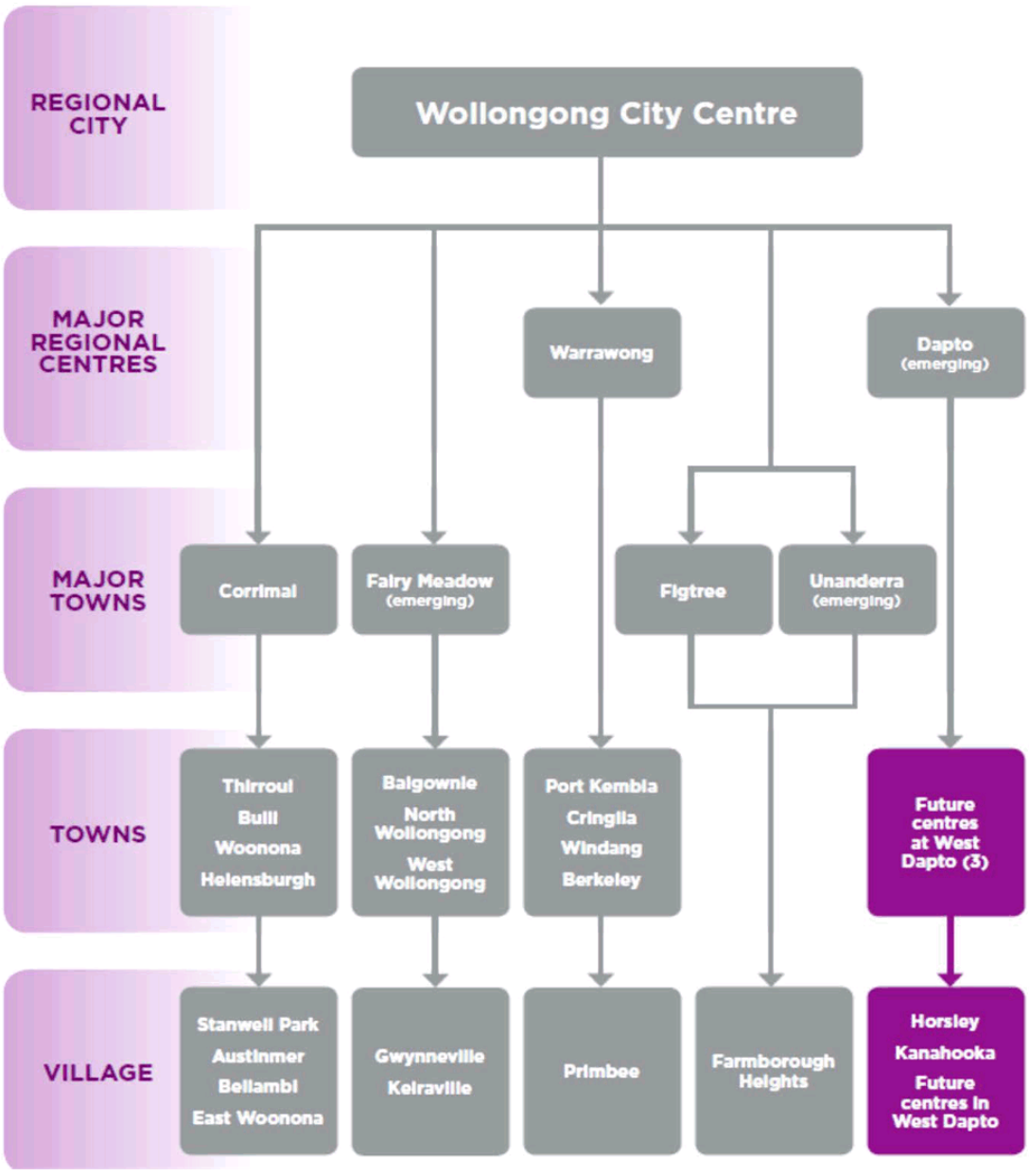


Figure 13. Wollongong Town Centres Hierarchy

Requirements for development in Business zones must comply with contents of the DCP **Chapter B4: development in Business Zones**. B4 outlines the Hierarchy for the LGA as well as other studies or assessments needed to support development applications.

Regional Centres

Wollongong Local Government Area has two major regional centres Warrawong and Dapto. It forms and important commercial and business centre role in Wollongong LGA.

Located in close vicinity of Dapto's existing urban landscape, will be a series of new centres. Supporting Dapto's development as a regional centre will be an important consideration in the planning of new town and village centres. These lower order centres must be sensitive to the levels of hierarchy so as to maintain existing functions and minimising any negative impact on the hierarchy.

Town Centres

There are three town centres planned for the urban release area.

The objective of the town centres is to ensure that development in the Bong Bong, Darkes Road and Marshall Mount town centres contributes to the creation of retail, business, commercial, and community hubs that act as public transport nodes and provide significant local employment opportunities.

Major town centres (~15,000m2) are planned within the central western (Bong Bong Road) and the southern (Marshall Mount) parts of the release area. A local town centre is planned in the northern (Darkes Road) area. These are intended to create local retail, business, commercial and community hubs providing significant local employment opportunities. They will need to complement rather than compete with the higher order major regional centre of Dapto.

Council expects the town centres of West Dapto to be master planned demonstrating how the plan responds to these planning principles.

Village Centres

The West Dapto further review of release area centres and controls (Urbacity, 2014) noted the role of Villages, as a lower order centre, is to *"provide convenient alternative to the supermarket based town centres for daily goods and services with a focus on amenity for housing density and improved public transport use".*

Village and local centres will develop localised business opportunities at key places / intersections where bus stops, community facilities and local open space come together to create an urban focal point for the local community. Small villages are proposed ~2,500m^2 of floor space and accommodate a 1,000-1,500m2 supermarket and variety shops.

Principle 2: Movement sensitive

The town centres of West Dapto are expected to facilitate social contact, employment, and living needs in a sustainable manner. That is, the town centres will be located to promote active transport, public transport and healthy lifestyles. Living within 400-800 metres of a mix of destinations is consistently associated with higher levels of active transport in adults and older adults (Heart Foundation, 2017).

Movement sensitive means movement (accessibility, location etc.) will be a key consideration for co-location of a mix of destinations (or land uses) within a centre. Centres will provide a location for activity, attraction, service for people to walk or cycle to. A focal point and community hub and transport node within the neighbourhood that allows for multiple activities to be undertaken and different daily needs (i.e., live, work, play) to be met in the one location.

Centres must also be supported and surrounded by a network of connected streets, paths and cycle ways, providing and promoting opportunities for active transport, and convenient access to public transport rather than private vehicles. The network will link open space works with Open Space and Recreation principles.

Precinct Plans of the release area must consider the ability for adjoining areas to develop. They must also consider how different land use parcels are linked with a road network and pedestrian / cycle paths within precincts and between different precincts.

Principle 3: Diversity and identity

Centres will be facilitating a diverse range of activities by prioritising places and spaces for people of all ages that become vital to the social fabric of a neighbourhood where people gather, meet friends and family and engage in social activities.

Especially important for new centres are creating a vision that encourages diversity and that shapes and reflects centres character. Centres will be diverse from each other (through hierarchy, features and visions). The vision in some respects can be understood as capitalising on existing features of heritage, environment (vegetation, topography etc.) contributing to a new theme expressing the centres role in the new urban residential landscape. In other words, a vision and purpose for people to create from, understanding that activity, physical setting and meaning come together to create a 'sense of place' framed by the built forms that provide a variety of building types.

The Town Centres will have a variety of building typologies with urban characteristics such as increased height, minimal or zero street setbacks and street level awnings and verandahs. The public domain is

intended to reflect an urban character, with high quality hard and soft landscape and paved footpaths with advanced planting of shade trees. Parking will be at the rear of blocks and underground as well as good on street provision of kerbside parking – building setbacks to accommodate front parking lots will not be permissible, as these detract from the street qualities sought in these centres.

Other Chapters of Wollongong DCP 2009 containing development controls relating to the developments within the town and village centres include:

1. Chapter B3 – Mixed Use Development for specific controls relating mixed use developments.
2. Chapter B4 – Development in Business Zones for specific controls relating to business and town centre developments.

11.1 Town centre development controls

Development in the West Dapto Town Centres is to comply with the following development controls:

1. Establish a strong urban form that clearly distinguishes the centre / local node from surrounding areas.
2. Taller buildings of 4-6 stories are encouraged in the core of the town centre. Lower scale buildings up to 3 stories in height should surround and support the core.
3. The street wall height should have a 2-3 storey building form.
4. Building setbacks on main streets to be nil (zero) while other streets are generally to have a setback of between 0 – 2.5 m.
5. Side and rear building setbacks are as follows:

Setback	Distance
Side	Zero
Rear	Zero where lot adjoins allotment zoned B2 Local Centre or 5-6m where lot adjoins allotment with any residential zone.

6. Civic public spaces designed to encourage social interaction with paved areas, outdoor seating and urban green spaces are encouraged to balance the indoor building provisions.
7. Provision of shared parking facilities is encouraged with access via laneways of minor streets. Parking lots and parking areas are generally not to be visible from the streets, allowing built form to perform a clearly street defining urban function.

11.2 Village centre development controls

Development in the West Dapto Village Centres is to comply with the following development controls:

1. Building setbacks can be either street aligned (zero) or setback up to 5m to create commercial forecourts or residential courts to the street.
2. Variation of setbacks between buildings is encouraged to create an informal organic character.
3. Building height of up to 2 storeys is encouraged to create an urban village character with upper floor uses including small scale commercial and residential developments.
4. Parking to be provided at the rear of buildings in the form of rear laneways and parking areas accessed from the rear laneways / car courts.
5. All shops should address street and be entered by front from the major street where possible or secondary street.
6. Community congregation areas to be north facing and where possible take advantage of escarpment views.
7. Street parking to be maximised around villages.
8. Parking lots and parking areas are generally not to be visible from the main collector roads, allowing built form to perform a clear street defining urban function.

12 EMPLOYMENT PRINCIPLES

Five of the Seven Employment Principles in the West Dapto Vision 2018 intend to guide the development and creation of sustainable employment outcomes for West Dapto release area.

The creation of employment opportunities within and near to West Dapto is a key strategy in enabling people to work close to where they live and thereby reduce the overall traffic generated by the development.

The Structure Plan **(Figure 2)** indicates employment land in purple. These areas are zoned mostly light industrial land uses as well as some heavy industrial. The main employment area is in Kembla Grange, in the north of the urban release area. There is also some limited areas of light industrial land arranged in an enterprise corridor north and south of the Dapto Regional Centre, and some west of the M1 and along Yallah Road, Yallah to provide additional local employment opportunities.

Other Considerations

1. Wollongong Economic Development Strategy and Implementation Plans, and Advantage Wollongong, Invest Wollongong.
2. Chapter B5 Industrial Development for controls relating to development on industrial lands.

Principle 1: Support local sustainable and accessible employment

1.1 Support a variety of employment opportunities accessible to the whole community (and LGA)

1.2 Employment containment to reduce commuting out of the release area and region.

1.3 Local access to higher order (career generating) employment opportunities.

1.4 Encourage high density employment opportunities within walking distance of existing or proposed public transport services.

1.5 Encourage employment area developments adjoining the structural road network to take advantage of accessibility and exposure.

Principle 2: Attract, facilitate and support industries, enterprises and business to locate in West Dapto (this principle is supported by Council, Business chambers and other organisations as required).

Principle 3: Ensure Town & Village centre employment outcomes are prioritised

3.1 Town and village centres are to ensure planning decisions (such as master plans and spatial arrangements) support and prioritise employment outcomes.

3.2 Encourage / promote / emphasise provision of professional service type jobs/roles and beyond, vs the normal retail type jobs that one might normally expect in new urban release areas.

Principle 4: Protect existing employment land

4.1 Maintain existing zoned employment land within the release area to ensure a supply is maintained over time and is available to take advantage of employment generating opportunities.

4.2 Create a strategy to enable appropriate interim uses of employment areas that also allows for gradual intensification over time.

4.3 Support the preservation of large lot parcels and clusters of light and heavy industrial land and ensure business parks are not accommodated in light industrial zones.

Principle 5: Take advantage of and encourage employment innovations

5.1 Planning decisions to anticipate, be responsive to and cater for innovative employment solutions.

Principle 6: Improve employment opportunities whilst ensuring development is of a high standard

6.1 Ensure developments are considerate of their context and compatibility with residential and sensitive land uses as well as conservation outcomes of the urban release area.

6.2 Apply merit based approach when assessing employment generating activities.

6.3 Encourage development for employment which provides a range of goods and services without adversely affecting the amenity, health or safety of any adjoining area.

13 HOUSING PRINCIPLES

Any specific controls for Precinct Plans of the release area must consider the ability to develop adjoining areas including linkages to those areas.

The Housing Principles should be read in conjunction with Council's LGA-wide Housing Policy setting, which is updated from time to time to ensure we are addressing the challenges of a changing housing environment.

These principles should be considered in conjunction with all other planning principles as they all contribute to achieving the vision for the West Dapto Urban Release Area and ultimately sustainable housing outcomes.

"*The communities will be healthy, sustainable and resilient and will have access to diverse housing choice and active or passive open space accessible by walkways, cycle ways and public transport.*"

Urban Residential Density Distribution

The intention for the urban structure in West Dapto is to provide for varying housing densities with increased densities around town and village centres and community hubs. Delivering density in housing particularly targeting delivery of the medium residential densities in the release area will help encourage population diversity, make the provision of efficient public transport more viable and support sustainability of the town and village centres. A range of housing types are to be provided to ensure that the housing needs of all household types are met. A diverse demographic profile will help ensure a sustainable and vibrant community in the long term.

The areas of lower residential density (R2 Low Density Residential zone), should provide an average of 13 dwellings per hectare and then in later stages, 15 dwellings per hectare. In the more sensitive areas such as the "transition" areas identified on the structure plan (**Figure 2**) Council proposes densities around 5 to 10 dwellings per hectare to enable protection of environmental values and minimize visual impact. The areas of medium residential density (R3 Medium Density Residential zone) should provide an average of 20 to 25 dwellings per hectare. Density measures such as Gross Density help inform and set targets at a precinct level (based on Landcom, 2011, Residential Density guide and supporting charts, See **Figure 15**). Net density (see **Figure 14**) will be used as an indicator to show over time where the release area development is achieving desired mix and ultimate (finished development) housing densities. These are NOT site by site or zone controls as the aim is for diversity but they help inform infrastructure planning, understand intensity of built forms and population.

Principle 1: Encourage housing diversity

Diversity can be delivered through different products at different stages of planning by promoting and providing a range of density and lot size and shapes to offer a range of choice to better meet changing community needs.

Mixture of density low to high, single dwellings, dual occupancy, town houses and apartments in appropriate locations should all be considered in precinct planning and subdivision design stages.

Promote increased densities and innovative design types close to town and village centres and transport infrastructure where possible.

A variety of lot sizes and dimensions must be provided to achieve diversity in products to suit a range of household structures and to meet the density targets relating to the residential zones (Refer to **Figure 14**).

Figure 14. Net Residential Density Chart (Landcom, 2011).

Figure 15. Gross Residential Density (Landcom, 2011)

Principle 2: Promote housing affordability

Residential neighbourhoods cater for a variety of demographic and socio-economic characteristics. Promoting housing mixture is one tool that provides opportunity for more affordable housing options and reduces housing stress.

Principle 3: Establish sustainable, energy efficient, appealing and functional residential living

1 Target an increased use and uptake of renewable energy through housing and neighbourhood design.

2 Seek to promote best practice design excellence in housing provision and precinct planning.

3 Lots must have the appropriate area and dimensions for the siting of dwellings, canopy trees and other vegetation, private outdoor open space, rainwater tank, and vehicular access and on-site parking.

Principle 4: Creating local amenity and a sense of place

Design safe, healthy and active neighbourhoods with interactive interfaces between residences, the streets and surrounds. It is about ensuring there is visual connection between housing and the streets, parks and activity areas they are adjoining or interfacing with.

Encouraging and supporting housing design that responds to place. Creating site responsive built form and lot layouts that consider existing features and landscape context, natural land form and surrounding land uses.

Manage housing growth to protect and promote the conservation values that contribute to concepts of 'place' in West Dapto.

1. Lot size and layout must respond to the physical characteristics of the land, such as slope and existing significant vegetation, and site constraints including bushfire risk.

2. Lot design is to facilitate housing fronting onto creek line corridors and other areas of public open space, to incorporate these spaces into the living environment, facilitate surveillance, and prevent isolation and degradation of these spaces.

Principle 5: Housing transition to the Illawarra Escarpment

Reduce housing density on the fringe of the urban release area to provide delineation to the housed urban areas and a buffer to the Escarpment and important environmental features.

14 Neighbourhood to Precinct – TRANSITIONAL ARRANGEMENTS

Wollongong City Council recognises that the WDURA is an active release area where much development has already occurred, and new neighbourhoods forming. Council also understands that Precinct Plans will be developed over time. Therefore, it is important to acknowledge that existing adopted Neighbourhood Plans will continue to play an important role in guiding development application preparation within the release area until such time that a Neighbourhood Plan is replaced by a Precinct Plan.

Council has identified the following transitional process while Precinct Plan preparation occurs.

All existing adopted Neighbourhood Plans in Section 16 remain the guiding step between the West Dapto Structure Plan and Development Applications until such time that a Neighbourhood Plan is repealed by an amendment to this chapter of the Wollongong DCP 2009 (Chapter D16: West Dapto Urban Release Area) where the guiding function of that Neighbourhood Plan is replaced by a Council adopted Precinct Plan.

Development Applications will continue to be prepared by an applicant and assessed by the relevant consent authority (eg. Council) where an existing adopted Neighbourhood Plan is in place. The applicant and consent authority should give regard to a Precinct Plan only when a Precinct Plan has been adopted by Council for inclusion in Chapter D16 of the Wollongong DCP 2009.

In accordance with Clause 6.2 of Wollongong Local Environmental Plan 2009, Development Consent cannot be granted for development on land within the WDURA where a development control plan that provides for certain matters prescribed in Clause 6.2 has not been adopted. Adoption of either a Neighbourhood Plan or Precinct Plan by Council for inclusion in Wollongong DCP 2009 would meet the requirement of Clause 6.2.

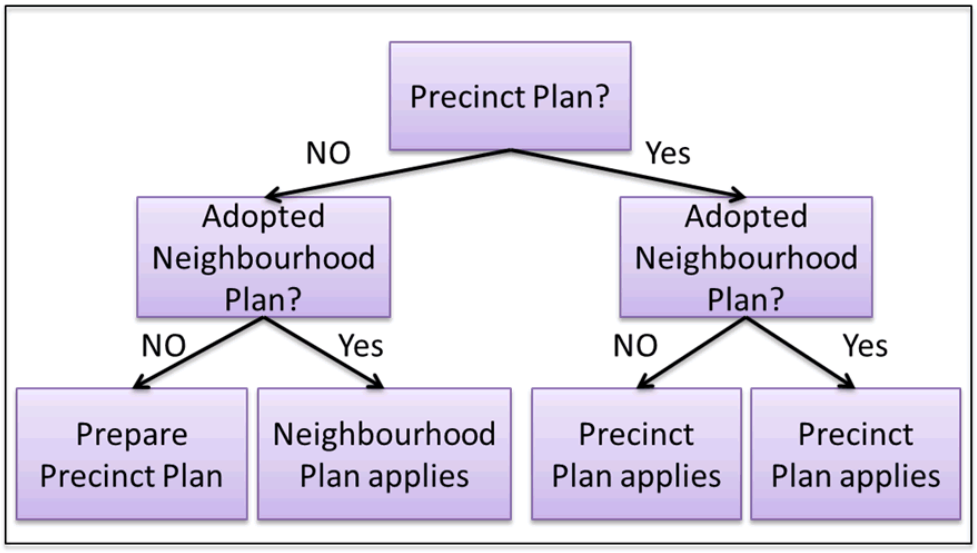


Figure 16. Transitional arrangements Neighbourhood Plans and Precinct Plans

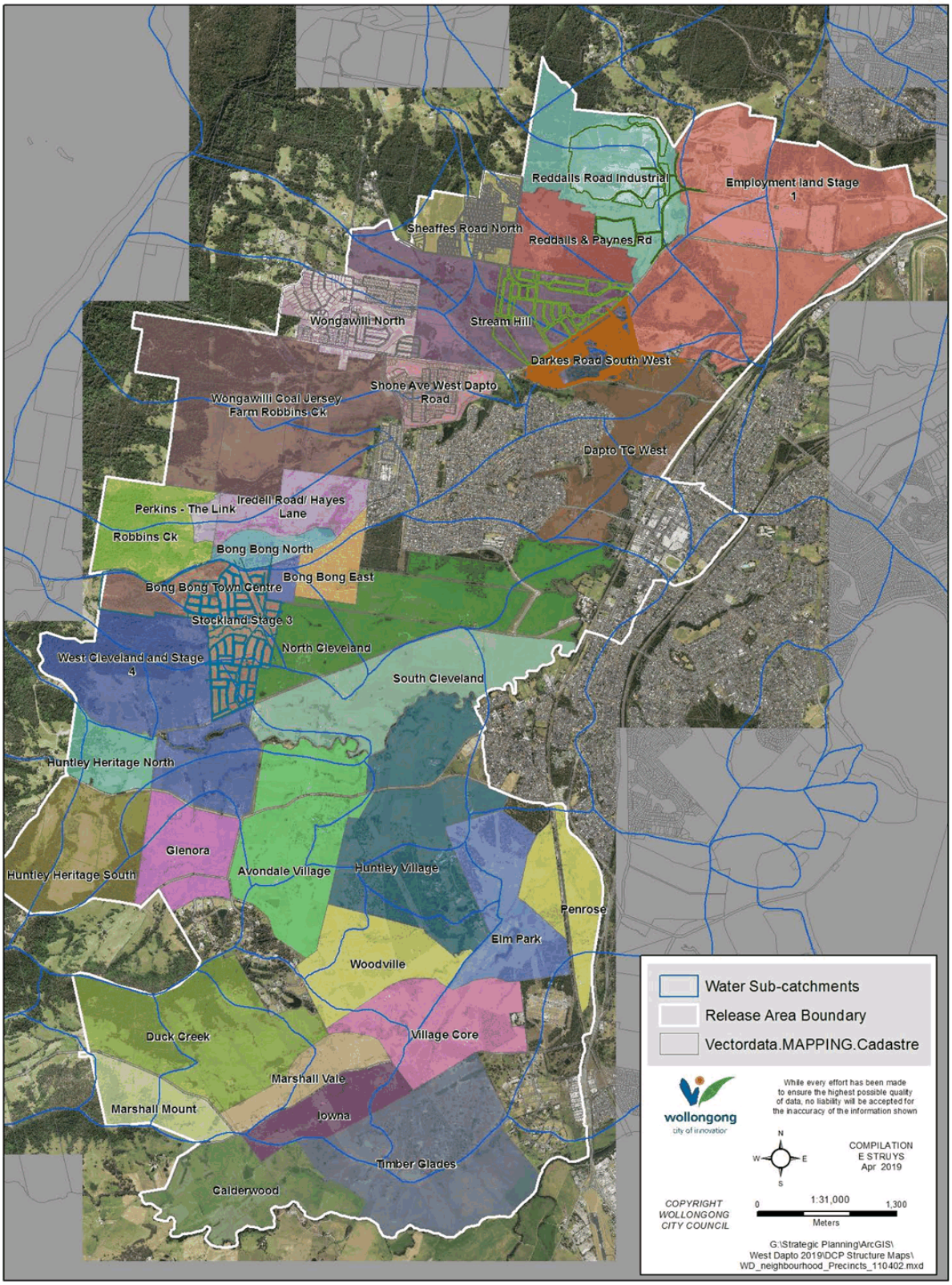


Figure 17. Precinct Plan Areas of West Dapto Urban Release Area

15 PRECINCTS

A Precinct Plan is a step between the West Dapto Structure Plan and a Development Application. It allows issues to be considered on a precinct/ catchment scale.

The intent for precinct planning is to:

- ensure adjoining land owners jointly (or on behalf of another) consider common constraints and design issues.
- provide a means to work through issues around access and staging of development.
- allow Council and other agencies to better align infrastructure planning and delivery to where development fronts are occurring.
- achieve efficiencies of shared infrastructure requirements (eg. stormwater) at an appropriate scale for the infrastructure to occur.
- at an appropriate scale, set urban density targets and understand tracking against them to support town and village centre development.
- align precincts between ownership/cadastre and water sub-catchments as an indicator of existing physical environmental setting.

Precinct Plans will be exhibited as an amendment to this Chapter and in place prior to determination of a development application for sites affected, subject to the transitional arrangement outlined in Section 14 of this Chapter.

15.1 Precinct Plan Requirements

Precinct Plans are required to:

- Support and reflect the West Dapto Vision, Planning Principles and Structure Plan detailed in the West Dapto Vision 2018.
- Confirm the developable areas within the defined Precincts outlined in **Figure 17**. Council will consider any proposals to consolidate precincts.
- Supplement the information prepared by Council during rezoning of West Dapto. Council did not have sufficient resources to consider every property in detail and Council's consultants were not granted access to all properties. Copies of the studies undertaken by Council are available on request (Note the West Dapto Aboriginal Heritage Study is not a public document).
- Consider all potential constraints, mitigate impacts or propose solutions to managing constraints on a precinct / catchment scale, rather than property by property.
- Plan the sequence of development for all affected parcels within a precinct, to ensure adjoining land owners consider the proposals, concepts and development timeframes of each other (planning through any access issues etc).
- Encourage the integration of development sites, development sequencing and economies of scale and avoid exclusion of adjoining lots that may result in development isolation or disjointed development outcomes (eg. opportunities for efficiencies through shared infrastructure, integrated outcomes with well-considered interfaces between landuses).
- Provide more detailed Precinct specific information guided by the West Dapto Structure Plan such as future residential density, open space functions, conservation areas, water management structures.
- Ensure sufficient space is provided in a Precinct for water management, open space and any other landuses or infrastructure required (considering the vision and Principles in the West Dapto Vision 2018) to support safe and sustainable residential communities.
- Ensure interfaces between land uses and delivery of large infrastructure is well coordinated within precincts and with adjacent precincts.

The Precinct Plan process:

1. Discuss site with Council's Urban Release Team and Land Use Planning Team.
2. Prepare Concept Precinct Plan, Staging or development Sequencing Plan and supporting technical studies. Council officers will review and provide feedback regarding any change needed before accepting and progressing with a draft Plan.
3. Council officer will report the draft Precinct Plan to Council as an amendment to the Wollongong DCP 2009 – Chapter D16 West Dapto Release Area.
4. Draft Precinct Plan Exhibition.
5. Council officers review submissions, consult with landowner / consultant over any further amendments needed and then report on submissions and the final Precinct Plan to Council.
6. Council adopts Precinct Plan as an amendment to the DCP (including where relevant any updates needed to the Structure Plan **Figure 2** or **Figure 17** Overview of West Dapto Precincts).

After the exhibition and adoption of a Precinct Plan, Development Applications for sites within the defined precinct can be lodged by individual landowners (or their consultants), for development in their part of the Precinct depending on appropriate sequencing/identified stage of the precinct the site is located in. A Development Application can be submitted on behalf of a number of landowners, provided owners consent is obtained. Note submission of a Development Application within a defined precinct will not be accepted unless the subject Precinct Plan has been adopted by Council.

Any proposed variation to the agreed Precinct Plan area will require justification considered on merit and any variation on or near a property boundary will require agreement of the adjoining owner.

15.2 Matters to be addressed in Precinct Plan and application

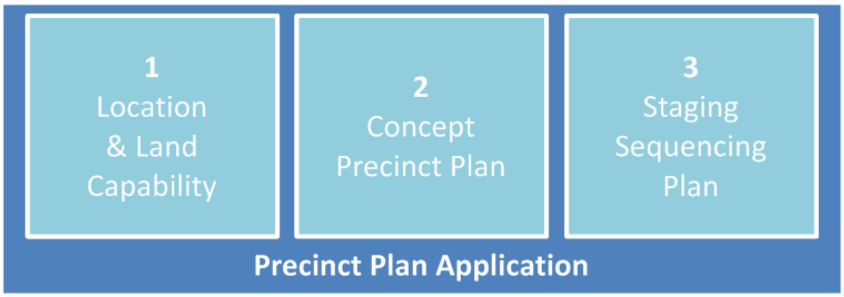


Figure 18. Items of a Precinct Plan application

A Precinct Plan Application should include:

1. Site location and description, and land capability assessment, addressing existing issues such as:
   - Wollongong LEP 2009 provisions (including Zoning, Minimum Lot Size, FSR, Building Height, Flooding, Heritage, Acid Sulfate Soils, riparian corridors etc).
   - Any other relevant legislation
   - The areas setting within West Dapto, eg proximity to commercial centres, main roads, community services.
   - Flooding and bushfire constraints.
   - Topography, known geotechnical constraints, known contamination constraints.
   - Biodiversity (EECs, bushland, significant trees, habitat).
   - Heritage - historical land use, heritage sites, including Indigenous Heritage cultural issues and visual character.

- Existing road network.
- Available utilities & services and existing easements.
- Need for community and recreation facilities.
- Noise impacts (e.g. from the main roads, industrial areas or public & private railways).

2. A concept Precinct Plan and supporting documentation, showing proposed:
   - All landuse areas including, but not limited to, Residential, retail, employment, recreation and conservation areas.
   - Road layout & hierarchy.
   - Indicative dwelling density (**Figure 15**) & yield.
   - Public transport, bicycle and pedestrian routes demonstrating walkability.
   - Drainage management concept plan based on modelling (water quantity & quality and flood behaviour) inclusive of indicative locations and sizing of infrastructure.

   Note – where a drainage/water quality solution is developed at a catchment or precinct level, Council will consider acquisition where the agreed detention basin site is consistent with the West Dapto Development Contributions Plan.

   - Buffers to heritage items or other proposed heritage conservation management measures.
   - Riparian corridors, buffers and proposed future uses.
   - Location of schools, community facilities, recreation facilities and parks, including any proposed public land.
   - Indicative or conceptual Bulk Earthworks Plan linked to demonstrating feasibility of the drainage (stormwater) infrastructure and road layout plans.
3. In collaboration with Council advice, a staging or sequencing plan supporting the concept Precinct Plan showing:
   - All existing site boundaries within the precinct
   - Proposed development staging within the precinct, taking into consideration delivery of essential infrastructure, access and logical progression as a development front.
4. Submission in electronic and PDF form.
   - All the above data layers are required to be presented in electronic form. The electronic Precinct Plan package will include either a set of Shapefiles, a Geodatabase or set of CAD files or be provided in another form as required by Council. The applicant shall also seek Council specific naming conventions, coordinate system and metadata requirements prior to lodgement of the Precinct Plan.
   - Council also requires the Precinct Plan and all supporting layers to be provided in PDF form.

16 NEIGHBOURHOOD PLANS

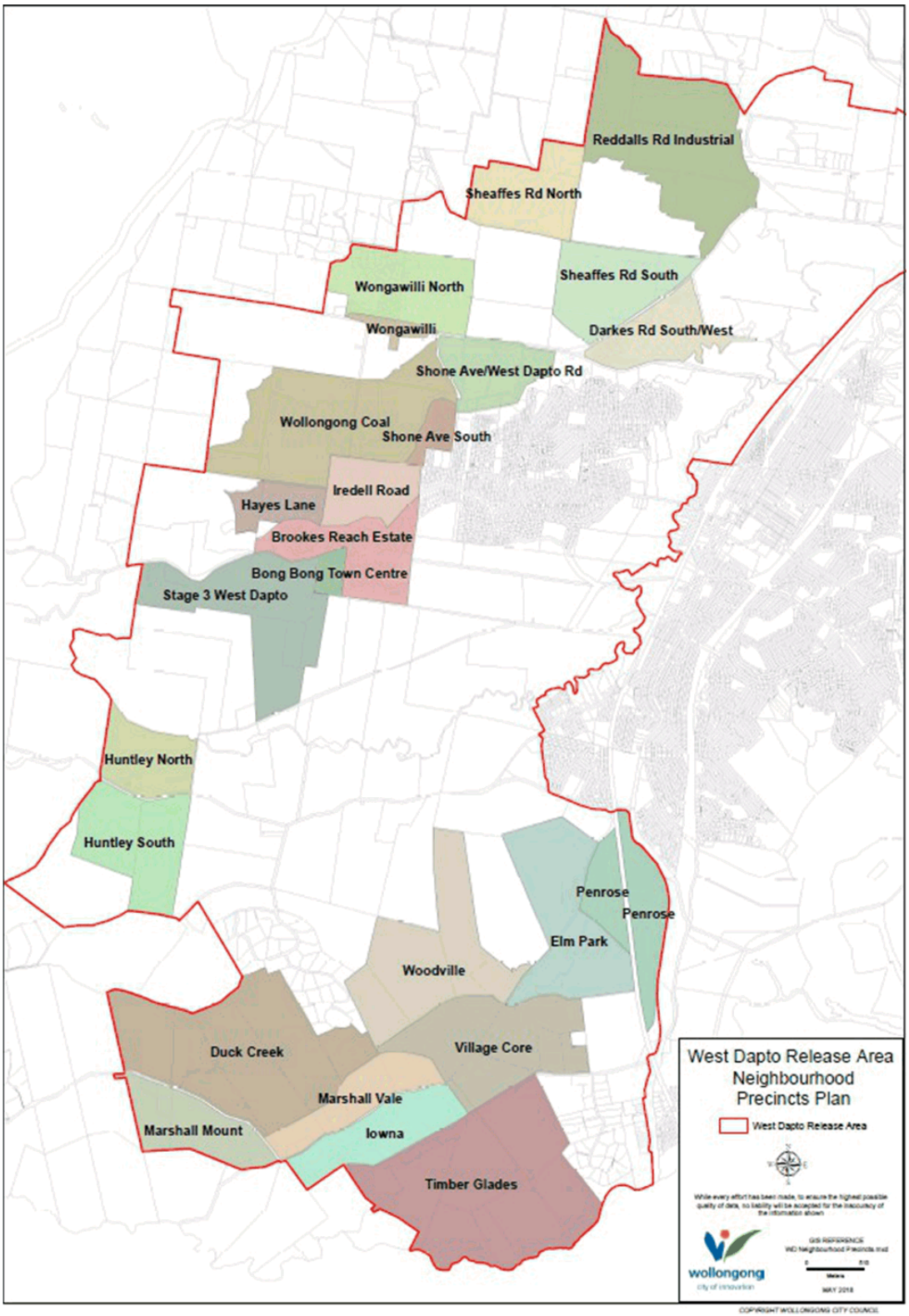


Figure 19. Defined Neighbourhoods in West Dapto Urban Release Area.

16.1 Adopted Neighbourhood Plans

The following Neighbourhood Plans have been adopted for the purposes of this Part:

Neighbourhood Plan	Submitted by	Adoption Date
16.1.1. Bong Bong East and north	Stockland	14 December 2010
16.1.2. Bong Bong Town Centre	Vinta Group / Bong Bong Town Centre	14 December 2010
16.1.3. Wongawilli north	Cardno Forbes Rigby and Jones Flint and Pike.	26 November 2012
16.1.5 Shone Avenue south	KF Williams	26 July 2011
16.1.6 Reddalls Road Industrial	Beadnell	9 December 2013
16.1.7 Sheaffes Road North	SMEC Urban	8 April 2013
16.1.8 Darkes Road South West	Don Fox Planning	24 March 2014
16.1.9 Avondale Road North, Huntley	Urbis	3 August 2015
16.1.10 Shone Avenue / West Dapto Road	KF Williams	24 August 2015
16.1.11 West Dapto Road / Sheaffes Road (south)	Watts Consulting for Wollongong City Council	19 October 2015
16.1.12 Bong Bong South	Stockland	19 November 2018

16.1.1 Bong Bong East and North

Figure 20. Neighbourhood Plan 1 - Bong Bong East and North

The following variations to development standards have been accepted:

Chapter B1 Residential Development - Section 4.5 Front setbacks – controls 1 and 2 are replaced with:

1. The following setback requirements apply from the primary street frontage to the front façade of the building:

(a) Front building line: 4.5 metre minimum setback, except for garages which must be setback at least 5.5 metres from the property boundary on the primary road.

(b) Articulation zone: An articulation zone up to a maximum of 1.5 metres measured from the foremost edge of the building line may be incorporated within the front setback zone. The following building elements are permitted in the articulation zone:

- i) an entry feature or portico,
- ii) a balcony, deck, patio, pergola, terrace or verandah,
- iii) a window box treatment,
- iv) a bay window or similar feature,
- v) an awning or other feature over a window,
- vi) a sun shading feature.

(c) A building element must not extend above the eave gutter line, other than a pitched roof to an entry feature or portico that has the same pitch as the roof on the dwelling house.

(d) The maximum area of all building elements within the articulation zone, other than a building element listed in (v) or (vi) above, must not be more than twenty five percent of the area of the articulation zone, measured through the horizontal plane of the elements.

2. For corner allotments the following setback requirement applies from the secondary street frontage to the façade of the building:

(a) Secondary building line: 2 metre minimum setback.

Chapter B1 Residential Development - Section 4.6 Side and rear setbacks – controls 1 to 3 are replaced with:

1. A dwelling house and any carport, garage, balcony, deck, patio, pergola, terrace or verandah that is attached to the dwelling house with a building height at any point up to 3.8 metres on an allotment with an area greater than or equal to 450m2 must have a setback from a side boundary of at least 900mm. This control does not apply to a secondary street frontage.
2. Any part of a dwelling house that has a building height in excess of 3.8 metres and any carport, garage, balcony, deck, patio, pergola, terrace or verandah that is attached to a dwelling house on an allotment with an area greater than or equal to 450m2 must have a setback from a side boundary of at least the sum of 900mm and an amount that is equal to one quarter of the additional building height above 3.8 metres. This control does not apply to a secondary street frontage.

   N.B. A two storey dwelling house may have its ground floor component (up to 3.8 metres in height) setback 900mm from the side boundary with the second storey setback further as required by the formula in (2).

   A dwelling house that is part two storey and part single storey may have the single storey portion of the dwelling house (up to 3.8 metres) setback 900mm from the side boundary and the two storey portion of the dwelling house setback further as required by the formula in (2).
3. On an allotment with an area less than 450m2 and a lot width 10m or less, where an easement for access and maintenance as well as driveway crossing locations (which are located so as not to adversely impact on-street parking capacity) are provided on title, a zero side setback may be applied to one side for the single storey component of the dwelling. The two storey component of the dwelling is to be setback further as required by the formula in (2). This control does not apply to a secondary street frontage.

The following additional controls to apply:

1. A dwelling house and any carport, garage, balcony, deck, patio, pergola, terrace or verandah that is attached to the dwelling house with a building height at any point up to 3.8 metres must have a setback from the rear boundary of at least 3 metres.
2. A dwelling house with a building height of more than 3.8 metres and any carport, garage, balcony, deck, patio, pergola, terrace or verandah that is attached to the dwelling house must have a setback from the rear boundary of at least 3 metres, plus an amount that is equal to three times the additional building height above 3.8 metres up to a maximum setback of 8 metres.
3. Despite (6) and (7), an allotment that has a rear boundary with a laneway may have a building line that abuts that boundary for up to 50 per cent of the length of that boundary.

Chapter B2 Residential Subdivision – Section 13 Cut and Fill land reshaping works – does not apply to master planning of land and precinct subdivision applications.

16.1.2 Bong Bong Town Centre

In the area where Bong Bong Road adjoins the north-south arterial route a new district town centre is to be established, based on a north-south orientated main street (see **Figure 20** Bong Bong East and North Neighbourhood Plan). The Bong Bong Town Centre is to be the primary town centre in the release area. The Bong Bong Town Centre is to be a supermarket based centre with a range of shops and would accommodate around 15,000m2 of retail floor space.

16.1.3 Wongawilli – North

Wongawilli North will provide a mix of housing densities from large lot housing towards the escarpment and becoming denser towards the east and surrounding the village centre. The riparian corridor will create some structural form for passive recreation and active transport links along shared paths between the residential pockets.

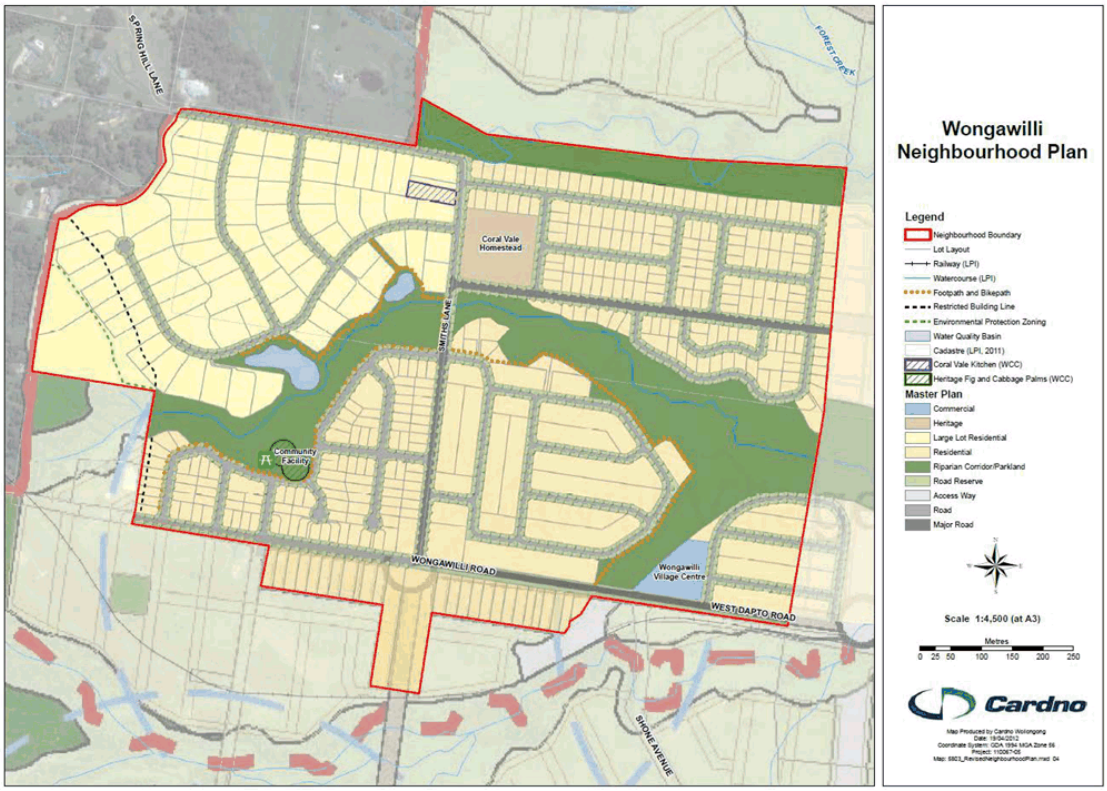


Figure 21. Wongawilli North Neighbourhood Plan

The following modified and additional controls to apply:

1. Minimum Lot width fronting Wongawilli Road and Smiths Lane of 15m;
2. Minimum front building line setback of 4.5m for all lots fronting Wongawilli Road and Smiths Lane;
3. The maximum length of cul-de-sacs that provide access to lots fronting Wongawilli Road Should not exceed 130m;
4. For Lots with a dual road frontage:

(a) Wongawilli Road and Smiths Lane is considered to be the primary road frontage and the internal unnamed road is considered to be the secondary road frontage and the rear of the lots;

(b) All dwellings must face, address and activate the primary road frontage of Wongawilli Road and Smiths Lane;

(c) Car ports or garages must be located and accessed from the secondary road frontage rear of the lots;

(d) Minimum rear setbacks are to remain in accordance with Chapter B1, garages and carports are to have a minimum rear setback of 5.5m in accordance with the principles shown in **Figure 22**;

(e) Fencing and landscaping treatment of the secondary road frontage is in accordance with the principles shown in **Figure 22**. Examples of Articulated fencing include, but are not limited to:

i) Masonry to 1.2m high with open type lattice or slates above with masonry elements no wider that 150mm;

ii) Timber Lap and Cap;

iii) Colourbond solid to 1.2m with Colourbond lattice style top sections.

5. For Lots backing onto or adjoining the Rural Fire Service (RFS) Property:

(a) Dwelling house, secondary dwelling and any habitable areas must be setback at least 10m from the rear or common property boundary that adjoins the RFS property;

(b) Outbuildings and garages must be setback at least 5m from the rear of common boundary that adjoins the RFS property.

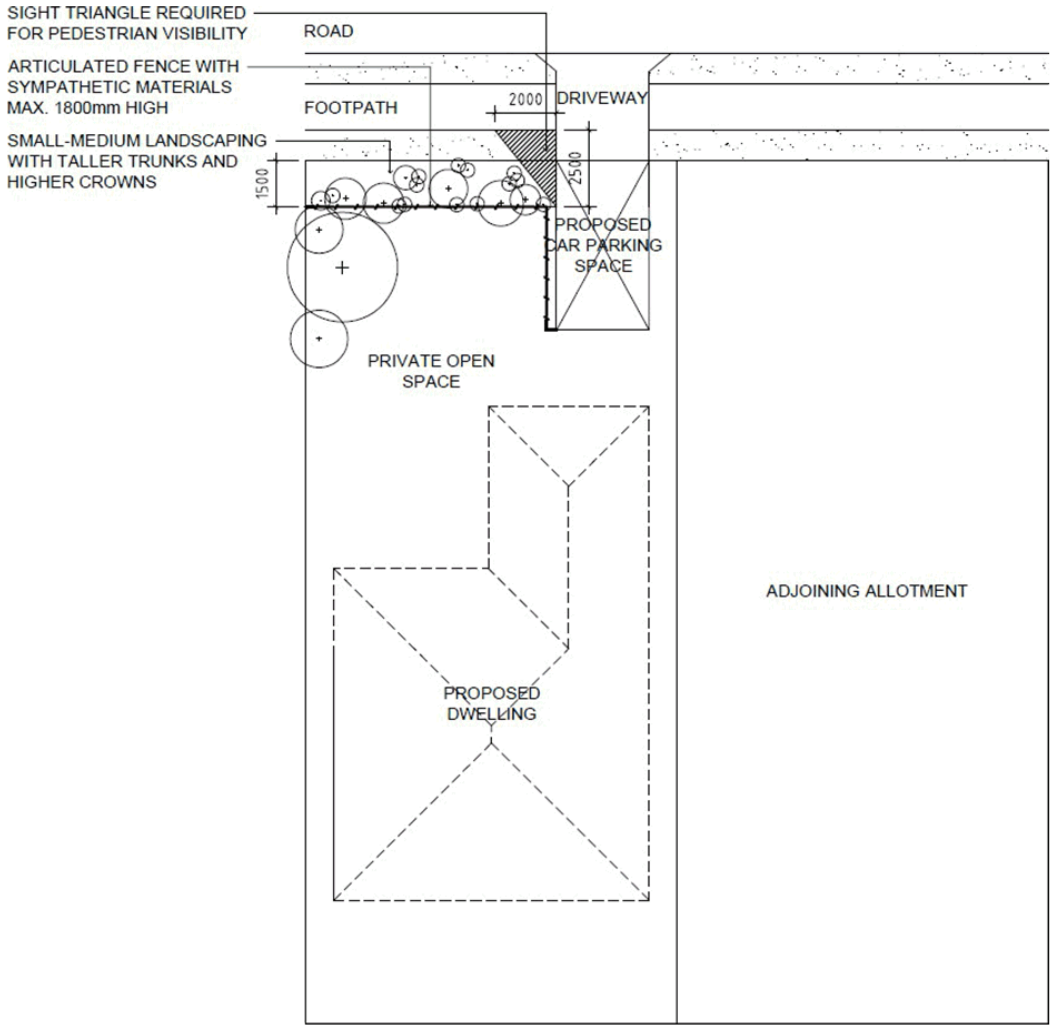


Figure 22. Dual frontage property secondary frontage treatment

Wongawilli Village centre will provide a small convenience centre with a small grocer and some mixed retail shops. The centre will be designed focusing on activating the interface with the riparian boundary and its West Dapto Road frontage. Parking will be included in the village design with street parking along the secondary street and a parking lot area provided along the north, generally not visible from West Dapto Road, allowing built form to perform a clear street defining urban function. The village will take form guided by the concept design presented in **Figure 23**.

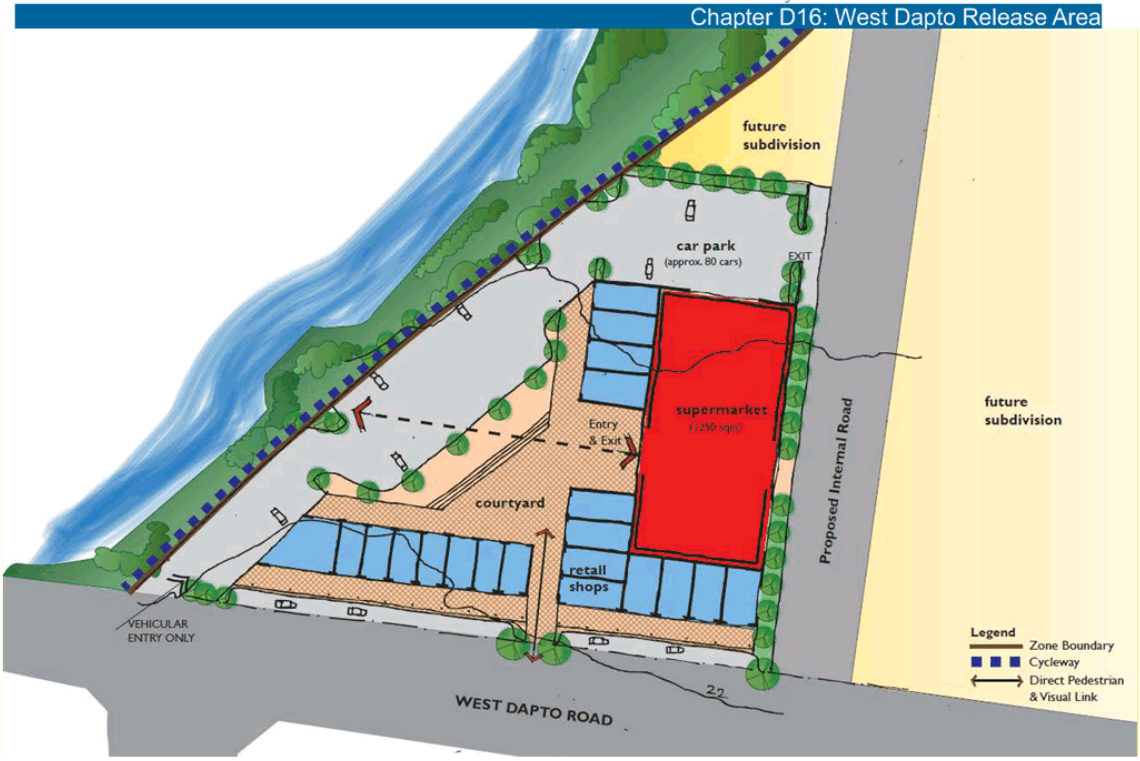


Figure 23. Wongawilli Village Centre – Conceptual design

16.1.4 Wongawilli Mine Spur Rail line

It is anticipated that the Wongawilli Mine will continue to operate for the next 30 years, or longer. Coal is transported from the mine to Port Kembla via the rail network. Future urban development should be designed to recognise the continued use of the rail spur line and include measure to mitigate noise and other potential impacts. Division 15 of SEPP Infrastructure 2007, applies to development near the spur line.

Objectives:

(a) To facilitate the transport of coal from Wongawilli Mine to Port Kembla by rail transport.

(b) To minimise rail noise, vibration and other impacts on dwellings near the rail spur line.

Controls:

1. Development Applications for subdivision and dwelling houses within the rail buffer area (Refer to **Figure 24**), are to include sound attenuation measures that achieve a maximum of 35dBA within the dwelling.
2. Development Applications for subdivision and dwelling houses within the rail buffer area, are to include consider vibration impacts and include mitigation measures.
3. The development applications must satisfy the requirements of SEPP Infrastructure Division 15.

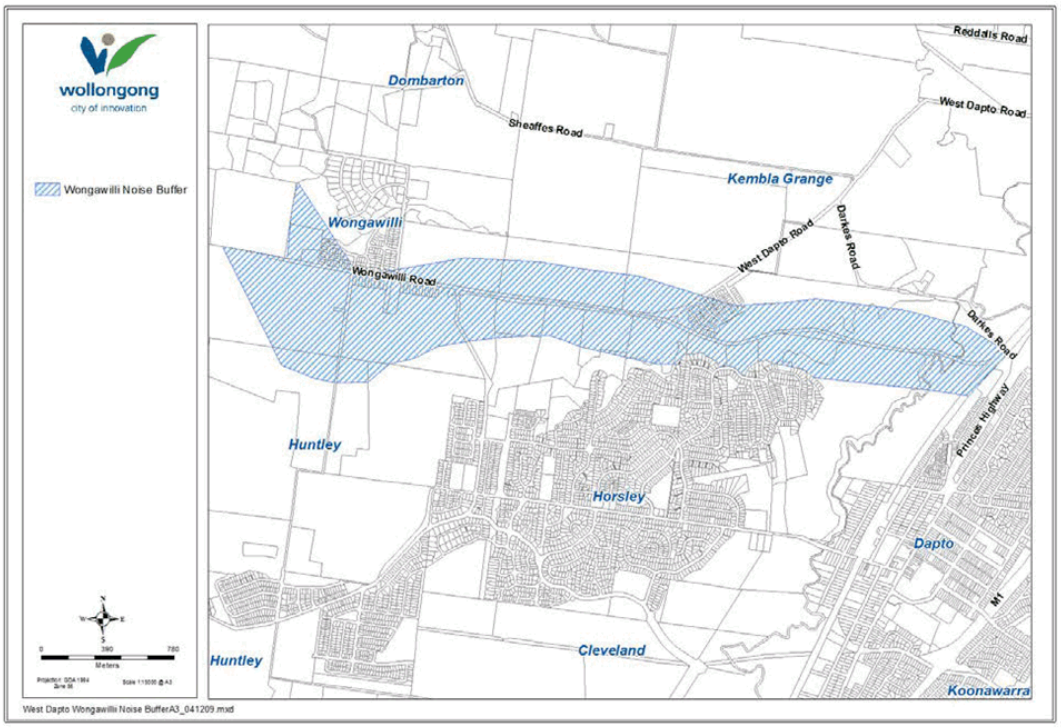


Figure 24. Wongawilli rail noise area

16.1.5 Shone Avenue - South

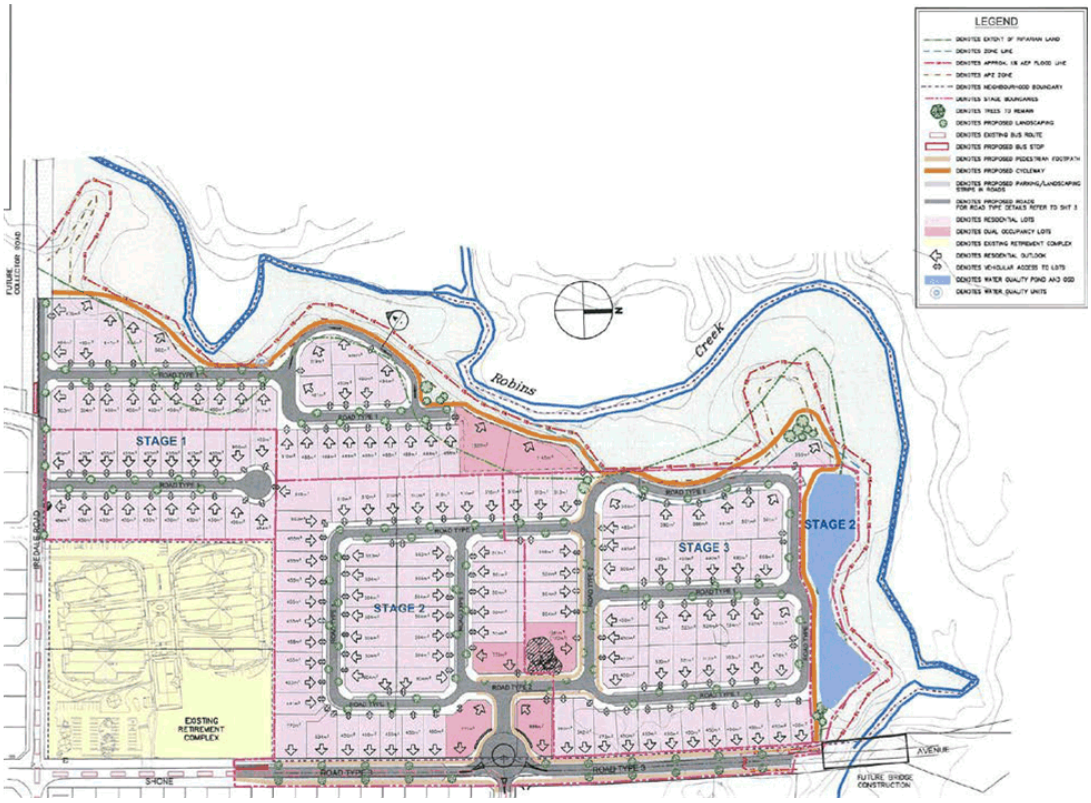


Figure 25. Shone Avenue South Neighbourhood Plan

The following modified and additional controls to apply:

1. For Lots with a dual road frontage:

(a) Shone Avenue and Iredell Road are considered to be the primary road frontage and the internal unnamed road is considered to be the secondary road frontage and the rear of the lots;

(b) All dwellings must face, address and activate the primary road frontage of Shone Avenue and Iredell Road;

(c) Car ports or garages must be located and accessed from the secondary road frontage rear of the lots;

(d) Minimum rear setbacks are to remain in accordance with Chapter B1, garages and carports are to have a minimum rear setback of 5.5m in accordance with the principles shown in **Figure 26**;

(e) Fencing and landscaping treatment of the secondary road frontage is in accordance with the principles shown in **Figure 26**. Examples of Articulated fencing include, but are not limited to:

i) Masonry to 1.2m high with open type lattice or slates above with masonry elements no wider that 150mm;

ii) Timber Lap and Cap;

iii) Colourbond solid to 1.2m with Colourbond lattice style top sections.

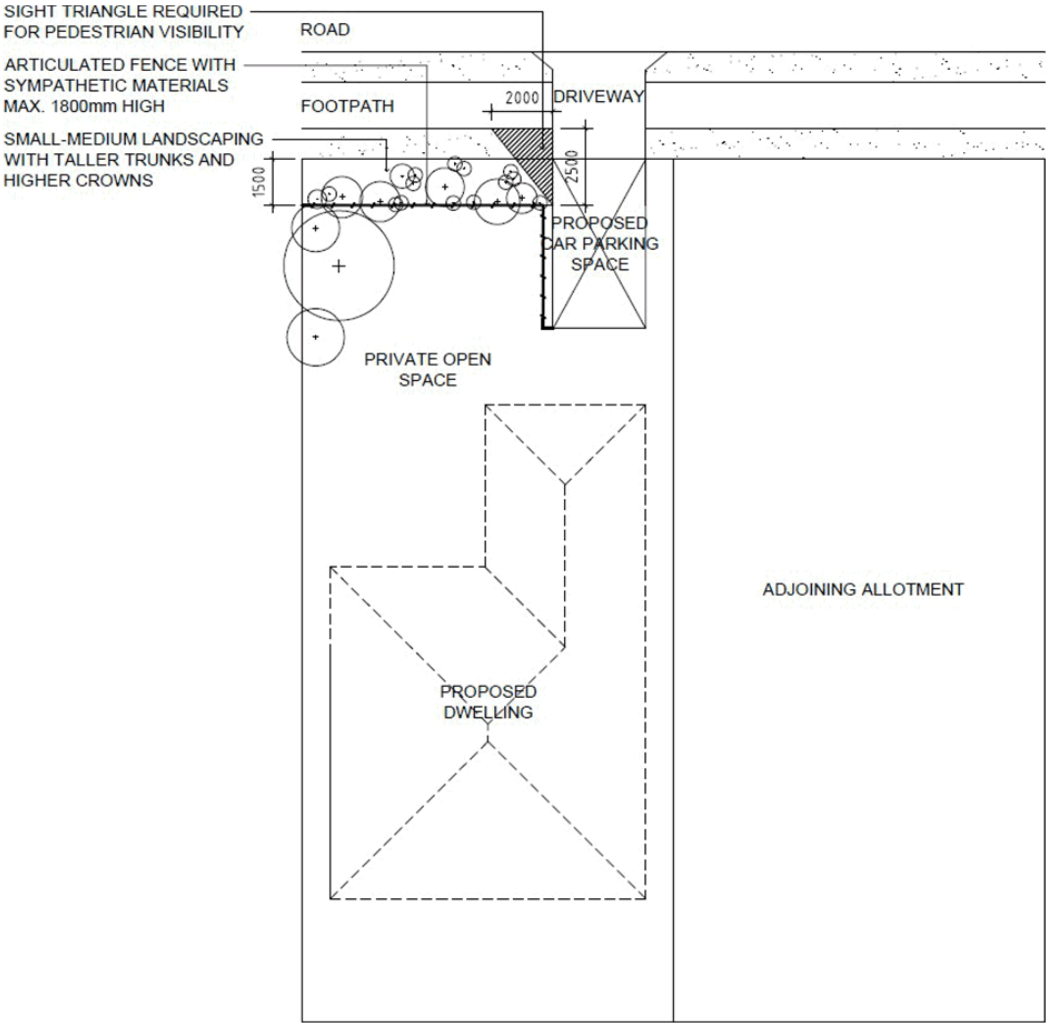


Figure 26. Dual frontage property secondary frontage treatment

(No vehicle Access)

16.1.6 Reddalls Road Industrial

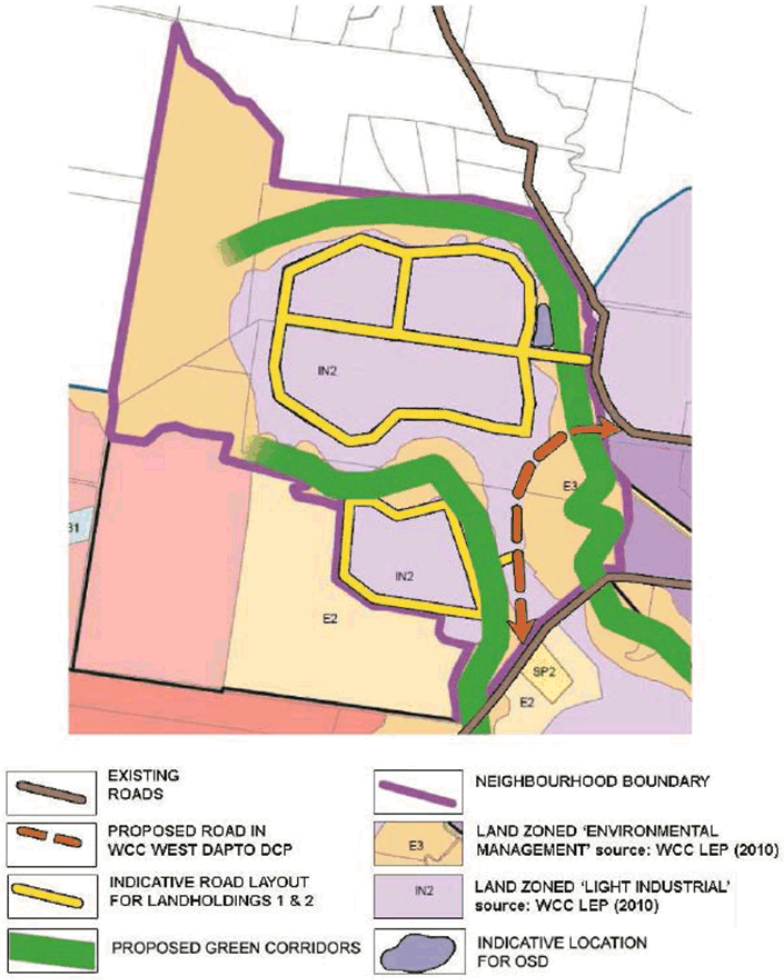


Figure 27. Reddalls Road Industrial Neighbourhood Plan

The following additional controls to apply:

1. The proposed cycleway must have adequate passive surveillance to ensure safety by design.
2. Indicative future bus stop locations should be identified and shown on road types capable of handling bus routes. A minimum number of stops should be located in a manner to ensure that the majority of lots are within 400 metres of a bus stop.
3. Any proposed development of the neighbourhood will require the applicant upgrading the relevant section of Reddalls Road to a standard that is suitable for the normal range of Heavy vehicles at no cost to Council. These upgrade works would also include any required intersection treatment to Reddalls Road and the new proposed Access Road as well as any necessary road safety works.

16.1.7 Sheaffes Road North

Figure 28. Sheaffes Road North Neighbourhood Plan

The following modified and additional controls to apply:

1. For Lots with a dual road frontage:

(a) Sheaffes Road and Paynes Road is considered to be the primary road frontage and the internal unnamed road is considered to be the secondary road frontage and the rear of the lots;

(b) All dwellings must face, address and activate the primary road frontage of Sheaffes Road and Paynes Road;

(c) Car ports or garages must be located and accessed from the secondary road frontage rear of the lots;

(d) Minimum rear setbacks are to remain in accordance with Chapter B1, garages and carports are to have a minimum rear setback of 5.5m in accordance with the principles shown in figure 6.3.6.2;

(e) Fencing and landscaping treatment of the secondary road frontage is in accordance with the principles shown in **Figure 29**. Examples of Articulated fencing include, but are not limited to:

i) Masonry to 1.2m high with open type lattice or slates above with masonry elements no wider that 150mm;

ii) Timber Lap and Cap;

iii) Colourbond solid to 1.2m with Colourbond lattice style top sections.

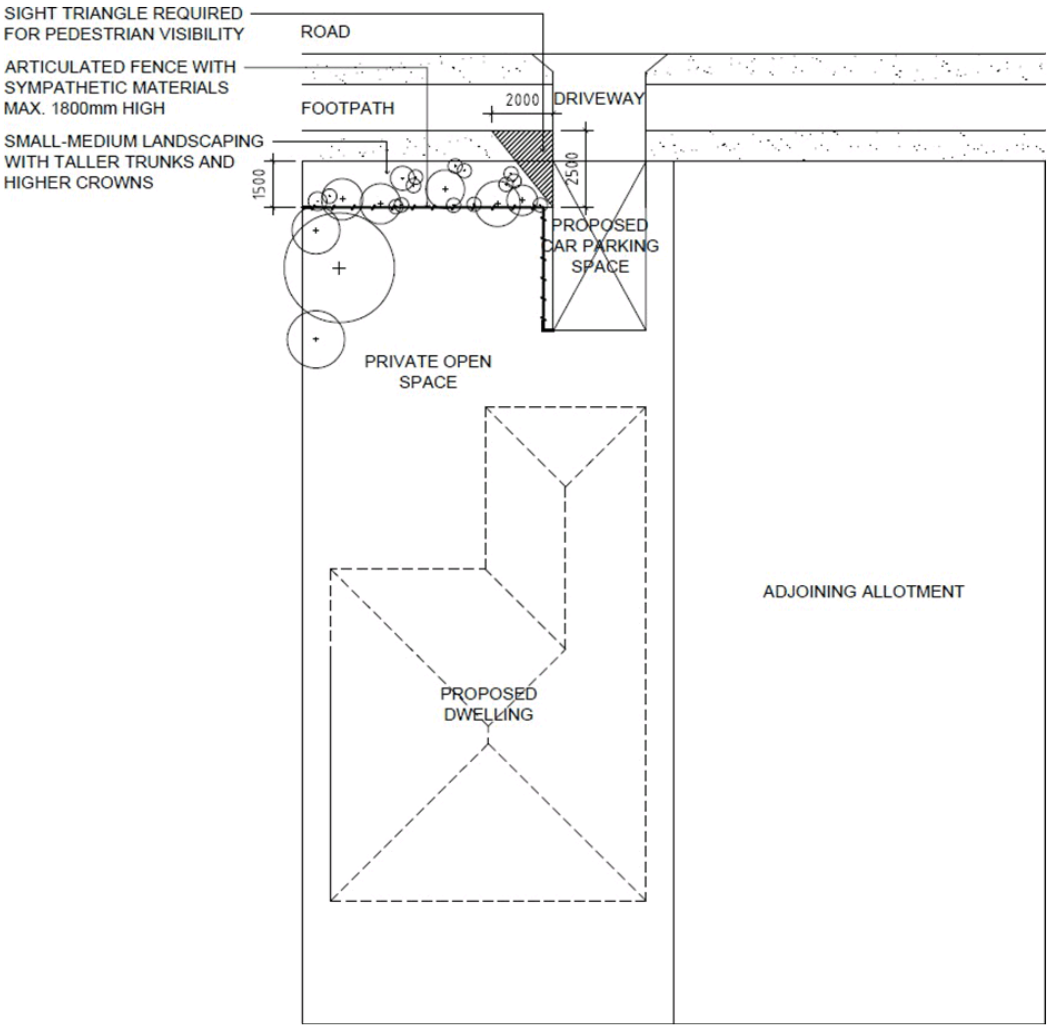


Figure 29. Dual frontage property secondary frontage treatment

PRIMARY ROAD
(No vehicle Access)

16.1.8 Darkes Road South West

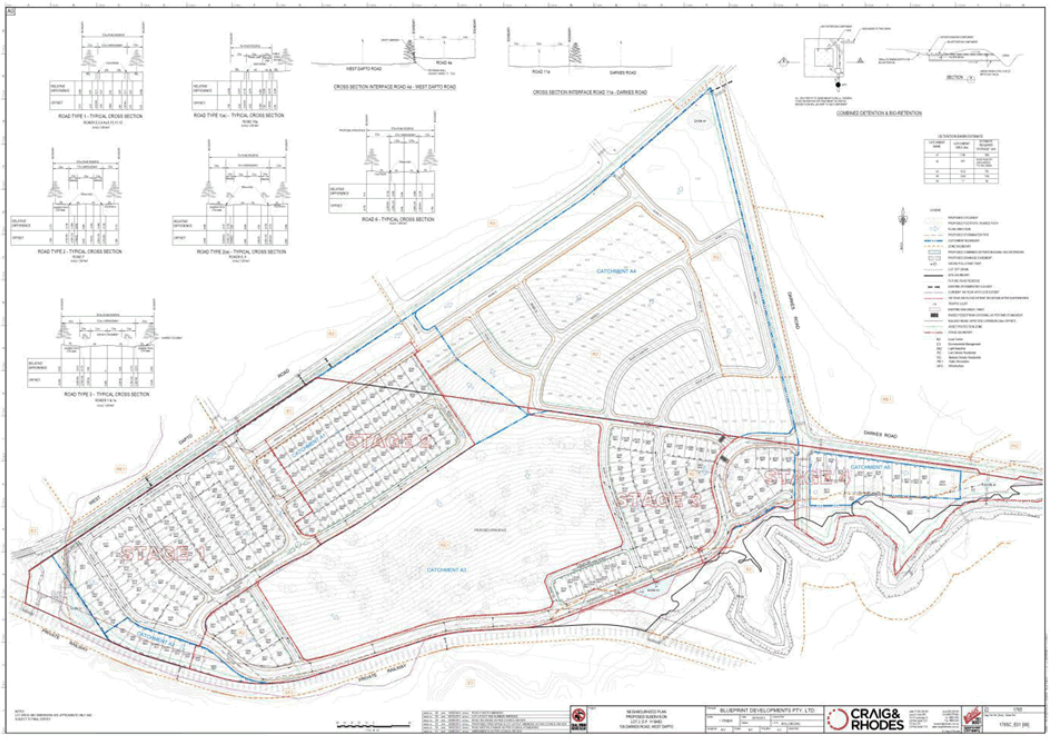


Figure 30. Darkes Road South West Neighbourhood Plan

The following modified and additional controls to apply:

1. Lot Width, Depth and Aspect are to be in accordance with Figure 6.3,7.1 above and are not required to comply with Chapter B2 Section 6 Subdivision Lot Layout – Aspect & Solar Access Orientation as well as Section 8 Lot Width & Depth Requirements. The relevant issues have been considered and the lot layout and details shown are considered acceptable. Should the lot layout depart substantially from that shown then compliance with Chapter B2 is required unless variation is sought in accordance with Chapter A1.
2. On an allotment with an area less than 450m2 and a lot width 10m or less, where an easement for access and maintenance as well as driveway crossing locations (which are located so as not to adversely impact on-street parking capacity) are provided on title, a zero side setback may be applied to one side for the single storey component of the dwelling. The two storey component of the dwelling is to be setback further as required by the formula in (2). This control does not apply to a secondary street frontage.
3. For Lots with a dual road frontage:

(a) West Dapto Road and Darkes Road is considered to be the primary road frontage and the internal unnamed road is considered to be the secondary road frontage and the rear of the lots;

(b) All dwellings must face, address and activate the primary road frontage of West Dapto Road and Darkes Road;

(c) Car ports or garages must be located and accessed from the secondary road frontage rear of the lots;

(d) Minimum rear setbacks are to remain in accordance with Chapter B1, garages and carports are to have a minimum rear setback of 5.5m in accordance with the principles shown in figure

(e) **Figure 31** below;

(f) Fencing and landscaping treatment of the secondary road frontage is in accordance with the principles shown in **Figure 31**. Examples of Articulated fencing include, but are not limited to:

i. Masonry to 1.2m high with open type lattice or slates above with masonry elements

no wider that 150mm;

ii. Timber Lap and Cap;

iii. Colourbond solid to 1.2m with Colourbond lattice style top sections.

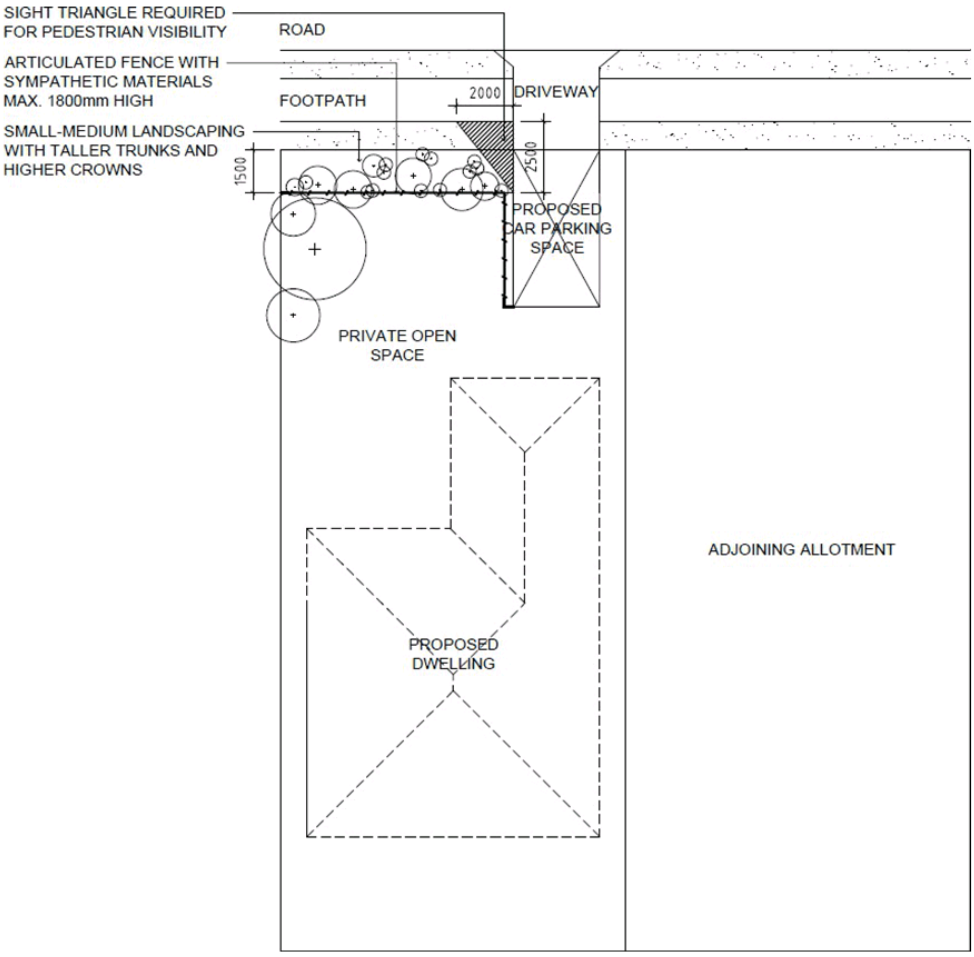


Figure 31. Dual frontage property secondary frontage treatment

1. For all development applications outside of the area denoted as Stage 1:

(a) An Aboriginal Heritage Assessment is to be undertaken in accordance with the Wollongong Development Control Plan 2009 Chapter E10.

(b) Additional archaeological investigations are required to be undertaken to the previously recorded archaeological sites and three (3) potential archaeological deposits (PADs) identified. This work is required in order to better determine the significance and extents of these areas.

(c) In-principle support for the intended mitigation or Aboriginal Heritage Impact Permit (AHIP) proposals is to be gained from the NSW Office of Environment and Heritage (OEH) prior to the determination of the associated development application.

(d) Further consultation with Local Aboriginal Groups is to be undertaken within the assessment of any future Development Applications.

(e) Consideration of the impacts of the proposal on identified Non-Indigenous Archaeological Deposits located on the site during the preparation of the Heritage reports and which are subject to Section 140 of the NSW Heritage Act 1977.

(f) Conservation planning related to any retained structures or features on the site (e.g. The Silo and gardens).

(g) Interpretation planning relating to the history and heritage significance of the development area.

2. Bushfire Matters

(a) Certain construction standards apply for development on Bushfire Prone Land. The applicable Construction Standards for proposed development are to reflect the Bushfire Attack Level (BAL) as identified at **Figure 32** below.

(b) Given that the site is identified as Bush Fire Prone Land, when a development application for subdivision is made, the development will require a Bush Fire Safety Authority to be issued by the NSW RFS under Section 100B of the Rural Fires Act 1997. The RFS has indicated that it is likely that by condition of the Bush Fire Safety Authority, restriction on the titles of the lots requiring the provision and maintenance of the necessary APZ's will be required.

APPENDIX 1 (Map 2): *AS 3959 – 2009 (Table 2.4.2) BAL Construction Standards relevant to the Neighbourhood Plan*

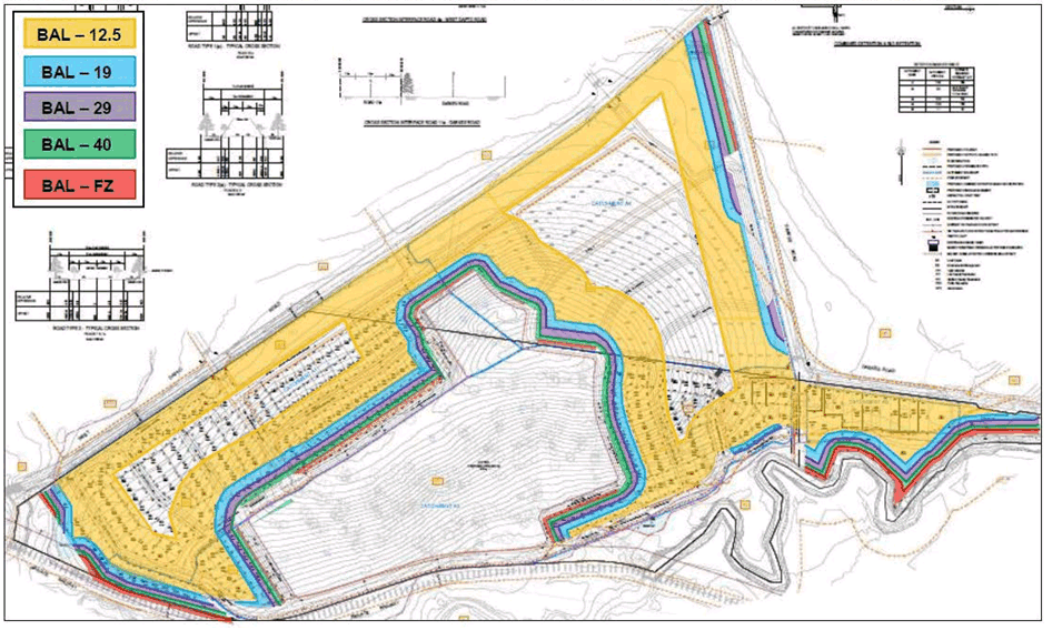


Figure 32. BAL Construction Standards relevant to the Neighbourhood Plan

1. Access

(a) An appropriate access track is to be provided to the Detention Basin A1 to facilitate sufficient maintenance access for Council.

(b) Appropriate access is also to be provided to the Wongawilli Rail Spur Line from the Detention Basin A1 and from Road 01.

(c) The final form of the access track is to be determined in conjunction with Council Engineering Officers within the assessment of future Development Applications. Hardstand access will be required.

2. There may be scope to amend the current Council Drainage Acquisition Maps to reflect more up to date flood mapping of the area. This is to be further investigated within future Voluntary Planning Agreements (VPAs) and assessment of Development Applications.

16.1.9 Avondale Road North, Huntley

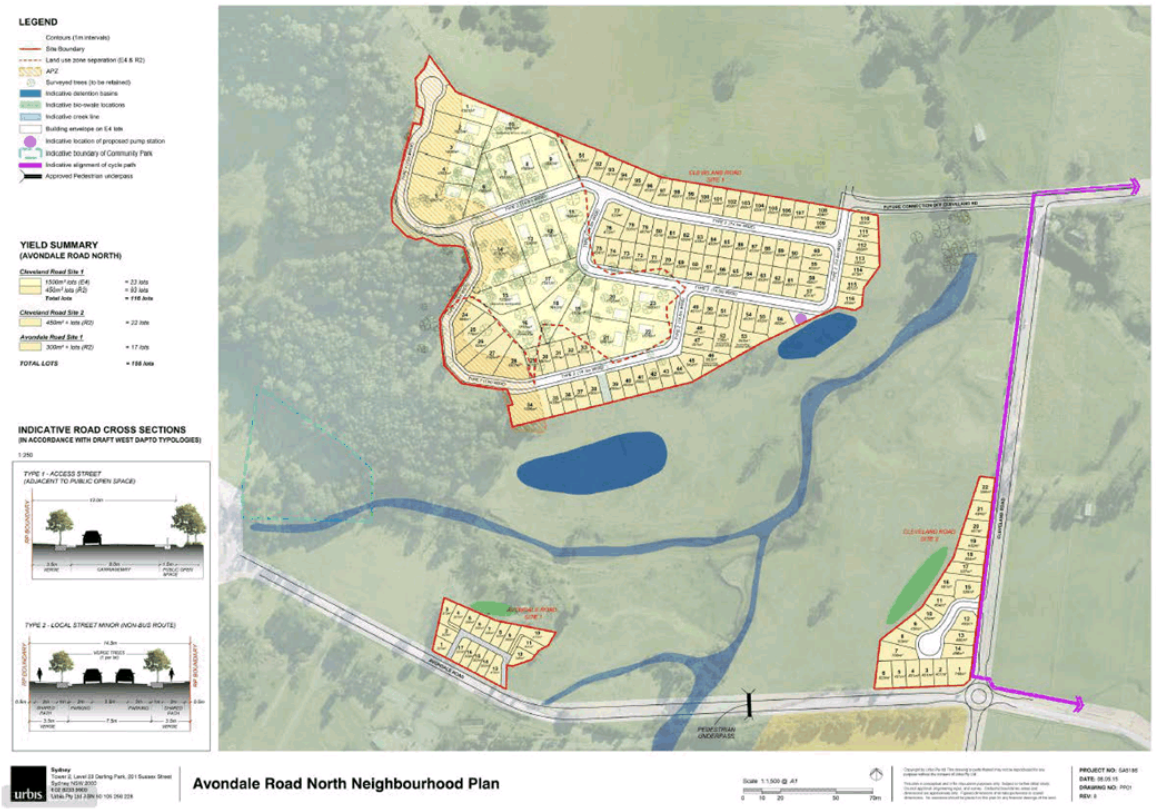


Figure 33. Avondale Road North, Huntley Neighbourhood Plan

16.1.10 Shone Avenue / West Dapto Road

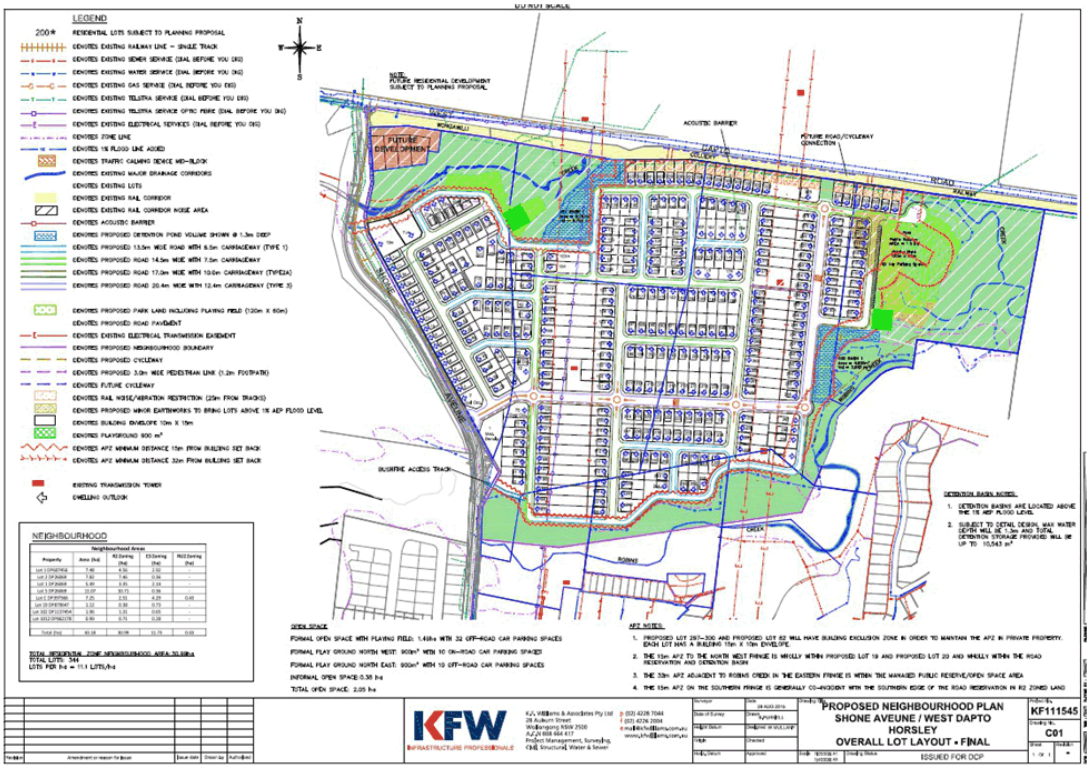


Figure 34. Shone Avenue and West Dapto Road Neighbourhood Plan

The following modified and additional controls apply:

1. For Lots with a dual road frontage:

(a) Shone Avenue is considered to be the primary road frontage and the internal unnamed road is considered to be the secondary road frontage and the rear of the lots;

(b) All dwellings must face, address and activate the primary street frontage of Shone Avenue – this is the main address of the dwelling;

(c) The minimum front setback on Shone Avenue is 4m (being a greenfield site) and the minimum setback from the secondary road is 4m;

(d) No car access to residential lots is permitted from Shone Avenue (ie lots are access denied). Carports or garages must be located and accessed from the secondary road frontage rear of the lots;

(e) Garages and carports must be setback a minimum of 5.5 metres from the property boundary on the secondary road to enable a vehicle to park or stand in front of the garage or carport (ie allow off street parking that does not impede the footpath) and in order to be a non dominant component of the streetscape;

(f) Fencing controls for the primary street frontage of Shone Avenue are outlined in Chapter B1: Residential Development and are designed to complement the objectives of passive surveillance;

(g) Fencing and landscaping treatment of the secondary road frontage must ensure that clear lines of sight are maintained for motorists and pedestrians to and from the lot, and ensure the design complements the objectives of passive surveillance. To help soften the visual impact and improve the streetscape appearance of the fence, and allow visual connection between the dwelling and the street, any fence will be required to be well articulated and landscaped with appropriate planting. Articulated fencing should be provided to a maximum height of 1.8 metres. Examples of articulated fencing include, but are not limited to:

i) Masonry to 1.2m high with open type lattice or slates above with masonry elements no wider than 150mm;

ii) Timber Lap and Cap;

iii) Colourbond solid to 1.2m with Colourbond lattice style top sections.

NB. Fences in bush fire prone areas shall be of a metal or masonry construction only.

(h) Any gates associated with the secondary street fence should open inwards so as to not obstruct the road reserve.

(i) Where garage door openings face the secondary road they shall be a maximum of 50% of the width of the dwelling. Refer to Chapter B1: Residential Development for other car parking and access controls.

2. For Lots backing onto West Dapto Road:

(a) An acoustic building exclusion zone of 25 metres applies along the length of the rail corridor to reflect Noise Report recommendations;

(b) A sound wall is to be erected by the developer along the length of the rail corridor, as indicated in the Neighbourhood Plan.

16.1.11 West Dapto Road / Sheaffes Road (south)

Along West Dapto Road a town centre (large local town centre) is to be established to the west. The town centre will interface with large neighbourhood open space provisions that will cater for active organised sporting needs. The Town centre will perform an important role in the provision of public transport, as a node with active transport facilities will meet with the public transport network. The core part will contain the primary retail and commercial functions and be surrounded by some business and medium density housing. It is envisaged that this centre would accommodate around 7,500m2 of retail floor space to support the employment land.

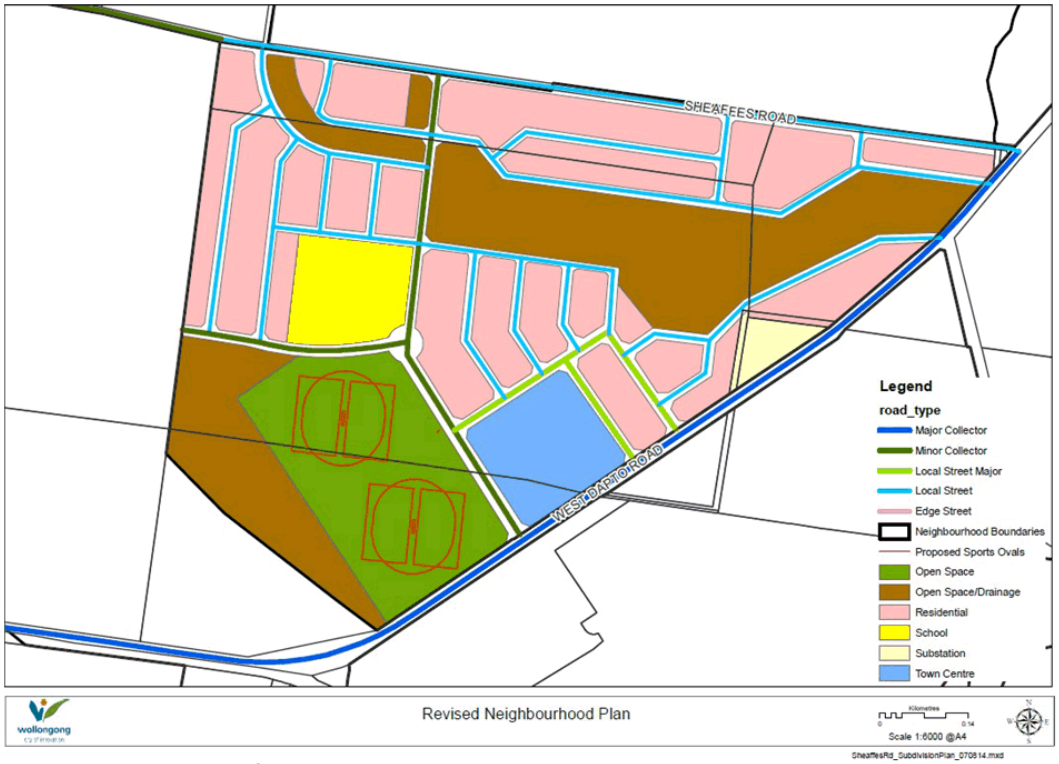


Figure 35. West Dapto Road / Sheaffes Road (south) Neighbourhood Plan

16.1.12 Bong Bong South

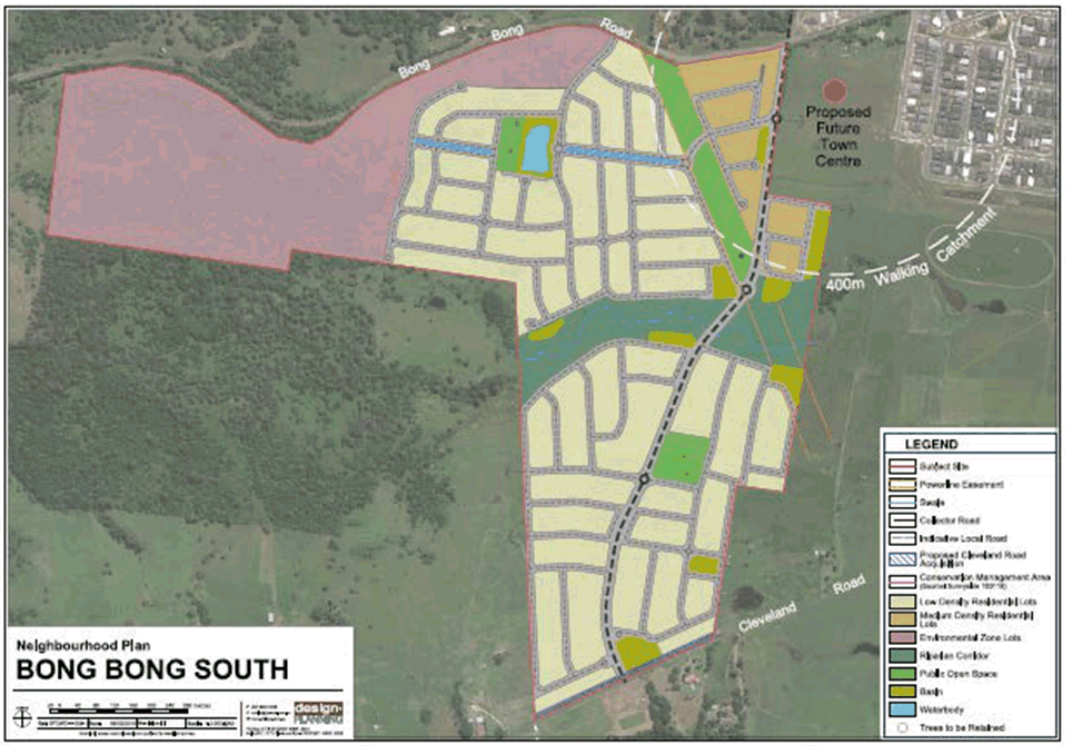


Figure 36. Bong Bong South Neighbourhood Plan

17 Matters to be addressed in Development Applications

The documentation accompanying the Development Application for subdivision will have to provide more detailed site specific information and specialist reports, addressing issues such as:

- Detailed site survey by a registered surveyor.
- Development plans – lot layout, detailed road designs, landscape plans, subdivision stages (if any) (Chapters B2, B3 and B4).
- Flora and fauna assessment and future management (Chapters E18, E23).
- Drainage/flooding/water quality modelling, WSUD (Chapters E13, E14, E15 and E22).
- Land contamination assessment (Chapter E20).
- Bushfire management (Chapter E16).
- Traffic assessment (Chapter E3).
- Aboriginal heritage assessment (Chapter E10 and E11).
- Noise assessment (where relevant) (Chapter E4).
- Pedestrian and bicycle routes, including accessibility for persons with a disability (Chapter E1).
- Crime Prevention through Urban Design (Chapter E2) etc.

The documentation accompanying a Development Application for a Dwelling House on a newly subdivided lot should have regard to Part A and B1 (Dwelling Houses) of this DCP and any variations to the generic controls under this chapter (e.g. the standard setbacks in individual neighbourhoods may have been varied).

An application for a Dwelling House can also be undertaken in accordance with the requirements of SEPP Exempt and Complying Development, which can be assessed by Council or a Private Certifier.

Contents

Figures

Tables

1 INTRODUCTION

1. This Chapter of the DCP outlines the objectives and detailed controls for residential subdivision in addition to the planning controls contained in the relevant Local Environmental Plan.

2. The purpose of this chapter of the DCP is to provide Council's detailed requirements for residential subdivision development upon land zoned either: R1 General Residential, R2 Low Density Residential, R3 Medium Density Residential, R4 High Density Residential, R5 Large Lot Residential, B1 Neighbourhood Centre and B4 Mixed Use.

3. This part of the DCP should be read in conjunction with:

   (a) The relevant Local Environmental Plan which prescribes the zoning and minimum subdivision lot size requirements.

   (b) Part A (Introduction and General Requirements) of the DCP which provides advice on the lodgment requirements for a Development Application.

   (c) Part D (Locality based DCPs / Precinct Plans) of the DCP which provides specific locality based or precinct based planning controls which may affect a proposed residential subdivision in a specific locality.

   (d) Part E (General Planning Controls City Wide) of the DCP which outlines Council's general planning requirements for all developments.

   (e) Council's Subdivision Policy which outlines Council's minimum design and construction specifications for all components of a subdivision including but not limited to earthworks, drainage and road works etc.

2 OBJECTIVES

The objectives of this Part of the DCP are:

(a) To facilitate a range of lot sizes to permit a range of housing styles and housing mix, in order to meet the changing demographic profiles and housing requirements for residents in the City of Wollongong Local Government Area;

(b) To ensure the subdivision of land is responsive to inherent site conditions and constraints;

(c) To ensure that all subdivisions are designed to take into account the principles of ecologically sustainable development and solar energy efficiency, to assist in ensuring that subsequent development is significantly more energy efficient;

(d) To ensure subdivisions achieve high quality urban design outcomes through maximising the number of new lots with principal street frontage and to restrict the number of battle- axe lots;

(e) To ensure that lot sizes, dimensions and layout are consistent with best practice in terms of urban design, solar access orientation and energy efficiency;

(f) To establish a clear hierarchy of different road types which cater for different types of traffic movement through residential subdivisions; and

(g) To ensure that the majority of residential allotments are within a 400 metre walking distance from an existing or proposed new bus stop.

3 DEFINITIONS

Corner Allotment Is a lot which has frontage to two roads on adjacent boundaries.

Irregular shaped allotment means an allotment which is not regular in shape.

Regular shaped allotment means either:

(a) Allotment which is either square or rectangular in shape; or

(b) Allotment of another shape where a square or rectangular shape equivalent in area to the minimum lot size area for the allotment type could be contained within the boundaries of the allotment and includes a battle-axe shaped allotment and a corner allotment where the only deviation from the above requirements is the access handle (ie battle axe lot) or the splay corner (ie corner lot).

4 TYPES OF RESIDENTIAL SUBDIVISION

In NSW, there are three (3) main forms of residential subdivision, namely:

1. Torrens Title subdivision;
2. Strata Title subdivision; and
3. Community Title subdivision.

4.1 Torrens Title Subdivision

Torrens Title subdivision is the main form of subdivision of a parcel of land.

Torrens Title is a system of title, based on registration. The property owner is referred to as the 'registered proprietor' who holds the land subject to interests and other rights recorded in the register but is free from all other interests. The registered proprietor is issued with a Certificate of Title (CT) that is a duplicate copy of the folio entry in the central Torrens Lands Title register, held by the NSW Department of Lands (Land & Property Information).

Any Development Application for a proposed Torrens Title subdivision must be supported by the following documentation:

(a) A registered survey plan of the subject site;

(b) A draft subdivision plan which shows all existing and proposed easements or covenants over relevant lots in the proposed subdivision;;

(c) A draft written instrument outlining the creation of any easements / restrictions under Section 88B or 88E of the Conveyancing Act 1919; and

(d) A Statement of Environmental Effects which addresses the proposal's relationship with relevant environmental planning instruments (including any relevant State Environmental Planning Policy, State Code, Wollongong Local Environmental Plan 2009 etc) and this DCP.

4.2 Strata Title Subdivision

The application of the Strata Titles Act applies principally to the subdivision of residential flat buildings, townhouses, villas or dual occupancies into separate parts / units.

Strata title subdivision is essentially the subdivision of space in three dimensions defined by or with reference to walls, floors and ceilings as well as courtyards. It allows for the horizontal subdivision of land

and / or airspace into separate titles for separate "strata" lots or units. Each lot or unit represents a separate apartment. An owner of a strata title unit has title to the air bounded by the inner skin of the boundary walls of the unit and by the ceiling height above and the floor level below horizontally.

The legal title to the land and building structure is owned by the "Owners Corporation" being a corporate body comprising and representing the owners of all the units in the building. The common property in the strata title includes the building itself, common open space, waste and recycling storage bin areas, visitor car parking and driveways on the land. Generally, car parking spaces (except visitor car parking spaces) are marked on the strata plan and form part of the unit title for the unit owner's exclusive rights.

Any Strata Title subdivision application must be accompanied by:

(a) A survey plan of the site and the building;

(b) A strata subdivision plan showing individual entitlements, common property (including common open space and visitor car parking) and any easements or other restrictions;

(c) A Statement of Environmental Effects which addresses the proposal's relationship with any previous development consents granted upon the site and consistency with relevant environmental planning instruments such as State Environmental Planning Policies (including SEPP 10 – Retention of Low Cost Rental Accommodation where relevant) and Wollongong LEP 2009, any State Codes and this DCP;

(d) A written 88B Instrument applying to any existing or proposed easements / restrictions (where relevant); and

(e) A copy of any previous Development Consents and Construction Certificates applying to the site, including any buildings upon the site.

4.3 Community Title Subdivision

Community Title subdivision is a form of subdivision which lies between conventional Torrens Title subdivision and Strata Title subdivision. Community Title enables common (shared) property to be created within an otherwise conventional subdivision.

Community title subdivision is primarily governed by the Community Land Development Act 1989 and Community Land Management Act 1989.

The Community Land Development Act 1989 permits community title subdivisions to be staged or non-staged developments. The main advantage of staging of larger Community Title subdivisions is that the initial development costs will be lower because the first stage(s) of the development can be used to finance the construction of later stages. It also enables the development of planned communities of any residential type where the use of some land is shared.

Council encourages urban consolidation / housing density initiatives involving Community Title subdivisions, particularly in areas within proximity to railway stations. In certain cases, Council may generally agree to the road carriageway widths for private roads servicing up to 12 dwellings within the subdivision being reduced in width, except where in the opinion of Council there is a potential adverse traffic management issue.

Management Structure

The Community Titles legislation allows for a multi-tiered management structure incorporating either two (2) or three (3) main levels or types of schemes, namely:

(a) Community;

(b) Precinct; and

(c) Neighbourhood.

The multi-tiered management structure applies only to Community Title schemes which are developed in stages. The multi-tiered management structure includes all three (3) levels in a scheme.

The Community Plan shows the development of the total area broken up into at least two (2) development lots plus common property.

The Precinct Plan is the subdivision of a development into at least two (2) precincts plus common property and is managed by a Precinct Association which comes under the control of the Community Association.

The Neighbourhood Plan is the further re-subdivision of a precinct within the Precinct Plan. Lots within the Neighbourhood Plan are managed by a Neighbourhood Association which comes under the control of both the Precinct Association and the broader Community Association.

It also allows a further level as a strata scheme integrated into the overall scheme.

In a proposed two tier management structure, the second tier of management is created by the registration of a neighbourhood plan subdividing a community development lot in a community plan into lots for separate use or disposition known as neighbourhood lots. The neighbourhood scheme is administered by a neighbourhood association which will automatically become a member of the community association.

The by-laws for each community scheme are set out in the Management Statement which is registered with the relevant plan of subdivision. Each community scheme is bound by the rules set out in its own Management Statement. The Management Statement is required to cover a range of matters including:

(a) The management, use and maintenance of community property such as roads and special facilities such as constructed wetlands, recreational facilities and open space areas;

(b) Waste and recycling storage and collection areas etc;

(c) Insurance of common property; and

(d) The proceedings of the Executive Committee.

The Development Contract is the construction agreement between the developer and the members of the scheme regarding the type and timing of facilities proposed to be constructed within the common property.

Any Development Application for a proposed Community Title subdivision must be accompanied by the following documents:

(a) A subdivision plan which shows the proposed individual lots and proposed “Association Property” lots (including any private roads, common open space, recreational facilities etc) as well as any necessary easements / restrictions;

(b) A draft Management Statement and a draft Development Contract which comply with the provisions of the Community Land Development Act 1989 and Community Land Management Act 1989;

Note: If development consent is ultimately granted to the Community Title subdivision, the final Management Statement and final Development Contract will be required to be lodged with the final plan of subdivision as part of the Subdivision Certificate application.

(a) A survey plan of the subject site;

(b) A written 88B Instrument for any necessary easements / restrictions; and

(c) A Statement of Environmental Effects which addresses the proposal’s relationship with relevant environmental planning instruments (including any relevant State Environmental Planning Policy, State Code, Wollongong Local Environmental Plan 2009 etc), any State Code and this DCP.

5 TOPOGRAPHY, LANDFORM CONSERVATION

Objectives

(a) Ensure the design of any proposed residential subdivision takes into account inherent site constraints and natural landform features.

(b) Ensure that the design of any proposed residential subdivision takes into account any significant trees or other vegetation upon the subject site, including any endangered ecological community or

threatened species.

Development Controls

1. The topography and landform of the site must be taken into consideration as part of the design of the subdivision layout, in order to optimise solar access opportunities and maximise views to key natural features.

2. The topography and landform of a locality are important place-making elements. Roads should be designed to respond to such features and work to minimise cut and fill. Roads must be constructed at the natural ground level of the site, wherever practical.

3. The subdivision lot layout should be designed to improve views to special features such as the escarpment backdrop, remnant stand of significant trees (ie Spotted Gum forest or stand of Norfolk Island pine trees) or the coastline.

4. Where the land slopes at a grade of 6% or greater, the predominant road alignment should be perpendicular to the contours of the site, wherever practicable.

5. The subdivision layout should be designed to minimise lots which are considerably higher or lower that the road level.

6. The road alignment should be straight or gently curved, wherever possible, to enable edges (eg street trees or building line setback frontages) to frame the vista.

6 SUBDIVISION DESIGN

Subdivision layouts are to incorporate adequate pedestrian, bicycle and vehicle links to the road network, public transport nodes, pedestrian/cyclist network, and public open space areas. The street and subdivision layout should minimise fuel use by reducing travel distances and maximising public transport effectiveness. Connectivity within neighbourhoods is essential to ensure the majority of dwellings are within 400 metres walking distance to bus stops.

1. The design of any residential subdivision must include a land suitability assessment, addressing the following issues where relevant:
   - Existing land use.
   - Flooding.
   - Bushfire.
   - Topography, geotechnical constraints, contamination constraints.
   - Biodiversity (Ecologically Endangered Communities, bushland, significant trees, habitat).
   - Known or likely heritage sites, including Indigenous heritage cultural issues.
   - Existing road network.
   - Street frontage and access.
   - Available utilities & services and existing easements.
   - Need for community and recreation facilities.
   - Visual character.
   - Noise impacts (e.g. from the main roads, industrial areas or public and private railways).
2. Subdivisions comprising 4 lots or more must demonstrate the following where applicable:
   - Proposed road layout and hierarchy.
   - Proposed public transport, bicycle and pedestrian routes.
   - Proposed drainage management concepts.
   - Proposed buffers to heritage items.

- Riparian corridors, buffers and proposed future use and ownership.
- Proposed Asset Protection Zone requirements.

3. New roads within subdivisions should:
   (a) Improve the landscape character of the locality;
   (b) Reduce the linearity of roads by segmentation;
   (c) Avoid continuous long straight lines (kerb lines) for local roads; and
   (d) Maximise the continuity between existing and new landscape areas.

4. Refer to Council's Subdivision Policy for general subdivision design and the construction requirements for roads, stormwater drainage, utility services etc.

6.1 Lot layout – Aspect and solar access

Objectives

(a) To ensure residential lots are well designed to take into account aspect, orientation, slope issues and optimal solar access.

(b) To provide residential lots which maximises solar access and energy efficiency opportunities for future dwellings and private open space areas.

Development Controls

1. Aspect is a major factor in designing the layout of a subdivision.
2. Roads running generally east – west are preferred since they provide for lots with a north-south axis which caters for optimum solar access to dwellings and private open space. Lots with a main north-south axis (20ºW to 30°E) provide the best flexibility for the siting of future dwellings and also reduce potential overshadowing problems.
3. Lots with a main east-west axis (ie roads running north-south) should be widened, in order to ensure satisfactory solar access opportunities into living rooms of future dwellings and rear private open space areas and to help prevent overshadowing of dwellings and private open space on adjoining lots.
4. Lots with a NW – SE or NE – SW axis are less favourable and may need to be specifically designed or larger than normal to allow for the siting of a dwelling which is not directly parallel to the boundaries.
5. Lots should be rectangular shaped rather than irregular shaped, wherever practicable, in order to maximise solar access opportunities. Lots on the southern side of any road should have a greater frontage to the road, to allow improved solar orientation for the future dwelling.
6. Wherever possible, an access way to a rear battle-axe lot should be located on the southern side of an allotment, in order to minimise any potential overshadowing of future adjoining dwellings.
7. Any subdivision proposal adjoining a rear lane shall be designed so as to provide both vehicular and pedestrian access to the front road.

6.2 Lot size

1. The minimum subdivision allotment size requirement for a particular parcel of land shall be in accordance with the provisions of Wollongong LEP 2009 and the accompany Lot Size Map, relevant to the land.
2. Irregular shaped lots shall have a minimum allotment size of 485m2.
3. Regular shaped corner lots shall have a minimum allotment size of 500m2 as per Table 1 below and as illustrated in Figure 1 below.
4. Regular shaped battle axe allotments within residential zones shall have a minimum allotment size of 550m2, excluding the battle axe access handle. Irregular shaped battle – axe lots shall have a minimum allotment size of 600m2 (excluding the access handle). Refer to Figure 1 and Table 1 below.

Table 1. Minimum allotment sizes

Allotment Type	Minimum Lot Size Requirement for Regular Shaped Lots	Minimum Lot Size Requirement for Irregular Shaped Lots
Standard Lot	Subject to Wollongong Local Environmental Plan 2009 (relevant Lot Size Map)	485m2
Corner Lot	500m2	NA
Battle-axe Lot (excluding access handle)	550m2	600m2

However, larger allotments may be required in certain circumstances such as lots containing steeply sloping land or land containing a watercourse or land fronting an arterial road.

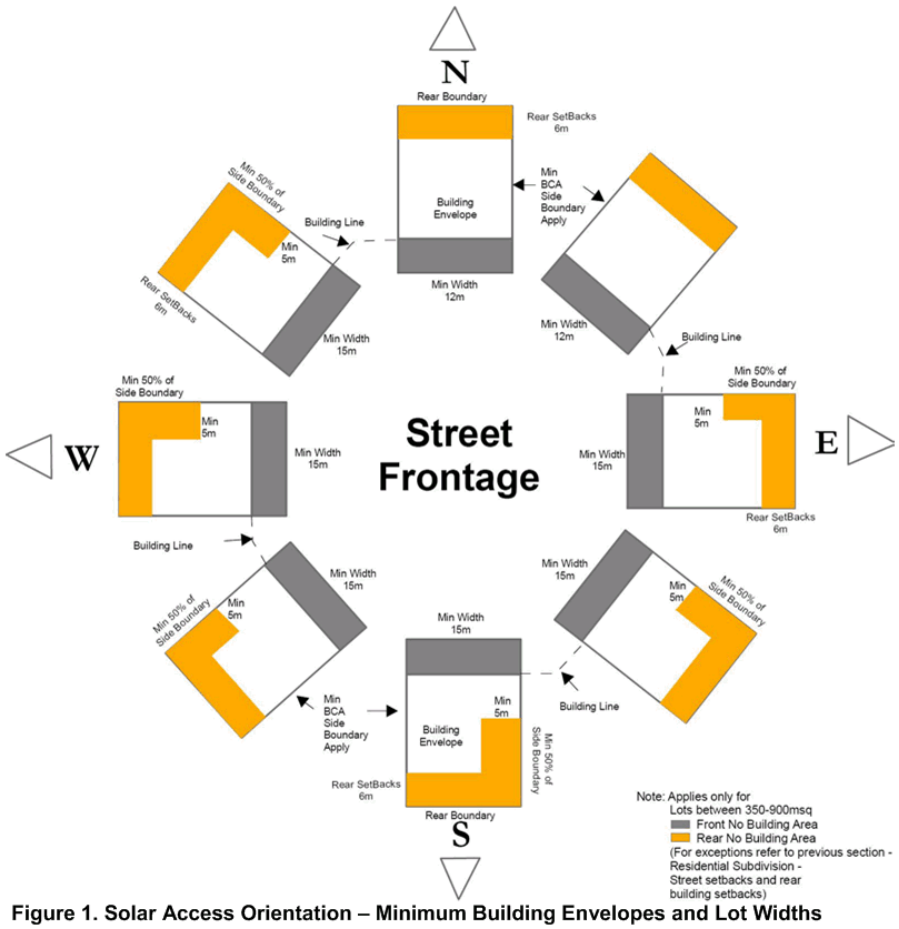


Figure 1. Solar Access Orientation – Minimum Building Envelopes and Lot Widths

6.3 Lot width and depth

Objectives

a) To ensure residential lots are designed to provide sufficient lot width and depth, to cater for a suitable range of dwelling styles having regard to any site constraints or environmental qualities of that land.

b) To ensure residential lots in low density residential areas provide sufficient site area to cater for detached dwelling-houses with sufficient rear private open space which gains appropriate sunlight access during mid-winter.

Development Controls

1) A minimum 12 metre lot width is required for residential allotments with N to NE rear boundary alignment.

2) Lots with a NW, W, SW, S, SE or E alignment should be 15 metres wide at the front building alignment, in order to ensure satisfactory solar access opportunities into living rooms of future dwellings and rear private open space areas and to help prevent overshadowing of dwellings and private open space on adjoining lots.

3) A minimum 15 metre lot width may be required where Council determines on-street parking is required.

4) The minimum depth for a residential allotment should be at least 25 metres.

6.4 Battle-axe lots

Objectives

(a) To encourage conventional residential subdivisions with direct public road access, rather than a series of battle axe allotments one behind each other, in order to maintain the residential amenity and character of the locality.

(b) To minimise the potential adverse streetscape and amenity impacts upon the locality arising from a number of battle axe lots sharing a common access corridors.

(c) To ensure each battle axe lot has a sufficient site area with a suitable building envelope to accommodate a range of different dwelling styles, in order to minimise any potential amenity or privacy impacts upon adjoining residential properties.

(d) To ensure each battle axe lot has a sufficient site area to provide satisfactory on-site parking with suitable vehicular access and maneuvering areas.

Development Controls

1. The minimum allotment size requirement for battle-axe lots shall be in accordance with the relevant LEP and accompanying Lot Size Map, excluding the site area required for the battle-axe lot access handle.

2. The minimum lot width for a battle-axe allotment shall be 15 metres as measured at the front building line (ie exclusive the access handle). The 15 metre minimum lot width requirement for battle axe lots is set at 6 metres from the end of the battle axe handle (ie within the main building portion of the site).

3. A maximum of two (2) battle-axe allotments will be permitted behind an allotment which has direct frontage to a dedicated public road in the proposed subdivision. This allows for inherent site constraints such as slope or topography which may otherwise prevent a conventional residential subdivision providing direct public road access to all lots. Under no circumstances will Council favourably consider any subdivision proposal involving a series of battle-axe lots, one behind each other.

4. All battle-axe allotments must have direct access to a dedicated public road, through the provision of an access handle attached to each battle-axe lot or via a shared access corridor (ie maximum of two (2) lots may share a common access corridor).

5. The minimum access corridor width for a battle axe allotment shall be 5 metres with a minimum road pavement width of 3 metres for the entire length of the access handle.

6. A 1 metre wide landscaping strip shall be provided along each side of the required 3 metre wide road pavement. The landscaping strip shall be planted with suitable small trees, shrubs and groundcovers.

7. A shared access corridor may be permitted for a maximum of two (2) battle axe allotments where, in the opinion of Council, the proposed access arrangement will satisfactorily cater for safe vehicular and pedestrian access to each of the lots and that satisfactory sight line distances are available between the subject lots and the public road.

8. Any access corridor shared between two (2) battle axe allotments must be created through reciprocal rights of carriageway under Section 88B of the Conveyancing Act 1919. The minimum shared access handle width shall be 5 metres with a minimum road pavement width of 3 metres for the entire length of the access handle. However, the shared access handle must be designed wide enough to satisfactorily cater for the placement of garbage and recycling bins (ie associated with the dwellings on the two battle axe lots) adjacent to the access handle road pavement

9. A minimum 1 metre wide landscaping strip must be provided along each side of the required 3 metre wide road pavement of any shared access handle. The landscaping strip shall be planted with suitable small trees, shrubs and groundcovers. A hard stand area on one side of the access handles for garbage and recycling bins (ie directly abutting the public road reserve). The opposite 1 metre wide landscaping strip in the shared access handle shall include letterboxes for the two lots (ie. directly abutting the public road reserve).

10. All battle-axe lot access corridors must be provided with all-weather road pavement. All access handle driveway crossings must be of a full concrete or asphalt construction and must be designed having regard to current fire regulations for fire hydrants. Driveways must be sited to allow for visibility of vehicles entering and leaving the site.

11. Driveway construction must give consideration to driveway drainage, utility servicing and retaining structures.

12. Within bush fire hazard areas, access to allotments shall be in accordance with the requirements of the NSW Rural Fire Service Planning for Bush Fire Protection 2006 guidelines. In the event of any inconsistency between the access requirements to lots between this part of the DCP and the Planning for Bush Fire Protection 2006 guidelines, the Planning and Bush Fire Protection guidelines.

13. Each battle axe access corridor must have capacity for vehicular turning facilities and two (2) on-site parking spaces must be provided for each battle axe lot.

14. Access corridors within bush fire prone areas must provide a suitable turning area, in order to enable the satisfactory maneuvering of fire fighting vehicles in accordance with the requirements of the NSW Rural Fire Service Planning for Bush Fire Protection 2006 guidelines will prevail.

15. The maximum gradient for any access way required for a battle axe lot subdivision should be 25%.

16. The gradients for access handles for allotments within bush fire prone areas shall be in accordance with the requirements of the NSW Rural Fire Service Planning for Bush Fire Protection 2006 guidelines.

17. Stormwater drainage on driveways must be contained in kerbs or a central dish and conveyed to the Council stormwater drainage system via the public road.

6.5 Building envelopes

Objectives

(a) To ensure each residential lot has a suitable building envelope to accommodate a range of different dwelling styles, in order to minimise any potential amenity or privacy impacts upon adjoining residential properties.

(b) To ensure the building envelope for each residential lot, takes into account all relevant constraints of the site and / or any easement or other restrictions pertaining to the land.

(c) To ensure the building envelope for each residential lot takes into account any area of the subject land which contains significant remnant trees or other significant vegetation (including riparian vegetation).

(d) To ensure building envelopes are appropriately positioned to maximise solar access opportunities and energy efficiency for future dwellings and rear private courtyards for each residential lot.

Development Controls

1. Council may require residential lots to provide a specific rectangular building envelope with minimum dimensions of 15 metres (depth) x 10 metres (width), where the subject site contains any inherent site constraint(s) (eg flooding, geotechnical constraints etc) or contains significant remnant vegetation, any threatened flora species, endangered ecological community etc. Any

such building envelope shall be exclusive of the required setback requirements for a dwelling - house as per Chapter B1: Residential Development.

2. A 15 metre (depth) x 10 metre (width) building envelope will be required for any proposed battle axe allotment upon land zoned R2 Low Density Residential, since the erection of a two storey .dwelling on a battle axe allotment is not permitted for land zoned Residential R2, under Chapter B1: Residential Development. Therefore, a building envelope is required to provide a sufficient building platform, to cater for a single storey dwelling.

3. Any proposed building envelope shall be shown on the required subdivision concept layout plan accompanying the Development Application. Additionally, any existing easements or other restrictions on the use of the land should be shown on the required subdivision layout plan.

Note: In the event that Council ultimately supports the proposed subdivision, a condition of consent may be imposed requiring the imposition of a restriction on the use of land pursuant to the provisions of Section 88B of the Conveyancing Act 1919 which shows the building envelope for each lot within the subdivision. This requirement may apply to certain subdivisions where sites are subject to inherent site constraints (eg geotechnical /slope instability issues etc) or contain significant vegetation, threatened flora or fauna, flood prone / riparian land or other constraints which may require the building envelope to be specifically identified on the lot(s).

6.6 Superlots in residential subdivisions for integrated housing or medium density housing

Objectives

(a) To ensure large residue lots or super lots for future dual occupancy or medium density housing are well planned and are strategically placed to reflect future traffic management conditions and other environmental conditions.

(b) To encourage large residue lots to be earmarked for medium density housing early in the residential subdivision process.

Development Controls

1. The configuration and lot size of residue or super lots shall be designed to meet the future planning requirements for either dual occupancy, multi dwelling development or residential apartment building developments contained in this DCP. Accordingly, the subdivision plan accompanying the Development Application shall indicate the intended future residential use of the residue lot.

2. In the event that the residue lots are not designed to comply with the future planning requirements for the intended future residential development, then a reduced dwelling yield may occur when the Development Application for the development of the residue lot is assessed.

3. Large residue lots should be located in strategically placed locations in subdivisions and generally not at the end of cul-de-sacs. However, in certain circumstances, the positioning of a residue lot at the end of a cul-de-sac may be supported where individual site circumstances such as traffic management and other environmental conditions, support this arrangement.

6.7 Existing easements

Objectives

(a) Guide the use land under electrical easement for appropriate urban purposes.

(b) Guide the use of land over gas easements for appropriate land uses.

Development Controls

1. A Development Application shall include the proposed use of all land under easement.

2. Water management can be carried out in electrical easements

3. Landscape planting (low rise) can be established in electrical easements while allowing for

necessary service access.

4. More significant planting can happen on the edge of electrical easements to create a visual buffer to electrical infrastructure

5. Recreational uses and open space can be established within easements.

6. Easements can be used for roads, pedestrian and bicycle routes subject to approval by the easement authority.

7. Consultation with TransGrid is required to ensure that buffers, road levels and access are adequate.

7 MAJOR RESIDENTIAL SUBDIVISIONS

A major subdivision is considered to be a subdivision of lots creating more than 15 lots and/or applies to an area greater than 3600m^2 and creating an increase to the number of dwellings in the site.

If the subdivision is within an urban release area the development may have additional staging and sequencing requirements relating to development Concept, Precinct Plan or Neighbourhood Plans (eg. DCP Chapter D16: West Dapto Urban Release Area).

Objectives

(a) To ensure the staging of a major residential subdivision is well planned and that all relevant roads, drainage and other infrastructure services are provided for each stage in the subdivision.

(b) To ensure the staging of the development minimises any potential adverse noise or amenity conflicts, arising from construction equipment and plant operating on later subdivision stages upon residents in early release stages.

Development Controls

1. In cases of a major residential subdivision, a staging plan will be required which shows the proposed staging program. Additionally, the Statement of Environmental Effects shall provide a detailed outline of the proposed staging program, including the proposed total number of lots within each relevant stage.

2. The subdivision staging should be designed to minimise conflicts arising from construction plant and equipment operating during the construction of later subdivision stages impacting upon the amenity of residents living in dwellings within the earlier subdivision stages. This may also require the provision of temporary access arrangements for heavy vehicles associated with the stages under construction separate from the first stage(s) of the subdivision. The provision of suitable landscaping treatment and / or acoustic walls may also be necessary to minimise potential privacy, amenity or noise impacts upon first stage residents.

3. In the event that the staging of the subdivision is approved, all necessary subdivision works (including road works, drainage works, water and sewerage infrastructure, telecommunications, electricity supplies etc) must be completed for each relevant stage, prior to the release of any Subdivision Certificate.

8 CUT AND FILL LAND RE-SHAPING WORKS

Objective

a) To ensure all finished residential lots are provided with a satisfactory fall towards the stormwater drainage system, in order to guarantee satisfactory stormwater run-off from each lot and to ameliorate against any potential water ponding impacts within the subdivision.

b) Ensure that the design of any proposed residential subdivision responds to the natural topography and landform features and minimizes as far as practicable and cut/fill and unnecessary re-shaping of the site.

Development Controls

1. All finished lots shall have a minimum 2% fall towards the proposed stormwater drainage system, in order to allow for suitable stormwater run-off from the site and to help minimise any potential

water ponding.

2. Excessive cut and fill and/or site re-shaping will not be supported.

9 PUBLIC RESERVES AND OPEN SPACE

Objectives

a) To ensure the provision and embellishment of public open space is consistent with Council's planned requirements, to meet the recreational needs of the community.

b) To provide public open space (ie both active and passive) within reasonable proximity for all residential lots within existing urban areas and new release areas.

c) To preserve remnant native bushland including endangered ecological communities within public open space buffers, where possible.

d) To limit the amount of land proposed to be dedicated to Council for public open space, to only lands zoned RE1 Public Recreation, under the relevant LEP or other lands previously identified by Council as being required for public open space.

e) To minimise costs of on-going maintenance of public open space.

Development Controls

1. The size and location requirements for public open space shall fall within a hierarchy of provisions in accordance with Council infrastructure planning and generally as indicated in Table 2. Exact location and the level of equipment or other embellishment required for the open space must be discussed with Council upfront, prior to the lodgment of the Development Application, where such open space is proposed to be dedicated to Council for a public reserve or other purposes.

Table 2. Size and Location Criteria for Public Open Space

Open space type	Minimum Area	Maximum walking catchment
Local open space	1-2 hectares	400-600 metres
Neighbourhood open space	2-4 hectares	2km via road or pedestrian/ bicycle networks
District open space	5-8 hectares	Ward based catchments (3 wards of Wollongong LGA)

Note: Whilst Council may have had preliminary discussions with an applicant upfront over the possible future dedication and embellishment of land for public reserve(s), there is no guarantee that the proposed subdivision will be ultimately approved until such time as the application is properly assessed and determined on its merits, based on the "Matters for Consideration" as listed under Section 79C of the Environmental Planning and Assessment Act 1979.

2. Council will not accept the dedication of land for the purposes of public reserve where in the opinion of Council, there is already sufficient public open space in the locality and / or the land is not zoned RE1 Public Recreation.

3. Any approved public reserve lot shall be fully embellished in accordance with Council's requirements, prior to the release of the Subdivision Certificate.

4. Private open space may be provided as community lots in a Community Title subdivision. Any small open space area in a Community Title subdivision should be at least 500m^2 - 1,000m^2 in area and should make provision for seating as well as provision for an integrated children's playground equipment.

5. Wherever possible, riparian corridors should form the 'spine' for public open space within a subdivision.

10 PEDESTRIAN AND BICYCLE NETWORKS

Objectives

(a) To ensure residential subdivisions provide safe and convenient pedestrian and bicycle linkages to facilities and services within the surrounding locality.

(b) To ensure the road network adequately caters for the safety of pedestrians, cyclists and motorists through the provision of adequate sight lines at critical locations such as intersections, driveway crossings, bus stops and crossing points.

(c) To ensure all pedestrian footpaths, and shared paths are designed in accordance with relevant Australian Standards and AUSTROADS.

(d) To ensure all pedestrian footpaths and shared paths are designed to incorporate Crime Prevention Through Environmental Design (CPTED) principles..

Development Controls

1. Any residential subdivision should identify the overall layout of dedicated pedestrian footpaths and shared paths within the subdivision. The constructed pedestrian footpath shall be a minimum width of 1.5 metres. For any shared path, a minimum 2.5 metre width is required and widened to 3 metres if the shared path is adjacent to any structure, or on a Minor Collector (Type 4) road.
2. Pedestrian and shared paths should be provided to link roads including cul-de-sacs and to directly access public transport routes/bus stops, public reserves, sporting / community facilities, schools, business precincts and adjacent residential subdivisions.
3. All pedestrian footpaths or shared paths should be designed in accordance with the requirements of relevant Australian Standards, AUSTROADS Guides and Council's Subdivision Policy as appropriate. All paths should be constructed of concrete, except where varied by Council.
4. Safe pedestrian crossings are to be created with the use of pedestrian refuges, slow points, kerb extensions or other appropriate measures, designed in accordance with relevant Australian Standards and AUSTROADS Guides.
5. All footpaths and shared paths are to be provided with appropriate lighting and designed to incorporate Crime Prevention Through Environmental Design (CPTED) principles by minimising any potential hiding places and maximising passive surveillance.
6. The full design details of any footpaths, shared paths, pedestrian crossings or any other associated infrastructure shall be clearly shown on the subdivision plans submitted with the Development Application.

(Note: "shared path" refers to a path that is shared by both pedestrians and cyclists)

11 ACOUSTIC ASSESSMENT

Objective

(a) Ensure appropriate acoustic measures are planned for and provided for subdivisions which are subject to potential adverse noise impacts, in order to provide a pleasant acoustic environment for all residential lots within the subdivision.

Development Controls

1. Council will refer to NSW Roads and Maritime Services (RMS) and Department of Planning to determine if an acoustic assessment is required as outlined in "Development near Rail Corridors and Busy Roads – Interim Guidelines" (Department of Planning).
2. When required, full details of the proposed acoustic mediation shall be submitted with the Development Application.

12 STREET TREE PLANTING

Objectives

(a) To provide suitable street trees within residential subdivisions, in order to improve the streetscape

character of the locality.

(b) To improve the general residential amenity of the subdivision.

(c) To ensure the planting of street trees in new subdivisions is appropriate and compatible with existing street tree planting within certain suburbs in the city.

Development Controls

1. The planting of street trees shall be integrated with driveway crossings, utility services, street lighting and shall be undertaken in accordance with the general requirements contained in the Chapter E6: Landscaping in this DCP.
2. Council may require the planting of a specific tree species for certain roads in a subdivision, especially if there is already an existing street tree scheme in the suburb. This requirement will be determined by Council as part of the assessment of the Development Application.

13 ENTRY STATEMENTS

Objectives

(a) Ensure entry statements are appropriately designed and constructed to enhance the streetscape character of the residential estate.

(b) Ensure all entry statements and supporting structures (including night lighting) are contained wholly within the private realm of the subdivision, rather than within any existing or proposed future public road reserve.

(c) Ensure all entry statements minimise any potential obstructions to motorists, pedestrians and cyclists and to prevent any potential adverse traffic visibility impact and / or visual distraction to motorists.

Development Controls

1. Entry statements mark and define the entry to a residential estate and are designed to enhance the streetscape character of the estate.
2. All entry statements (including associated special effects and night lighting) at the entry to residential subdivisions must be contained wholly within the private property and not within any land proposed to be dedicated as public road reserve.
3. The location and form of the entry statement must not unduly impede or restrict pedestrian, cyclist or public and private vehicular movement to or from the site. The siting and design of an entry statement must not reduce traffic visibility on adjacent roads and should not cause an unsafe visual distraction to vehicle drivers.
4. The entry statement should also be designed to incorporate Crime Prevention through Environmental Design (CPTED) principles by minimising any potential hiding places.
5. The full design details of the proposed entry statement(s) shall be shown on the required Landscape Plans to be submitted with the Development Application.

14 TRAFFIC FACILITIES

14.1 Road connectivity, permeability and legibility

Objectives

(a) To establish a legible and well connected road network that promotes safe pedestrian and bicycle movement as well as convenient vehicular access.

(b) To provide improved road, pedestrian and bicycle connections linking residential areas with public reserves, business centres, public services and facilities.

Development Controls

1. New subdivision roads should be designed to be integrated and connected with the existing local road network of the surrounding neighbourhood, wherever possible. In new subdivisions, cul-de-sacs should be minimised, wherever possible, in order to ensure connectivity within an estate.
2. Road design taking into account the surrounding local road network in the locality, especially the existing road hierarchy.
3. The subdivision design must achieve enhanced vehicular permeability and legibility in the location and layout of the road pattern.
4. The integration of new subdivision roads with existing roads will help to:
   (a) Improve interconnections and minimise travel distances to / from facilities and services;
   (b) Provide a choice of routes; and
   (c) Spread traffic loads throughout the local road network, rather than intensifying traffic volumes to a restricted number of roads.
5. Connected grid networks may also improve safety when dwellings are sited to address block edges, to enable passive surveillance.
6. The road network should provide internal connectivity to allow for a distributed traffic flow as well as encourage walking and cycling within the subdivision and wider area.
7. Pedestrian footways and shared paths should be safe and convenient to encourage alternative transport options to motor vehicles.
8. A larger subdivision involving 50 or more residential lots should be designed to minimise any excessive “backtracking”. Therefore, the creation of multiple cul-de-sacs and “no through” roads within a larger subdivision is discouraged.
9. Developments that include commercial /retail or business that will generate employment for more than 10 people should develop and submit a Workforce Travel Plan that demonstrate there will be facilities provided to encourage positive active transport and public transport outcomes.

14.2 Road hierarchy and design requirements

Objectives

(a) To provide a defined hierarchy of roads, in order to provide an acceptable level of access, safety and convenience for all road users.

(b) To ensure that the design features of each residential road within a subdivision reflects the role of the road within the overall road network.

(c) To provide an acceptable level of access, safety and convenience for all road users within existing urban areas and new release areas, whilst ensuring acceptable levels of amenity and minimising traffic management issues in the particular locality.

(d) To provide appropriate road access for larger and special purpose vehicles including garbage and recycling trucks, fire trucks, delivery trucks etc.

(e) Ensure sufficient road carriageway and verge widths are provided for each road type, in order to enable all roads to perform their designated function within the road network.

(f) Ensure that the road reserve adequately caters for all required functions including safe and efficient vehicular and pedestrian movement throughout the road network, provision of on-street parking and the provision of street tree planting and other landscaping, where appropriate.

(g) Ensure road verges are of sufficient width to physically accommodate all necessary infrastructure assets and utilities.

(h) Provide road geometry that is consistent with the designated function of the specific road as well as the physical characteristics of the locality.

(i) Ensure the road network is simple and safe for all road users, including motor vehicles, pedestrians and cyclists.

(j) Ensure that appropriate vehicle speed limits are incorporated into the road design to enhance the

safety of pedestrians and cyclists, the young and people with a disability.

(k) Ensure new release areas are designed to provide for safe, convenient and efficient bus routes.

Development Controls

1 The design of any road as part of a subdivision shall be in accordance with the following Table 3, Table 4 and Table 5, the Road Type Cross-Sections accompanying this section 14.2 and in accordance with Council's Subdivision Policy.

2 Roads should be designed to provide visual interest in the streetscape through kerbs (where appropriate), landscaping and paving treatments. The road design should be compatible with the existing road pattern in the locality.

3 The minimum spacing of staggered intersections in a local subdivision road network (generally Road Types 5 and above) should be 20 metres.

4 Street layout and curve radii must make provision for service vehicles to manoeuvre.

5 The provisions of the NSW Rural Fire Service publication "Planning for Bushfire Protection" and the State Government Publication "Fire Safety Guideline – Access for Emergency Vehicles and Emergency Service Personnel" must be met and will take precedence.

6 The maximum length of cul-de-sacs should not exceed 80 metres.

7 Painted centerline marking required where AADT exceeds 1,000vpd.

8 For all roads that permit direct driveway access, a minimum 15 metre lot width may be required at the street frontage, where Council determines that on-street parking is required.

9 Angled parking may be utilised adjacent to active open space and in town and village centres, particularly for lower volume roads, provided it does not unduly impact traffic flow or public transport services. Angled parking must comply with Australian Standards and will be assessed by Council as to its merits on a case-by-case basis.

Table 3. Road network environment

Street Types		Road Environment				
		Access (driveway)	Indicative Daily Traffic Volume (vpd)	Target Speed (km/h)	Street Pavement Type	Parking
Sub-Arterial Road	Type 1 *(entry road with WSUD median strip (4.2m) & bus services)*	No Access	20,000 - 40,000+	70	Asphalt	No
	Type 2 *(with bus services)*	No Access	15,000 - 20,000+	60	Asphalt	No
	Type 2A *(with parking & bus services)*	No Access	10,000 - 15,000	60	Asphalt	Yes
Major Collector Road	Type 3 *(with parking & bus services)*	No Access	3,000 - 15,000	60	Asphalt	Yes
Minor Collector Road	Type 4 *(with parking & limited bus access)*	Access	3,000 - 9,000	50	Asphalt	Yes
Town & Village Centre Road	Type TC	Limited Access	(varies)	40	Asphalt	Yes
Local Road	Type 5 *(with parking)*	Access	1,000 - 3,000	40	Asphalt	Yes
Access Street	Type 6 *(with residential on both sides, and parking)*	Access	300 - 1,000	25	Asphalt	Yes
Access Place	Type 7 *(with parking)*	Access	< 300	25	Asphalt	Yes
	Type 7A *(1-Way, adjacent open space on one side)*	Access	< 300	25	Asphalt	Yes
	Type 7B *(2-Way, adjacent open space on one side)*	Access	< 300	25	Asphalt	Yes
Laneway	Type 8 *(no parking)*	Access	< 150	10	Asphalt	No

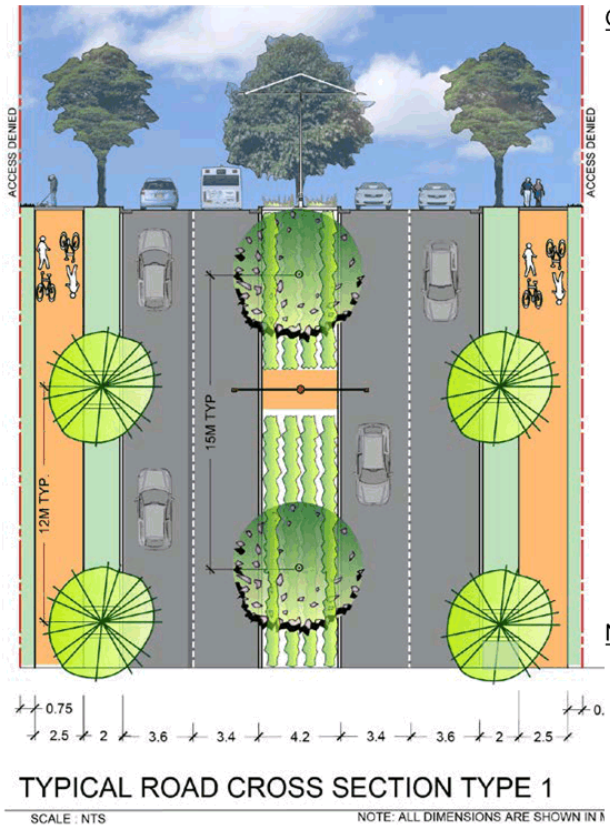
Table 4. Carriageways and verges

Street Types		Carriageway			Verge			
		Kerb Lane (m)	Centre Lane (m)	Total (m)	Verge (m)	Total Reserve (m)	Footpath (m)	Shared Path (m)
Sub-Arterial Road	Type 1 (entry road with WSUD median strip (4.2m) & bus services)	3.6	3.4	18.2	10.5 (5.25 each side)	28.7	n/a	5m (2.5m each side)
	Type 2 (with bus services)	3.5	3.2	13.4	9.5 (4.75 each side)	22.9	n/a	5m (2.5m each side)
	Type 2A (with parking & bus services)	3.5	3.2	13.4	9.5 (4.75 each side)	22.9	n/a	5m (2.5m each side)
Major Collector Road	Type 3 (with parking & bus services)	3.0	3.2	12.4	9.5 (4.75 each side)	21.9	n/a	5m (2.5m each side)
Minor Collector Road	Type 4 (with parking & limited bus access)	2.6	3.0	11.2	9.75m (5.25m one side, 4.5m other side)	20.95	1.5	3m
Town & Village Centre Road	Type TC	(varies)	(varies)	(varies)	9m (4.5m each side) or 9.75m (5.25m residential side, 4.5m centre side)	(varies)	4.5m full width commercial side	3m to be provided on one side if residential frontage
Local Road	Type 5 (with parking)	2.1	2.8	9.8	9m (4.5m each side)	18.8	3m (1.5m each side)	n/a
Access Street	Type 6 (with residential on both sides, and parking)	2.3	3.5	8.1	9m (4.5m each side)	17.1	3m (1.5m each side)	n/a
Access Place	Type 7 (with parking)	3.5	n/a	7.0	8m (4m each side)	15	n/a	n/a
	Type 7A (1-Way, adjacent open space on one side)	2 (parking lane) or 3.5 (travel lane)	n/a	5.5	5.5m (1.5m open space side, 4m other side)	11	n/a	n/a
	Type 7B (2-Way, adjacent open space on one side)	3.5	n/a	7.0	5.5m (1.5m open space side, 4m other side)	12.5	n/a	n/a
Laneway	Type 8 (no parking)	n/a	n/a	5.5	2m (1m each side to property boundary)	7.5	n/a	n/a

Table 5. Street vegetation

Street Types		Verge Trees	Street Tree Planting
Sub-Arterial Road	Type 1 *(entry road with WSUD median strip (4.2m) & bus services)*	1 every 12m	n/a
	Type 2 *(with bus services)*	1 every 12m	n/a
	Type 2A *(with parking & bus services)*	1 every 12m	1 every 30-60m via kerb bulges, small trees < 3m high
Major Collector Road	Type 3 *(with parking & bus services)*	1 every 12m	1 every 30-60m via kerb bulges, small trees < 3m high
Minor Collector Road	Type 4 *(with parking & limited bus access)*	1 per lot or every 15-20m	None – use kerb extensions at intersection
Town & Village Centre Road	Type TC	1 every 12m	Kerb extensions can be used mid-block (eg at pedestrian crossings) and intersections
Local Road	Type 5 *(with parking)*	1 per lot or every 15-20m	None – use kerb extensions at intersection
Access Street	Type 6 *(with residential on both sides, and parking)*	1 per lot or every 15-20m	None – use kerb extensions at intersection
Access Place	Type 7 *(with parking)*	1 per lot or every 15-20m	n/a
	Type 7A *(1-Way, adjacent open space on one side)*	1 per lot or every 15-20m	n/a
	Type 7B *(2-Way, adjacent open space on one side)*	1 per lot or every 15-20m	n/a
Laneway	Type 8 *(no parking)*	1 per lot depending on lane design	n/a

TYPE 1 – Major Sub-arterial road



TYPICAL ROAD CROSS SECTION TYPE 1

SCALE : NTS NOTE: ALL DIMENSIONS ARE SHOWN IN M

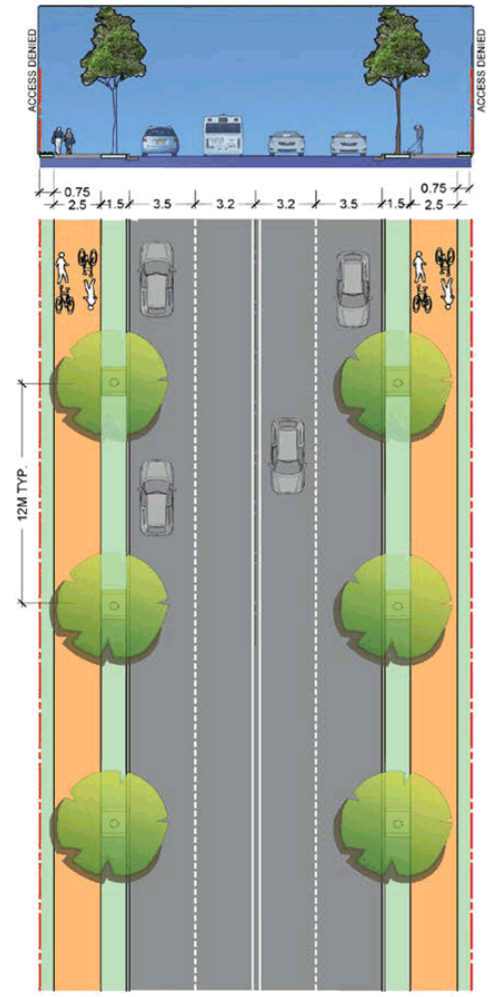
Objectives

1. Provide for high general traffic and heavy vehicle volumes with 4 travel lanes.
2. Provide connectivity between neighbourhoods and local centres/arterial road network.
3. Direct access is not permitted (access denied).
4. Provide for bus routes and bus stops (generally indented stops).
5. Design speed 80km/h, posted speed 70km/h.
6. Provide legible pedestrian and cycle network via shared paths on both sides of road.
7. Provide improved safety and amenity through provision of planted median.
8. Allows for development of right turn lanes at intersections via the central median provision.

Notes

1. The median will include low planting and incorporate WSUD where appropriate.
2. The road capacity is considered to generally cater for greater than 15,000vpd.
3. Lighting can be provided in the median as well as within the verge.
4. A kerbside verge width of 2m has been provided for an improved buffer for pedestrians/cyclists to higher speed road traffic.
5. Barrier kerb used for kerbside lanes.
6. Travel lanes wider than other road types reflective of higher speed limit and proportion of heavy vehicles.
7. Bus stops shall be via indented bus bays where practicable.
8. Intersections are to be controlled (signals, roundabouts) and provide appropriate pedestrian crossing facilities.
9. Priority controlled intersections will only be considered for left turns (eg Left-in/Left-out).
10. Controlled intersections (signals, roundabouts) are to be generally spaced a minimum of 400 metres apart.
11. Mid-block pedestrian crossings not permitted (eg refuges, marked crossings, kerb extensions etc).

TYPE 2 - Sub-arterial road with bus service



TYPICAL ROAD CROSS SECTION TYPE 2
SCALE : NTS
NOTE: ALL DIMENSIONS ARE SHOWN IN METRES

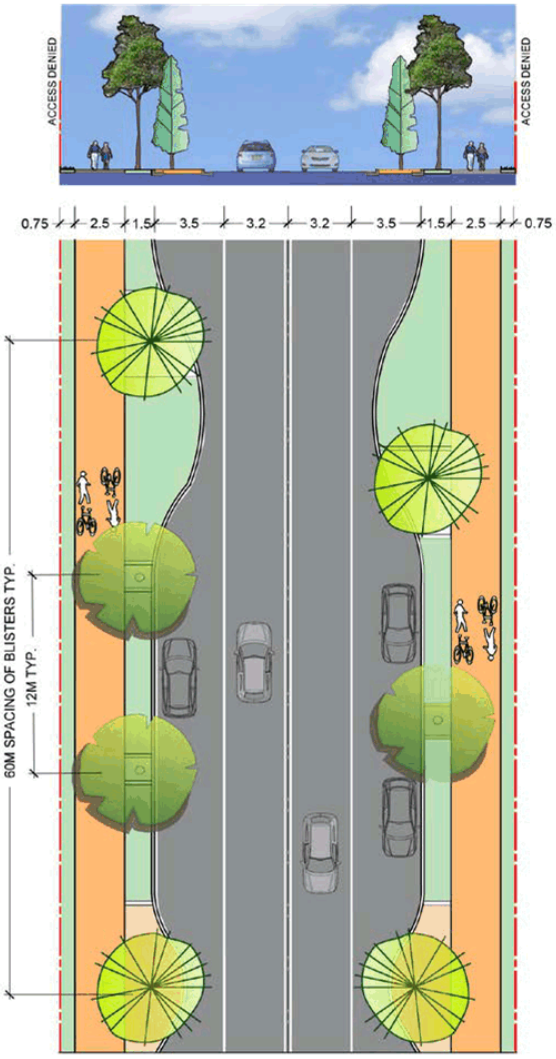
Objectives

1. Provide for high traffic volumes with 4 travel lanes.
2. Provide connectivity between neighbourhoods and local centres/higher order roads.
3. Direct access is not permitted (access denied).
4. Provide for bus routes and bus stops.
5. Design speed 70km/h, posted speed 60km/h.
6. Provide legible pedestrian and cycle network via shared paths on both sides of road.
7. All adjoining lots must provide an active frontage to the Type 2 road (can be direct frontage or via secondary parallel internal road).

Notes

1. The road capacity is considered to generally cater for greater than 15,000vpd.
2. Lighting can be provided within the verge.
3. A kerbside verge width of 1.5m has been provided to allow for space for trees.
4. Barrier kerb to be provided.
5. Bus stops shall be provided in the kerbside lane.
6. Intersections are to be controlled (signals, roundabouts) and provide appropriate pedestrian crossing facilities.
7. Priority controlled intersections will only be considered for left turns (eg Left-in/Left-out).
8. Controlled intersections (signals, roundabouts) are to be generally spaced a minimum of 400 metres apart.
9. Mid-block pedestrian crossings not permitted (eg refuges, marked crossings, kerb extensions etc).
10. Road reserve may need to be locally widened at intersections to allow for turn lane requirements.

TYPE 2A – Sub-arterial with bus service and parking



TYPICAL ROAD CROSS SECTION TYPE 2A

SCALE : NTS

NOTE: ALL DIMENSIONS ARE SHOWN IN METRES

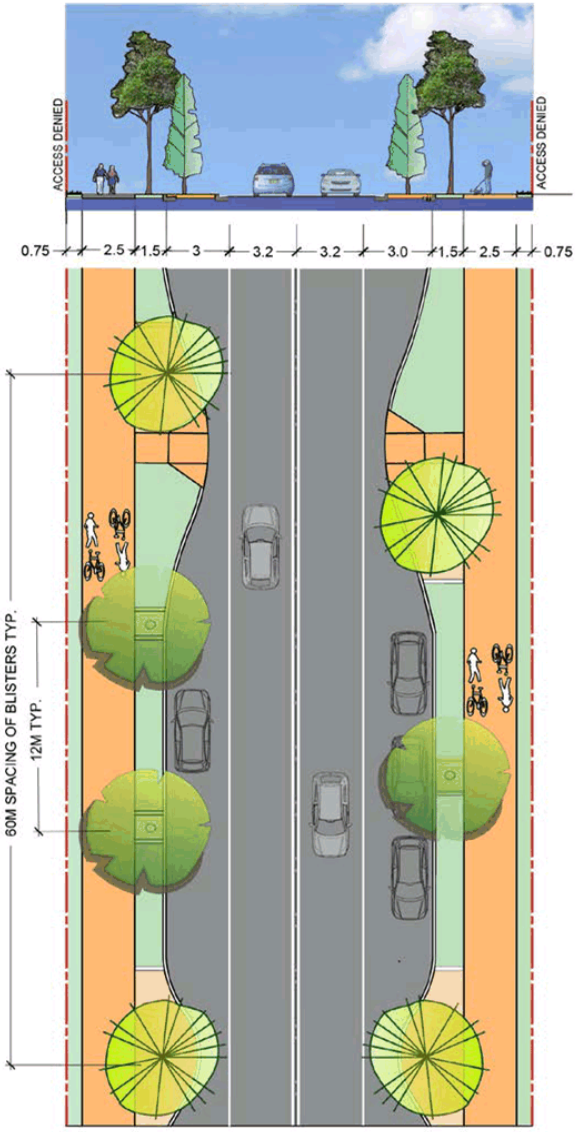
Objectives

1. Provide for moderate traffic volumes with 2 travel lanes and 2 parking lanes, with potential to provide 4-lane capacity when required.
2. Provide kerbside parking.
3. Allow for traffic calming and greening opportunity through provision of regular kerb extensions in parking lane.
4. Provide connectivity between neighbourhoods and local centres/higher order roads.
5. Direct access is not permitted (access denied).
6. Provide for bus routes and bus stops.
7. Design speed 70km/h, posted speed 60km/h.
8. Provide legible pedestrian and cycle network via shared paths on both sides of road.
9. All adjoining lots must provide an active frontage to the Type 2A road (can be direct frontage or via secondary parallel internal road).

Notes

1. The road capacity is considered to generally cater for 10,000 - 15,000vpd.
2. Lighting can be provided within the verge.
3. A kerbside verge width of 1.5m has been provided to allow for space for trees.
4. Barrier kerb to be provided.
5. Bus stops shall be provided in the kerbside (parking) lane.
6. Intersections are to be controlled (signals, roundabouts) and provide appropriate pedestrian crossing facilities.
7. Priority controlled intersections will only be considered for left turns (eg Left-in/Left-out).
8. Controlled intersections (signals, roundabouts) are to be generally spaced a minimum of 400 metres apart.
9. Mid-block pedestrian crossings generally not permitted (eg refuges, marked crossings, kerb extensions etc).
10. Road reserve may need to be locally widened at intersections to allow for turn lane requirements.

TYPE 3 - Major collector with bus service and parking



TYPICAL ROAD CROSS SECTION TYPE 3

SCALE : NTS NOTE: ALL DIMENSIONS ARE SHOWN IN METRES

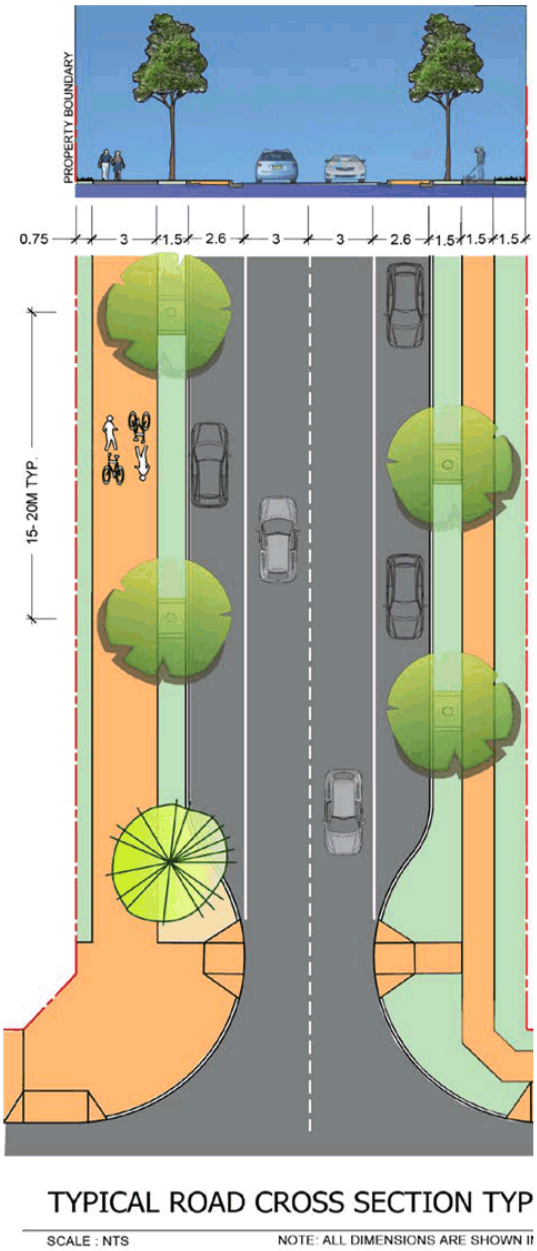
Objectives

1. Provide for moderate traffic volumes with 2 travel lanes and 2 parking lanes.
2. Provide kerbside parking.
3. Allow for traffic calming and greening opportunity through provision of regular kerb extensions in parking lane.
4. Provide connectivity between neighbourhoods and local centres/higher order roads.
5. Direct access is generally not permitted (access denied) but may be considered dependent on traffic demand.
6. Provide for bus routes and bus stops.
7. Design speed 70km/h, posted speed 60km/h.
8. Provide legible pedestrian and cycle network via shared paths on both sides of road.
9. All adjoining lots must provide an active frontage to the Type 3 road (can be direct frontage or via secondary parallel internal road).

Notes

1. The road capacity is considered to generally cater for 3,000 - 15,000vpd.
2. Lighting can be provided within the verge.
3. A kerbside verge width of 1.5m has been provided to allow for space for trees.
4. Barrier kerb to be provided.
5. Bus stops shall be provided in the kerbside (parking) lane.
6. Intersections are to be generally controlled (signals, roundabouts) and provide appropriate pedestrian crossing facilities.
7. Priority controlled intersections may be considered dependant on traffic demand.
8. Controlled intersections (signals, roundabouts) are to be generally spaced a minimum of 400 metres apart.
9. Mid-block pedestrian crossings may be considered based on traffic demand and location (eg refuges, marked crossings, kerb extensions etc).
10. Road reserve may need to be locally widened at intersections to allow for turn lane requirements.

Road Type 4 – Minor collector with parking and limited bus access



TYPICAL ROAD CROSS SECTION TYP

SCALE : NTS NOTE: ALL DIMENSIONS ARE SHOWN I

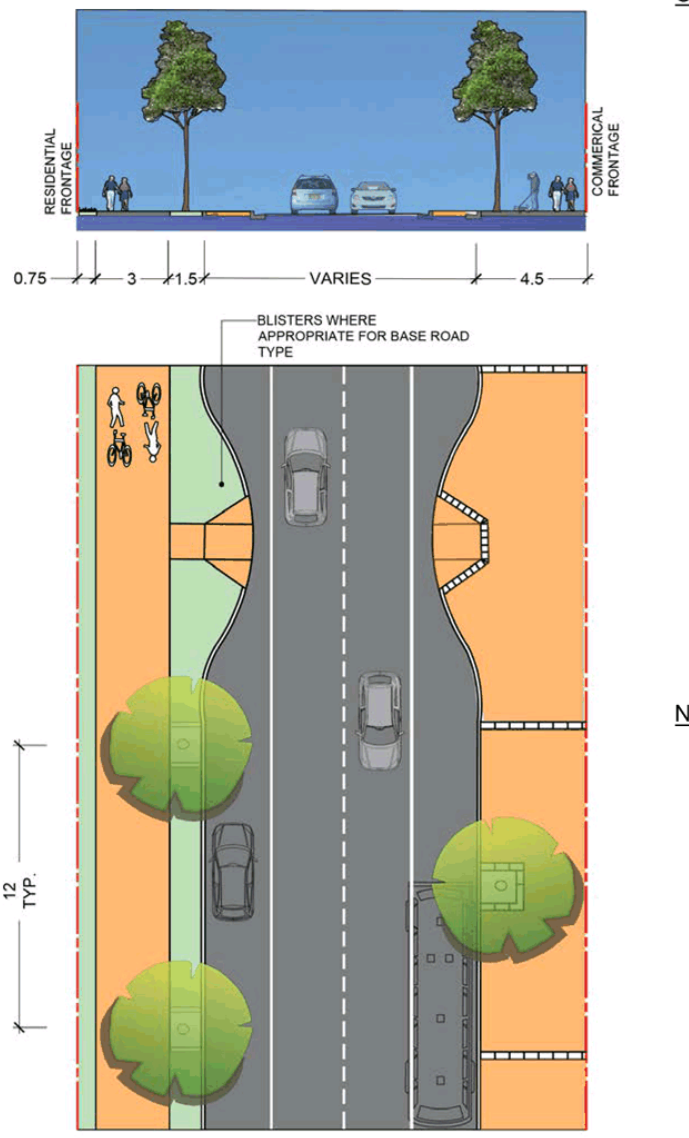
Objectives

1. Provide for low to moderate traffic volumes with 2 travel lanes and 2 parking lanes.
2. Provide kerbside parking.
3. Allow for traffic calming, greening opportunity and improved pedestrian safety through provision of kerb extensions at intersections.
4. Provide connectivity between and within neighbourhoods and to local centres/higher order roads.
5. Direct access is permitted.
6. Limited provision for bus route services in certain circumstances.
7. Design speed 60km/h, posted speed 50km/h.
8. Provide legible pedestrian and cycle network via shared path on one side and footpath on other.

Notes

1. The road capacity is considered to generally cater for 3,000 - 9,000vpd.
2. Lighting can be provided within the verge.
3. A kerbside verge width of 1.5m has been provided to allow for space for trees.
4. Barrier kerb to be provided.
5. Where a bus service exists, bus stops shall be provided in the kerbside (parking) lane.
6. Intersections with higher order roads to generally be controlled (signals, roundabouts) and provide appropriate pedestrian crossing facilities.
7. Priority controlled intersections may be considered where not intersecting the same or higher order road.
8. Road segment length shall be a maximum of 200m between intersections/bends.
9. Mid-block pedestrian crossings are generally acceptable (eg refuges, marked crossings, kerb extensions etc).
10. Verge trees are to be provided at one per lot, located to avoid impacts on utilities, driveways and drainage infrastructure.
11. Road reserve may need to be locally widened at intersections to allow for turn lane requirements.

Road Type TC – Town & Village Centre Road



TYPICAL ROAD CROSS SECTION TYPE TC

SCALE : NTS NOTE: ALL DIMENSIONS ARE SHOWN IN METRES

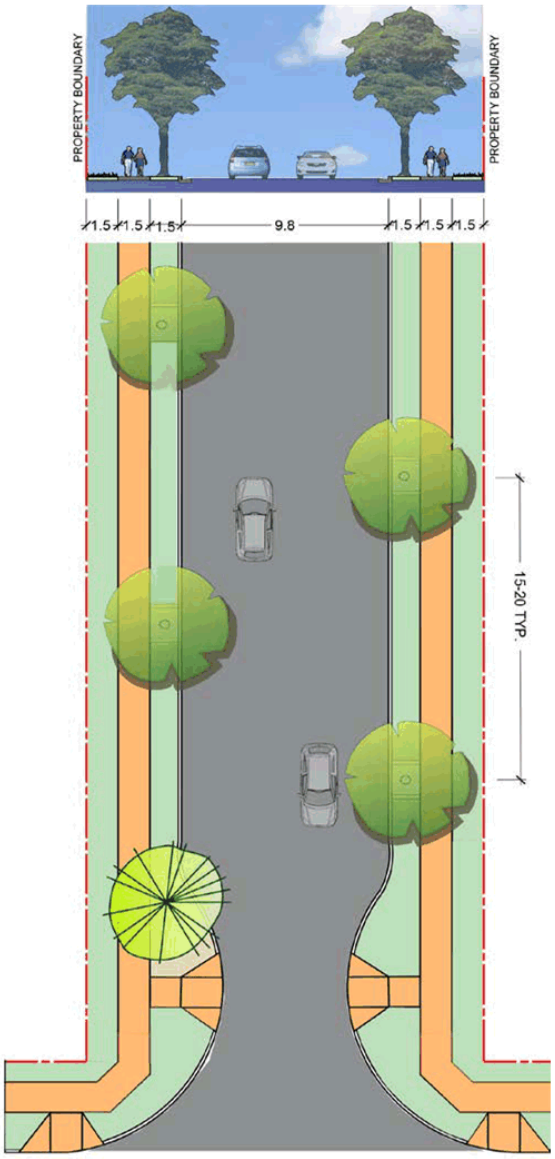
Objectives

1. Provide a variation on Road Types 2-4 specifically for town and village centre environments.
2. Provide for low to moderate traffic volumes.
3. Provide kerbside parking and bus stops.
4. Allow for traffic calming, greening opportunity and improved pedestrian safety through provision of kerb extensions mid-block &/or at intersections.
5. Provide connectivity to local centres/higher order roads.
6. Direct access may be considered on residential side (where relevant) depending on base road type and traffic demands.
7. Consolidation of access points to commercial development to maintain high level of pedestrian amenity and safety.
8. Allows for bus services.
9. Design speed generally 50km/h however road design should seek to encourage lower speeds in these high pedestrian activity areas.
10. Provide improved pedestrian/cyclist amenity through provision of full width sealed paths on commercial frontages and shared path on any residential frontage.

Notes

1. The road capacity varies depending on base road type.
2. Lighting can be provided within the verge (or median if provided).
3. A kerbside verge width of 1.5m has been provided to allow for space for trees on residential frontage.
4. Barrier kerb to be provided.
5. Verge trees to be provided within paved area on commercial frontage with tree grates.
6. Planter boxes, bus shelters and street furniture will be considered for paved verge adjacent commercial development.
7. Bus stops shall be provided in the kerbside (parking) lane.
8. Intersections with higher order roads to generally be controlled (signals, roundabouts) and provide appropriate pedestrian crossing facilities.
9. Priority controlled intersections can be considered depending on base road type and traffic demands.
10. Mid-block pedestrian crossings are generally acceptable (eg refuges, marked crossings, kerb extensions etc).
11. Median treatments can be considered however base road type lane widths must still be provided.
12. Road reserve may need to be locally widened at intersections to allow for turn lane requirements.

Road Type 5 – Local Road with parking



TYPICAL ROAD CROSS SECTION TYPE 5
SCALE : NTS NOTE: ALL DIMENSIONS ARE SHOWN IN MET

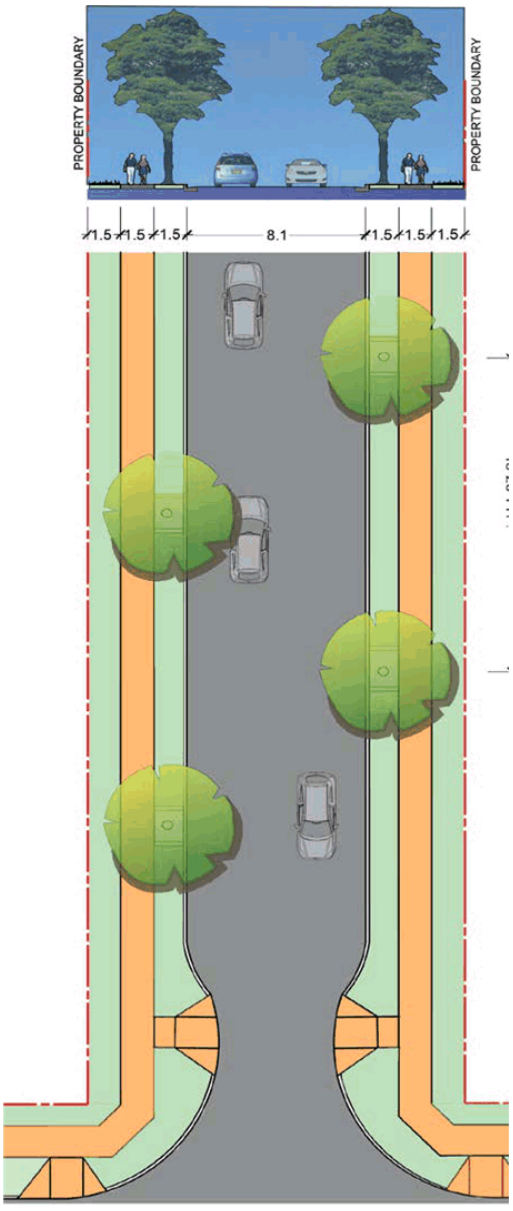
Objectives

1. Provide for low traffic volumes, access to properties and amenity in residential areas.
2. Provide kerbside parking.
3. Allow for traffic calming, greening opportunity and improved pedestrian safety through provision of kerb extensions at intersections.
4. Provide connectivity between and within neighbourhoods.
5. Direct access is permitted.
6. Not intended to cater for bus routes.
7. Design speed 60km/h, posted speed 50km/h.
8. Provide legible pedestrian access via footpaths on both sides of road.

Notes

1. The road capacity is considered to generally cater for less than 3,000vpd.
2. Lighting can be provided within the verge.
3. A kerbside verge width of 1.5m has been provided to allow for space for trees.
4. Road segment length shall be a maximum of 200m between intersections/bends.
5. Barrier kerb to be provided.
6. Intersections will generally be priority control however small roundabouts may be used for traffic calming (eg to break up long sections of road) &/or at 4-way intersections.
7. Traffic calming measures can be used to reduce the likelihood of through-traffic use (rat running).
8. Mid-block pedestrian crossings are generally acceptable (eg refuges, marked crossings, kerb extensions etc).
9. Verge trees are to be provided at one per lot, located to avoid impacts on utilities, driveways and drainage infrastructure.
10. Shared path is required (2.5m width) if the street forms part of a dedicated off-road cycle route (eg riparian shared path route).

Road Type 6 – Access Street



TYPICAL ROAD CROSS SECTION TYPI
SCALE : NTS NOTE: ALL DIMENSIONS ARE SHOWN IN

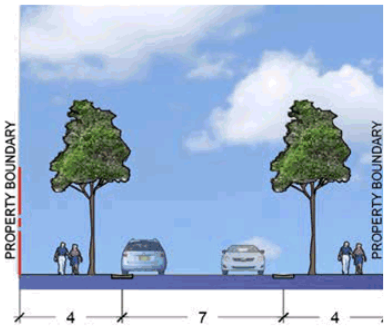
Objectives

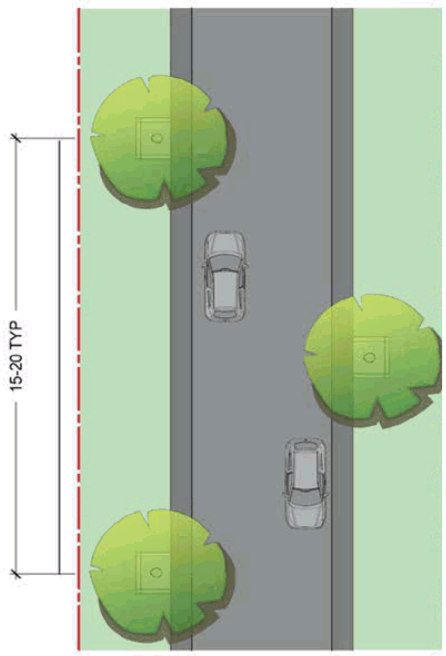
1. To provide access to properties and amenity in residential areas.
2. Allows for some casual on-street parking.
3. Allow for traffic calming, greening opportunity and improved pedestrian safety through provision of kerb extensions at intersections.
4. Provide connectivity within neighbourhoods/subdivisions.
5. Direct access is permitted.
6. Does not cater for buses.
7. Design speed 60km/h, posted speed 50km/h.
8. Provide legible pedestrian access via footpaths on both sides of road.

Notes

1. The road capacity is considered to generally cater for less than 1,000vpd.
2. Lighting can be provided within the verge.
3. A kerbside verge width of 1.5m has been provided to allow for space for trees.
4. Road segment length shall be a maximum of 200m between intersections/bends.
5. Barrier kerb to be provided.
6. Intersections will generally be priority control.
7. Verge trees are to be provided at one per lot, located to avoid impacts on utilities, driveways and drainage infrastructure.
8. Shared path is required (2.5m width) if the street forms part of a dedicated off-road cycle route (eg riparian shared path route).

Road Type 7 – Access Place





TYPICAL ROAD CROSS SECTION TYPE 7
SCALE : NTS
NOTE: ALL DIMENSION ARE SHOWN IN METRI

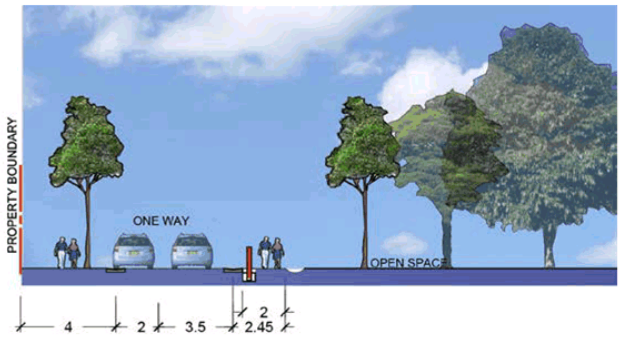
Objectives

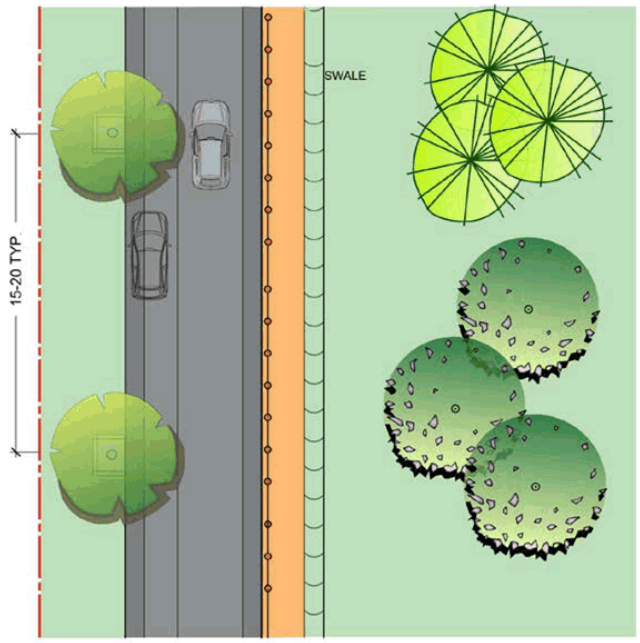
1. Provide for access to small sections of properties & high pedestrian/cyclist amenity in residential areas – no through traffic.
2. Allows for some casual on-street parking.
3. Direct access is permitted.
4. Does not cater for buses.
5. Urban default speed limit of 50km/h applies, however lower speeds maintained through geometry/design.

Notes

1. The road capacity is considered to generally cater for up to 300vpd (ie approx. 30 properties).
2. Lot layout shall be designed to ensure staggered on-street parking in order to present a clear travel lane with passing opportunities.
3. Provides dish drains rather than barrier kerb to increase pedestrian amenity.
4. Road segment length shall be a maximum of 100 metres.
5. Lighting can be provided within the verge.
6. Verge trees are to be provided at one per lot, located to avoid impacts on utilities, driveways and drainage infrastructure.
7. This road type does not provide kerb and gutter for builders to connect stormwater into. The applicant will need to provide a piped stormwater connection point within each lot (eg stub, or pit) draining to the receiving stormwater system.
8. The final method of stormwater collection (ie dish drain, swale, etc) is subject to Council approval.
9. Concrete footpath (1.5m width) is required if the street forms part of a dedicated pedestrian route.
10. Shared path is required (2.5m width) if the street forms part of a dedicated off-road cycle route (eg riparian shared path route).

Road Type 7A – Access Place adjacent to open space (one-way traffic)





TYPICAL ROAD CROSS SECTION TYPE 7A

SCALE : NTS NOTE: ALL DIMENSIONS ARE SHOWN IN METRES

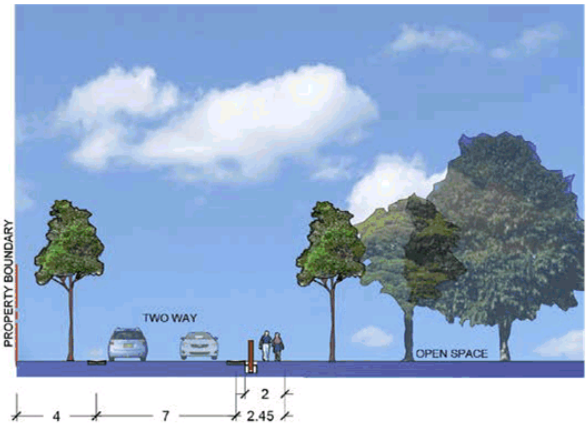
Objectives

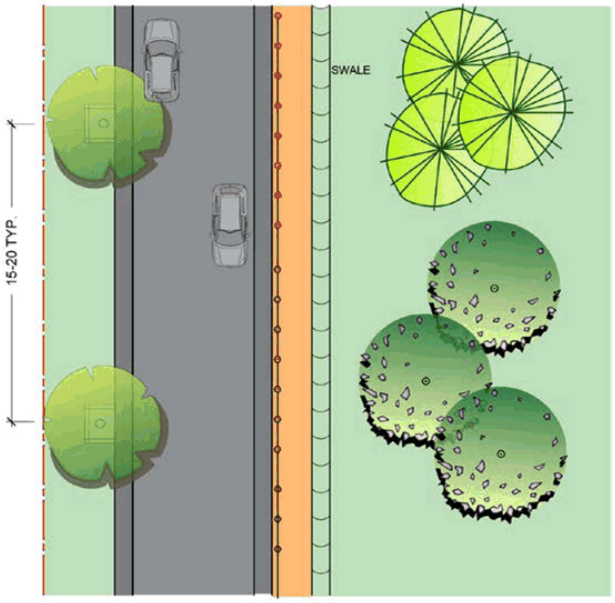
1. Provide for access to small sections of properties & high pedestrian/cyclist amenity in residential areas – no through traffic.
2. Provide for informal access to open space, whilst not generating any more than 300vpd.
3. Allows for some casual on-street parking.
4. Direct access is permitted.
5. Does not cater for buses.
6. Urban default speed limit of 50km/h applies, however lower speeds maintained through geometry/design.

Notes

1. This road is one-way and only permitted adjacent to open space and excludes sporting fields.
2. The road capacity is considered to generally cater for up to 300vpd (ie up to approx. 30 properties) and must include any anticipated traffic from open space component.
3. Provides dish drains rather than barrier kerb to increase pedestrian amenity.
4. Road segment length shall be a maximum of 100 metres.
5. Lighting can be provided within the verge.
6. Verge trees are to be provided at one per lot, located to avoid impacts on utilities, driveways and drainage infrastructure.
7. This road type does not provide kerb and gutter for builders to connect stormwater into. The applicant will need to provide a piped stormwater connection point within each lot (eg stub, or pit) draining to the receiving stormwater system.
8. The final method of stormwater collection (ie dish drain, swale, etc) is subject to Council approval.
9. Verge tree planting on open space side is not required – these requirements will be dealt with separately to the road section.
10. Shared path is required (2.5m width) if the street forms part of a dedicated off-road cycle route (eg riparian shared path route).

Road Type 7B – Access Place adjacent to open space (two-way traffic)





TYPICAL ROAD CROSS SECTION TYPE 7B

SCALE : NTS NOTE: ALL DIMENSIONS ARE SHOWN IN METRES

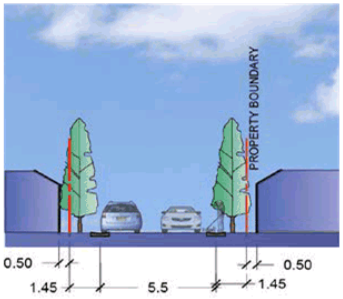
Objectives

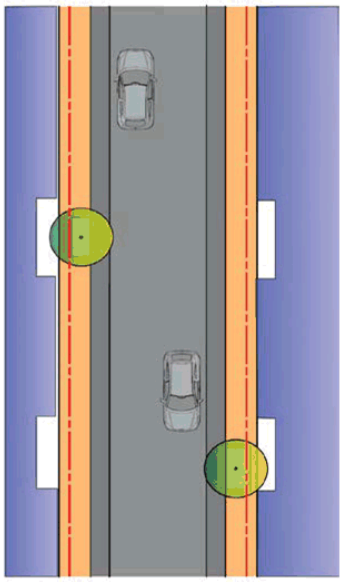
1. Provide for access to small sections of properties & high pedestrian/cyclist amenity in residential areas – no through traffic.
2. Provide for informal access to open space with improved parking opportunity, whilst not generating any more than 300vpd.
3. Allows for some casual on-street parking.
4. Direct access is permitted.
5. Does not cater for buses.
6. Urban default speed limit of 50km/h applies, however lower speeds maintained through geometry/design.

Notes

1. This road is two-way and only permitted adjacent to open space and excludes sporting fields.
2. The road capacity is considered to generally cater for up to 300vpd (ie up to approx. 30 properties) and must include any anticipated traffic from open space component.
3. Road segment length shall be a maximum of 100 metres.
4. Provides dish drains rather than barrier kerb to increase pedestrian amenity.
5. Lighting can be provided within the verge.
6. Verge trees are to be provided at one per lot, located to avoid impacts on utilities, driveways and drainage infrastructure.
7. This road type does not provide kerb and gutter for builders to connect stormwater into. The applicant will need to provide a piped stormwater connection point within each lot (eg stub, or pit) draining to the receiving stormwater system.
8. The final method of stormwater collection (ie dish drain, swale, etc) is subject to Council approval.
9. Verge tree planting on open space side is not required – these requirements will be dealt with separately to the road section.
10. Shared path is required (2.5m width) if the street forms part of a dedicated off-road cycle route (eg riparian shared path route).

Road Type 8 – Laneway





TYPICAL ROAD CROSS SECTION TYPE 8

SCALE : NTS NOTE: ALL DIMENSIONS ARE SHOWN IN METRES

Objectives

1. Provide vehicular access to the rear or side of lots where front access is restricted or not possible.
2. To maximise on-street parking and landscaping in residential street frontages.
3. Provide housing density, diversity and affordable housing options.
4. Reduce vehicular conflict through reduced driveway cross overs on the main road frontage.
5. To create a slow speed zone that is distinctly different in character and materials to residential streets.
6. Urban default speed limit of 50km/h applies, however lower speeds maintained through geometry/design.
7. Does not cater for buses.
8. Verge design allows space for pedestrians, garbage bins, planting and lighting, whilst not encouraging casual parking, storage of boats/trailers etc.
9. All lots adjoining a laneway are to utilise the laneway for vehicular/garage access.

Notes

1. The lane capacity is considered to generally cater for up to 300vpd (ie up to approx. 30 properties).
2. “C” shaped laneways are to be avoided as they do not provide good sightlines for passive surveillance.
3. Lighting can be provided within the verge.
4. No raised kerb is to be provided in laneways to increase pedestrian amenity.
5. Verge trees of appropriate species are to be provided within the verge area (tree grates may be utilised).
6. This road type does not provide kerb and gutter for builders to connect stormwater into. The applicant will need to provide a piped stormwater connection point within each lot (eg stub, or pit) draining to the receiving stormwater system.
7. Any bends or intersections in the laneway must be designed to permit garbage truck movements.
8. Passive surveillance along the laneway from upper storey rooms or balconies of secondary dwellings, studios, lofts over garages &/or principle dwelling is encouraged.
9. No more than 25% of the lots adjoining lanes (excluding corner lots) are to have secondary dwellings or strata studios.
10. The intersection of laneways with other roads should not be designed as a typical street intersection with kerb returns, but instead as a driveway entrance (ie vehicle crossover). Any footpath or shared path along the main road frontage is to be continued across the laneway intersection.

14.3 Road and drainage construction

Objective

(a) To ensure all residential lots have suitable, safe and efficient access to and from public roads and that all road and stormwater drainage infrastructure works are properly constructed.

Development Controls

1. All allotments in a subdivision must gain direct access to / from a properly formed public road.
2. The full cost of the construction of new roads (including the construction of the road carriageway, footpaths and / or shared paths, full kerb and gutter, street tree planting etc), stormwater drainage and the provision of infrastructure services to a subdivision will be borne by the subdivider / developer.
3. The required road, stormwater drainage and infrastructure works shall be constructed in accordance with Council's Subdivision Policy and any necessary requirements by the infrastructure service authority. The roadworks, drainage works and infrastructure services shall be completed, prior to the issuing of a Subdivision Certificate. For approved staged subdivisions, all required road, drainage and infrastructure works must be completed for each stage prior to the issue of the Subdivision Certificate for each respective stage.

14.4 Upgrading poorly constructed or unformed roads

Objective

(a) To ensure all residential lots have suitable, safe and efficient access to and from public roads and that all road and stormwater drainage infrastructure works are properly constructed.

Development Controls

1. All allotments in a subdivision must gain direct access to / from a properly formed public road.
2. In areas where the subdivision fronts a poorly constructed or unformed public road, the subdivision will be subject to the construction of full kerb and gutter, stormwater drainage, full or half road construction and sealing in addition to the provision of nature strips with a 3% cross fall to the roadway. The final decision as to the level of construction required will be at the discretion of Council.

14.5 Half-road construction

Objective

(a) To ensure half road construction is undertaken to effectively and safely meet the needs of road users both in the interim (half road) and final (full road) scenario.

Development Controls

1. Where a subdivision fronts an existing road and requires a road upgrade, it is the developer's responsibility to design and construct the half-road with the associated pedestrian / shared path facilities, adjacent to the subject property. The road and path widths are determined by the road type.
2. Roads with an existing frontage that require half-road construction require a minimum 3m existing travelling lane from the new crown of the road.
3. The construction of the half road requires overlapping of longitudinal joints and may require additional pavement construction of an existing road.

14.6 Bus Routes and public transport

Objectives

(a) Encourage bus services to link existing urban areas (especially business centres) with new residential subdivisions within new release areas.

(b) Ensure residential subdivisions within new release areas are designed to ensure safe, convenient and efficient bus routes within reasonable walking distance to the majority of residential lots in a subdivision.

(c) Provide safe and convenient bus stops along the planned bus route.

Development Controls

1. Large residential subdivisions should be designed to make provision for a bus service to link existing urban areas with the new residential subdivisions. The bus route should be designed to provide adequate servicing by bus companies. Therefore, consultation should take place with the local bus companies and Transport for NSW to determine whether a bus service can be provided within or connecting to the new residential subdivision.
2. The design of roads and infrastructure to support bus servicing should be in accordance with relevant Australian Standards, AUSTROADS guidelines and *'Guidelines for Public Transport Capable Infrastructure in Greenfield Sites'* (Transport for NSW).
3. The bus route should be generally designed along collector roads and linked up to sub-arterial or arterial roads, due to the requirement for wider road carriageways.
4. Bus stops should be generally located within 400 metres walking distance for 90% of the lots in the immediate locality.
5. Bus stop locations should be located to maximize active transport accessibility via footpath and shared path networks.
6. Any proposed roundabout on a bus route must be designed to satisfactorily accommodate bus maneuvering through and around the roundabout.
7. Bus shelters are to be provided at all bus stops. Bus shelters are to be located in positions that will service the maximum number of dwellings. The approved bus shelters are to be installed during the subdivision construction stage by the property developer involved in the subdivision.
8. Bus stops should be easily accessible for all people (including people with a disability), well defined and within casual observation from nearby dwellings, whilst minimising any interference with the streetscape amenity of the locality. All pedestrian pathways leading to and from bus stops should be designed to have a maximum gradient of 1 in 14 and be in compliance with relevant AUSTROADS guidelines and Australian Standards.
9. Safe pedestrian crossing points should be provided at each bus stop on local roads by the introduction of kerb extensions and refuges and in accordance with the requirements of Council. For collector/arterial roads safe pedestrian crossing should be provided by locating stops near controlled crossing points (traffic signals, roundabouts).

14.7 Cul-de-sacs and turning heads

Objectives

(a) Restrict the length of cul-de-sacs within a residential subdivision to improve accessibility to public transport facilities such as bus stops and provide more direct vehicular access arrangements for emergency vehicles.

(b) Ensure cul-de-sacs and turning heads are designed to provide safe and efficient vehicular access for cars, waste collection and recycling trucks, removalist trucks, emergency vehicles etc.

(c) Ensure all new residential lots are capable of being either accessed or serviced by emergency vehicles and other non-passenger vehicles such as waste and recycling collection trucks and removalist trucks, without adversely affecting the performance or safety of the surrounding road network.

(d) Restrict "T" or "Y" turning heads to smaller cul-de-sacs which serve a limited number of residential lots within a subdivision.

Development Controls

1. The maximum length of any cul-de-sac should be 80 metres, in order to ensure adequate accessibility to public transport facilities such as bus stops as well as suitable access arrangements for emergency service vehicles and waste disposal vehicles.
2. The minimum kerb radius for the turning head of any small residential cul-de-sac (ie serving a maximum 30 dwellings / allotments) shall be 10.5 metres.
3. "T" or "Y" turning heads will only be permitted within small cul-de-sacs / access roads which serve up to a maximum of 10 lots / dwellings. In most cases, a "Y" turning head configuration is preferred, in order to discourage potential parking in the turning space. Turning heads must provide sufficient space for larger vehicles such as waste, emergency services and recycling collection trucks to make a three point turn.
4. Where a "T" or "Y" turning head is proposed, a suitable waste and recycling bin storage area(s) must be carefully positioned on the left hand side (forward direction of the truck). The bin storage area(s) must not be located any closer than 5 metres from the forward end and 8 metres from the reverse end of the "T" or "Y" turning head. This is to ensure that waste and recycling collection trucks are able to satisfactorily service the bin storage areas.

14.8 Roundabouts and road junctions

Objective

(a) Ensure all roundabouts and road junctions are safe, designed in accordance with traffic engineering best practice and appropriately spaced to help define residential areas.

Development Controls

1. Roundabouts and other road junctions are to be designed in accordance with the requirements of the relevant AUSTROADS and RMS guidelines and Australian Standards. Roundabouts must also be designed to provide for safe passage of pedestrians and cyclists.
2. The design and construction of a roundabout upon an existing or proposed public road will be subject to the separate approval of Council's Infrastructure Division. As part of this consideration, Council's Infrastructure Division will also consider the whole of life assets cost of the roundabout and determine whether landscaping or hard finishings to the centre island of the roundabout is required.
3. The minimum distance between an access road and a collector road shall be 60 metres where the junction is on the same side of the road or 40 metres where the junction is located on the opposite side of the road.
4. The minimum distance between collector roads shall be 120 metres if the junction is on the same side or 100 metres where the junction is staggered on the opposite side of the road.
5. All intersections are to be T-junctions or roundabouts (ie subject to Council's agreement as to the location and design of any proposed roundabout).

14.9 Traffic control measures

Objectives

(a) Provide appropriate traffic calming devices, in order to improve traffic management flow within large residential subdivisions.

(b) Provide appropriate traffic control devices and signs within residential subdivisions, in order to ensure traffic safety.

Development Controls

1. Traffic calming devices such as thresholds, slow points, speed humps, chicanes and splitter islands are to be designed in accordance with the requirements of relevant AUSTROADS and RMS guidelines and Australian Standards.. Any proposed traffic calming devices will require the approval by Council's Local Traffic Committee.
2. Traffic control signs, pavement markings and guideposts are to be provided for roads,

intersections, pedestrian / cycle paths in accordance with the relevant AUSTROADS and RMS guidelines and Australian Standards.

Location of Traffic Calming Devices

1. The location of traffic calming devices must be consistent with the streetscape requirements of the locality and must also be based upon the location of existing and / or proposed street lighting, drainage pits, driveway crossings, on-street car parking requirements and the location of utility services.

Traffic Calming Devices – Design Vehicles

1. Any proposed traffic calming device must be designed to enable emergency vehicles and garbage trucks to reach all properties from the road.

2. Traffic calming devices upon local roads with a feeding function between arterial or sub-arterial roads and access streets are to be designed in accordance with a 14.5 metre long rigid truck / bus as per AUSTROADS Guide to Traffic Engineering Practice (Drawing No.SD037).

3. Raised platform threshold treatments are not permitted where such treatments may be used as pedestrian crossings by pedestrians.

Design Speed Controls

1. A reduction in vehicular speed can be achieved by creating a visual environment conducive to lower speeds through using landscaping treatments and other traffic calming devices to segment streets into relatively short road lengths (ie generally less than 300 metres long).

2. Speed reduction can also be achieved through using traffic calming devices which shift vehicle travel paths laterally (eg slow points, roundabouts, corner treatments) or vertically through humps, platform intersections etc).

Sight Distance Requirements

1. Any proposed traffic calming device must be designed to cater for critical sight distances for the design operating speed of the subject road.

2. Speed control devices (such as narrowed threshold treatments) should be located in close proximity to existing or proposed street lighting. Any such traffic calming measures must incorporate appropriate reflective treatments to delineate the vehicular travel path.

Streetscape Requirements for Traffic Calming Devices

1. The main streetscape issues to be taken into account in the design of traffic calming devices include the following:

   (a) Improve the landscape character of the locality;

   (b) Reduce the linearity of roads by segmentation;

   (c) Avoid continuous long straight lines (kerb lines) for local roads; and

   (d) Maximise the continuity between existing and new landscape areas.

14.10 Splay corners

Objective

(a) Provide appropriate splay corners at intersections within residential subdivisions, to ensure adequate sight line distances.

Development Controls

1. All intersections in a subdivision shall be provided with a minimum 4.25 metre splay or as required

by Council's Infrastructure Division.

14.11 Street lighting and fire hydrants

Objectives

(a) Provide effective street lighting along all roads within the subdivision, to maximise vehicular and pedestrian safety.

(b) Provide appropriate street lighting at key intersections and pedestrian crossings as well as traffic calming device locations to maximise vehicular and pedestrian safety.

(c) Provide appropriate lighting along all pedestrian pathways and / or shared pathways / cycle ways, in order to maximise pedestrian and cyclist safety.

(d) Provide fire hydrants within close proximity to all residential lots in a subdivision in accordance with the relevant Australian Standard and the requirements of Sydney Water Corporation and Fire and Rescue NSW.

Development Controls

1. Electric street lighting systems are to be provided for roads and intersections as well as pedestrian crossing and traffic calming device locations in accordance with AS / NZS 1158 Road Lighting as indicated in the following Table 3.

2. All allotments created must be within 60 metres to a fire hydrant in accordance with Australian Standard AS 2419. The proposed location of fire hydrants shall be shown on the subdivision plan.

Table 3: Road type - street lighting requirements

Road Type	Street Lighting Category (AS 1158)
Arterial Roads	V4
Collector Road (>7000 vehicles / day)	P3
Collector Road (<7000 vehicles / day)	P4
Access Road in Business Areas	P3
Access Road	P4
Laneway	P5
Public Pathways & Cycleways	P4
Car parks	P11
Traffic Calming Device (including roundabout)	Horizontal illuminance min. of 3.5 lux
Pedestrian Refuge	Horizontal illuminance min. of 3.5 lux

Note: Category of illumination is defined in AS 1158 Part 1.1 and Part 3.1. All lighting designs are to be prepared in accordance with AS / NZS 1158 for the above specified categories.

14.12 Restricted access to arterial or sub-arterial roads

Objectives

(a) Restrict access to any arterial or sub-arterial road to maintain satisfactory traffic flows and safety along such roads, where alternative public road access is available and practicable.

(b) When deemed necessary, create legal restrictions prohibiting direct access to designated roads (Arterial or Sub-Arterial Roads).

(c) Create temporary access agreements for designated roads (Arterial or Sub-Arterial Roads).

Development Controls

1. Direct access to any arterial or sub-arterial road will not be permitted where alternate public road access is available. However, direct property access to / from an arterial or sub-arterial road will not be restricted until such time as alternate public road access is available.
2. Council may require as a condition of consent as part of any subdivision or development that a suitable restriction on the use of land be created pursuant to the provisions of Section 88B of the Conveyancing Act 1919, in order to legally prohibit direct access to / from any adjoining Arterial or Sub-Arterial Road where alternative direct public road access is available to / from the subject site.
3. Temporary access may be granted to a designated road (arterial or sub-arterial road) where alternate public access has not yet been completed. However, this temporary access arrangement will be dependent upon the nature of the access arrangement in relation to the arterial or sub-arterial road. Additionally, the formal concurrence of the NSW Roads and Maritime Services may be required.

15 BUSHFIRE PROTECTION

Objectives

(a) Proposed residential subdivisions designed to minimise the potential bush fire hazard risk to prevent future loss of, and damage to life, property and the environment due to bushfires.

(b) Residential subdivision designed to minimise the siting of future dwellings away from ridge tops and other steeply sloping land, especially upslope lands, within saddles or narrow ridge crests.

(c) Proposed residential subdivisions designed to provide an efficient and safe road network which minimises potential bottle-necks.

(d) Minimise the impact of fire protection measures on vegetation, fauna, views, watercourses and soil erosion, amenity and safe access.

(e) Ensure each residential subdivision upon bush fire prone land is designed to provide satisfactory asset protection zones (APZ) between areas of potential hazard and development.

Development Controls

1. New residential subdivisions in bush fire hazard prone lands will generally require a perimeter road system to assist in providing space and access to fire fighting vehicles. Council will refer to NSW Rural Fire Service regarding compliance with specifications and requirements.
2. Any proposed residential subdivision upon land classified as bush fire prone land is an Integrated Development Application under the *Environmental Planning and Assessment Act 1979*. As such, formal concurrence is required from the NSW Rural Fire Service, pursuant to section 100B of the *Rural Fires Act 1997.*
3. Any Integrated Development Application for residential subdivision upon bush fire prone land will be subject to compliance with the requirements of NSW Rural Fire Service publication *"Planning for Bush Fire Protection".* The application must be accompanied by a bush fire assessment report. The bush fire assessment report must be prepared by a suitably qualified and experienced bush fire consultant and must provide a comprehensive assessment as to how the proposed development complies with the relevant specifications and requirements.

   The Statement of Environmental Effects (SEE) should specifically address the findings and conclusions of the bush fire assessment report to ensure compliance with the *"Planning for Bush Fire Protection"*. The findings and conclusions of the bush fire assessment report should also be reflected in the design of the proposed subdivision. Council will refer this information to NSW Rural Fire Service for assessment advice.

16 STORMWATER DRAINAGE

Objectives

(a) Minimise stormwater drainage run-off impacts upon downstream properties.

(b) Limit post development discharges to pre-development levels.

(c) Provide a sustainable stormwater drainage and water quality environment incorporating both natural and man-made landscape features and which is aesthetically pleasing.

(d) To encourage water sensitive urban design initiatives for larger residential subdivisions, in order to maintain or enhance the water quality in watercourses.

Development Controls

1. A detailed stormwater drainage concept plan together with calculations is required to be submitted with the Development Application.
2. The proposed stormwater drainage system for the subdivision shall be designed in accordance with the requirements of the Stormwater Management & Water Sensitive Urban Design chapters in Part E of the DCP.
3. For subdivisions involving 20 or more allotments, the proposed stormwater drainage system must incorporate water sensitive urban design techniques, wherever possible, in order to minimise runoff and restrict discharge from the site. This may be achieved by using grass swale drains, bio-filtration, bio-retention basins, detention ponds, reuse systems and retention of natural watercourses including wetlands and pool and riffle zones etc. Other stormwater quality improvement measures such as artificial wetlands, sedimentation basins and gross pollutant traps or trash racks may also be provided to facilitate the removal of sediment and other pollutants.
4. Where water sensitive urban design features (eg grass swales, bio-filtration measures, water quality detention ponds or basins etc) are proposed to be ultimately handed over to Council, upfront consultation is required to be held with Council prior to the lodgment of any subdivision application. This will ensure that appropriate design parameters, minimum performance requirements, monitoring and maintenance regimes are agreed upon between Council and the subdivider for each relevant WSUD treatment measure upfront. In the event that no agreement is reached upfront, Council is unlikely to accept the handover of any such assets.
5. All stormwater drainage systems are to be designed considering 'living waterways' as places for people. Some protections may be needed to prevent access to any highly hazardous features of drainage and water quality facilities.
6. The discharge of stormwater runoff must be restricted into a lawful point of discharge such as a natural watercourse or waterway to which the development site naturally drains or existing stormwater drainage systems as agreed to by Council.
7. Where there is no existing lawful point of discharge, the applicant must:
   (a) Dedicate the discharge point to Council's connecting reserves or easements that provide legal continuity from the site to an off-site legal point of discharge into a natural watercourse or waterway or suitable public stormwater drainage system and
   (b) Construct the necessary connecting drainage works.
8. For downward sloping sites away from public roads or watercourses, written documentary evidence must be provided from downstream property owners which confirms their agreement for stormwater drainage pipes and associated creation of necessary easements through their properties, in order to guarantee that satisfactory arrangements have been made for stormwater drainage from the site.
9. The provision of inter-allotment drainage is required where drainage pipelines convey stormwater from private residential lots across other adjoining residential lots (ie not draining directly to a public road). The creation of 1.5 metre wide inter-allotment drainage easements will be required as part of the subdivision. The inter-allotment drainage easements shall not be vested in Council.
10. Where it is necessary to connect into Council's existing stormwater drainage system, the capacity of the existing stormwater drainage system is to be checked to ensure its capacity of accepting the additional developed run-off from this development. Costs associated with any necessary upgrading or drainage is to be borne by the developer and work is to be undertaken in accordance with Council's Subdivision Policy and Part E Stormwater Management chapter to this DCP.

17 RIPARIAN LAND MANAGEMENT

Objectives

(a) Protect urban creeks and riparian corridors and their native ecology from further degradation and improve their environmental function.

(b) Maintain or enhance the stability of the bed and banks of a watercourse.

(c) Minimize 'edge effects' at the riparian corridor / urban interface by the provision of a suitable riparian corridor width and create borders with perimeter road systems and pedestrian/cycle paths.

(d) To ensure riparian land management measures are compatible with floodplain risk management objectives.

Development Controls

1. Any proposed residential subdivision involving waterfront land on, in or within 40 metres of the top of bank of a river, creek or intermittent watercourse, lake or estuary will be subject to compliance with the requirements of Chapter E23 Riparian Corridor Management in this DCP.

2. Any riparian land within a subdivision will be subject to a Vegetation Management Plan (VMP) to assist in establishing an ongoing management process. This VMP will include ownership, maintenance and management arrangements.

18 SERVICING ARRANGEMENTS

Objectives

(a) To ensure the provision of infrastructure servicing / utilities is carried out in accordance with the requirements of Council and the relevant infrastructure servicing authority.

(b) To maximise the opportunities for shared (common) trenching and to reduce constraints on landscaping within road reserve verges.

Development Controls

1. It is recommended applicants consult with servicing authorities at an early stage in the planning process to ensure that all allotments can be appropriately serviced by reticulated water and sewerage and electricity supplies as different servicing needs may require subdivision lot/layout design responses.

2. Shared common trenches for service infrastructure to be underground are preferred in order to also enable the planting of trees and other landscaping within the road verges.

3. In the event that the subdivision cannot be adequately serviced by reticulated water and sewerage supplies, then Council is unlikely to support any such application.

4. Where a subdivision is approved, a condition of consent will be imposed requiring the submission of a Notice of Requirements from Sydney Water Corporation to Council prior to the release of the Construction Certificate for the proposed subdivision. Additionally, a separate condition of consent will be imposed requiring the submission of a Section 73 certificate from Sydney Water Corporation which confirms that satisfactory arrangements have been made for reticulated water and sewerage infrastructure to the subdivision and the original Section 73 Certificate lodged with the Subdivision Certificate application.

5. Electricity distribution must be underground in all new residential subdivisions. Accordingly, the subdivision plan should provide details of the location of any required electricity sub-stations.

6. Telecommunication services are to be provided to all proposed lots. The submission of documentary evidence from a telecommunications carrier will be required for any approved subdivision, prior to the release of the Subdivision Certificate.

7. All allotments must be designed to enable the suitable provision for waste facilities. In cul-de- sacs, the head of the cul-de-sac must be designed to provide sufficient road reserve width (footpath area), in order to enable the storage of garbage and recycling bins without hindering access to adjacent properties.

8. Battle axe allotments shall be designed to include sufficient area within the existing public road reserve verge to cater for the provision of garbage and recycling bins. Alternatively, a garbage and recycling bin storage area may be provided within close proximity to the adjoining public road, but will be subject to private waste servicing arrangements being made by the property owner in the event that Council's waste contractor is not able to service the bin storage area.

9. Applicants are encouraged to liaise with Council's Waste Services Section of the City Works Division, in order to guarantee satisfactory waste service arrangements and to minimise potential future problems arising from poorly designed waste and recycling storage facilities.

19 ROAD ADDRESSING

Objectives

(a) To ensure that addressing of property is undertaken in a consistent approach across NSW.

(b) To ensure logical and unique identification of property.

(c) Provide improved clarity and direction for emergency services and the community.

(d) Addressing to reflect longstanding address identification to minimise confusion and reduce disruption to the local community.

Development Controls

1. Lot numbering (assignment of address numbers) and road naming is to be undertaken in accordance with the Geographical Names Board - NSW Addressing User Manual.

2. Council has a responsibility to clearly identify public roads in accordance with the Roads Act 1993, and in the interests of public information and safety.

3. Where new roads exist the developer is to apply for a road naming application for the names of new road(s), together with the reasons for the names proposed, should be submitted in accordance with Council's Road Naming Policy for Council's consideration.

4. Where no suggestions are received for the naming of roads, Council will determine the street names.

5. New street name signs are to be paid for and installed by developers.

6. As part of the road naming procedures under the Roads Act 1993, Council will forward the proposed road names in a subdivision to the Geographical Names Board for the Board's appropriate comment. In cases where the Geographic Names Board does not support the proposed road naming, Council will request alternative road names and in certain cases will liaise with the applicant.

7. For any classified roads, the NSW Roads and Maritime Services will determine the road name in consultation with the Geographic Names Board.

8. Upon receipt of development consent Council can assign address numbers. Addressing for lots will be provided from Council according to Councils Property addressing policy, prior to the issue of a construction certificate.

9. Poor or inadequate house numbering (or even no numbering at all) can seriously hamper emergency services in the performance of their duties. Street / property numbering shall be clearly and permanently displayed at the primary frontage of each lot.

20 SUBDIVISION HANDOVER

Objectives

(a) Ensure that local Council assets are handed over to Council in a satisfactory condition and reflecting the assets intended design purpose.

(b) To ensure the community can suitably utilise the asset to be handed over in a safe and practical manner.

(c) To provide clear requirements, procedures and guidelines relating to the handover process.

(d) Provide information and documentation that ensure the longevity and design life of any Council asset.

Development Controls

1. Records are to be kept of the dimensions, length, square meterage and associated costs of constructed roadworks, landscaping and other civil assets intended to be dedicated as public infrastructure. CCTV is required of all pipelines to be dedicated to Council at practical completion of the development and again prior to handover of the asset.
2. Road pavement details, including survey of each layer, material used, during road construction, is to be documented. Additional geotechnical engineering testing results including pavement density and Benkelman beam results must be provided.
3. Operations and maintenance manuals for assets are to be prepared and handed over to Council. These manuals must include but not be limited to proposed type and frequency of establishment and maintenance intervention requirements. Maintenance requirements must cover civil assets (including and not limited to gross pollutant traps, detention basins, water sensitive urban design assets), landscape assets (including and not limited to street trees, reserves, parks, playgrounds), and riparian areas (such as creeks, bushland), and areas covered by vegetation management plans.
4. Risk assessment of carrying out maintenance of constructed roadworks, landscaping and other civil assets to be dedicated as public infrastructure is to be undertaken. Appropriate traffic control plans (prepared in accordance with RMS Guidelines) will need to be submitted for approval where maintenance work takes place in a proposed road reserve.
5. All relevant reports / documentation (e.g. surveillance reports, emergency management plans etc.) associated with any detention storage basin/s, as required by the NSW Dam Safety Committee (DSC) are to be provided, including documentary evidence confirming approval of this reporting/documentation by the DSC.
6. A final inspection is required at the conclusion of the defects liability period outlined in the development consent, for each component/asset to be handed over to Council. This meeting will be undertaken with relevant Council staff to ensure that the assets are in a satisfactory condition for handover to Council. The inspection is a review of works that have received practical completion against the approved drawings/development consent after the defects liability period has ended.

DRAFT

WEST DAPTO OPEN SPACE DESIGN MANUAL

wollongong
city of innovation

Document Revision Status

Author	Revision No.	Review	Date Issue
D. Pollock	Draft A	A. Goldie	1/4/19
D. Pollock	EMC Draft	A. Goldie	7/6/19
D. Pollock	Draft for Council	A. Goldie	20/6/19

OPEN SPACE

Contents

5.0 OPEN SPACE INFRASTRUCTURE DESIGN

1.0 Project Description

1.1 Introduction

The manual provides design guidance to ensure that proposed developments adhere to and facilitate the delivery of the West Dapto Vision, and Council's open space requirements.

This manual outlines the open space requirements and Design Standards to be achieved in the lodgement of all plans for subdivision applications in The West Dapto Urban Release Area and surrounding suburbs.

1.2 Objectives of Design Manual

- To set design objectives and requirements for open space in the West Dapto Urban Release Area.
- To be utilised by both external and internal stakeholders as well as professionals involved with the development, planning and design of open space within the West Dapto Urban Release Area and surrounding suburbs.

1.3 Policy Location

The manual should be read in conjunction with (but not limited to) the following development controls and Strategic Plans:

- Wollongong City Council West Dapto Vision 2018;
- Wollongong City Council DCP 2009 -
  - Chapter D16: *West Dapto Urban Release Area;*
  - Chapter B2: *Residential Subdivisions;*
  - Chapter E2: *Crime Prevention Through Environmental Design;*
  - Chapter E6: *Landscaping*
  - Chapter E10: *Aboriginal Heritage;*
  - Chapter E11: *Heritage Conservation;*
  - Chapter E13: *Floodplain Management;*
  - Chapter E14: *Stormwater Management;*
  - Chapter E15: *Water Sensitive Urban Design;*
  - Chapter E17: *Preservation and Management of Trees and Vegetation;*
  - Chapter E23: *Riparian Land Management;*
- West Dapto Section 94 Development Contribution Plan 2017;
- Wollongong City Council Urban Greening Strategy 2017-2037;
- Wollongong City Council, Wollongong Social Infrastructure Planning Framework 2018-2028;
- Wollongong City Council Civil Specifications 2019;
- Recreational and Open Space Planning Guidelines for Local Government 2010 Department of Planning;
- West Dapto Social, Cultural and Recreational Needs Study – Facility and Open Space Recommendations – Final Report (Elton Consulting, 2007);
- Play Wollongong Strategy 2014 – 2024 – in particular the Background Research Report 2014;
- Wollongong City Council's Public Art Policy 2016, and Animating Wollongong: Public Art Strategy and Guidelines 2016-2021;
- Wollongong City Council - *Vegetation Management Guidelines for Development Applications;*
- West Dapto Open Space Technical Manual;
- Transport Canberra and City Services (TCCS) publication – *'Design Standards for Urban Infrastructure, 24 - Sportsground Design.'*

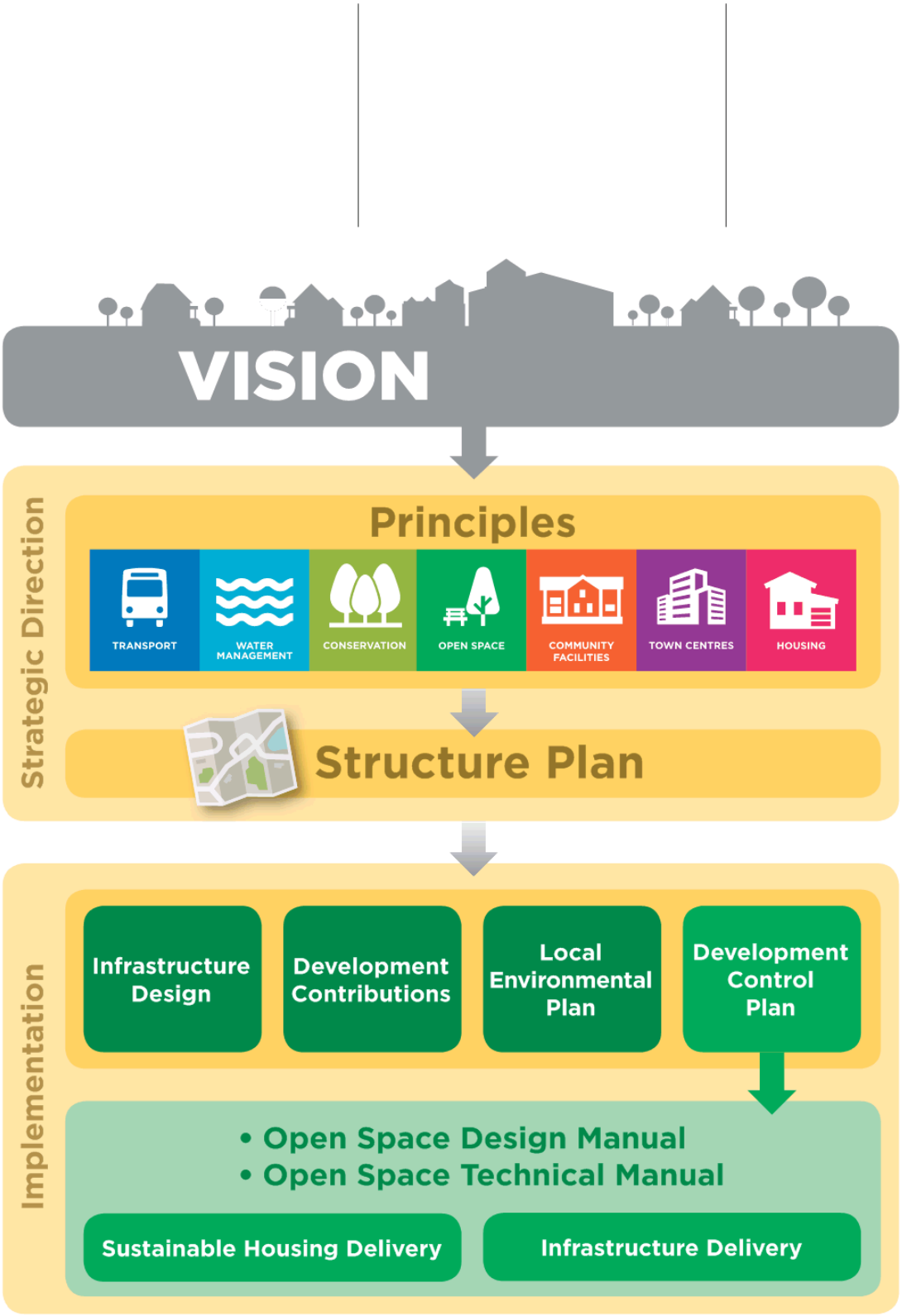


Figure 1
Structure and relationships of principles to planning tools

2.0 West Dapto Open Space Hierarchy

2.1 General Design Principles

Objectives

Open space should be planned and designed to achieve the following key objectives:

Well distributed network of open space – the design of neighbourhoods must provide a connected network of accessible, attractive, and usable public open spaces and natural areas.

Flexibility of design - open space and natural areas must provide for a variety of recreational, sporting, play, and social needs of the community. Sufficient size and flexibility of design must be incorporated to accommodate the needs of the community as they change over time.

Competing functions - flooding and water management, traffic and road infrastructure, cultural heritage and biodiversity must be accommodated without compromising the open space and recreation functions.

Open space embellishment - open space should not contain an excessive amount of embellishments that results in an unsustainable maintenance cost to the community. Embellishments should be appropriate to the intended catchment of users and to the type of park and associated service level of maintenance.

Active (formal) and Passive (informal) functional split – the West Dapto Urban Release Area open space provision must provide for an equal split between active (formal) and passive (informal) recreation.

Crime Prevention Through Environmental Design (CPTED) – CPTED principles are applied in the planning and development of open space, community facilities, and town and village centres.

Connectivity - open spaces must be connected with shared paths, pathways, and trails to other facilities and places of interest. These include: heritage sites, riparian areas, schools, shops, community facilities, public transport nodes, employment centres, and natural areas.

Urban Greening - the West Dapto Urban Release Area presents unique opportunities to increase the quality and quantity of vegetation with the provision of street tree planting, enhancement of existing remnant vegetation, revegetation of riparian areas, and the provision of significant tree planting within open space.

Conservation - the West Dapto Urban Release Area presents opportunities to preserve remnant and regrowth bushland vegetation, and enhance ecological connectivity.

Amenity - open space and natural areas will provide for a variety of recreational and social needs of the community and contribute to the local landscape character.

Value – open space design must deliver quality infrastructure that is robust and made from durable materials and finishes, and neat, uncomplicated designs that minimises maintenance requirements and discourages vandalism.

2.2 Open Space Hierarchy - Function and Catchment Distance

'Catchment' refers to the area and resident (or future resident) population intended to be serviced by the open space facility. The catchment area for an open space facility also relates to the size and function of the facilities to be provided. As illustrated in table 1 below, open space facilities are intended to service city wide, district, neighbourhood or a local catchment.

It is important to note that land parcel size is not the only criteria defining a catchment level to be provided. The proposed function of the open space incorporating the future needs of the community is equally as significant in determining likely catchment.

As part of the open space network for West Dapto, open space is required at all hierarchy and catchment levels. This relationship is illustrated in table 1 below.

Open Space Hierarchy Table

Function and service	Size	Catchment radius (distance)
Local Passive (Informal)	0.5-2 ha	400-600m
Local Active (Formal)	1-2 ha	400-600m
Neighbourhood Passive (Informal)	2-4 ha	2km
Neighbourhood Active (Formal)	3-5 ha	2km
District Active (Formal)	5-8 ha	Southern ward of LGA
City wide Active (Formal)	8 + ha	Facility to serve the whole LGA

Table 1
Open space provision standards (based on NSW Recreation and Open Space Planning Guidelines for Local Government (2010) and the Elton Report (2007) recommendations).

Open Space Hierarchy and Function

The section 94 Development Contribution Plan provides for open space and recreational facilities including neighbourhood and local parks within each stage of the West Dapto Urban Release Area.

Figure 2
Open space hierarchy and functions

City Wide

Sports Park

Darkes Town Centre Sports Park

Cleveland Road Sports Precinct.

These facilities will provide a range of sporting fields and recreational opportunities designed to align with the West Dapto Open Space Design Manual.

District - South Wollongong

Community Leisure Centre

West Dapto Community Recreation and Leisure Centre.

Neighbourhood (min 2 - 4ha size)

Active (Formal) Recreation

Large scale open space designed to facilitate organised outdoor sports and training eg AFL, soccer, rugby league, rugby union, netball, basketball hockey, cricket, baseball and softball, etc.

Passive (Informal) Recreation

Unorganised or structured outdoor sport eg walking, running, cycling, fitness stations, youth spaces, play spaces such as playgrounds, kick about areas and children learn to ride facilities.

Local (min 0.5 - 2ha)

Active (Formal) Recreation

Small scale open space designed to facilitate organised outdoor sports with the provision of modified sportsfields or multi purposed courts to provide active recreational opportunities eg basketball and netball.

Passive (Informal) Recreation

Open space for unorganised activities promoting outdoor movement for all age, eg walking, running, cycling, youth spaces, playgrounds, kick-about areas as well as spaces for picnicking and family gatherings.

3.0 Open Space Categories

3.1 Neighbourhood Parks

Principles

Catchment
Neighbourhood parks are larger scale spaces for residents and visitors providing both active (formal) and passive (informal) recreational opportunities. Neighbourhood parks are intended to service a neighbourhood of residential areas with a catchment radius of 2km depending on the functions of the open space.

Activation and Flexibility
Neighbourhood parks should aim to have five sources of activation to provide a diversity of active and passive recreational opportunities. Neighbourhood parks should have the flexibility to cater for a wide variety of recreational experiences, activities, and formal sports to cater for all age groups and future community needs.

Neighbourhood park example, Rockley Oval 'Googong' Queanbeyan

Active (Formal) and Passive (Informal) Split
Active open space is defined by the Greater Sydney Commission as land set aside for the primary purpose of formal outdoor sports for the community. Active open space supports team sports, training and competition'.

Neighbourhood parks across West Dapto must provide a range of recreational opportunities that must be evenly split between active (formal) and passive (informal). The location of a park will influence the design, function and the range of outdoor recreation, sport and exercise opportunities in response to the size, shape, topography, landscape setting and adjacent land uses.

Passive (informal) open space is land set aside for parks, gardens, linear corridors, conservation bushland and nature reserves. These areas are made available for informal recreation, play and physical activity. Examples of passive (informal) recreation are cycling, exercise stations, running, walking, play spaces, sitting and picnicking.

Neighbourhood Parks adjacent to Natural Areas
Neighbourhood parks, which are near to natural areas zoned as E2 Environmental Conservation, and E3 Environmental Management zones such as bushland or riparian areas, must accommodate self-directed recreational activities such as walking, running and cycling within these areas. This will increase access to these areas and create activity nodes for passive surveillance, and encourage social interaction in a natural setting.

Multi-purpose Sportsfield
Neighbourhood parks must be capable of accommodating multi-purpose sports fields for training and competition in addition to providing attractive green environments for hosting community events.

Site Interpretation
Neighbourhood parks should respond to the local setting and characteristics, and where possible incorporate references to local Indigenous and historical features in the form of interpretive signage and or public art.

General Requirements

- **Utilities** - Where land is to be dedicated to Council for future open space the land must include appropriate utility mains including but not limited to water, sewer, stormwater and power, that can be connected when the embellishment design is carried out.
- **Size** - Neighbourhood parks require a minimum provision for open space of two (2) to five (5) hectares with a particular emphasis on the provision of active (formal) recreational opportunities. The size of the park should respond to the specific requirements of the sport code.
- **Riparian corridors** – Neighbourhood parks cannot incorporate riparian corridors in open space area calculations.
- **Frontage requirements** - Neighbourhood parks should be located along a major road with an additional smaller order road leading to car parking. Seventy-five percent (75%) of the neighbourhood park must have road frontage with no boundary less than thirty (30) metres.
- **Connectivity** - to achieve active transport outcomes in the West Dapto Urban Release Area it is essential that community facilities and neighbourhood parks are connected with shared paths and linked to public transport nodes to ensure pedestrians and cyclists can safely access open space.
- **Equal Access paths** - entry points and internal pathway networks must achieve equitable access. At least one continuous pedestrian path providing access to the major features of the park must be designed to AS1428.1.2009 'Design for Access and Mobility-general requirements for access'.
- **Passive Surveillance** - residential dwellings must be orientated to overlook neighbourhood parks to allow passive surveillance and deter anti-social activities. This includes incorporating **Crime Prevention Through Environmental Design (CPTED)** principles, such as the facilitation of casual community surveillance through layout and design.
- **Inclusive Playgrounds** - play spaces planned for open space should be inclusive with the provision of accessible play features. Supporting infrastructure such as accessible parking and paths of travel are required to help meet the needs of carers and children accessing the space.
- **Amenities** - public toilets are required. The number of cubicles required is subject to an objective assessment of potential demand through a needs analysis.

  Public toilet buildings in parks should be designed, located and constructed in accordance with **Crime Prevention through Environmental Design (CPTED)** principles, relevant Australian Standards and Building Codes. The amenities must:
  - use infrastructure that is readily maintainable
  - be sited to avoid nuisance to neighbours;
  - be within reasonable proximity to a car park or other demand source;
  - be in close proximity to a road, gate or internal maintenance access for servicing;
  - be sited where casual surveillance is possible from surrounding streets.
- **Co-location of social infrastructure**- Neighbourhood parks could include the co-location of leisure and recreational facilities. This could be achieved by co-locating facilities within a multi-purpose community facility as recommended in the Wollongong Social Infrastructure Planning Framework.
- **Car parking** – Neighbourhood park design must include off street parking within the park to facilitate parking for visitors. Car parking within the park should not visually dominate and always incorporate substantial shade tree planting.
- **Park lighting** - Lighting should facilitate evening sports activities on fields and pathways that link to car parking areas. The lighting must be in accordance with AS2560.1:2018 Sports Lighting Part 1: General Principles, AS 2560.2.3 - 2002 Specific Application for football (all codes). Final determination of an appropriate lighting standard, for any particular pathway location, shall be subject to Council approval. Lighting design must consider illumination and spill requirements for functions.
- **Emergency and maintenance vehicles** – Neighbourhood park designs are required to provide appropriate entry points and route alignments for emergency and maintenance access. Emergency access to sporting fields must be carefully planned to allow vehicles to treat injured players.

- **Public art** – park designs should accommodate appropriate public art. Public art can enhance and enrich our experience of a public space by representing and interpreting the local heritage and culture of the area.
- **Signage** - park signage is to be provided at all entries. Refer to West Dapto Open Space Technical Manual.
- **Waste** – litter bins should be located near a road so that trucks are not required to enter the park to service them.
- **Urban Greening** - Significant feature tree planting is required with the aim of establishing canopy and shaded pathway networks, recreational spaces, car parks, and play spaces with 30 percent of the park provided with natural shade.

Active (Formal) Recreation Requirements

- The active (formal) recreational component provided would be in the form of multi-sport fields to accommodate demand for local sports training and competition, including soccer, rugby union, rugby league, cricket, and AFL. Refer to section 5.2 for sports field requirements.
- Gradients of fields are to be no greater than 2 percent. Correct preparation of the subgrade and playing surface, and final grading is the most important design component affecting the performance of a sportsfield.
- Orientation of fields must be between north, and 15 degrees east of north depending on specific sporting requirements of the sporting code to be accommodated.
- The active (formal) recreational spaces are to be designed with appropriate drainage to ensure they are not significantly damaged by flooding, are self draining (ie no entrapped low points) to ensure that they are available for play within three (3) days of a rain/flood event.
- Tennis, netball, and basketball courts are appropriate in neighbourhood parks.

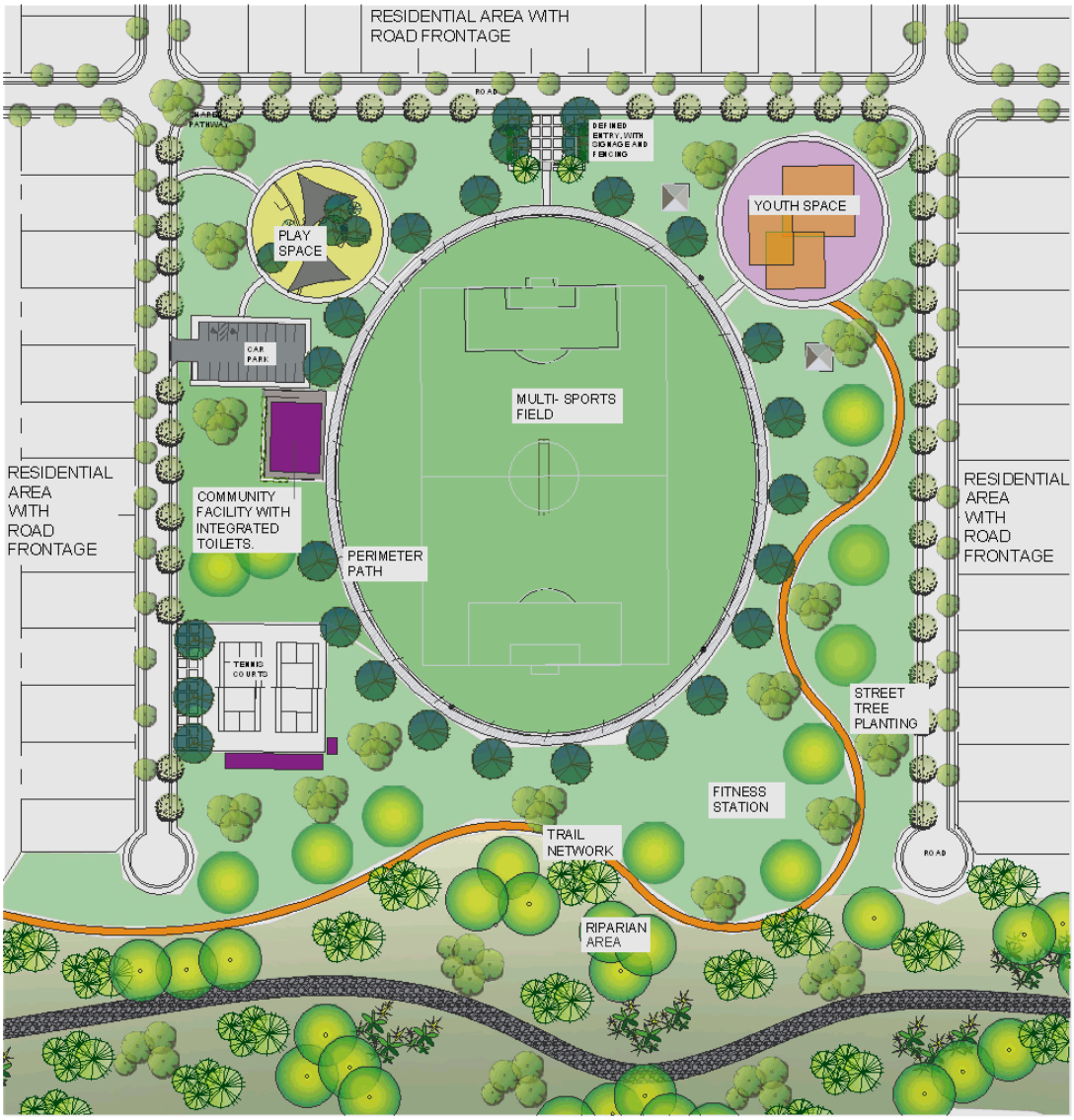
Passive (Informal) Recreation Requirements

- The remnant bushland which may form part of the neighbourhood park, can cater for passive recreational uses as well as achieving the West Dapto Vision conservation principles with acceptable impacts on biodiversity values. Activities such as walking, running and cycling can be integrated, creating experiences enhanced by the site features.
- Neighbourhood parks can offer opportunities for community gardens and conservation themes such as bird watching and nature walks.
- Fitness and exercise stations can be used by all ages to create opportunities for self-directed recreational exercise.

Examples of play space and fitness station

- Youth spaces are required to be incorporated into neighbourhood parks. Youth recreational spaces should aim to cater for activities such as Parkour, ping pong tables, re-bound walls, skate features, BMX, and pump tracks. Seating areas for hanging out spaces should also be incorporated.
- Play spaces within the neighbourhood park should provide play equipment and experiences that provide a range of opportunities for play. Play spaces should be planned to be inclusive. The provision of a children's learn to ride area is an example of a desire play feature.
- Park design must incorporate picnic areas of different sizes with shelters and tables, water, barbecues, and waste stations located offline from the pathway networks.
- Neighbourhood parks should be capable of hosting community events such as market days.

Figure 3
Typical features of a of good neighbourhood park design



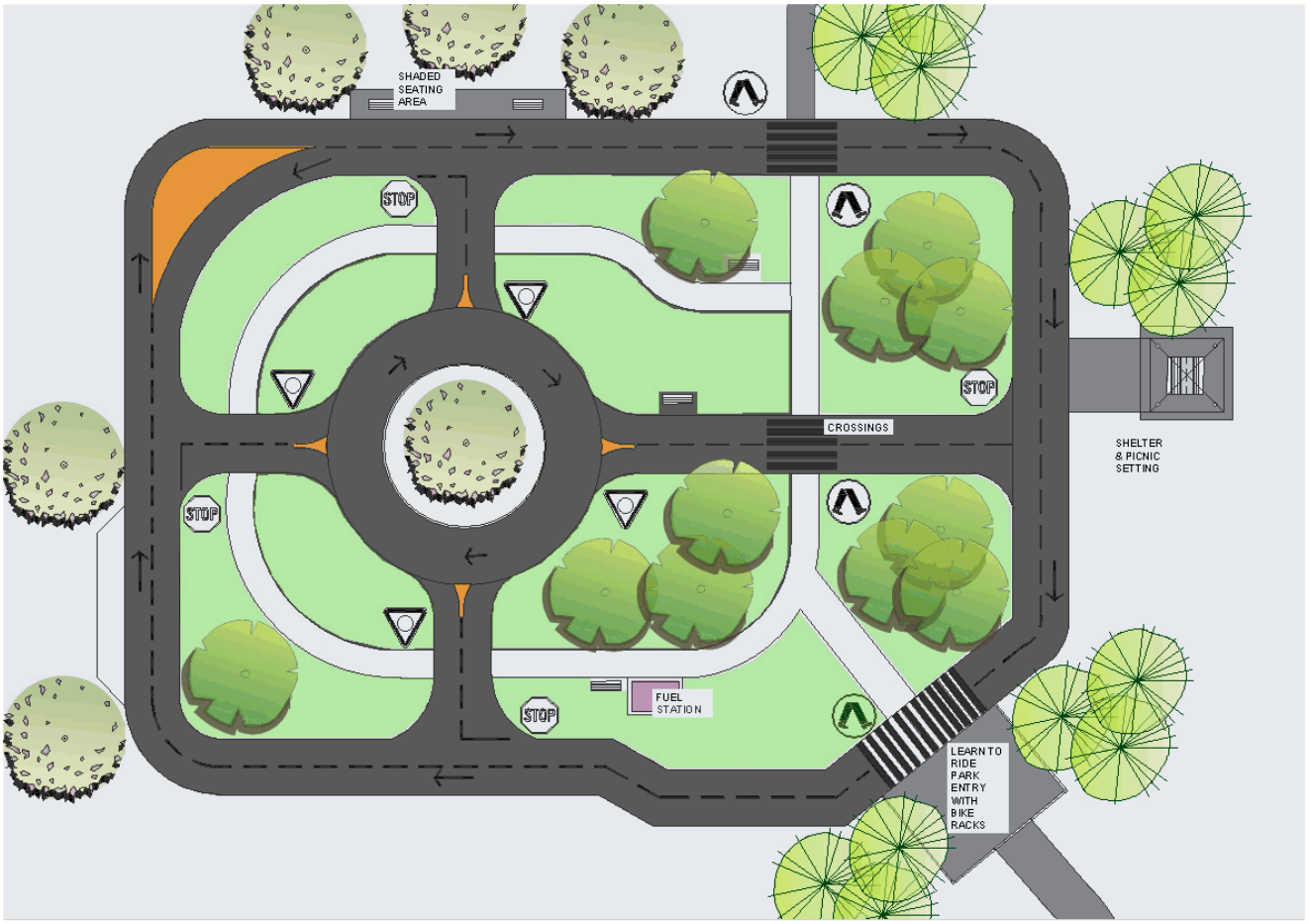


Figure 4 *Typical Learn to Ride facility layout plan*

Learn to Ride facility feature, Stuart Park Wollongong

Learn to Ride facility feature, Mt Stromlo Canberra

3.2 Local Parks

Principles

Access
Local parks should be accessible and be a safe walking distance within 400m-600m of the surrounding residential area.

Passive Surveillance
Local parks must be located in a highly visible location to allow for passive surveillance. The park should have direct residential frontage with four road frontages. This includes incorporating **Crime Prevention Through Environmental Design (CPTED)** principles, such as the facilitation of casual community surveillance through layout and design.

Recreation opportunities
Local park features and activations must service the immediately adjacent residential population. Local parks should provide a range of recreation spaces with a flexible design.

Level of Embellishment
Local parks should not contain an excessive amount of embellishments that results in an unsustainable maintenance cost to the community. Features such as an integrated path network with variable seating options complemented by significant tree planting must be primary features of park designs. Embellishments should be appropriate to the type of park and associated service level, and to the intended catchment of users.

Shade
Significant shade planting must be incorporated into the park design with at least 40 percent of the park provided with natural shade. Tree species should be selected from a minimum of three genus types.

Requirements

- **Size and Gradient** - Local parks require a minimum area of zero point five (0.5) to two (2) hectares with a particular emphasis on the provision of a range of recreational opportunities. The minimum provisions for informal ball sports (kick-about areas) should be 40m wide x 60m long with a maximum gradient of 5 percent and minimum of 2 percent.

- **Frontage requirements** - Local parks must be located on residential streets and not adjacent to main roads. The park should have direct residential frontage with four road frontages.
- **Passive Surveillance** - residential dwellings must be orientated to overlook neighbourhood parks to allow passive surveillance and deter anti-social activities.
- **Connectivity** - to achieve active transport outcomes in the West Dapto Urban Release Area it is essential that local parks are connected with pathways and shared paths to ensure pedestrians and cyclists can safely access open space.

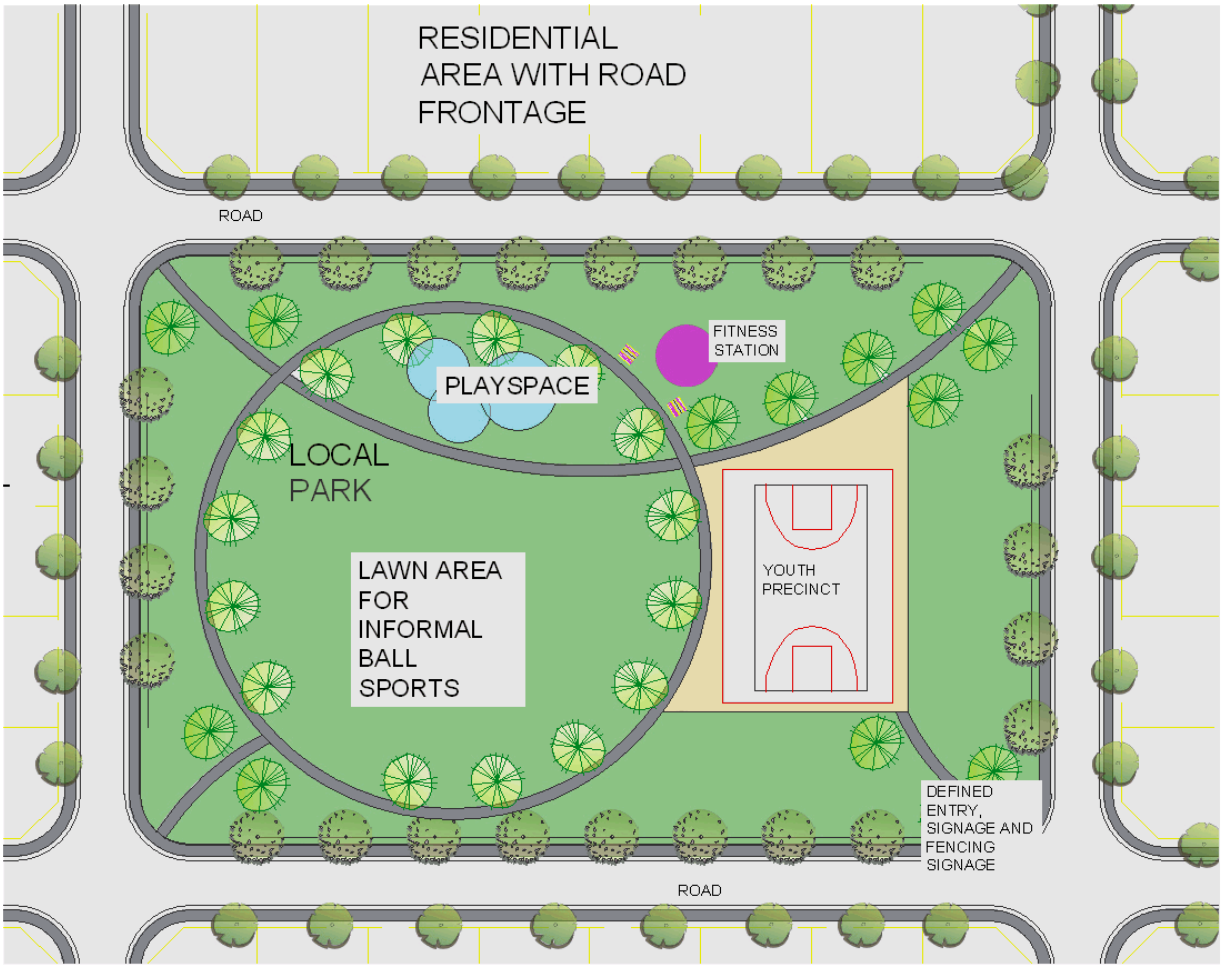
Top: Play feature, Emu Park West Dapto

Middle: Half basketball court, Emu Park West Dapto

Bottom: Skate features West Epping Park, source City of Parramatta

- **Equal Access paths** - Entry points and at least one route within the internal pathway network linking key park features must achieve equitable access as per AS 1428.
- **Play spaces** - within the local park play spaces should provide play equipment and experiences that provide a range of opportunities for play. Play spaces should be planned to be inclusive.
- **Youth spaces** – park designs are required to respond to the progression of children to youth and include facilities such as ball courts and skate elements.
- **Amenities** - Provision of infrastructure such as toilets is not required as most visitors are able to return to their homes if necessary.
- **Park Lighting** - none required. Street lighting only.
- **Emergency and Maintenance Vehicles** – Maintenance and emergency access must be provided.
- **Signage** - park signage is to be provided at all entries. Refer to West Dapto Technical Manual.
- **Waste** – Litter bins should be located as close as possible to entrances and or road frontages for servicing, and near high activity areas such as play spaces.
- **Urban Greening** - Tree planting is a major focus of local parks with mass planting bed provision confined to focal areas only or where slopes exceed 25 percent. Significant feature tree planting is required with the aim of establishing canopy and shaded pathway networks, recreational spaces, and play spaces with 40 percent of the park provided with natural shade. A variety of genus of tree planting to be selected to provide diversity.
- **Picnic nodes** - picnic areas with tables and a variety of seating areas are to be provided through the park. Facilities such as shelters with furniture to accommodate family gatherings such as birthday parties, must be included.

Figure 4
Local Park typical features



4.0 OPEN SPACE DESIGN GUIDELINES

4.1 Natural Areas

Objectives

The West Dapto Urban Release Area presents opportunities to preserve and enhance remnant and regrowth vegetation and other biodiversity values. Natural areas such as riparian environments and remnant and regrowth bushland zoned as E2 (Environmental Conservation) and E3 (Environmental Management) are an important community asset. They provide opportunities to learn about flora and fauna and appreciate and enjoy the environment. The primary purpose of natural areas is conservation however balanced passive (informal) recreation is a key secondary function of natural areas in urban settings.

Requirements

Trails and Rest Areas

Activities such as walking, running and cycling can be integrated, creating varied experiences enhanced by the diversity of landforms and site features. The creation of appropriate trail networks and rest areas in natural areas will increase access and create activity nodes for passive surveillance, encouraging social interaction in a natural setting.

By allowing controlled access for the public it can also deter damaging activities such as rubbish dumping and other anti-social activities. Designing a trail network within natural areas may also prevent the proliferation of informal trails and reduce impacts on biodiversity values. Trailheads or trail access points should be visible and defined by signage and/or fencing.

Conservation

The primary objective for natural areas is to ensure their ongoing conservation. Conservation can include rehabilitation of areas which have suffered misuse or have been impacted by previous land uses. Areas of thriving natural habitat are to be preserved to ensure they are not adversely impacted by development and human activity. Natural areas or parts of natural areas with biodiversity values of high conservation significance are to be protected and managed to minimise the potential for adverse impacts.

Good example of walking trail within a conservation area (Tasmania)

Vegetation Management Plans
Vegetation Management Plans must be developed for all natural areas such as riparian environments and remnant bushland. All works recommended in the Vegetation Management Plans must be undertaken by a licenced bush regeneration company. Embellishments such as trails proposed within a natural area must be integrated and considered as part of the Vegetation Management Plan. Monitoring and ongoing maintenance is required to ensure the effectiveness of the Vegetation Management Plan. Refer to Wollongong City Council Vegetation Management Guidelines for Development Applications.

Recreation and Conservation
Any embellishment works need to be targeted at providing recreation opportunities that minimise the impact to vegetation and wildlife. Low impact recreation such as walking, track running, cycling (on track only), observation points, and rest areas are suitable activities.

Trails and seats should be located away from high conservation areas.

Works within natural areas must make appropriate provisions to accommodate suitable activities and inhibit degrading ones such as vegetation vandalism, firewood collection, four wheeled driving, and motorbike riding.

Access and Frontages
Subdivision design must provide good connectivity to streets and pathway networks, with the majority of the natural area having road frontages to allow for passive surveillance. Road frontages also provide an offset as a fire protection measure to residential dwellings.

CPTED Principles in Trail design
Trails for walking and running should be designed in consideration of Crime Prevention Through Environmental Design (CPTED) in order to facilitate casual community surveillance.

CPTED elements can guide trail design to reduce the likelihood of crime and enhance community safety. For example, routing walking trails around the perimeter of natural areas and the creation of active edges will encourage casual surveillance into these areas.

Routing walking trails on the perimeter will also allow for a clear line of sight for users enabling them to see what is ahead. This is an essential element of people's perception of safety and will therefore encourage use of the trail.

As part of the trail route design the applicant will be required to include a comprehensive risk assessment following CPTED principles within the Development Application documentation.

Good example of walking trail within a conservation area Wisemans Park, Gwynneville

Figure 5
Natural Area within Subdivision typical layout

Riparian Corridors

Refer to Chapter E23: *Riparian Land Management* for riparian corridor objectives.

Classification of Watercourses

All watercourses within the Wollongong Local Government Area have been classified into one or more of the following three (3) categories, depending upon the nature and function of each watercourse:

- **Category 1: Environmental Corridor** – This category aims to provide extensive habitats for terrestrial and aquatic fauna and to maintain and restore the viability of riparian vegetation as well as protect water quality and provide bank stability.
- **Category 2: Terrestrial and Aquatic Habitat** – This category aims to maintain or restore the natural functions of a stream in order to maintain the viability of riparian vegetation and provide suitable habitat for terrestrial and aquatic fauna as well as improve water quality and provide bank stability.
- **Category 3: Bank Stability and Water Quality** – This category aims to minimise sedimentation and nutrient transfer

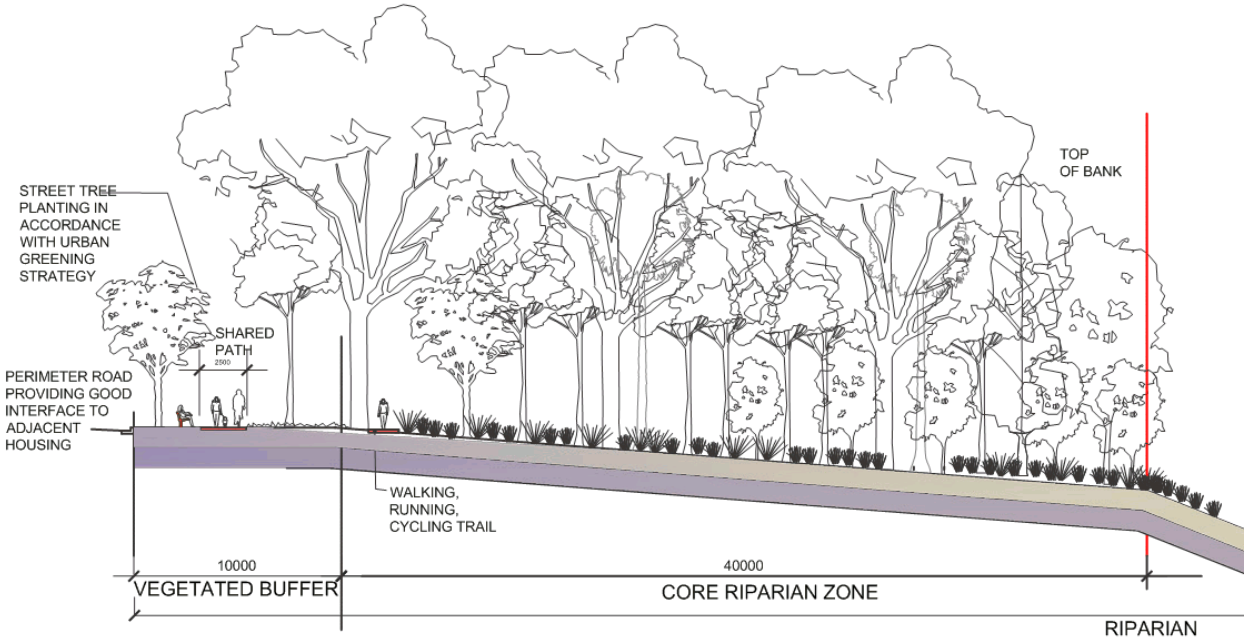
Requirements

- **Frontage requirements** – subdivision layouts should provide a road frontage to all riparian areas.
- **Services** - services must be located on the outer edge of the riparian corridor.
- **Pathways** - locate shared pathways and walking trails sensitively so they do not compromise the integrity of the riparian corridor and facilitate passive (informal) recreation.
- **Passive (Informal) Recreation** - integrate infrastructure such as picnic facilities and exercise equipment sensitively to facilitate passive (informal) recreation. Riparian areas accommodate self-directed recreational activities such as walking, running and cycling. This will increase access to these areas and create activity nodes for passive surveillance, and encourage social interaction in a natural setting.

- **Riparian Vegetation Communities** – subdivision design must retain existing communities and revegetate where necessary riparian vegetation communities to achieve creek bank stability.
- **Access** - the ecological integrity of existing riparian vegetation must be protected by limiting access to the watercourse to strategic locations where the stream bed and bank stability will not be compromised.

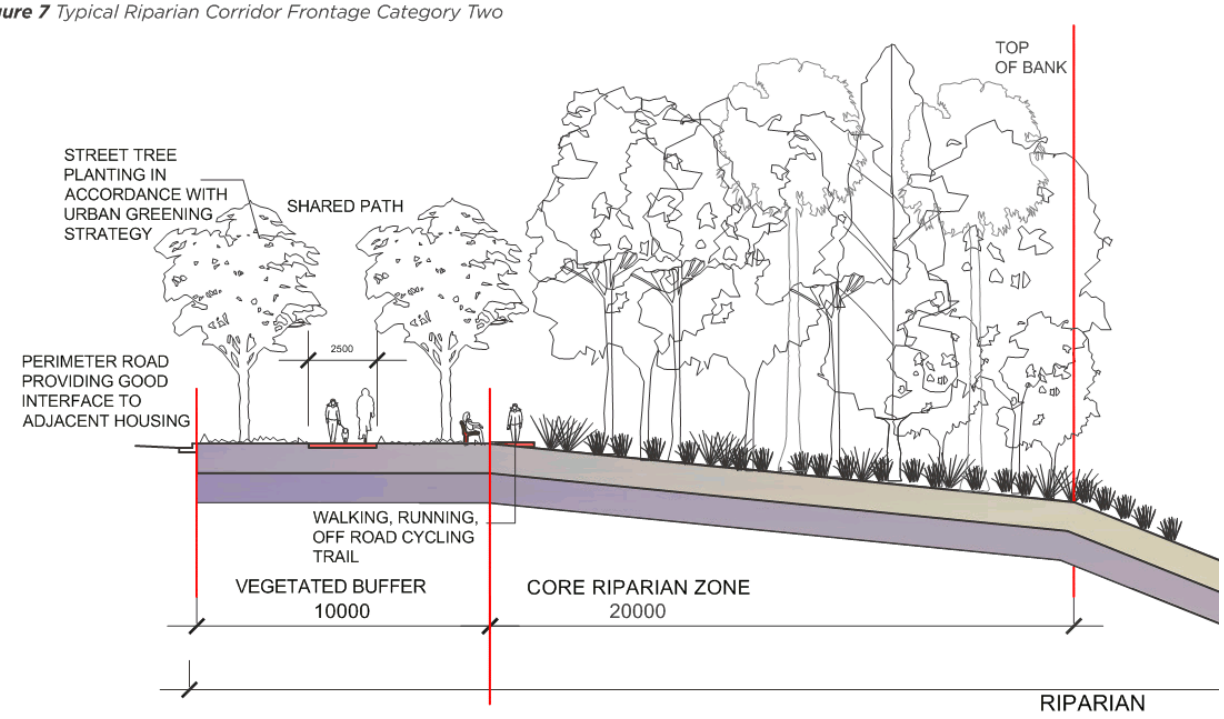
Riparian Corridor - Category One

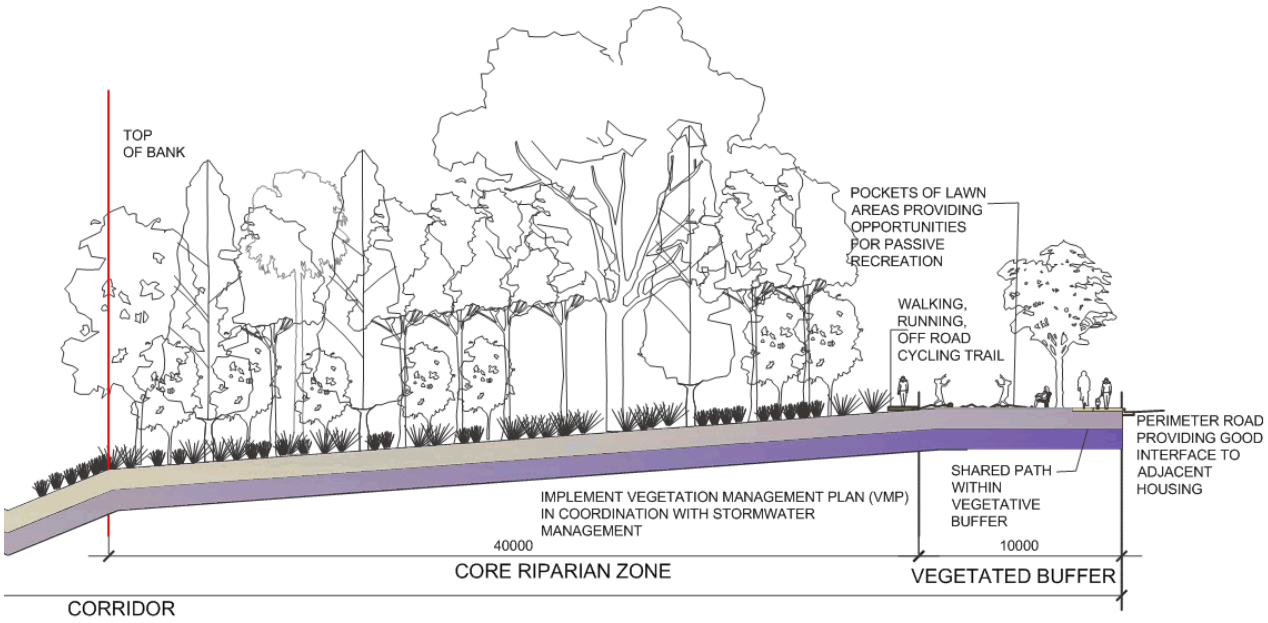
Figure 6 *Typical Riparian Corridor Frontage Category One*

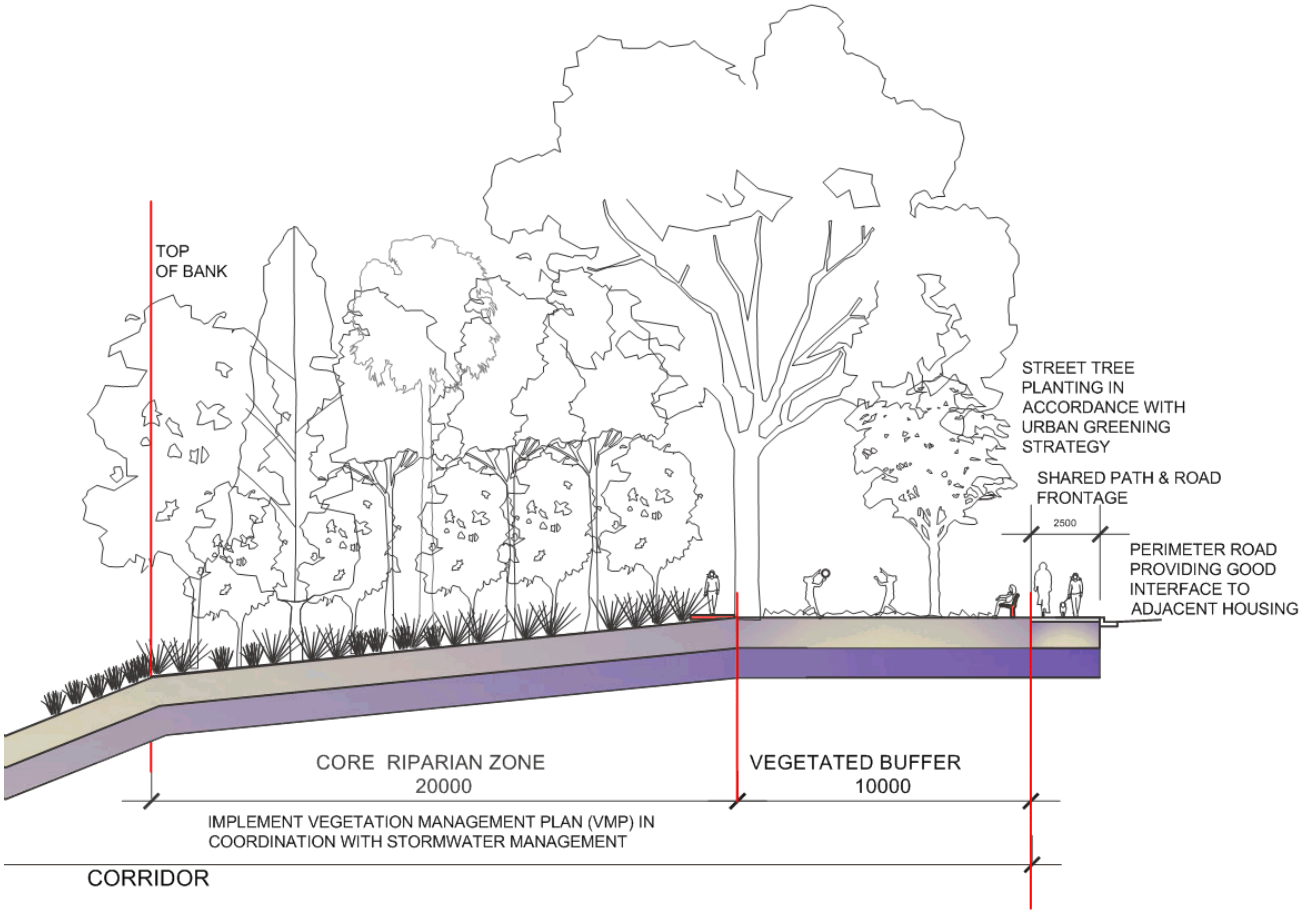


Riparian Corridor - Category Two

Figure 7 *Typical Riparian Corridor Frontage Category Two*

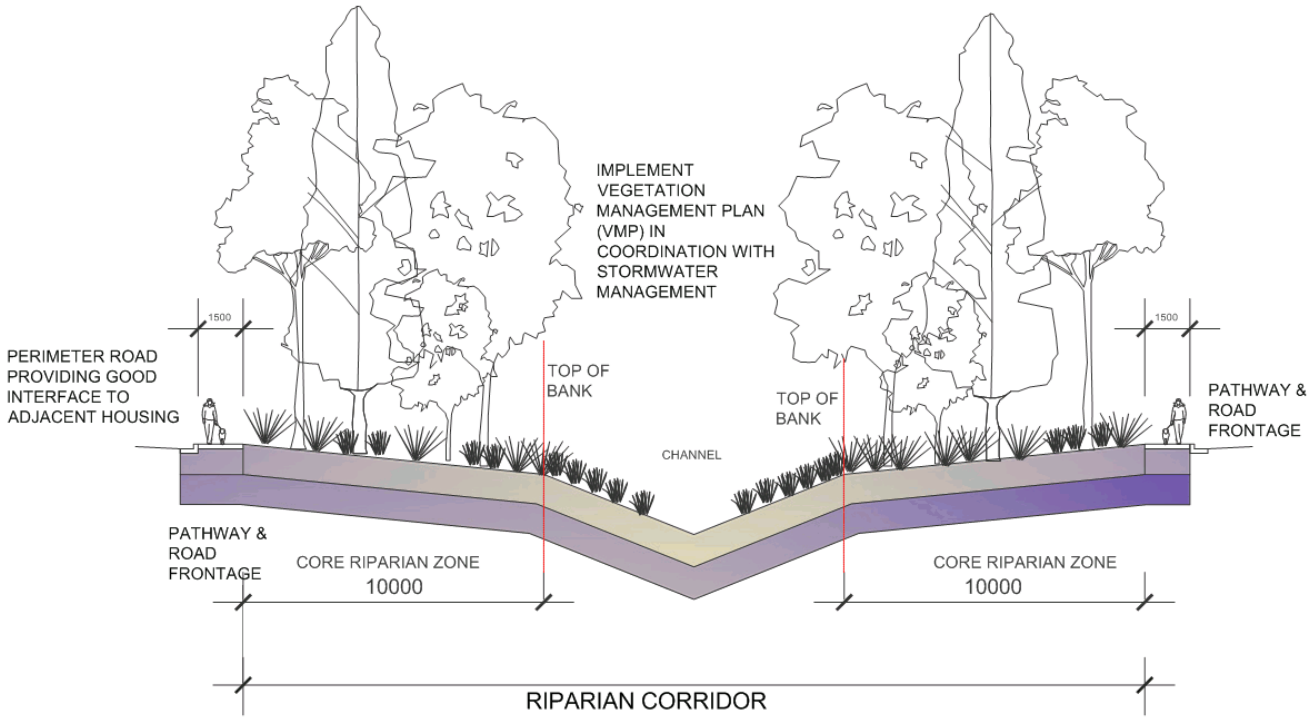



TOP
OF BANK
POCKETS OF LAWN
AREAS PROVIDING
OPPORTUNITIES
FOR PASSIVE
RECREATION
WALKING,
RUNNING,
OFF ROAD
CYCLING TRAIL
PERIMETER ROAD
PROVIDING GOOD
INTERFACE TO
ADJACENT
HOUSING
SHARED PATH
WITHIN
VEGETATIVE
BUFFER
IMPLEMENT VEGETATION MANAGEMENT PLAN (VMP)
IN COORDINATION WITH STORMWATER
MANAGEMENT
40000
10000
CORE RIPARIAN ZONE
VEGETATED BUFFER
CORRIDOR


TOP
OF BANK
STREET TREE
PLANTING IN
ACCORDANCE WITH
URBAN GREENING
STRATEGY
SHARED PATH & ROAD
FRONTAGE
2500
PERIMETER ROAD
PROVIDING GOOD
INTERFACE TO
ADJACENT HOUSING
CORE RIPARIAN ZONE
20000
VEGETATED BUFFER
10000
IMPLEMENT VEGETATION MANAGEMENT PLAN (VMP) IN
COORDINATION WITH STORMWATER MANAGEMENT
CORRIDOR

Riparian Corridor - Category Three

Figure 8 *Typical Riparian Corridor Frontage Category Three*



4.2 Open Space Water Management

Objectives

The design of stormwater management at times has a significant impact on open spaces as it is often integrated. The required facilities should not impede the recreational function of an open space and where possible it should be designed to complement and enhance recreational opportunities.

Permanent detention basins and panels can not be included in open space calculations. Dual use of open space and detention areas must be carefully considered, as there are safety hazards associated with pairing of stormwater management in open space, which may not be obvious to users. Stormwater facilities should be located in consideration of the activity areas function.

The key criteria for the design of stormwater and flood management infrastructure in open space should be aesthetics, safety, maintenance, and public access risk analyses.

Stormwater engineers and landscape architects have a key role in shaping open space and contributing to community benefits that go beyond flood mitigation.

Requirements

Safety
If stormwater and flood plain management infrastructure are integrated into open space it must be demonstrated that all aspects of public access risk analysis, safety and aesthetics have been achieved in the design. The design of stormwater must be in accordance with 'Queensland Urban Drainage Manual Third Edition 2013 - provisional, Department of Energy Pnd Water Supply'. This requires that water management functions are assessed and graded for their ability to safely accommodate public interaction. Where possible the design should offer opportunities for the public to interact with components of the water cycle management system and provide environmental education. Fencing to prevent public access should only be used where all other safety in design measures are not feasible.

Safety in Design Report
A Safety in Design Report is required for the investigation of proposed stormwater infrastructure in open space design, considering the location, type and size of infrastructure necessary, as well as public access requirements and proposed recreational use. Types of stormwater structures may include pipe inlets /outlets, basins, grates and surface flow paths. The associated risks arising from the proposal must be detailed, and how those risks are to be mitigated. This report is required to identify and rectify any potential design safety issues such that future risks can be mitigated during the operational phase of the proposal.

Slope Gradients
The side slopes of detention basins should be a maximum gradient of 16 percent or flatter to allow easy egress up the likely wet surface. Areas with slopes steeper than 25 percent cannot be turfed and will require steps and a handrail to assist egress at regular intervals. Drainage swales and pits and pipes should not impede maintenance operations and the recreational function of a park.

Stormwater Management and Active (Formal) Sports
It is essential that the active (formal) sportsfield component of open space is designed to ensure that it is not significantly affected by flooding and is available year round for competition play except during the flooding event. Sportsfields should be located outside the 10 percent Annual Exceedance Probability (AEP) flood extent. Sportsfields incorporated into open space designs should be available for play with good diversion and subsurface drainage around any active playing areas. Designs of sportsfields should minimise the frequency of maintenance as a result of stormwater run-off.

Stormwater Management and Passive (Informal) Sports
The preservation of the natural waterways and riparian corridors also provides an important community asset that could provide passive recreational opportunities. Low impact recreation such as walking, track running, cycling (on track only) can be integrated into riparian corridors providing an opportunity for off road pedestrian linkages. If the proposed subdivision water management infrastructure is intended to be dual purposed with open space activities (eg an informal ball sports

area within a detention basin) there are specific requirements that must be provided:

- Side slope gradients cannot exceed 16 percent
- Informal ball sports area gradient cannot exceed 5 percent
- Informal ball sports minimum available area to be 40m x 60m. Any storm-water infrastructure such as outlets, weirs, and swales must be located outside this proposed area so as not to impede usage.
- Informal ball sport area to be provided with adequate subsurface drainage.

Urban Greening and Stormwater Management

Tree planting for shade and amenity wherever possible should be integrated in the floodplain. For example, basin floors and some bank designs offer scope for planting when compatible with the required open space provision. Where trees are proposed to be planted in a floodplain, flood modelling and flood impact mapping must be under-taken to identify the impact on flood behaviour and flood levels resulting from the change in vegetation densi-ties and hydraulic roughness. The flood modelling and impact mapping should be undertaken as part of a flood study prepared by a suitably qualified civil engineer in accordance with Chapters E13 and E14 of the Wollongong DCP2009. This information will need to demonstrate compliance with Clause 7.3 of the Wollongong LEP and Chapter E13 of the Wollongong DCP2009, with respect to flood impacts.

Urban greening and stormwater manage-ment, Nyrang Park, Keiraville.

4.3 WCC Urban Greening Strategy

Objectives

The Wollongong Urban Greening Strategy 2017-2037 aims to strategically increase the quality and quantity of all vegetation in an urban setting, particularly tree canopy cover on all land types.

The West Dapto Urban Release Area presents unique opportunities to increase the quality and quantity of vegetation with the provision of street tree planting, enhancing existing remnant vegetation and riparian areas, and the provision of significant feature tree planting within open space.

Open space should integrate natural areas such as riparian environments and remnant and regrowth bushland and the active recreational areas with provision of significant tree planting. Open spaces, which are greener and well shaded, will attract people and encourage them to stay longer.

Tree planting is a form of place making as it creates a pleasant place for users. Tree planting provides environmental benefits such as; shade and cooling, protection from prevailing winds, storing carbon, an increased sense of local identity, encouragement of outdoor activity, provision of habitat for local wildlife, and increased property values. Tree planting can frame view corridors and provide privacy.

Tree planting is an essential part of shade provision for open space and associated facilities such as play spaces, seating areas and pathways. Provision of appropriate tree planting around play spaces is considered essential to provide shade for children and carers. Natural shade of play spaces by the provision of evergreen or deciduous trees is preferred to built shade structures.

Street Tree Planting Requirements

- Street tree planting provides a great opportunity to create streetscapes which deliver amenity and environmental performance. Street tree species selected should aim to create avenues of trees which provide shade and visual amenity. A variety of genus and species should be utilised to create diversity. Street tree species selected can be drawn from the West Dapto Open Space Technical Manual Tree Species List or as recommended by Parks and Open Space Manager.
- The equivalent of one (1) street tree for each lot on residential road frontages (ie with locations adjusted for driveway crossings, lighting, sightlines, utility services and the like) will generally be required to enhance the appearance of the locality.

Significant tree canopies contribute to urban amenity

New street tree planting, Paynes road Kembla Grange

- The location of street trees should take into account overhead and underground services.
- Where street trees are to be installed in areas with hard surfaces such as town and village Centres, suitable grates are to be laid around the tree to protect the roots and enable water infiltration.
- Minimum plant requirements for street trees is 100 litre container size, in accordance with AS 2303: 2018 Tree Stock for Landscape Use.
- Trees to be planted in accordance with the standard detail. Refer to West Dapto Open Space Technical Manual for detail.
- The planting of the street trees should occur, after at least 80 percent of the construction and infrastructure work has been completed for the subdivision.
- Where coal wash forms the subgrade of proposed street tree and verge planting a minimum depth of natural soil must be provided to allow healthy root growth. Refer to West Dapto Open Space Technical Manual for details and typical sections.
- A minimum of 52 weeks establishment period should be applied to all new tree plantings. Longer establishment periods may apply under DA conditions.

Tree Planting in Open Space Requirements

Tree planting is required in open space to provide shade and amenity. Canopy trees should be planted to provide shade to active recreational nodes such as sporting fields, basketball and netball courts, exercise stations, play spaces as well as seating areas.

A planting plan must be prepared as part of all open space submissions. Tree planting should be utilised to define spaces and functions in open space.

- Tree planting must be integrated with pathway networks. Tree planting must be offset from pathways in consideration of the tree's mature height and spread.
- Significant feature tree planting should be integrated into open space with the aim of establishing canopy and shade to amenities, parking and play spaces.
- Minimum plant requirements for amenity trees within open space are 75-200 litre container size.
- Tree planting must be spaced adequately to allow deck mowers to access all turfed areas or grouped together in mulch beds.
- Where coal wash forms the subgrade of proposed open space areas a minimum depth 600mm of natural soil must be provided to allow healthy root growth.

- In lawns, tree pits are required to be backfilled with site soil if good quality or with good quality soil, mixed with a suitable soil conditioner. Trees in lawn areas are to be installed with a mulch ring of minimum 1500mm radius and 75 mm thickness.
- Tree planting locations must be compliant with service authority offset requirements.
- As per the WCC Urban Greening Strategy, provision of canopy cover is of the highest priority. Tree species should be selected to provide the maximum canopy size that fits within the context of the selected location.
- Further guidance on tree planting as required to be advised by Parks and Open Space Manager.

Planting in Natural Areas Requirements

Where remnants of existing vegetation will be retained, environmental weeds should be selectively controlled prior to enhancement planting. Weed-free mulch should be laid evenly to a nominal thickness of 75 mm over the prepared subsoil, except along waterways subject to flooding where erosion control matting or similar materials resistant to water movement are to be used.

- Select plants that are indigenous to the local area and appropriate to the existing vegetative community, and include a range of shrub, ground-covers and grass species. Species selection in natural areas is to be consistent with the recommendations in the Vegetation Management Plan. Plant a mixture of tube stock and plants in pots up to 140 mm, to achieve the maximum survival potential.
- Pioneer species should be used in conjunction with slower more permanent species, as to provide shade and protection during the establishment period.
- Plant at sufficient density (recommended average density of 6 native grasses per m2) with the tree component spaced at about 4 to 6 m centres to achieve substantial cover of the ground surface at the time of the Maintenance Inspection.
- Water and weed the rehabilitation area to ensure the site is well established at the time of the inspection, with plants conditioned to survive dry periods without supplementary watering. An approved temporary fence may be required around rehabilitation areas to deter deer and other pests.
- Further guidance on planting for Natural Areas is provided in Council's Vegetation Management Plan Guidelines or as otherwise advised by Council officers.

Protection of Existing Vegetation

Objectives

West Dapto presents opportunities to preserve remnant vegetation and enhance ecological connectivity.

The planning, design and location of open space should aim to preserve and enhance remnant native bushland and riparian areas. Existing trees are considered a valuable asset in the community.

A subdivision application must incorporate the following requirements:

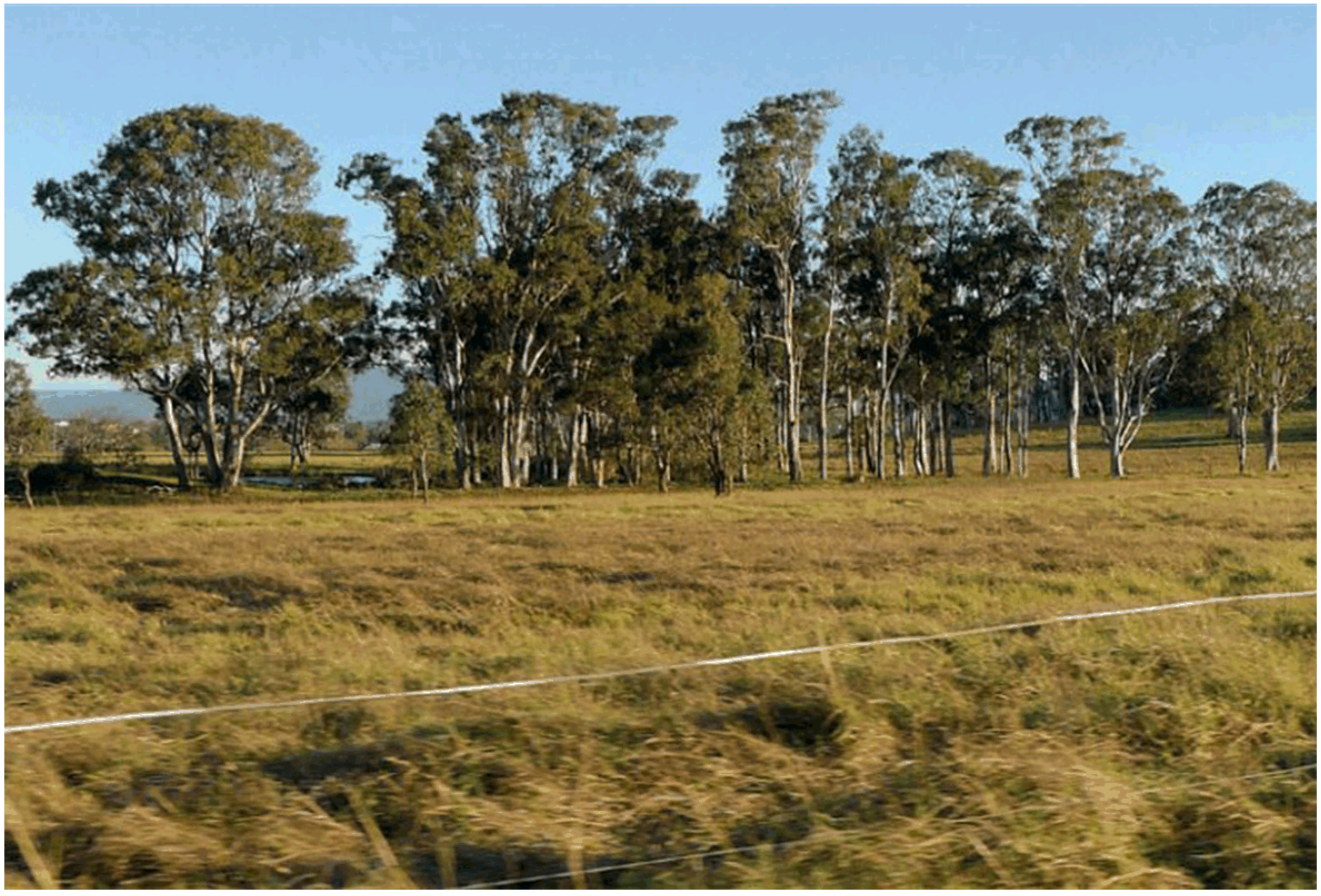
Requirements

- Tree survey of existing trees on the site and trees on adjacent properties, accurately located by a registered surveyor, indicating the trunk location and level to Australian Height Datum (AHD) and an accurate portrayal of the canopy spread,
- The applicant must engage an Australian Qualifications Framework (AQF) Level 5 consulting arborist to prepare an Arboricultural Impact Assessment (AIA) in the initial stages of planning the development to determine which trees are suitable to be retained and integrated into the open space. The suitability of vegetation for incorporation should be based on the tree's health, amenity value and significance of the tree.
- The arborist must assess trees from a public safety risk, where they are located in close proximity to proposed active recreation spaces, pathways and play spaces. In assessing existing remnant/regrowth vegetation the arborist should carry out an AIA to make recommendations for pruning, dead wooding or removal

of hazardous trees. This AIA must address the health, amenity value and Useful Life Expectancy (ULE) rating of each tree.

- Where appropriate an AIA Level 3 assessment may be required;
- Should the land be bushfire prone the landscape plan must be coordinated with the Arborist Report and in accordance with the Planning for Bushfire Protection Guidelines.
- The arborist must provide a Tree Protection Plan (TPP) outlining the specifications for tree protection to be in place during the construction phase including any pruning requirements. All development activity must be in accordance with the Australian Standard 4970 – Protection of Trees on Development Sites.
- Tree protection fencing for retained trees must be installed as per the arborist recommendations prior to the commencement of any excavation or land clearing works.
- The applicant may also be required to have an arborist inspect and report on the tree/s at monthly intervals during construction. This report must be submitted to the Principal Certifying Authority.
- Tree protection details to be as per the Wollongong City Council Civil Specification 2019.

Significant stand of existing vegetation West Dapto Road



4.4 Equal Access

Objectives

Open space should be designed by applying Universal Design principles to promote equal access and connectivity for everyone from the very young to youths and the elderly, families, carers, and people of all abilities.

The design of open spaces should provide equitable access to allow people to access the park in accordance with the Disability Discrimination Act as specified in AS 1428. This will ensure that the design of the open space will eliminate obstacles and barriers that prevent access by people of all ages and abilities and create an inclusive open space that considers as many people's needs as possible.

Open spaces should be easy to navigate, interesting and attractive. They should offer a variety of landscape settings to explore, and provide opportunities to connect with others. Pathways and paved areas must be provided for all weather pedestrian access to key areas and facilities such as lookouts, amenities and play spaces.

Equal Access Requirements

- Points of entry to the park must be compliant with Australian Standard AS1428.1.2009 'Design for Access and Mobility general requirements for access'.
- At least one compliant path of travel must be designed linking to key features or facilities contained within the park such as play spaces, picnic areas and toilets.
- A pathway must link to the park from the Equal Access Parking spaces.

4.5 Material Selection

Objectives

The West Dapto Planning principle for infrastructure is to utilise robust and durable materials with high quality finishes that minimise maintenance requirements and discourage vandalism.

Materials and furniture items within an open space that are difficult to maintain and difficult or costly to replace can have a significant impact on both the aesthetics, function of a park, and the long-term maintenance costs.

Requirements

Open Space infrastructure materials must be:

- vandalism and graffiti resistant
- constructed with low maintenance high quality, durable materials.
- robust and fire resistant
- non-corroding and non-corrosive
- sustainable, with low whole of life costs
- sourced locally where possible (such as site rock)
- comply with relevant Australian standards

Typical materials suitable for use are galvanised steel, stainless steel, aluminium, stone (sourced locally), concrete, recycled hardwood and non-toxic paint.

Refer to West Dapto Open Space Technical Manual for specifications.

Top: Equal access pathway. City of Parramatta

Above: Equal access pathway

High quality, durable seats, East Corrimal

4.6 Open Space Maintenance

Objectives

Open space and park infrastructure must be easy to maintain and financially sustainable. Parks shall not be over-embellished with multiple pieces of bespoke infrastructure. Often the most important elements in parks such as paths, trees, grass, and seats are the simple and long lasting features of parks that appeal to the community. Careful design and planning is required to ensure sustainable ongoing maintenance costs and achieve long lifecycles.

Requirements

- Maintenance access must be provided into open space. Access must be unobtrusive and be separated from pedestrian access points.
- Mass planting in centre medians within roads are not supported unless safe maintenance zones can be provided.
- A minimum of one maintenance access point should be provided at strategic locations along road frontages to provide for maintenance and emergency access.
- A driveway should be formed to create the maintenance access point. A controlled access device such as a removable bollard, gate or lock rail to be installed at each driveway. A 3.5m wide reinforced concrete driveway should be provided as per WCC Civil Specification 2019.
- Where a maintenance access route crosses an internal path, the path must be reinforced to withstand maintenance equipment traversing it.
- Provide for vehicular access to park facilities and areas requiring regular cleaning and ongoing maintenance (toilets, playgrounds, refuse bins, barbecues, mown areas, firebreaks, etc.). Wherever possible all weather access should be provided to these facilities and areas.
- Provide access to stormwater infrastructure such as stormwater detention basins, drainage swales/ channels, stormwater pits, manholes, water quality treatment facilities (eg wetlands, bio retention basins, etc.), and stormwater quality improvement devices (eg GPT's, CDS units, etc.).'
- Feature garden beds in open space should be minimal and be relative to the size, function and service of the public open space. For example, a local park would have minimal to no feature garden beds whereas a neighbourhood park with a civic space may include them.
- A maintenance schedule is required for all open spaces detailing soft and hard landscape features such as areas of turf, mass planting beds, edging, fencing and furniture.

5.0 OPEN SPACE INFRASTRUCTURE DESIGN

5.1 Play Spaces

Objectives

People of all ages and abilities engage in play. Play helps to enhance mental and physical wellbeing. Play happens at our parks, natural areas, beaches, public swimming pools, playgrounds, outdoor exercise stations, skate facilities, youth precincts, public art installations, ball courts, bicycle tracks and many other locations.

The West Dapto Urban Release Area is in a unique position to enable, enhance and promote play opportunities by providing a broad range of quality facilities and infrastructure.

Wollongong City Council has developed a strategy - 'Play Wollongong' which has been developed to guide the future direction of play across the Wollongong Local Government Area (LGA). This strategy focuses specifically on toddlers to 12 year olds. Youth spaces are also required to respond to the natural progression of children to teenagers as outlined in the 'Social Cultural and Recreational Needs Study for the West Dapto New Release Area' Elton, 2007.

Design Principles

Distribution - quality play opportunities must be equitably distributed across the city, including large regional play spaces and smaller local play spaces. Ensure play spaces meet the function, service, size and catchment distance requirements of the park type.

Access - play spaces must be easily accessed by walking and cycling and encourage healthy living and independent access by children.

Engagement - ensure meaningful engagement is undertaken with the surrounding community including children, in relation to play space planning. Work with the local community and engage school children and young people when planning and designing play spaces. Involve children and the broader community in the design of public art features and in accordance with Council's Public Art Policy.

Inclusive and age appropriate design - play spaces are to be inclusive of all ages and abilities and encourage participation in play. Well-designed play spaces provide a range of age-appropriate experiences that can help to foster independence, support social interaction, develop learning and encourage creativity.

Below left:
Play equipment, Bankbook Park Wongawilli

Below right:
Inclusive equipment, Bankbook Park Wongawilli

Informal play spaces - informal play spaces and the provision of natural play elements are to be given priority, recognising the benefits of connecting with nature. Children who are able to access natural play environments regularly are more active and resistant to stress, and play in more imaginative, diverse and creative ways. Natural elements that feature in good play space design include wet/dry creek beds, bridges and tunnels, mounds and slopes, plants and where possible existing trees.

Appropriate risk and challenge - play spaces must provide children with an appropriate level of risk and challenge while complying with relevant safety standards. Play spaces that encourage children to take manageable risks allow them to test their limits.

General Requirements

Playgrounds in parks should be designed, located and constructed in accordance with the following requirements:

- Certification is required that the impact attenuation surfacing and associated landscaping comply with the relevant Australian Standards *AS/NZS 4442:1996* Playground Surfacing Specification Requirements and Test Method.
- Certification is required that the play spaces and play equipment comply with the relevant Australian Standards *AS/NZS 4486.1:1997 Playgrounds and Play Equipment. Part 1: Development, Installation, Inspection, Maintenance and Operation, Standards Australia.*
- Certification is required that the play equipment comply with the relevant Australian Standards *series AS 4685.1, AS4685.2, AS4685.3, AS4685.4, AS4685.5, AS4685.6, AS85.11.*
- Ensure play elements complement and enhance other recreation opportunities in a park. Where possible playgrounds should be linked to other areas of play including open activity areas, natural areas and recreation facilities such as shared paths and basketball courts.
- Ensure play equipment is readily maintainable and approved by WCC. A list of preferred Council suppliers can be provided to assist with the selection of suitable equipment.
- A minimum of five-year manufacturer's warranty is required for any off the shelf equipment.
- Custom playground equipment is permitted in neighbourhood playgrounds only unless approved by WCC.
- Playground design should achieve a balance between carer supervision and independent play. Carer involvement in the play of young children is essential to reduce the risk and severity of accidents. However, older children need to be able to play without constant adult supervision, to maximise opportunities for social development.
- Fencing of play spaces is not encouraged. The location of play spaces should be carefully considered to design out the need for fencing. Where there is no alternative for the location of a playground, a safety fence is permitted between playgrounds and a main road, a water body with standing water, a shared pathway, when play elements are less than 20m from the road frontage, bikeway or water body.
- CCA treated timber must not be used in the construction of play equipment, fencing and furniture within playgrounds.
- The installation of water play elements requires specific involvement and approval of Council during the concept development stage to undertake risk analysis and to plan for sustainable water use.
- Incorporate natural shade and seating and other park furniture.

Playground Surfacing

Surfacing of playgrounds should comply with the following Council requirements.

- Grade the site to produce a gentle fall (maximum 2 percent) towards the perimeter of the playground to enhance drainage, particularly away from fall zones and areas of high traffic or activity. A shallow swale or low bund may be required at strategic locations around the playground to divert overland flow.
- Typical drainage treatment will include the installation of a robust plastic agricultural drain fitted with a filter sock around the outer edge and below the under surfacing area, with disposal to the stormwater system.
- Construct an extruded 200 x 200mm reinforced concrete edge around the perimeter of the playground under surfacing and fill the entire area with an appropriate impact attenuation

Wet pour surface treatment under swings. 'Brickworks' Bulli

Inclusive play features, Beltana Park Googong Queanbeyan

material, in accordance with AS/NZS 4422. The edge must be set back at least 2.5 m from any item of play equipment to provide adequate circulation and maintenance space.

- All features within 1.0 m of the proposed playground such as seats should be incorporated within the boundary of the surfacing by at least 0.5 m, to enhance the aesthetics of the playground and for ease of maintenance of the park.
- Impact attenuation should be provided over the entire fall zone and circulation space around play equipment, as specified in the AS 4685 series, and/or by the equipment manufacturer.
- WCC does not support the use of sand as soft fall due to poor performance, hygiene and high maintenance requirements.
- Solid impact attenuation surfacing such as wet pour synthetic surfacing should be installed under swings, basket swings, slippery dip exits, fireman's poles, and at the entrance and exits of flying foxes. Coverage should extend the length and width of a flying fox unit.
- All finished grass and impact attenuation surfaces should be flush with the concrete edge and internal solid surfacing if applicable, to avoid trip hazards.

Shade

The siting of playgrounds and infrastructure such as seating should take into account the relationship to existing mature vegetation. Advanced stock of suitable tree species should also be planted to provide future shade around playgrounds. More permanent shade structures such as shade sails are often required over larger play elements in neighbourhood playgrounds.

Shade structures are not desirable within local playgrounds with a preference for shade from existing vegetation or supplementary advanced planting of shade trees.

Natural shade to play spaces, 'Melaleuca Park' Jordan Springs Sydney

5.2 Sportsfields

Objectives

The location and design of sportsfields is intended to encourage, promote and facilitate recreational pursuits in the community involving organised competitive sporting activities and games as well as informal recreation. Sportsfields of the West Dapto Urban Release Area must provide for the active (formal) sporting needs of the new population with the provision of sporting facilities such as AFL, soccer, rugby and cricket.

Sportsfield design and location must accommodate flooding and water management without compromising the open space and recreation functions. Sportsfields should be located outside the 10% Annual Exceedance Probability (AEP) flood extent. The fields should be available for play within 3 days after the rain event.

An internal and external pathway network for pedestrians and cyclists must be provided ensuring connectivity within the park and externally to residences and public transport.

The adjacent proposed residential housing must encourage passive surveillance by orientating the dwellings to overlook the open space and deter anti-social behaviour.

Requirements

Standard of Construction - sportsfield construction and layout must be in accordance with the Transport Canberra and City Services (TCCS) publication – 'Design Standards for Urban Infrastructure, 24 - Sportsground Design.'

Sportsfield design principles - the sporting fields are to be planned in consideration of the specific requirements of the relevant sport code such as field size, posts, nets, line markings and safety, in addition to the following points:

- Gradient of fields to be no greater than 2 percent slope
- Orientation of the fields are to be between north and 15 degrees east of north depending on the particular code to be catered for.

Fencing - Sportsfields should be fenced in accordance with the West Dapto Technical Manual, typically with a barrier fence separating road easement and active fields.

Scoreboard - a structure for a scoreboard is required.

Goal Posts - Galvanised steel construction, with in ground sleeves.

Neighbourhood Park – West Epping Park, City of Parramatta. Image sourced from City of Parramatta

Tree planting - sportsfield design must include significant shade tree planting with at least 30 percent of the off field areas of the park provided with natural shade.

Shelter - protection from dominant winds to improve spectator amenity must be provided wherever possible.

Utilities – sportsfields must be provided with all required utilities such as sewer, drainage and water and power connections.

Public amenities - an amenity block is required for Sports Field provision. Toilets with disabled access, showers and change facility must be provided as it is expected people will visit and stay in the park for extended periods. The number of cubicles and size of change rooms is subject to an objective assessment of potential demand.

Passive surveillance - the majority of the park should be road frontage with activated edges to encourage passive surveillance on the frontages. In addition, the park design must include the provision of pathways and shared pathways within the park boundaries to improve passive surveillance within the park.

Signage - park signage must be as per the West Dapto Urban Release Area Open Space Technical Manual to define entries.

Emergency Access – sports park design must include provision for compliant emergency access.

Car parking - provide car parking within the park to facilitate off street parking for visitors.

Any new sportsfield application needs to be accompanied by an assessment of future visitor parking demand (prepared by a suitably qualified transport consultant), and must include the provision of public car parking to facilitate off street parking for visitors.

As part of the visitor demand assessment the applicant needs to:

- Undertake a site-specific on-street car parking capacity survey to establish the number of available on-street and off-street 'public' car parking spaces within a 250 metre radius of the facility.
- Establish the projected weekend sportsfield car parking demand based on surveys of similar existing facilities during peak weekend operation (Saturday and Sunday during winter sport season).
- Provide details of public transport links (proximity of bus and rail stations).
- Provide details of pedestrian and cycling routes. Additional car parking using the criteria above, taking into account any reasonable reductions based on the availability of public transport and pedestrian/cyclist accessibility (maximum of 10 percent).

Integrated perimeter control and tree planting. Towradgi

Standard Dimensions for Sportsfields

(Note: spectator area excluded).

SPORT	PITCH DIMENSION	RUN OFF AREA	ROTATION AREA/ SUBSTITUTION BENCH
AFL	177x 155m	6m from pitch perimeter	5 x 5m
CRICKET	138 x 119m	6m from pitch perimeter	6 x 2m
FOOTBALL	110 x 68m	6m from pitch perimeter	5 x 5m
RUGBY UNION	144x 69m	6m from pitch perimeter	5 x 5m
RUGBY LEAGUE	122x 69m	6m from pitch perimeter	5 x 5m
TOUCH FOOTBALL	76x 50m	6m from pitch perimeter	5 x 5m

Table 2
Sourced from Gold Coast Planning Policy II:
Land Development Guidelines Section 6 - Open Space Requirements

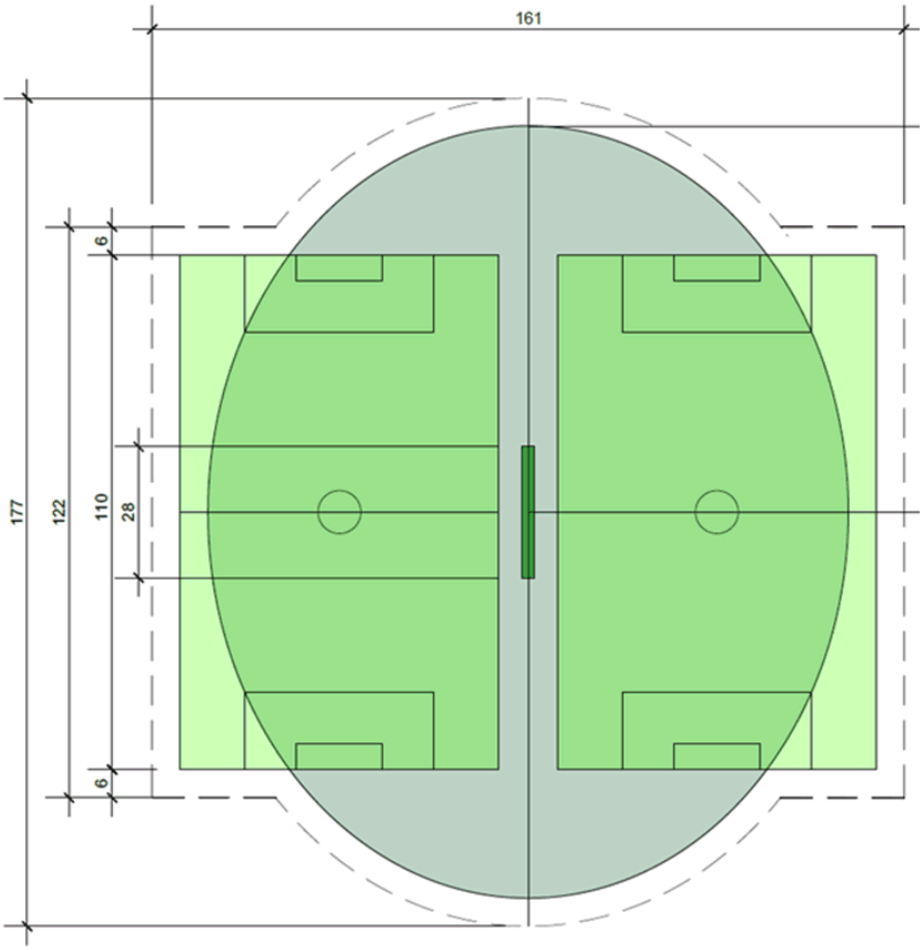


Figure 9
Typical layout multi-sportsfield layout for Cricket, AFL, and Soccer: sourced from Transport Canberra and City Services (TCCS) publi-cation – 'Design Standards for Urban Infrastructure, 24 - Sportsground Design

- Car park design must be in accordance with relevant civil design standards - AS2890 series.
- Disabled car parking must accord with AS2890.6 with the number of spaces provided in accordance with BCA rates. These spaces must be located as close to the entrance of facilities as possible and be linked by an accessible path of travel as per AS1428.1.
- Car park design must include provision for buses.
- Car parking should not visually dominate the landscape and always incorporate substantial shade tree planting.
- Car parking must be linked to the pedestrian path networks within the park.
- A suitable number of bicycle racks to further encourage cycling must be provided. These facilities must be provided as 'Class C' bicycle facilities with adequate weather protection and good passive surveillance.

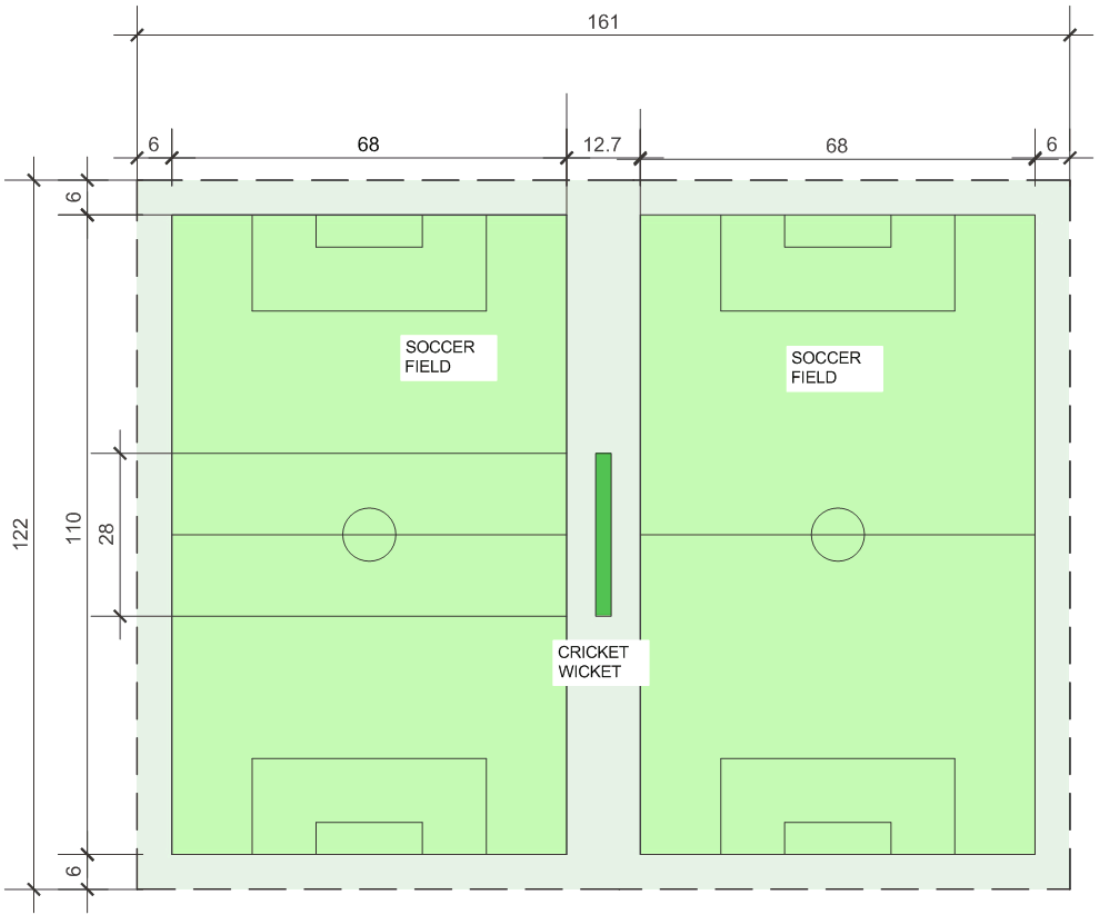
Pathway networks - entry points and paths to internal key destinations such as sports fields and amenities must provide equitable access in accordance with the Disability Discrimination Act. The pathway network should use different widths, path finishes and detailing to establish a clear hierarchy

Perimeter control - the park perimeter is to be furnished with a suitable barrier to define vehicle entry points, including maintenance and emergency access points.

Water supply – Sportsfields are to be provided with a compliant water supply to allow the provision of water for visitors and maintenance of sportsfields. In particular:

- Field irrigation water supply is required for sports grounds for maintenance. Explore opportunities for recycled water for sportsfield irrigation.

Figure 10
Typical layout for dual use – Soccer and Junior Cricket Transport Canberra and City Services (TCCS) publication – 'Design Standards for Urban Infrastructure, 24 - Sportsground Design



- Bubblers and water filling stations are required near play spaces and sportsfields where visitor use is high.

Lighting – sportsfields should comply with the appropriate Australian Lighting Standards, in particular:

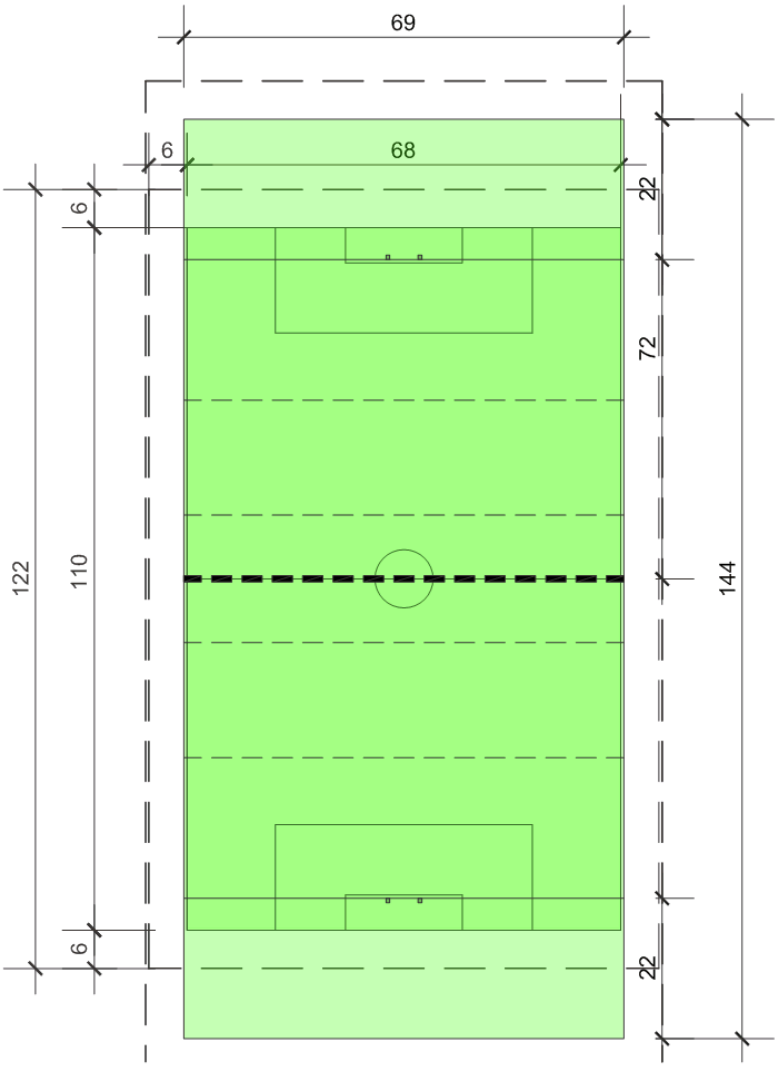
- Lighting to be provided to facilitate evening sports training and competition on sporting fields and pathway networks linked to car parking areas.
- Lighting design should consider illumination and spill requirements for functions, and the siting of light standards to enable free movement of specified mowing equipment.

Waste Requirements - consideration must always be given to the location of bins so that emptying can be undertaken as efficiently as possible, in particular:

- Bins should be located as close as possible to entrances and or road frontages of parks or high activity areas such as BBQ or picnic facilities.
- Bins should be located near a road or the perimeter of the open space to allow the bins to be serviced without the need to drive the collection trucks into the park.

Turf specification for fields – Kikuyu (Pennisetum clandestinum) installed as per West Dapto Open Spaces Technical Manual.

Figure 11
Typical dual use layout for Rugby and Soccer



5.3 Open Space Frontages

Objectives

Good design of park perimeters is essential to activate the park and enable passive surveillance. The majority of the park should be road frontage to allow for passive surveillance.

Parks should have active edges with the provision of pathways or shared pathways to enable passive surveillance.

Requirements

- The majority of park perimeters must be surrounded by a road network with footpath or shared pathways with defined entry points.
- Neighbourhood parks must be located along a major road with additional smaller order roads leading to car parking. Seventy-five percent (75%) of the neighbourhood park must have road frontage. No boundary to be less than thirty (30) metres.
- Local parks should have direct residential frontage with four road frontages.
- Residential dwellings should be oriented to allow passive surveillance.
- All park perimeters should be provided with a suitable barrier to define vehicle entry points including emergency and maintenance access.
- Street trees should be provided to the perimeter of all parks.
- Signage across Council's parks must be consistent and of a high standard. Messages should be consolidated to reduce visual clutter. Refer to West Dapto Urban Release Area Open Space Technical Manual.

5.4 Pathways

Objectives

All neighbourhood and local parks must be linked to the shared pathway network. Walking and cycling is a very important component of active transport in the West Dapto transport system to achieve a sustainable, healthy and active community. Creating attractive walking routes will contribute greatly to the health and vitality of communities.

A hierarchy of internal pathways should be developed to connect the park perimeter pathways to key features and facilities within the open space. At least one internal path should be Equal Access connecting to the main entry point and linking to key facilities in the park such as sportsfields, picnic areas, toilets and play areas.

Pathways should link to shared pathways in riparian areas. Walking and running trails are permitted in natural areas subject to careful route mapping in consideration of high conservation areas, natural landform, existing gradients, and points of interest. Trails should minimise impacts on existing landform and vegetation and other biodiversity values.

Tree planting should be integrated with pathway networks to provide shade and amenity.

Below left: Open space frontage treatment, Penrith NSW

Left right: Internal pathway networks, Stuart Park Wollongong

Requirements

- All paths to be designed in accordance with WCC Civil Specification 2019.
- All concrete pathways shall have a minimum of 1500mm width.
- The selection of planting adjacent to paths should be in consideration of Safety in Design Principles and not provide places of concealment.
- Trees should be offset from pathways to allow sufficient area for the root zone in consideration of the species and mature size.

Shared Pathways

Objectives

Active transport is achieved with the provision of convenient, connected, direct and attractive shared pathway networks between residences, schools, town and village centres, community facilities, parks and public transport nodes. The aim is to increase participation in all forms of cycling and walking by the development of safe, connected networks of shared pathways.

Site analysis of open spaces should map existing shared pathway and footpath networks. The parks need to connect to shared pathway networks to create safe and easy access to the park by bike, scooter or walking.

Neighbourhood parks should integrate the shared pathway network. The shared pathway network could be integrated into transmission easements, riparian areas and open space to create convenient pedestrian and cycle links that are safe, scenic and direct.

Shared path bridges are planned as part of the West Dapto Section 94 Plan on major riparian corridors to allow direct linkages and maximise accessibility between precincts and land uses.

Requirements

Shared pathway networks must provide both connectivity within the proposed subdivision, and form part of the wider context of the West Dapto Urban Release Area active transport network.

- A site analysis should be undertaken mapping any existing or proposed shared path networks within the park's catchment area prior to commencement of shared pathway route planning.

Below: Shared pathway, Squires Way Wollongong

Bottom: Shared pathway adjacent to riparian area, Cordeaux Road Mt Kembla

- Shared pathway networks can be integrated into the riparian corridors to provide an off road cycle network.
- Utilisation of the riparian corridors can create pedestrian and cycle links that maximise accessibility between open spaces. Shared pathways should be located where possible outside the 10 percent Annual Exceedance Probability (AEP) flood extent.
- For any shared pedestrian footpath/ cycleway, a minimum 2.5 metre width is required and widened to 3 metres if the shared footpath/cycleway is adjacent to any embankment or structure.
- Fencing must be provided where required with safety fencing ie cycle rails.
- Where possible incorporate a level 0.6m shoulder (maximum cross fall of 2.5%) along both sides of a pathway. No planting should occur in this shoulder to create a safe and level run off area.
- All pedestrian footpaths or shared pathways / cycle ways should be designed in accordance with the requirements of Australian Standard AS 1428-2001. The maximum gradient for such pathways should be one in 14 with handrails, or 1 in 20 without, wherever practicable. The pathway should be constructed of concrete, except where varied by Council.
- Shared pathways should be designed in accordance with RTA NSW Bicycle Guidelines. These comprehensive guidelines assist in the planning and construction of high quality bicycle transport facilities in NSW including on-road and off-road facilities, intersection treatments, parking, line marking and signage. This document is to be read in conjunction with Austroads Guides part 6A: Pedestrian and Cyclist Paths, which prevails where there are differences between these two sets of guidelines.
- Provide end of trip facilities such as bubblers, water bottle filling station, seating and picnic facilities within parks.
- Provide bicycle parking at all parks.

Trails

Objectives

A trail is a component of the active transport network that is compatible with natural areas. Trail networks can facilitate activities such as walking, jogging and on trail cycling. The trail networks within a natural area should be planned around the high conservation areas, natural landform, existing gradients, and points of interest. Trails should minimise impacts on existing landform and vegetation and other biodiversity values.

Trails can also provide access to undertake maintenance in a natural area.

Requirements

- Trail construction materials can vary dependent on site conditions and anticipated uses.
- All walking trails should be in accordance with Australian Standard 2156.2:2001 - Walking Tracks Infrastructure Design. This standard specifies requirements for the structural design of walking track structures, to protect natural and cultural assets.

Concrete pathway adjacent to riparian area, Wongawilli

- Trail heads or trail access points must be visible. Trails should have good lines of sight.
- As part of the trail route design the applicant will be required to undertake a comprehensive risk assessment following CPTED principles.
- A hierarchy of trails should be determined with variable pathway widths dependent on function (with a minimum of 1.5m width). The width of a trail should respond to not only the hierarchy but also respond to natural features and vegetation.
- Trails should be designed to ensure that they are not significantly damaged in a storm event with a hard wearing surface preferred unless there is significant existing vegetation which may be impacted.
- Trails in natural areas, should incorporate long sweeping bends and meanders, with crests and gentle rises and falls, to create interest and assist drainage.
- Raised walkways and minor footbridges are permitted in natural areas in low-lying areas and areas of high environmental sensitivity. Materials for raised walkways and bridges must be durable, hardwearing and slip resistant. Structural components should be corrosion resistant such as galvanised steel and Fibre Reinforced Plastic (FRP). All boardwalks and pedestrian bridges to be designed in accordance with Australian Standard 2156.2:2001 - Walking Tracks Infrastructure Design.

Off Road Cycling

Objectives

Open space designs should provide a safe and fun environment to allow for cycling. Mountain biking is a rapidly growing recreational activity in NSW and the riparian corridors of West Dapto provide a unique opportunity for both a formal shared pathway network and for on trail off road cycle network.

Trail networks for off road cycling within a natural area should be planned in consideration of high conservation areas, natural landform, existing gradients and points of interest. Trails should minimise impacts on existing landform, vegetation and other biodiversity.

Planning, design and management of off road cycling trails can minimise environmental impacts, provide a quality experience for riders to enjoy and appreciate open space, and minimise conflict between park users.

Requirements

- The Australian Mountain Bike Trail Guidelines for trail planning, design and construction should be utilised to create a sustainable mountain bike network. Off road bike tracks must be designed and constructed so that water flows are managed and riders and other users are contained on the tracks. This is crucial to reduce erosion, sediment travel, track widening and proliferation, vegetation damage, and associated maintenance requirements.

Left: Off road cycling trails, Mt Kosciuszko

Below: Off road cycling trails, Falls Creek Victoria

5.5 Car Parking

Objectives

Car parks should be located in areas which have natural surveillance from adjoining residential areas. Car parking within the park should not visually dominate and always incorporate substantial shade tree planting. Car parking should be separated from dedicated play spaces so there is no conflict between vehicles and pedestrians.

Requirements

- Car park design within open space must comply with relevant civil design Australian Standards.
- Car parking within the park should not dominate the development and provide shade to a minimum of 50 percent of parked vehicles. This should be achieved by the provision of medians and planting beds within the car parks to allow for shade tree planting. Appropriate soil volumes must be provided in consideration of proposed stocking rate.
- Planting beds must have sufficient deep soil area for the trees to grow. The minimum dimension of the planting bed is 2.4 metres by 5.5 metres (one car space). If an elongated bed design is required, the minimum width of available soil is 1.5m.
- Pedestrian and vehicular movement is to be clearly separated by use of design devices such as kerbs, bollards and or fencing.
- Car parking must be linked to the pedestrian path networks of the park.
- Trees in car parks should be long-lived large canopy species that do not excessively drop branches or soft fruit that may damage vehicles.
- Car parking should incorporate water sensitive urban design principles.

Car Park and integrated shade planting, Bald Hill Wollongong

5.6 Public Art

Objectives

Public art as defined in the WCC Public Art Strategy & Guidelines is 'a broad term that refers to a range of sculptural installations in the public realm. Public art can be enduring in the form of iconic, stand-alone work and integrated artistic elements. Ultimately, public art embraces its environment, and helps create places that inspire investigation and interaction, and are enjoyable and meaningful in their own right'.

Public art can enhance open spaces by:

- creating a sense of place,
- enhancing and enriching our experience in a public space by representing the local history of the area,
- increasing amenity and activating the open space,
- providing a medium to educate on the culture and heritage of an area.

Public art is permitted in neighbourhood and district parks only, due to the long term maintenance costs of the work.

Requirements

Public artwork and design proposals must be submitted to be assessed by the Public Art Advisory Panel and comply with the following requirements to be considered for approval:

- The artwork should not portray or depict material in a way which discriminates against or vilifies a person or section of the community on account of race, ethnicity, nationality, gender, age, sexual preference, religion, disability, mental illness or political belief.
- The artwork must principally include the work of artists and art-forms or designers and should not contain advertising or promotional material for any other product or service.
- The artwork must be the original work of the submitter and must have obtained all necessary clearances and approvals for subjects or materials featured in the work.
- The artwork should not employ sexual appeal in a manner which is exploitative and degrading of any individual or group of people.
- The artwork should not present or portray violence unless it is justifiable in the context.
- The artwork should not use language which is inappropriate in the circumstances.
- Public art should be located offline from pathways to ensure they do not create a hazard.
- Items should not have any sharp edges that could be a hazard to people.
- Artworks should be designed to prevent finger and head entrapment.
- A maintenance report is required to be prepared by the artist at the end of the project addressing the following:
  - a description of the artwork (including digital images and the date of completion);
  - artist/artist team contact details;
  - completed list of construction drawings;
  - a maintenance schedule
  - an agreement relating to decommissioning of an artwork once it has reached its intended lifespan, has been damaged or destroyed, and is no longer safe;
  - the method of construction, the types of materials used and details of the fabrication company (if relevant);
  - any specific instructions or products to be used when cleaning and maintaining the artwork.

Public art Bald Hill Stanwell Park

BMX Pump track (Barden Ridge). Image sourced from Sutherland Shire Council

5.7 Skateboarding, Scooting, & Bmx

Objectives

Parks need to cater to the needs of both young and older children with the provision of facilities for skateboarding, scooting, roller blading, and BMX riding.

This section does not relate to the provision of formal skate facilities but to features and elements where skating, scooting and roller blading can occur without conflict with other open space users. BMX riding activities can be accommodated in separate BMX and pump tracks.

Requirements

All concrete pathways can be used for skateboarding, scooting and roller blading.

- Hard landscape elements such as concrete steps, ramps, retaining walls, and steps that are not intended as skate facilities should integrate skate deterrent devices.
- Skating, scooting and roller blading provisions should be located offline from where young children are playing. Surface treatment changes such as unit pavers can be integrated to define skate area.
- Skate specific forms and typical furniture such as wedge boxes and fun boxes can be integrated adjacent to pathway networks to address the needs.
- For design guidelines for BMX facilities refer to BMX (Sports Dimension Guide) - Department of Local Government, Sport and Cultural Industries (Gov of WA).

Right: Skate feature, Holborn Park Berkeley

5.8 Park Furniture

Objectives

Open space furniture selection should be appropriate to the size, function and service of the open space. Parks should not contain an excessive amount of park furniture that results in an unsustainable maintenance cost to the community. For example, a local park would have minimal furniture whereas a neighbourhood park with a greater intensity of use may have a variety of park furniture such as multiple seating options, barbecues, and picnic tables with shelters, drinking fountains and bike racks.

The required provision of furniture and amenities within the park hierarchy is detailed in the West Dapto Open Space Technical Manual – Furniture.

Requirements

- All specifications for park furniture are detailed in the West Dapto Urban Release Area Open Space Technical Manual. Below are some examples of requirements needed.
- Seats should be provided at regular intervals and at points of interest such as play spaces and sporting fields. Seats should be offset from the trail so as not to affect the path of travel. Refer to Open Space Technical Manual for seat specification.
- Seats are to be constructed on an extended concrete pad to allow for wheelchairs, prams, walkers etc. Seats are to be positioned with a continuous accessible path of travel where possible.
- Tree planting should be positioned to complement seat positions to maximise shade.
- Picnic nodes (picnic table with shelter) should be located adjacent to places of special interest, and to complement, and enhance other recreational opportunities in the park. The picnic node must have accessible pedestrian paths from adjoining car parks and roads.
- Within a neighbourhood park, electric barbeques are generally provided as part of a picnic node and must be covered by a shelter.

Picnic shelter, Sheaffes Road Kembla Grange

5.9 Lawn Areas

Objectives

Grass areas provide opportunities for formal and informal recreation in open space. Grass areas should be as large as possible to create functional and flexible spaces to suit a large array of recreational activities.

Requirements

- Informal grass areas for ball sports or unorganised sport should be a minimum dimension of 60m long x 40m wide.
- Lawns should generally be kept clear of furniture elements such as signs, seats, lights, bins.

- Trees in lawns should be spaced to allow ease of mowing and be planted with a maintained 1.5m radius mulch ring where no edge is specified.
- The gradient of lawn areas proposed for informal kick about areas should have a slope of less than 6 percent and greater than 2 percent to allow for surface drainage and safe ball play.
- The maximum slope of turfed areas in public open spaces is to be to be 25 percent to ensure the safety of individuals carrying out maintenance. Areas with slopes steeper than 25 percent must be treated as a mass planting bed and may need stabilisation with a geo fabric.
- Stones, sticks and roots should be removed from all soil profiles.
- Turf areas should have a minimum of 100mm depth of top soil.
- For lawn species and construction details refer to West Dapto Open Space Technical Manual.

5.10 Mass Planting Beds

Objectives

Mass planting beds are defined as a mulched area that is densely planted. Mass planting beds in open space should be minimal and be relative to the size, function and service of the public open space. For example, a local park would have minimal to no mass planting beds whereas focal areas of a neighbourhood park with a civic space may benefit from appropriately sized mass planting beds.

In riparian zones mass planting beds will form part of the re-establishment of the original riparian vegetation community and therefore may be of considerable size dependent on the order of the stream being revegetated.

Although mass planting beds can be an important amenity improvement in the right location, the priority for open space upgrades should always be the establishment of canopy trees, groups of trees and feature trees.

All vegetation established in or around any open space shall be located to maximise passive surveillance opportunities, maintain clear lines of sight and avoid the creation of concealment areas.

Requirements

- Areas with slopes steeper than 25 percent must be planted as a mass planting bed or constructed with materials specifically designed to stabilise the slope.
- All planting areas are to be prepared to a minimum depth of 300mm and free of weed species. This may require the importation of planting mix or a mixture of weed free site soil and soil conditioner.
- If planting areas are required, the garden beds should not be narrower than 750mm for grasses only, and 1500mm for a mix of trees and grasses.
- Planting beds should have hard and robust masonry construction edges installed. The edging should be straight, or with long sweeping curves with no acute angles, which would require hand mowing.
- Planting beds should comprise a mix of native canopy trees, groundcovers and grasses.
- Plants shall comply with AS 2303:2018 be healthy, of good form and be true to species and size. They must be free from pests and disease, and shall not be root bound.
- Advanced trees and grasses are to be planted in good quality soil and humus. The planting hole shall be twice the width and the same depth as the plant container.
- Any sites adjoining any natural areas or creek lines with native vegetation must use locally indigenous species (no cultivars) in the landscape plan and must have regard to any impacts of water flows and flooding.
- Planting selection should be based on a weeds risk assessment to prevent the dispersal of inappropriate species into natural areas.
- Mulch for all planting areas shall be hardwood mulch. Mulch is to be free of weed material and seed, debris and foreign matter. The contractor shall spread a 75mm thickness of approved mulch on all mass planting beds and 75mm thick mulch ring around all trees in lawn areas. The stems of all plants shall be kept free of mulch to protect the stem from possible rot.

5.11 Water Supply

Objectives

Open spaces must be provided with a water supply to allow the provision of water for maintenance of landscape areas as well as provision of water for bubblers. Taps should be provided in a park to allow the cleaning of infrastructure and the maintenance of turf and planting areas.
Bubblers and water filling stations are also required near play spaces and active recreation nodes where it is expected that people stay longer.
Water supply for irrigation of sportsfields should be obtained from sustainable sources such as recycled or harvested water supplies.

Requirements

- A minimum size of 25mm water service connection is required at the park boundary with a water meter and at least one vandal proof water tap.
- Taps should be located near the edge of the landscaping and turf to be maintained. The tap should not interfere with maintenance activities such as grass mowing.
- Taps to be placed in fifty (50) metre intervals.
- Water supply connections should be located within twenty five (25) metres of a maintenance vehicle access point.
- All water provided from Council's reticulated water supply system shall be metered and all irrigation systems shall comply with the back-flow prevention requirements of AS3500 Plumbing and Drainage - Part 1. Locate water supply connections and back-flow prevention devices away from public access points adjacent to other park infrastructure or within landscape beds where possible.
- Bubblers should be provided in parks in key locations, on shared pathway networks and near play spaces and active recreation nodes where visitor use is high.
- A dog drinking bowl must be added to bubblers in proposed dog parks.

5.12 Fencing And Barriers

Objectives

Wherever possible, the need for fencing should be designed out of open space proposals. However, there may be special circumstances where fencing or barriers may be required, such as along road frontages of a park to prevent illegal vehicle access to open space or natural areas, or to provide protection from potential hazards such as permanent water bodies.

As detailed above, play space design should avoid the need for fencing by careful planning and placement of the play environment wherever possible.

The type of fence or barrier to be provided in open space should be consistent with the park type and existing site characteristics. Fencing must be robustly constructed and made from durable materials with high quality finishes that minimise maintenance requirements.

Requirements

- Fence rails and the tops of bollards should be generally installed following the overall slope of the land, without minor dips and bumps.
- Vehicle barriers are to be installed along the perimeter of natural areas, along road frontages and near public entrances and facilities. Refer to the West Dapto Technical Manual for a range of appropriate fence types.
- Barrier materials to control and define the entry points into natural areas should be as simple and robust as possible, such as quarry sawn sandstone 'logs', timber railing fences, bollards, or galvanised pipe and timber posts as detailed in the Open Space Technical Manual.
- Designated access gates to be provided for emergency and maintenance vehicles as detailed in the Open Space Technical Manual.
- Ensure that fencing adjacent to riparian areas does not result in the undesirable obstruction of the free flow of floodwaters, or obstruct the connectivity and movement of fauna along riparian corridors.

- Fencing is required where there is a danger of children gaining access to high risk areas (eg around stormwater drain head walls, outlets and stormwater quality improvement devices) or where the drop height exceeds 1.0m. Fencing to be installed in accordance with stormwater design best practice and relevant standards. Refer to the West Dapto Urban Release Area Open Space Technical Manual for a range of appropriate fence types.
- A safety fence is permitted when play elements are less than 20m from the road frontage, shared pathway or water body.

5.13 Retaining Walls

Objectives

Wherever possible, the need for retaining walls should be designed out of open space proposals. Retaining walls will only be permitted in special circumstances such as to achieve accessible paths of travel or to retain the natural ground levels around significant vegetation.

Requirements

- Retaining walls over 1000mm high are to be designed and certified by an experienced chartered structural engineer and will require safety fencing.
- Retaining walls must be constructed with low maintenance high quality, durable materials. In this regard, masonry and stone walls are preferred as retaining structures.
- Boulder walls may only be constructed where natural stone is a feature of the site and the retaining walls are less than one metre in height.
- Timber retaining walls are not acceptable.

Retaining Wall, Bulli

5.14 Dog Parks

Objectives

The term 'dog park' is generally given to designated fenced dog off leash areas that contain a variety of landscape features and/or equipment that offer different activities and experiences for dog owners and their dogs. They are defined areas which offer a safe and controlled environment for dogs to play, socialise, interact and exercise with other dogs and their owners. Dog parks can contribute to enhancing social connectivity and improving community health. The provision of dog parks may also reduce impact on sensitive natural habitats by the creation of purpose built facilities.

The Companion Animal's Act 1998 states that dogs under effective control of a companion person are allowed in open space. Under the Act, dogs are not allowed within 10m of children's play equipment and in areas specifically prohibited by Council.

Dog parks must be located where people want to go, where people will feel safe, where natural surveillance is achieved through passing cars and/or foot traffic, and a site that is not within 50 metres of residential houses.

The design and detailing of dog exercise embellishments should blend in and complement the landscape quality of the space.

Requirements

- Minimum area required for a fenced dog park is 0.25 to 1.0 hectares.
- Dog parks must not be placed adjacent to children's playgrounds.
- Dog parks cannot be co-located with formal sportsfields.
- Dog parks could be considered in some drainage areas where there are less competing uses, such as a large detention basin.
- The site must have car parking options.

Dog exercise areas should have the following features as a minimum:

- The installation of double gate systems to allow people to enter/exit the facility easily with their dogs not being able to run away. The entry point must be treated with a hard surface such as concrete;
- The installation of two entrance points to allow people to enter/exit without conflict if encountered;
- provision of a 1.2m high perimeter fence with tree planting to create natural shade around the perimeter;
- seating for visitors;
- waste bins at each entry point;
- a maintenance access gateway;
- a water service to allow for the provision of water for dogs and owners with water fountains and dog bowls;
- regulatory signage;
- open ball play area;
- dog agility equipment.

Dog exercise equipment

5.15 Waste Collection

Objectives

Bins should be located as close as possible to entrances and or road frontages of parks, or high activity areas such as BBQ or picnic facilities. Bins should be located near a road or the perimeter of the open space to allow the bins to be serviced without the need to drive the collection trucks into the park.

Bins shall not be provided in natural areas.

Requirements

- Consideration must always be given to the location of bins so that emptying can be undertaken as efficiently as possible.
- Provide a dispenser for dog waste bags on all bins at neighbourhood parks.
- Bins generally should be positioned offset from a pathway network on a concrete base with a minimum dimension of 1.2 x 1.2m in close proximity to either an entry point or an area of high activity.
- 240 litre size wheelie bins to be used with or without enclosure, depending on type of park.
- Refer to the West Dapto Open Space Technical Manual for specifications for waste bins.

5.16 Transmission Easements

Objectives

Transmission easements primary function is the distribution of power, however they can provide important links between the open space networks. Transmission easement areas should be accessible to the public where possible with the integration of pedestrian/cycle linkages.

Site analysis of open spaces should map existing shared pathway and footpath networks and plan to integrate a safe and easy access to the park by bike, scooter or walking through the transmission easement where possible.

Permitted uses and requirements for treatment of transmission easements vary. Professionals involved with the development, planning, design and integration of transmission easement in open space must consult with electricity service providers.

A general guide of permitted activities is as follows:

- grazing;
- water storage dams, subject to sufficient clearances from conductors and towers;
- non-metallic fences up to three metres in height. Metallic fences, or fences incorporating metallic materials, must be suitably earthed and sectionalised, and are subject to approval by electricity service providers;
- dog exercise could be considered in transmission easement areas where there is good access and parking.

Requirements

The following guidelines apply:

- Pedestrian paths should connect to adjacent open space pathways and shared pathway networks;
- At least one key path must be provided for each transmission easement area;
- When a more complex path network is proposed the design should use different widths to establish a clear hierarchy. Minimum clear path width of 1500mm.

5.17 Signage

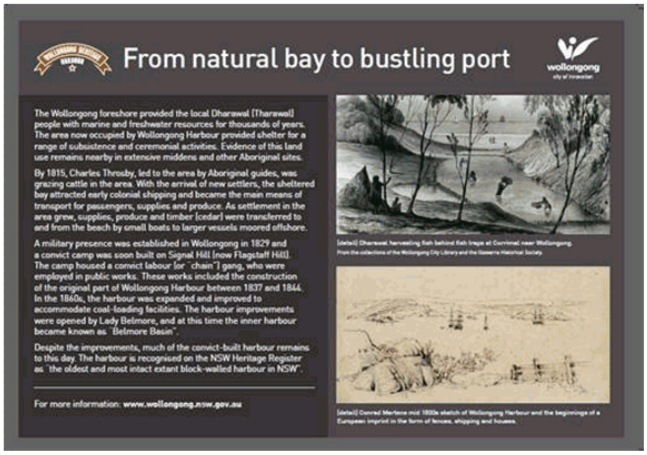
Wollongong City Council follows the guidelines of the NSW Geographical Names Board (GNB) for the assignment of names to parks, sportsgrounds, and natural areas within the Wollongong Local Government Area. Council will consider the naming of parks, sports-grounds, natural areas and general community use lands (including features within those) based on the following:

- names of Aboriginal origin and Indigenous significance to the local area;
- botanical reference native to the area;
- historical or cultural significance to the local area;
- geographical relevance of the immediate area;
- a person's name or
- a group – charitable, social/cultural community.

It is acknowledged that the GNB's primary directive is to give precedence to the use of names of Aboriginal origin associated with the feature or a name with an historical background in the area of the feature. Council will utilise these long standing practices wherever possible.

Signage across Council's parks needs to be consistent and of a high standard. Messages should be consolidated to reduce visual clutter. Refer to the West Dapto Open Space Technical Manual for specifications.

Below and bottom: Small interpretive signage examples, Endeavour Drive, Wollongong



Below: Large interpretive signage 'Purrungully' West Dapto

6.0 SUBMISSION REQUIREMENTS

Requirements for submission of Landscape Concept plans to Wollongong City Council when seeking approval for a subdivision development application, which contains open space:

- **Site Analysis plan** - shows relationship of the open space to the development as well as its relationship to the surrounding open space network and original neighbourhood or precinct plan. Connectivity must be shown to shared pathway networks and linkages to key destinations such as town and village centres, community facilities, schools and public transport.
- **Open Space inventory** - assessment of the existing and planned recreational facilities in the surrounding neighbourhood precinct.
- **Landscape Plan** - Refer to Chapter E6: Landscape for Lodgement of a Landscape Plan. A statement from both a registered landscape architect and civil engineer that the proposed open space design complies with the West Dapto Open Space Design Manual
- **Arboricultural Impact Assessment (AIA) report** - to cover existing vegetation. Arborist report must correlate the cut and fill plans with proposed trees to be retained and removed.
- **Flooding impacts on proposed open space** – mapping of flood impacts on proposed open space. For example sportsfields are to be located outside the 10 percent AEP flood extents and are available year around for competition play except during the flooding event.
- **Formal and Informal recreation** - concept designs must demonstrate the achievement of an equal split of active (formal) and passive (informal) play.
- **Vegetation Management Plan** – a VMP must be provided to cover riparian areas and areas of remnant / regrowth vegetation.

7.0 DEFINITIONS

Active (formal) open space
As defined by Greater Sydney Commission 'Active open space is land set aside for the primary purchase of formal outdoor sports for the community. Active open space supports team sports, training and competition'.

Passive (informal) open space
Is land set aside for parks, gardens, linear corridors, conservation bushland and nature reserves. These areas are made available for informal recreation, play and physical activity. Examples of passive (informal) recreation are cycling, exercise stations, running, walking, play spaces, sitting and picnicking.

Consulting Arborist
An arborist qualified to be consulted in the preparation of subdivision documentation must have achieved an AQF Level 5 (or equivalent) qualification.

Dog park
The term 'dog park' is generally given to designated fenced dog off leash areas that contain a variety of landscape features and/or equipment that offer different activities and experiences for dog owners and their dogs.

Landscaped area
A landscape area is a part of a site used for growing plants, grasses and trees which does not include any building, or hard paved area.

Natural areas
Natural areas are reserves created to protect the ecological biodiversity and habitat values of the land, the flora and fauna of the land, and other ecological values of the land. Natural areas include riparian environments and remnant, regrowth and restored bushland. Natural areas protect the aesthetic, heritage, recreational, educational and scientific values of the land. The management of the natural area protects and enhances the values and quality of the land and facilitates public enjoyment of the land with measures directed to minimising or mitigating any disturbance caused by human intrusion.

Public Art
Is defined in the WCC Public Art Strategy & Guidelines 'Public art is a broad term that refers to a range of sculptural installations in the public realm. Public art can be enduring in the form of iconic, stand-alone works and integrated artistic elements. Ultimately, public art embraces its environment and helps create places that inspire investigation and interaction, and are enjoyable and meaningful in their own right'.

Remnant vegetation
Any patch of native vegetation around which most or all of the native vegetation has been removed.

Shared pathway
A concrete or paved path, which is a shared pedestrian/cycleway with a minimum width of 2.5 metres designed in accordance with the requirements of Australian Standard AS 1428-2001 and WCC Civil Specification 2019.

Trail
A trail is usually a path or track to facilitate activities such as walking, jogging and on trail cycling. Trail construction materials can vary from compacted natural ground or compacted gravel to asphalt and concrete.

Tree Protection Zone
The Tree Protection Zone (TPZ) is defined as the optimal distance from the trunk of a tree that should be maintained free of development and construction activity in accordance with AS4970-2009 in order to protect the tree and keep the tree viable.

Urban Greening
Is strategically increasing the quality and quantity of all vegetation in open green spaces and on all land types in an urban setting with a particular emphasis on the increase of canopy cover.

Universal Design is the process of designing for everyone. It is the "design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation and specialised design", Ron Mace, 1997.

Vegetation Management Plan (VMP)
A VMP is a map-based report to assist the landowner to manage a site to ensure that biodiversity on the site is protected, maintained and enhanced.

NOTES

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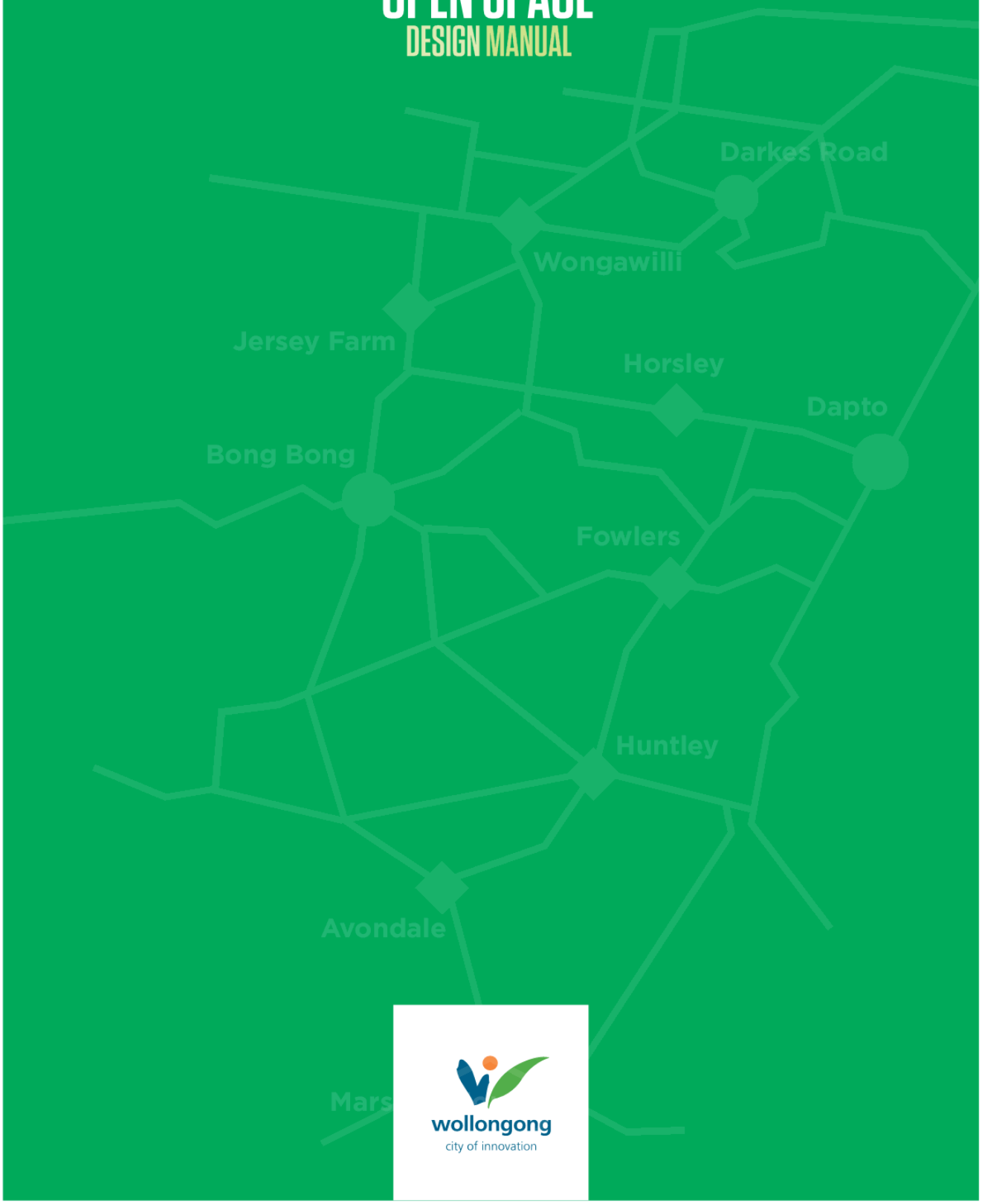
WEST DAPTO OPEN SPACE DESIGN MANUAL



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WEST DAPTO OPEN SPACE TECHNICAL MANUAL

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Document Revision Status

Author	Revision No.	Review	Date Issued
D. Pollock	Draft A	A. Goldie	2/4/19
D. Pollock	EMC Draft	A. Goldie	7/6/19
D. Pollock	Draft for Council	A. Goldie	20/6/19

OPEN SPACE TECHNICAL MANUAL

INTRODUCTION

This manual will be a controlled document that will be updated regularly in line with the changes in maintenance requirements, construction technology, and advances in environmentally sustainable design as experienced by the managing authorities.

Professionals involved with the development, planning and design of open space within the West Dapto Urban Release Area (WDURA) should in all cases also consider the specific qualities, technical requirements and existing site features of each design. The Open Space Technical Manual establishes a series of generic design materials, finishes, and performance standards to be used in open space design. Site specific character and constraints will also influence the design to give each individual space a particular character.

This manual provides technical specifications to ensure that all elements proposed in developments integrate quality design and apply consistent standards of infrastructure within open space that are required to adhere to and facilitate the delivery of, the West Dapto Vision and in line with Council's open space requirements.

Enquiries regarding this document may be directed to the Council's Landscape Architecture Section on telephone number (02) 4227 1111.

The following tables provide a list of the various infrastructure required to be provided in open space to achieve a consistent level of treatment to the type of park and associated service level of maintenance.

OBJECTIVES

Maintenance Costs

Open space and park infrastructure must be easy to maintain and financially sustainable. The level and nature of infrastructure required or considered appropriate will depend on Councils determination of the open space hierarchy, function and service (refer to tables below). Careful design and planning is required to ensure sustainable ongoing maintenance costs and achieve long lifecycles.

Materials and furniture items within an open space that are difficult to maintain and difficult or costly to replace can have a significant impact on the aesthetics, function, and the long term maintenance costs of a park. Materials should be hard wearing, and vandalism and graffiti resistant.

Durability

The West Dapto Planning principle for infrastructure is to utilise robust and durable materials with high quality finishes that minimise maintenance requirements and discourage vandalism.

Tree planting

The tree planting specifications detailed in Table 5 below recognises the importance of establishing street trees as part of the Urban Greening of the West Dapto Urban Release Area. Street trees improve the amenity and quality of city streets in measurable ways such as reduction of dust, glare and temperature extremes. In addition, trees improve streetscapes in more subtle ways that improve the visual quality of the street which is frequently reflected in higher property values.

Due to the importance of the streetscape, it is vital that correct stock is selected and correct methods of planting are applied, as per the details and specifications contained within this document. The tree species list also reflects Council's policy of a preference for local native species.

Amenity and Security

Streets and open spaces must be safe, convenient and comfortable pedestrian spaces that cater to the needs of all users. The design of the open space should provide equal access for all users, such as pedestrian crossovers, and the choice of paving and street furniture should meet slip resistance and access codes. Design for pedestrian amenity should maximise the actual and perceived sense of safety in open space. Active use of all spaces and passive surveillance of streets and open space should be encouraged, particularly at night, in line with Safer by Design principles and in accordance with Crime Prevention Through Environmental Design (CPTED).

Codes and Standards

All infrastructure construction works, including hard and soft landscape material and workmanship must be in accordance with the relevant Australian Standards and Building Codes of Australia, and Wollongong City Council Standard Engineering drawings where applicable.

The Open Space Technical Manual outlines the soft and hard landscape treatments for inclusion in the Landscape Plans and other information in support of a Development Application for a subdivision in The West Dapto Land Release Area (WDURA).

HOW TO USE THIS MANUAL

The following tables provide a list of the various infrastructure to be provided in the park hierarchy to achieve a consistent level of amenity provision and associated service level of maintenance.

OPEN SPACE HIERARCHY PARK TYPE & INFRASTRUCTURE

		TABLE 1 – PARK FURNITURE					
PAGE	ITEM	LOCAL PARK	NEIGHBOURHOOD PARK	NATURAL AREA	TRANSMISSION EASEMENT	DOG PARK	TOWN CENTRES
11	**S1** Seat	X	X	X	X	X	
12	**S2** Bench	X	X	X	X	X	
13	**S3** Seat						X
14	**S4** Bench						X
15	**S5** Picnic Setting		X				X
16	**PS1** Picnic Shelter	X	X				
17	**PS2** Picnic Shelter	X	X				
19	**PS3** Large Picnic Shelter		X				
21	**PS4**- BBQ Shelter		X (optional)				
22	**BBQ**		X (optional)				
23	**GB1** – Bin Post Mount	X				X	
24	**GB2** – Bin Enclosure		X				X
25	**TAP**	X	X			X	X
26	**BU1** - Bubbler	X				X	
27	**BU2/BU3** Equal Access Bubbler		X				X
28	**BR** – Bike Rack	X	X				x
29	**B1** – Timber Bollard		X	X	X		
30	**B2** – Stainless Steel Bollard		X				X
31	**B3** – Removable Bollard	X	X				X
32	**B4** – Sandstone Log	X	X	X			

OPEN SPACE HIERARCHY PARK TYPE & INFRASTRUCTURE

		TABLE 2 - OPEN SPACE FENCING REQUIREMENTS					
PAGE	ITEM	LOCAL PARK	NEIGHBOURHOOD PARK	NATURAL AREA	TRANSMISSION EASEMENT	DOG PARK	TOWN CENTRES
33	**F1 -** Single rail timber barrier.	X	X	X			
34	**F2 -** Vehicle access control			X			
35	**F3 –** Sports Field Fencing		X				
40	**F4 –** Play Space fencing						
41	**F5 –** Safety Fencing		X				
42	**F6 –** Dog Park Fence					X	
44	**G1 -** Boom Gate	X	X	X			

OPEN SPACE HIERARCHY PARK TYPE & INFRASTRUCTURE

		TABLE 3 – PATHWAY & PAVEMENT REQUIREMENTS					
PAGE	ITEM	LOCAL PARK	NEIGHBOURHOOD PARK	NATURAL AREA	TRANSMISSION EASEMENT	DOG PARK	TOWN CENTRES
45	Decomposed Granite Path			X			
46	Raised Walkways		X	X			
47	Asphalt Pathway			X			
48	Broom Finished Concrete Pavement	X	X	X	X	X	X
49	Coloured Honed Concrete Pavement		X				X
50	Unit Paving		X				X
51	Softfall	X	X			X	X

OPEN SPACE HIERARCHY PARK TYPE & INFRASTRUCTURE

		TABLE 4 – PARK SIGNAGE					
PAGE	ITEM	LOCAL PARK	NEIGHBOURHOOD PARK	NATURAL AREA	TRANSMISSION EASEMENT	DOG PARK	TOWN CENTRES
53	**PS1 –** Park Name/ Ordinance	X	X	X		X	X
54	**PS2** – Trail Marker	X	X	X		X	X
55	**PS3** – Small Interpretive Sign	X	X	X			X
56	**PS4** – large Interpretive Sign		X	X			X

OPEN SPACE HIERARCHY PARK TYPE & INFRASTRUCTURE						
		TABLE 5 – LANDSCAPE DETAILS				
PAGE	ITEM	LOCAL PARK	NEIGHBOURHOOD PARK	NATURAL AREA	DOG PARK	TOWN CENTRES
58-59	Tree Species List	X	X		X	X
60	Street Tree Planting Detail	X	X		X	X
61	Tree Planting with Mulch Ring	X	X		X	X
62	Street Tree Planting in coal wash	X	X	X	X	
63	Tree Planting With Edging	X	X		X	X
64	Mass Planting Detail	X	X	X		X
65	Turf Detail	X	X		X	X

PARK FURNITURE

S1 - Seat

LOCATION:

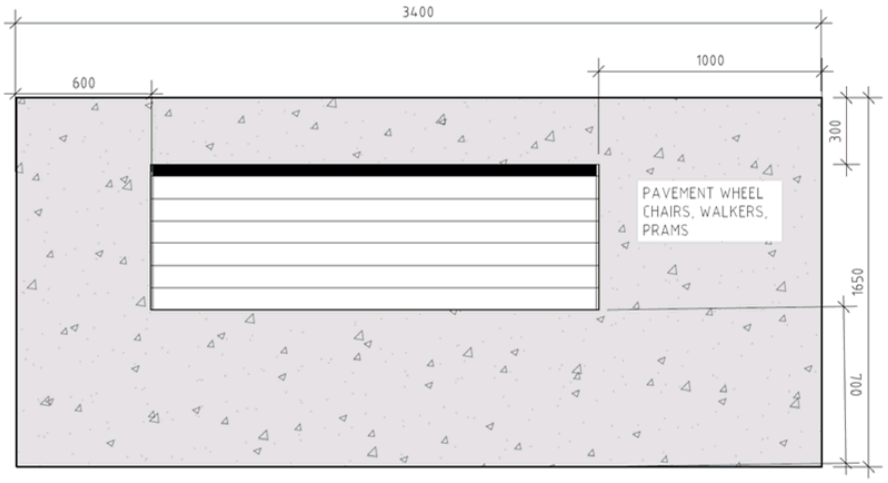
- Natural Areas, Dog Park, Transmission Easements, Local Parks, Neighbourhood Parks.

INSTALLATION:

- Concrete base slab. 3.4m x 1.65m

SPECIFICATION:

- Model: Gossi Park 'Parkway Seat' © or approved equal with armrests with skate guards.
- Frame: Die Cast legs: Powder Coated in standard Dulux colour range (Citi Pearl)
- Batten: Clear anodised aluminium planks, cast aluminium frame.
- Leg type: flange leg surface mounted
- Size:1800m long



S1 SEAT
PLAN NTS

PARK FURNITURE

S2 – Bench

LOCATION:

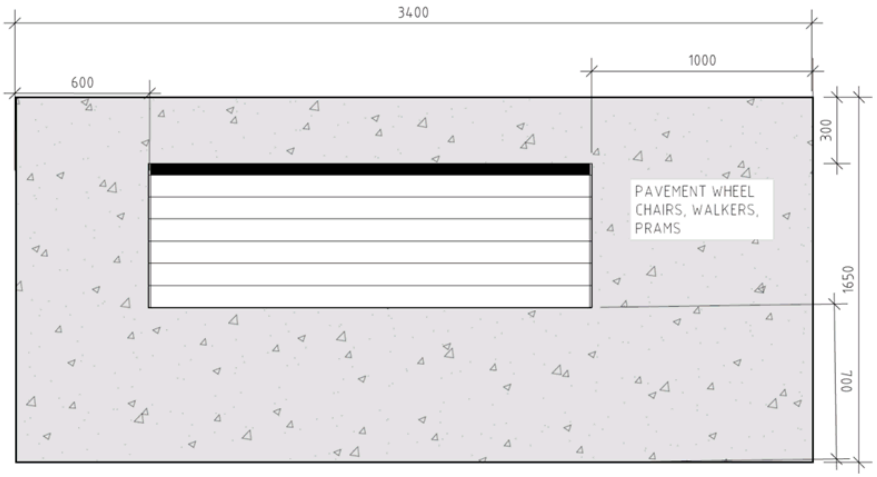
- Natural Areas, Local Parks, Neighbourhood Parks.

INSTALLATION:

- Concrete base slab. 3.4m x 1.65m.

SPECIFICATION:

- Model: Gossi Park 'Boulevard Bench' © or approved equal fitted with skate guards.
- Frame: Die Cast legs, Powder Coated in standard Dulux colour range (Citi Pearl).
- Batten: Clear anodised aluminium planks, cast aluminium frame, cast aluminium frame.
- Leg type: flange leg surface mounted.
- Size:1800mm length.



S2 BENCH
PLAN NTS

PARK FURNITURE

S3 Seat

LOCATION:

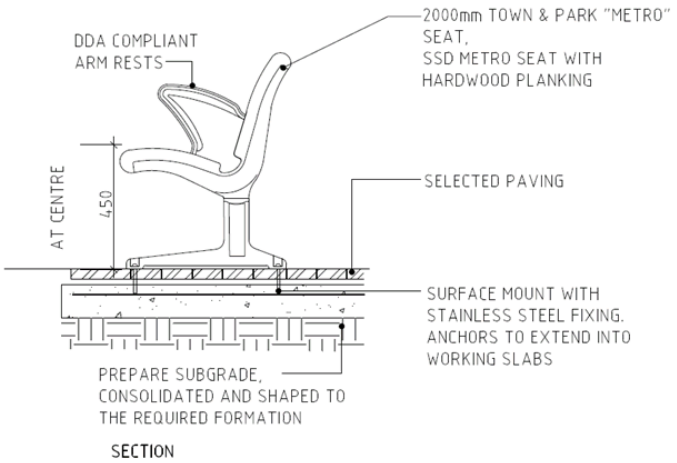
- Town, Village Centres.

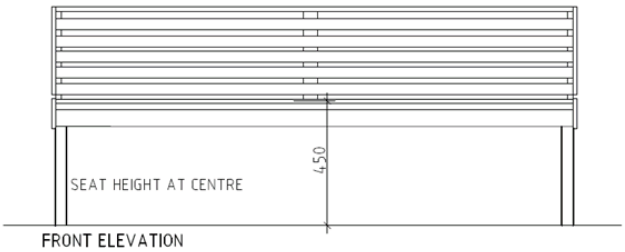
INSTALLATION:

- Surface mounted on unit pavers on concrete base slab.

SPECIFICATION:

- Model: Town and Park Metro Seat with armrests and skate guards by Stoddart © or approved equal.
- Frame: Cast aluminium.
- Battens: oiled Forest Stewardship Council (FCR) certified hardwood timber planks or approved equal.
- Size: 2000mm length.
- Leg type: leg foot surface mounted.





S3 SEAT
SECTION & ELEVATION NTS

PARK FURNITURE

S4 Bench

LOCATION:

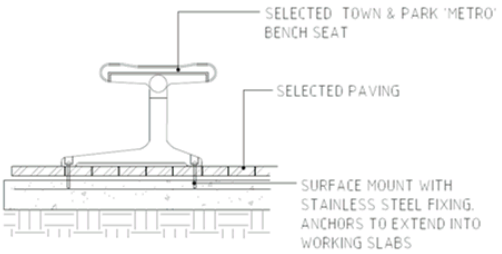
- Town Centres, Village Centres.

INSTALLATION:

- Surface mounted on unit pavers on concrete base slab

SPECIFICATION:

- Model: Town and Park Metro Bench by Stoddart © or approved equal with and skate guards.
- Frame: Cast aluminium frame.
- Batten: oiled Forest Stewardship Council (FCR) certified hardwood timber planks or approved equal.
- Leg type: leg foot surface mounted.
- Size: 2000mm long.



S4 BENCH SEAT
SECTION NTS

PARK FURNITURE

S5 Picnic Setting

LOCATION:

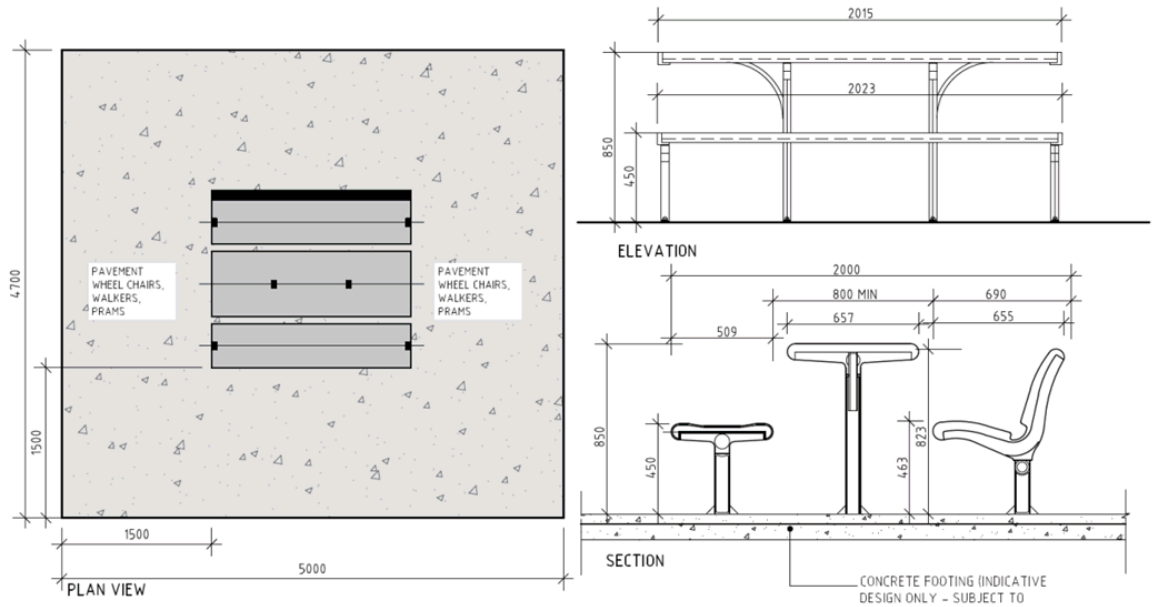
- Town Centres, Neighbourhood Parks

INSTALLATION:

- Unit pavers or coloured concrete base slab. 4.7m X 5m

SPECIFICATION:

- Model: wheelchair accessible Town and Park 'Metro' picnic setting by Stoddart © or approved equal. One (1) 'Metro' Seat and one (1) 'Metro' bench.
- Frame: Cast aluminium frame.
- Table Battens: Clear anodised aluminium planks.
- Seat Battens: oiled Forest Stewardship Council (FCR) certified hardwood timber planks or approved equal.
- Leg type: surface post.
- Size: 2000mm long.



S5 PICNIC SETTING

PLAN, ELEVATION, SECTION NTS

PARK FURNITURE

PS1 Picnic Shelter

LOCATION:

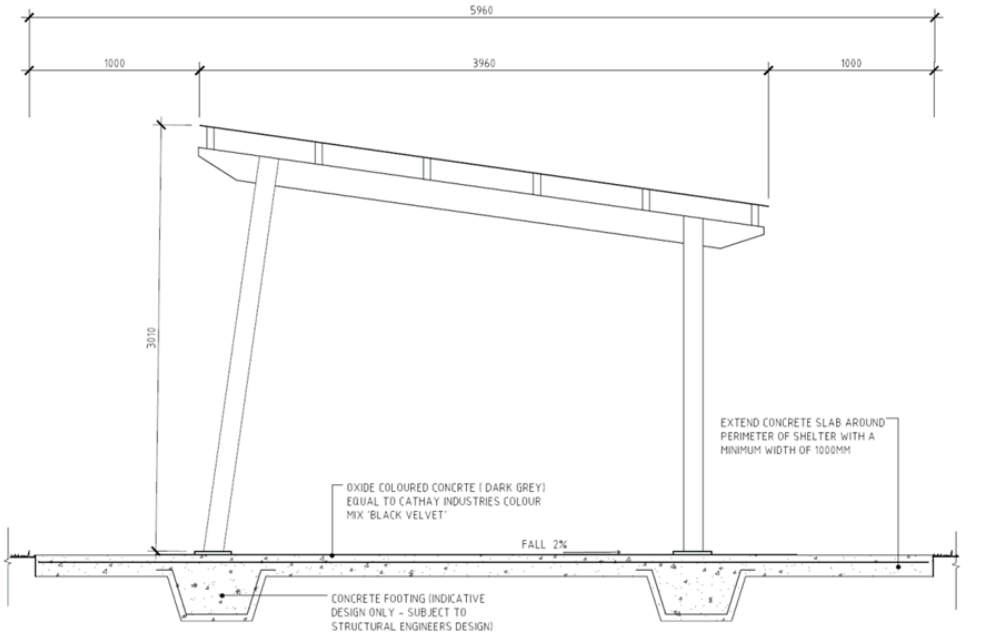
- Local Parks, Neighbourhood Parks

INSTALLATION:

- Surface mounted on oxide coloured concrete (dark grey) 5.96m x 5.8m

SPECIFICATION:

- Tathra Shelter by Precinct © or approved equal.
- Size: 3800mm X 3960mm
- Posts: Extruded aluminium posts 125 x 125 x 5mm powder coated
- Frame: Class 2 F27-Hardwood roof frame with exterior grade stained coating
- Roofing: Pre-cut Colorbond, custom orb roof sheeting - Ultra grade (Surfmist)
- No guttering or downpipes.
- Fixing: Stainless steel brackets and fixings.
- Picnic setting: Wheelchair accessible' 'Bridgewater' table setting with cast aluminium legs by Precinct © or approved equal. Picnic setting: cast aluminium frame with aluminium battens.



PS1 PICNIC SHELTER
SECTIONAL ELEVATION NTS

PARK FURNITURE

PS2 Picnic Shelter

LOCATION:

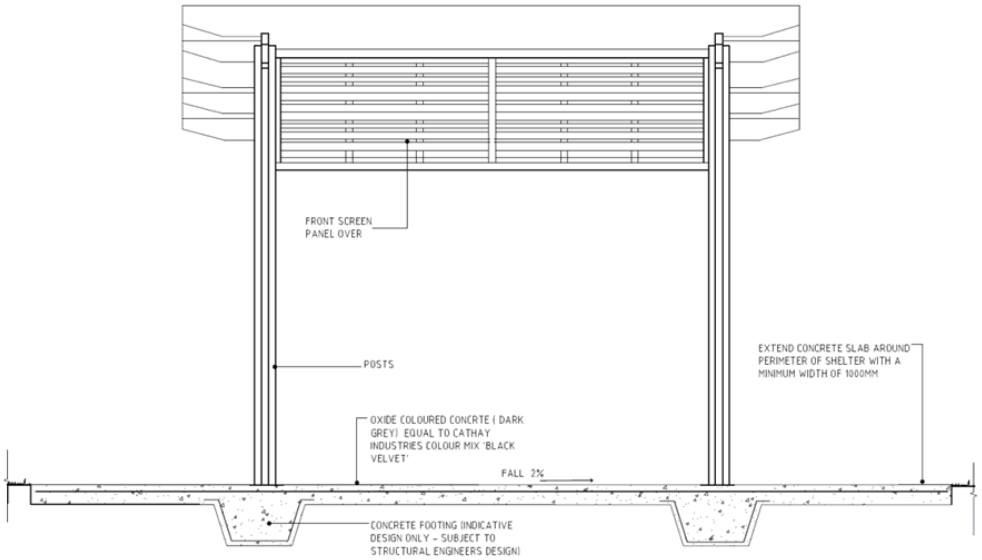
- Local Parks, Neighbourhood Parks

INSTALLATION:

- On oxide coloured concrete (dark grey) 6.m X 6m

SPECIFICATION

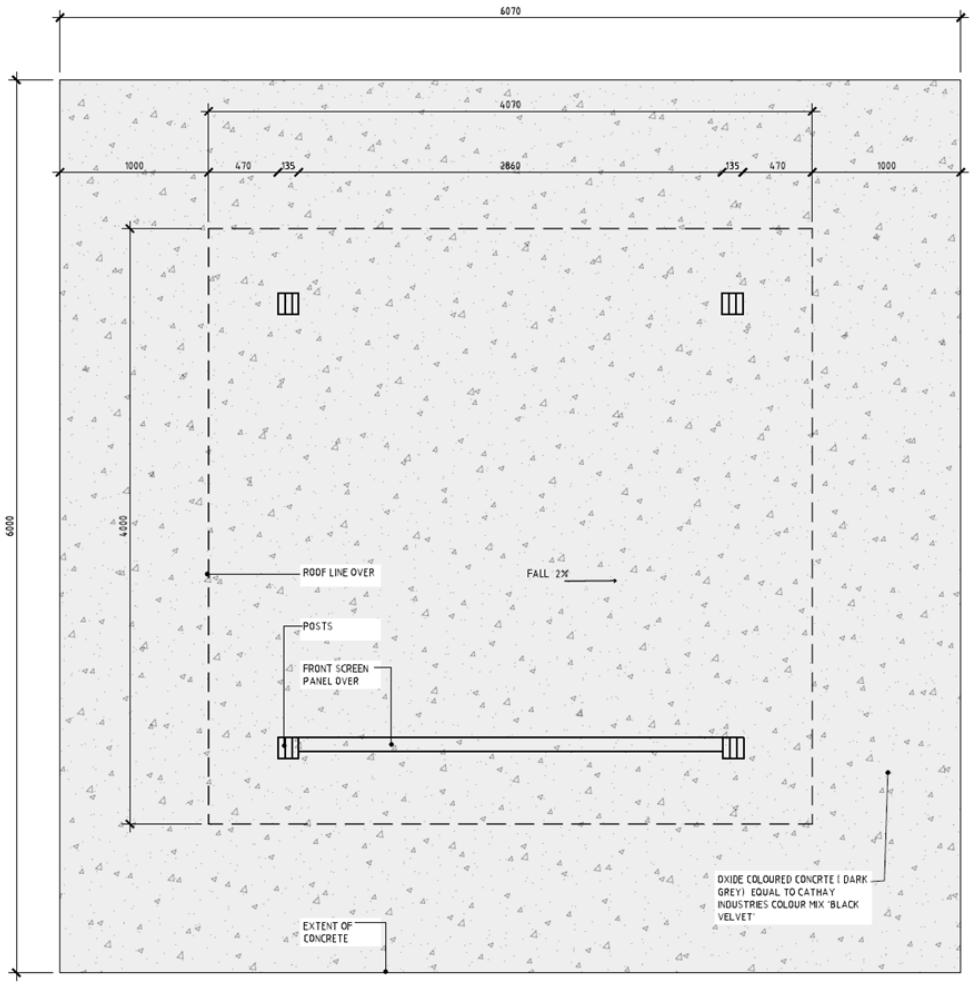
- Skillion roof shelter Peninsula Series (K302) by Landmark © or approved equal
- Size: 4000mm x 4000mm
- Posts: Class 2 F27-Hardwood, factory exterior grade stained coating triple leaf posts.
- Roof frame: ACQ treated, factory exterior grade stained F27 hardwood timber roof frame
- Roofing: Pre-cut Colorbond, custom orb roof sheeting - Ultra grade (Surfmist)
- No guttering or downpipes.
- Fixing: All remaining brackets and fixings are stainless steel **G316** including Stainless steel anti vandal fastenings.
- Picnic setting: Wheelchair accessible' San Remo' by Landmark © or approved equal.



PS2 PICNIC SHELTER

ELEVATION NTS

PARK FURNITURE



PS2 PICNIC SHELTER
PLAN NTS

PARK FURNITURE

PS3 Large Picnic Shelter

LOCATION:

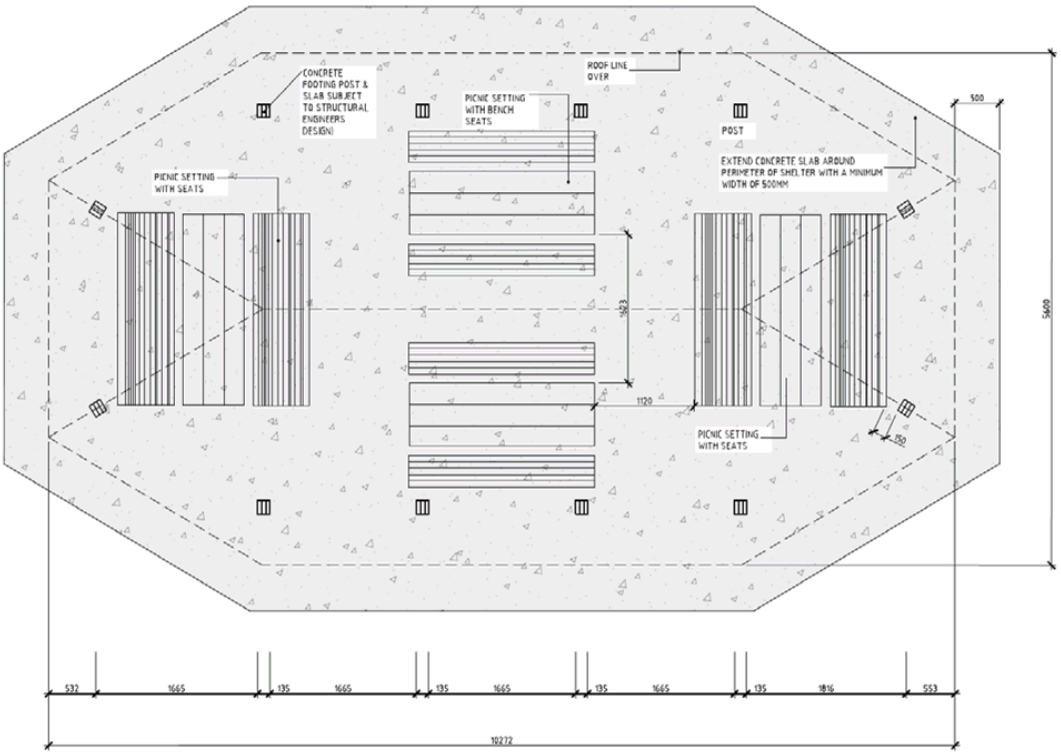
- Neighbourhood Parks.

INSTALLATION:

- Oxide coloured concrete (dark grey)

SPECIFICATION:

- Large picnic shelter with gable roof 'Mulgrave' by Landmark © or approved equal. Product Code K504 10m x 5m
- Posts: Class 2 F27-Hardwood timber dual leaf posts with factory exterior grade stain.
- Roof Frame: ACQ treated, hardwood timber roof frame with factory exterior grade stain.
- Roofing: Pre-cut Colorbond, custom orb roof sheeting - Ultra grade (Surfmist).
- No guttering or downpipes
- Fixing: All remaining brackets and fixings are stainless steel G316 including Stainless steel anti vandal fastenings.



PS 3 PICNIC SHELTER
PLAN NTS

PARK FURNITURE

PS3 Picnic Setting

LOCATION:

- In PS3 Large Picnic Shelter

INSTALLATION:

- Surface mounted.

SPECIFICATION:

- Wheelchair accessible x 4 San Remo' by Landmark or approved equal.
- Frame: aluminium powder coated table and seat frames (Powdercoat: APO Grey).
- Table battens: Aluminium anodised table boards (Clear Finish).
- Bench seat Batten: ACQ treated hardwood timber bench boards with exterior grade stain.
- Leg type: surface post

PARK FURNITURE

PS4 Barbecue Shelter

LOCATION:

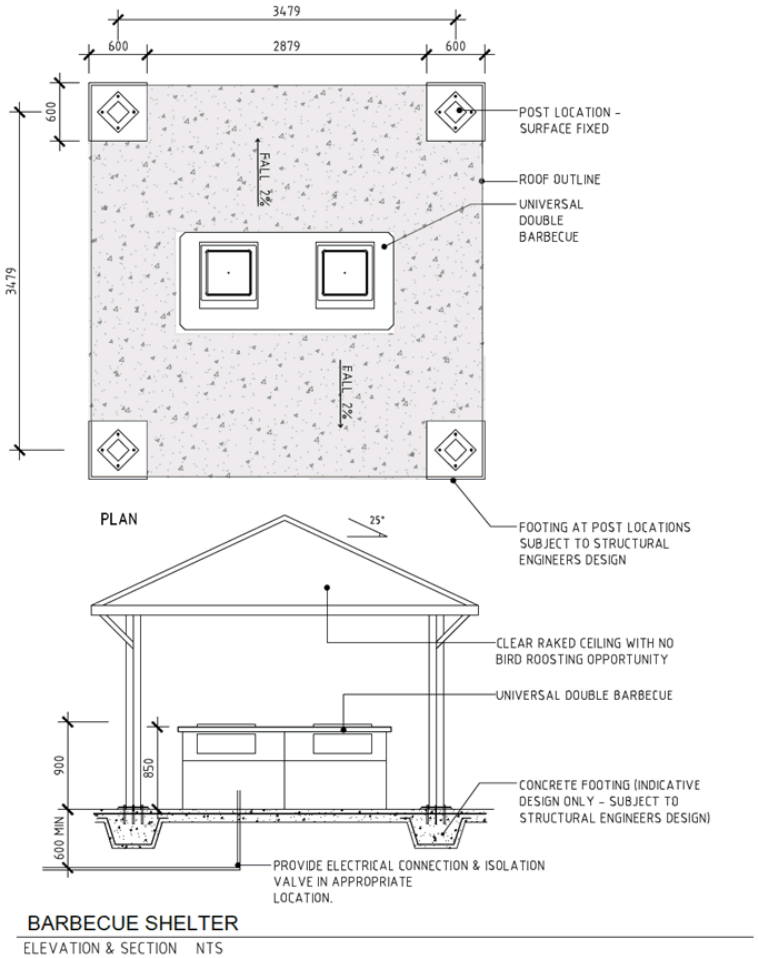
- Neighbourhood parks

INSTALLATION:

- Oxide coloured concrete (dark grey)

SPECIFICATION:

- Barbecue shelter with gable roof 'Tilba' by Precinct © or approved equal
- Size: 4000x 4000mm
- Posts: Class 2 F27-Hardwood timber posts with exterior grade stain.
- Roof Frame: ACQ treated hardwood timber roof frame with exterior grade stain.
- Roofing: Pre-cut Colorbond, custom orb roof sheeting - Ultra grade (Surfmist).
- No guttering or downpipes
- Fixing: All remaining brackets and fixings are stainless steel.



BARBECUE SHELTER
ELEVATION & SECTION NTS

PARK FURNITURE

Barbecue

LOCATION:

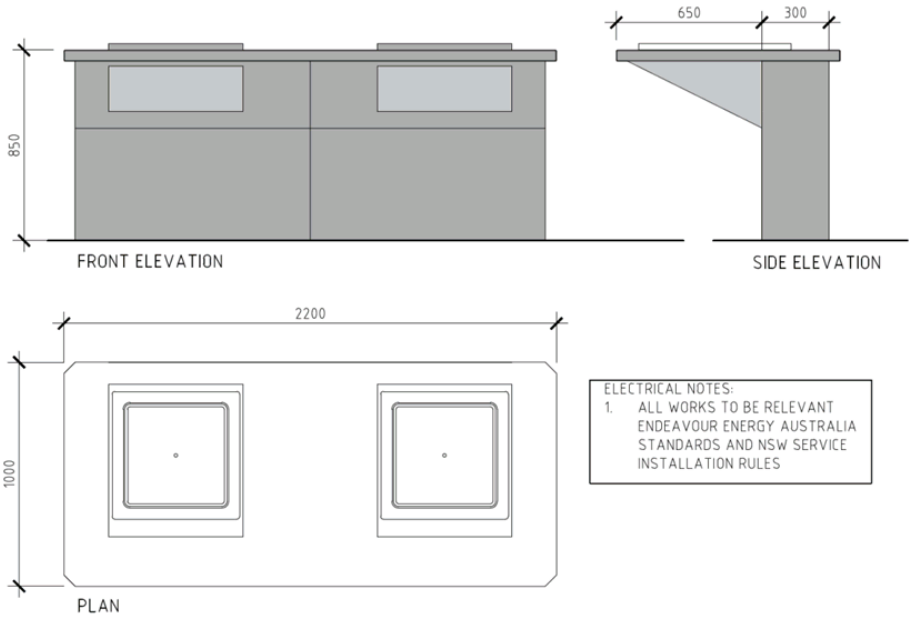
- Neighbourhood parks where need has been demonstrated.

INSTALLATION:

- within Barbecue shelter on oxide coloured concrete (dark grey)

SPECIFICATION:

- Stoddart Town and Park Metro Double Barbeque © or approved equal. CODE: SPTP.BBQ.W.S.SM.DBL.800.D01
- Note: All service locations to be conducted prior and supplies to be continuous with no underground (hidden) connections points. All work to be relevant Endeavour Energy and Australian Standards and NSW Services installation rules.



UNIVERSAL BARBECUE

ELEVATION & PLAN NTS

PARK FURNITURE

GB1 Garbage Bin Post Mount

LOCATION:

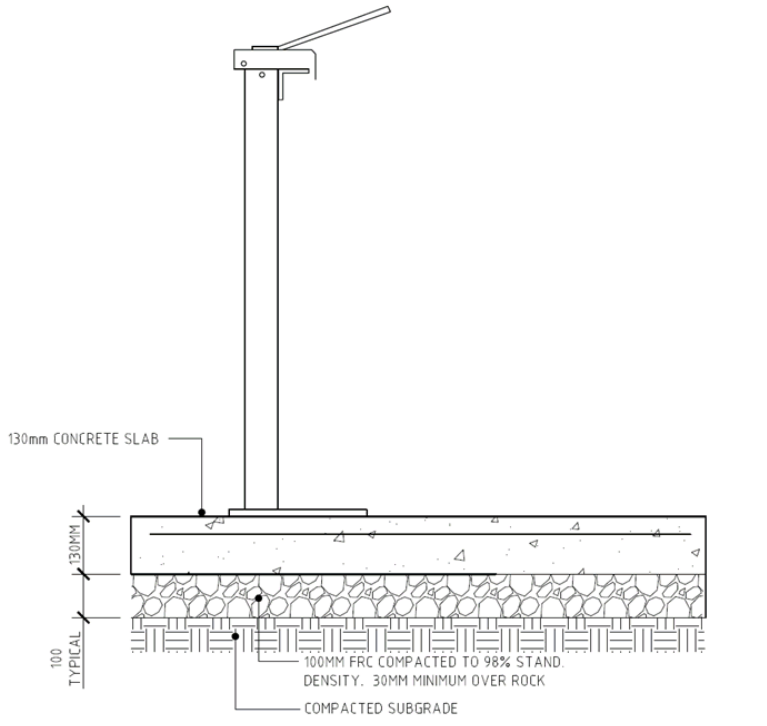
- Local Park, Neighbourhood and Dog Park

INSTALLATION:

- Surface mount on oxide colour concrete pad (dark grey) 1.2m x 1.2m offset from a path in close proximity to either an entry point or an area of high activity.

SPECIFICATION:

- 240 Litre Modular post lock system. Product code: 383 by Draffin Street Furniture© or approved equal.
- Finish: Hot dip Galvanised Finish. 2.5mm TK RHS Upright, 5.0mm TK Mild Steel Angle and Channel, 8.0mm TK Mild Steel Top Arm.



GARBAGE BIN POST MOUNT
SECTION NTS

PARK FURNITURE

GB2 Garbage Bin Enclosure

LOCATION:

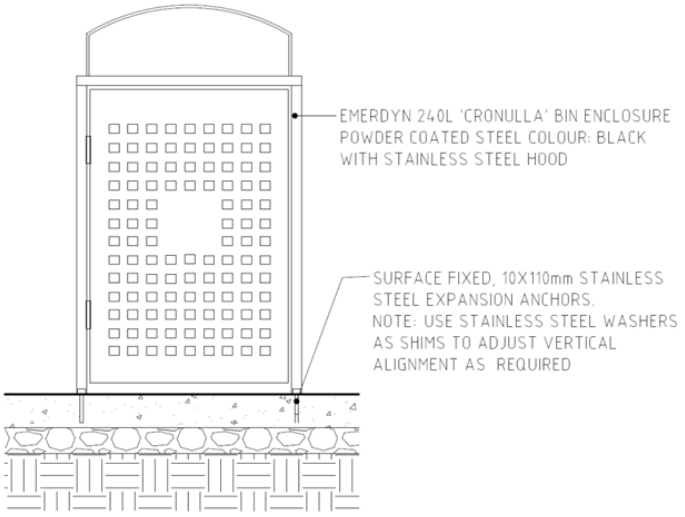
- Town Centres and Neighbourhood Parks

INSTALLATION:

- Surface mount on oxide colour (dark grey) concrete pad minimum 1.2m x 1.2m offset from a path in close proximity to either an entry point or an area of high activity. Ensure that enclosure is installed plumb with bin opening facing pathway.

SPECIFICATION:

- Emerdyn© 'Cronulla' EM 224 240 litre bin enclosure with hood or approved equal.
- Materials: galvanised steel body, stainless steel chute and hood, custom perforation, powder coated black.



240L BIN ENCLOSURE
SECTION NTS

PARK FURNITURE

TAP

LOCATION:

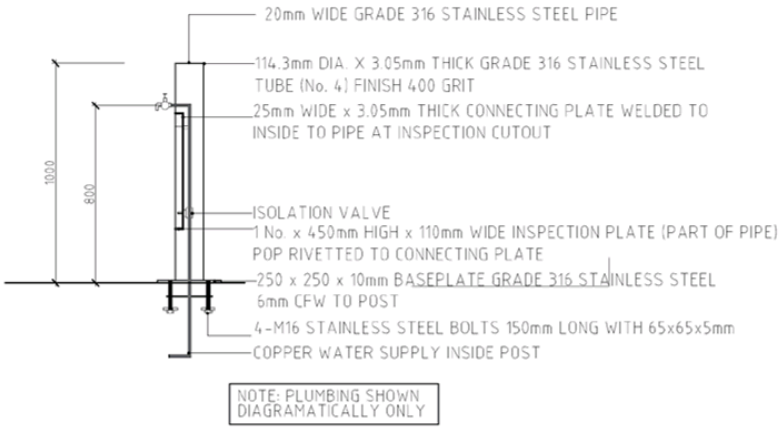
- Dog Park, Local and Neighbourhood Parks.

INSTALLATION:

- Installed in close proximity to Barbecue and picnic shelters.

SPECIFICATION:

- Vandal proof hose cock fitted on 316 stainless steel pipe finish 400 GRIT with inspection plate.
- Fixed on a stainless steel base plate.



TAP IN STAINLESS STEEL PIPE

SECTION NTS

PARK FURNITURE

BU1 BUBBLER

LOCATION:

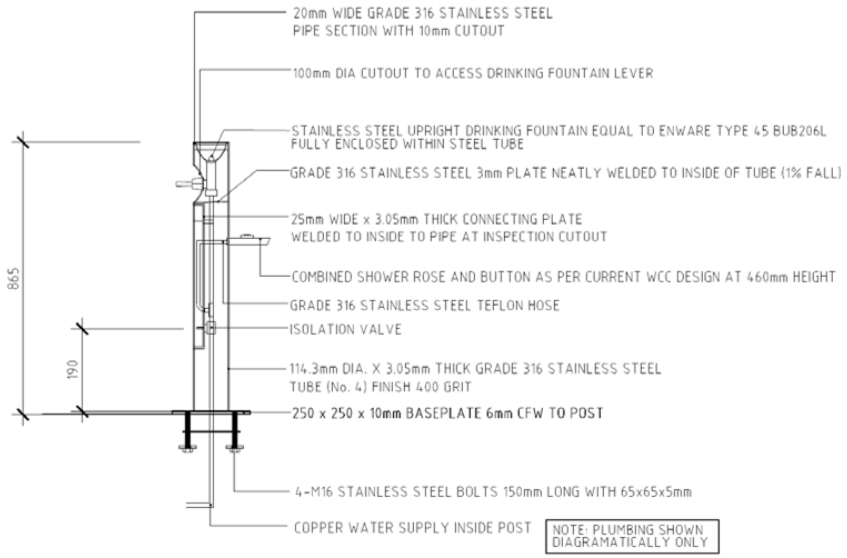
- Dog Park and Local Parks.

INSTALLATION:

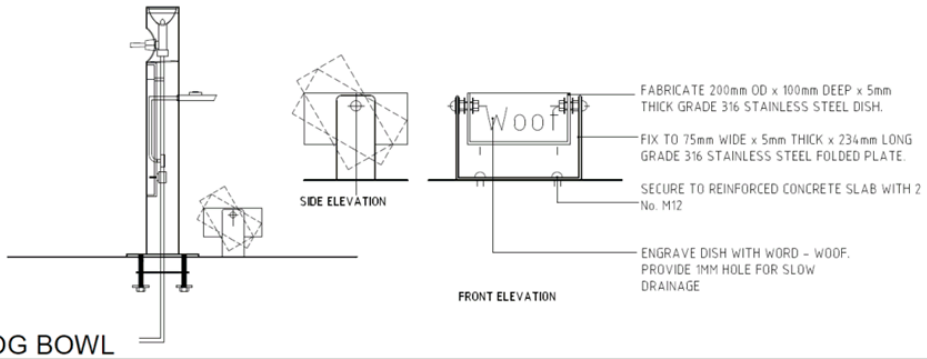
- Located in area of high activity in association with picnic shelter and or nodes of park furniture of play features

SPECIFICATION

- Encat © pipe style or approved equal.
- Materials - Marine grade 316 stainless steel frame, electro polished mirror finish.
- Features - bottle filling tap and dog bowl.



WATER FOUNTAIN & DOG BOWL
SECTION NTS



DOG BOWL
SECTION NTS

PARK FURNITURE

BU2 - Equal Access Bubbler

LOCATION:

- Town Centres

INSTALLATION:

- In area of high activity.

SPECIFICATION:

- 'Prospect' drinking fountain by Botton & Gardner © or approved equal. Conforms to the Australian disabled access standard. Product code PDF.316.DB.BT.WC
- Materials: marine grade 316 stainless steel frame, electro polished mirror finish.
- Features: bottle filling tap. Self-draining and levelling dog bowl. Perforated grate covering the drainage sump.

BU3 - Equal Access Bubbler

LOCATION:

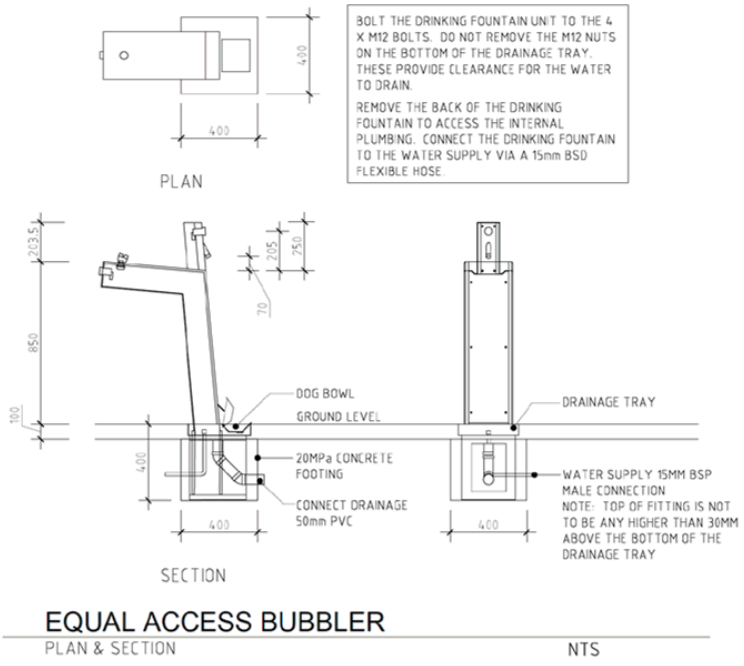
- Neighbourhood Parks

INSTALLATION:

- In area of high activity in association with picnic shelter and nodes of park furniture.

SPECIFICATION:

- 'Aquafil drinking fountain, bottle refill station with dog drinking bowl' by Civiq © or approved equal. Conforms to the Australian disabled access standard.
- Materials: marine grade 316 stainless steel
- Features: bottle filling tap and dog bowl.



PARK FURNITURE

BR - BIKE RACK

LOCATION:

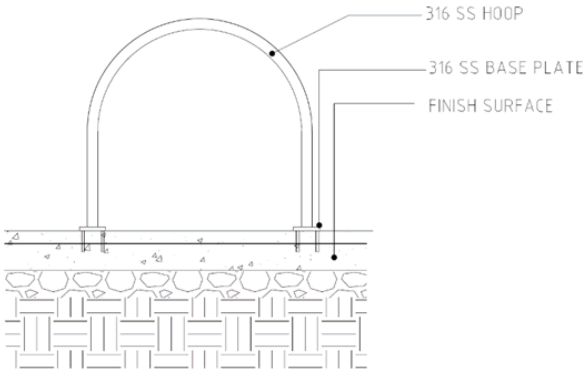
- Local, Neighbourhood, and Civic Parks.

INSTALLATION:

- Surface mount on concrete base slab.
- Three grouped together.

SPECIFICATION:

- Single Hoop Bike Rail AS Urban © or approved equal.
- Material: 50mm dia polished 316 stainless steel
- Fixing: 316 Stainless steel M8 chemical Anchor. Surface mounted spaced at 1200mm centres in accordance with AS2890.3 Part 3 Bicycle Parking Facilities unless otherwise directed by WCC.



BIKE HOOP FIXED IN SITU
TYPICAL SECTION AND ELEVATION nts

PARK FURNITURE

B1 –Timber Bollard

LOCATION:

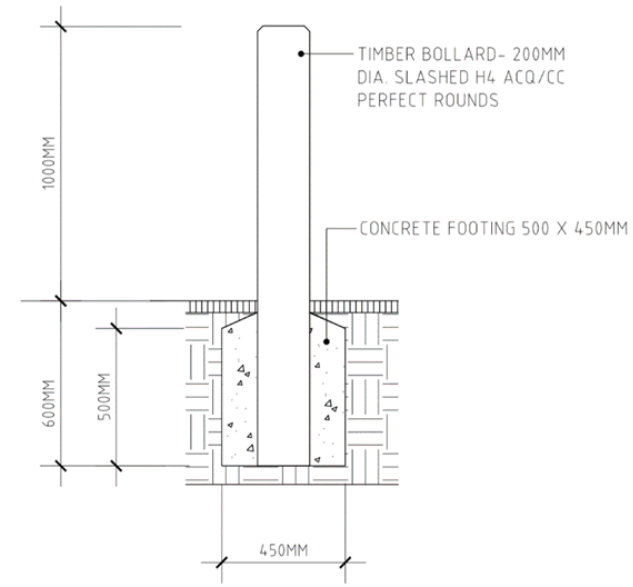
- Natural Areas, Local and Neighbourhood Parks.

INSTALLATION:

- Within mulched areas adjacent to natural areas. If located in grass install in concrete strip.

SPECIFICATION:

- Dome topped timber 200mm dia. Bollard. H4 ACQ treated Slash Pine timber.
- Height: 1000mm spaced at 1500mm centres
- Finish: Two coats of exterior grade stain that protects against staining, sun deterioration and damage, water and fungal damage and provides stabilisation of the timber.



TIMBER BOLLARDS
SECTION NTS

PARK FURNITURE

B2 – Stainless Steel Bollard

LOCATION:

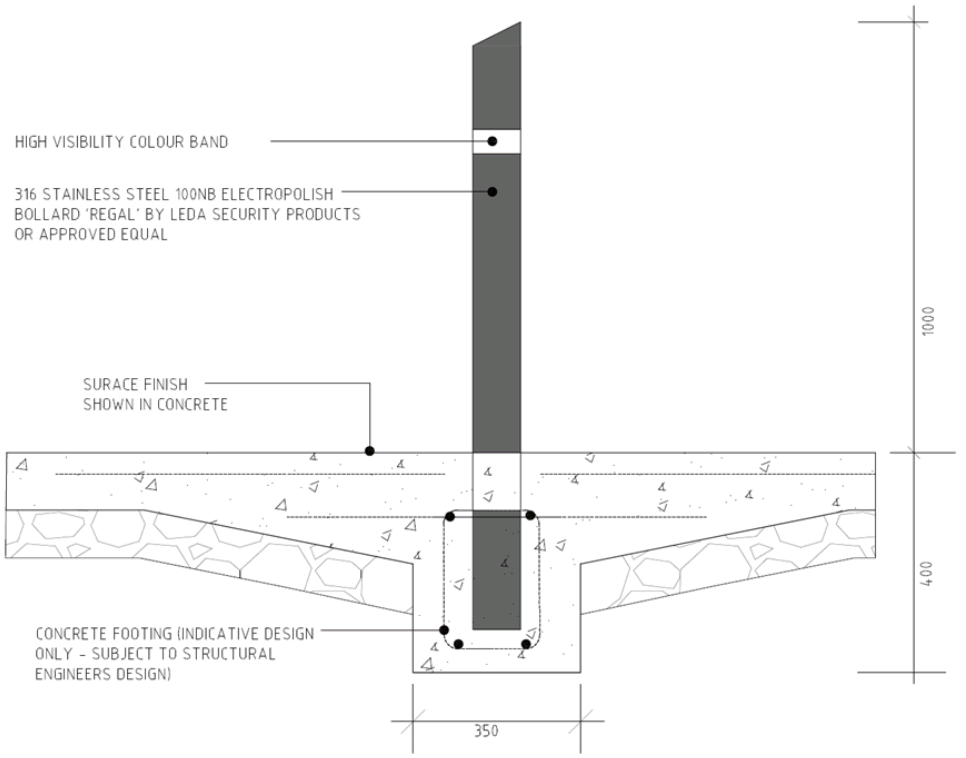
- Neighbourhood Parks and Town Centres.

INSTALLATION:

- Within pavement.

SPECIFICATION:

- 316 Stainless steel mitre top 100mm dia with 5mm wall thickness by Leda Security Products © or approved equal.
- Height: 1000mm x 140mm dia. spaced at 1500mm centres
- Finish: Milled with high visibility reflective band.



STAINLESS STEEL BOLLARD

SECTION NTS

PARK FURNITURE

B3 – Removable Bollard

LOCATION:

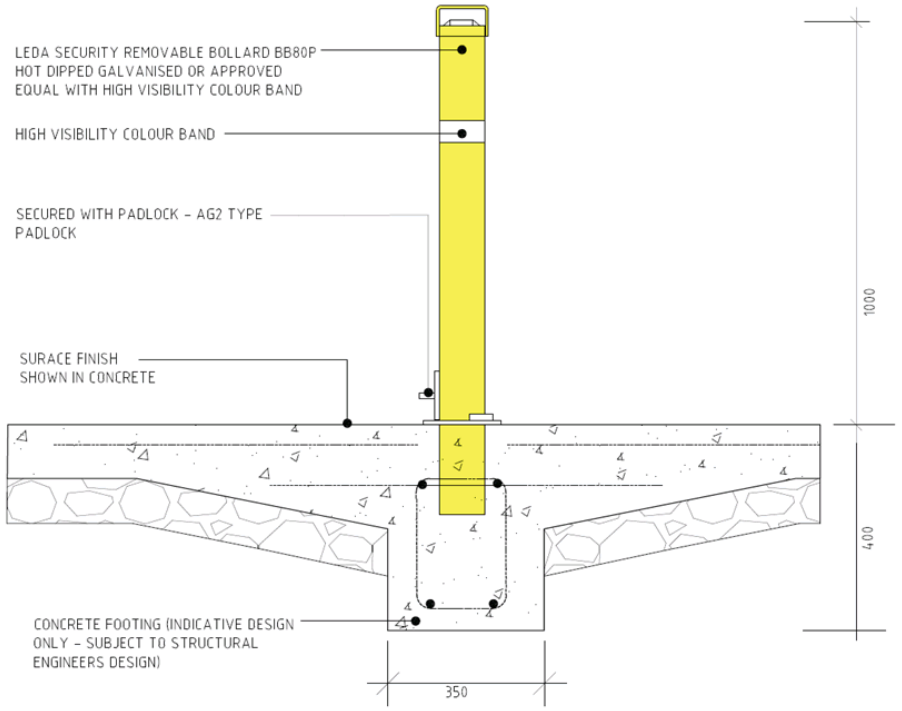
- Local, Neighbourhood and Town Centres.

INSTALLATION:

- Installed within pavement of vehicle access points

SPECIFICATION:

- Hot dipped galvanised electrostatically powder coated in industrial yellow with reflective tape. Removable bollard BB80P by Leda © or approved equal.
- Materials: 80NB (88.9) x 10.4mm extra heavy duty galvanised pipe.
- Height: 1000mm x 80mm dia. spaced at 1500mm centres



HOT DIPPED GALVANISED REMOVABLE BOLLARD

SECTION NTS

PARK FURNITURE

B4 – Sandstone Log

LOCATION:

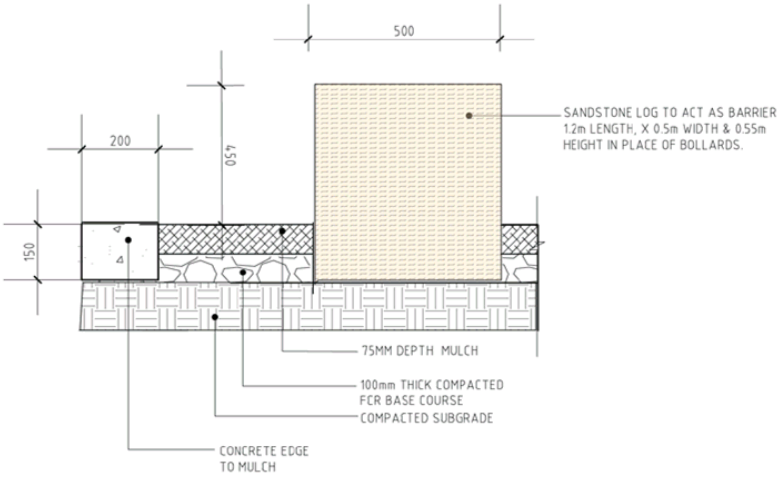
- Natural Areas, Local and Neighbourhood Parks.

APPLICATION:

- Restriction of vehicle access to natural areas within mulched zones. Informal seating in play spaces.

SPECIFICATION:

- Quarry sawn sandstone 'log' shapes.
- Dimensions: approximately 550mm high and 1200mm long
- Material: sandstone 'logs' by Bundanoon Sandstone © or approved equal.
- Finish: 2 sides diamond sawn, 4 sides quarry sawn, grey in colour. 500mm x 550mm x 1200m



SANDSTONE LOG

TYPICAL SECTION NTS

OPEN SPACE FENCING REQUIREMENTS

F0 – General Fencing Requirements:

DESIGN

- The contractor shall be responsible for the design compliance, strength and durability of the finished fence and the fence elements.

DESIGN COMPLIANCE

All fencing shall be designed and constructed in accordance with all relevant regulations and standards, including but not limited to:

- National Construction Code NCC (formerly Building Code of Australia)
- AS1170.0 Structural design Actions – General Principles
- AS1170.1 Structural design Actions – Permanent, Imposed and other actions
- AS1170.2 Structural design Actions – Wind Actions
- AS1428.1 Design for access and mobility – General requirements for access
- AS1725.1 Chain link fabric fencing – Security fencing and gates – General requirements
- AS1725.4 Chain link fabric fencing - Cricket net fencing enclosures
- AS1725.5 Chain link fabric fencing – Sports ground fencing - General requirements

DESIGN LOADING

All fencing shall be designed to accommodate all relevant design loadings as set out in the following:

- AS1170.1 Permanent, Imposed and other actions –
- In particular, Table 3.3, Minimum Imposed Actions for Barriers. Categories C3 and C5 are typically most used by Council. Refer below.
- AS1170.2 Wind Actions
- Other reasonably expected loadings due to climbing, vandalism etc. – i.e. must be fit for purpose.

TABLE 3.3

MINIMUM IMPOSED ACTIONS FOR BARRIERS

Type of occupancy for part of the building or structure		Specific uses	Top edge			Infill	
			Horizontal	Vertical	Inwards, outwards or downwards	Horizontal	Any direction (see Note 2)
			kN/m	kN/m	kN	kPa	kN
A	**Domestic and residential activities**	All areas within or serving exclusively one dwelling including stairs, landings, etc. but excluding external balconies and edges of roofs (see C3)	0.35	0.35	0.6	0.5	0.25
		Other residential, (see also C)	0.75	0.75	0.6	1.0	0.5
B, E	**Offices and work areas not included elsewhere including storage areas**	Light access stairs and gangways not more than 600 mm wide	0.22	0.22	0.6	N/A	N/A
A2		Fixed platforms, walkways, stairways and ladders for access (see Note 1)	0.35	0.35	0.6	N/A	N/A
		Areas not susceptible to overcrowding in office and institutional buildings also industrial and storage buildings	0.75	0.75	0.6	1.0	0.5
C	**Areas where people may congregate**						
C1/C2	Areas with tables or fixed seating	Areas with fixed seating adjacent to a balustrade, restaurants, bars, etc.	1.5	0.75	0.6	1.5	1.5
C3	Areas without obstacles for moving people and not susceptible to over-crowding	Stairs, landings, external balconies, edges of roofs, etc.	0.75	0.75	0.6	1.0	0.5
C5	Areas susceptible to over-crowding	Theatres, cinemas, grandstands, discotheques, bars, auditoria, shopping malls (see also D), assembly areas, studios, etc.	3.0	0.75	0.6	1.5	1.5
D	**Retail areas**	All retail areas including public areas of banks/building societies, (see C5 for areas where overcrowding may occur)	1.5	0.75	0.6	1.5	1.5

Extract from AS1170.1

DESIGN LIFE

- All fencing is to be designed with due consideration to the site exposure classification (refer appendix A) and other site conditions for a service life of 20 years, with little to no maintenance.

WARRANTIES

- The Contractor shall provide with their quotation the warranties offered for their work. This shall include warranties offered with regard to protective coating systems for materials and workmanship.
- Minimum Warranty shall be 10 years on all protective coatings and workmanship

INSTALLATION

SITE WELDING

- On-site welding shall not be undertaken.
- Site cutting and drilling is to be avoided to maintain protective coating.
- Repairs to cut or damaged material which compromise the protective coating are to be repaired in accordance with protective coating manufacturer specification.

VANDALISM

- The fencing shall be designed and installed such that opportunities for vandalism are minimised. This may include the burring or bending of bolt threads after installation to prevent the unauthorised removal of nuts, use of anti-tamper screws etc.

POST HOLES

- The top surface of footings is to be a trowelled concrete finish 10mm above the level of the existing surface and shaped to fall away from the post.

MATERIAL SPECIFICATION

- All materials and workmanship shall be in accordance with the following:
    - AS1450-2007 Steel tubes for mechanical purposes
    - AS1397-2011 Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
    - AS/NZS 1163-2009 Cold-formed structural steel hollow sections
    - AS4680-2006 Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
    - AS1111.1-2015 ISO metric hexagon bolts and screws – Product grade C –Bolts

- AS1111.2 ISO-2015 metric hexagon bolts and screws – Product grade C –Screws
- AS1604.1-2012 Specification for preservative treatment – Sawn and round timber
- AS1725.1-2010 Chain link fabric fencing – Security fencing and gates – General requirements

FITTINGS, FIXTURES AND BRACKETS

- All fittings, fixtures, brackets etc. shall be constructed of the same material as the fence proper wherever possible, with consistent protective coating system (including colour).
- Dissimilar metals shall be electrically isolated via neoprene washers, bushes etc.
- All fittings such as hinges, locks, latches etc. are to be Heavy Duty and suitable for the site exposure and require nil maintenance.

PROTECTIVE COATING SYSTEM

- Refer to fence types for specific requirements of protective coating systems.
- Generally, the Contractor is to provide details of the proposed system at the time of quotation and a 10 year warranty on materials and workmanship.
- Cut or damaged materials which compromise the protective coating are to be repaired in accordance with protective coating manufacturer specification.
- Any damage to the galvanised elements including where the thickness of the galvanising has locally been reduced to less than the relevant requirement of AS/NZS 4680 shall be repaired in accordance with Section 8.2(a) of AS/NZS 4680, using an approved two-pack epoxy zinc rich primer meeting the requirements of a Type 2 product of AS 3750.9.

OPEN SPACE FENCING REQUIREMENTS

F1 – Single Rail Timber Barrier

LOCATION:

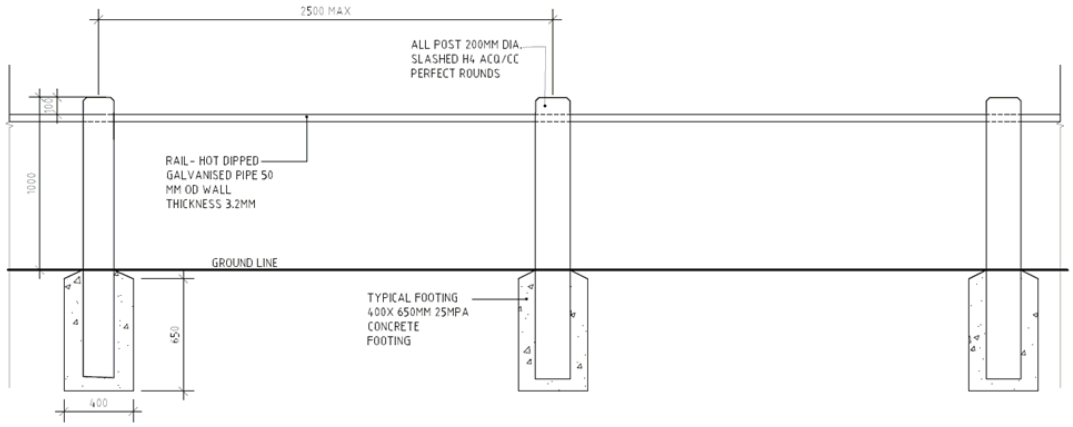
- Natural, Local, and Neighbourhood Parks.

APPLICATION:

- Restriction of vehicle access in open space.

SPECIFICATION:

- ACQ treated Slash Pine timber post with hot dipped galvanised pipe rail.
- Height: 1000mm
- Material: H4 ACQ treated Slash Pine post with galvanised pipe top rail.
- Finish: Two coats of exterior grade stain that protects against staining, sun deterioration and damage, water and fungal damage and provides stabilisation of the timber.



F1 FENCE

SECTION & ELEVATION NTS

OPEN SPACE FENCING REQUIREMENTS

F2 – Vehicle Access Control

LOCATION:

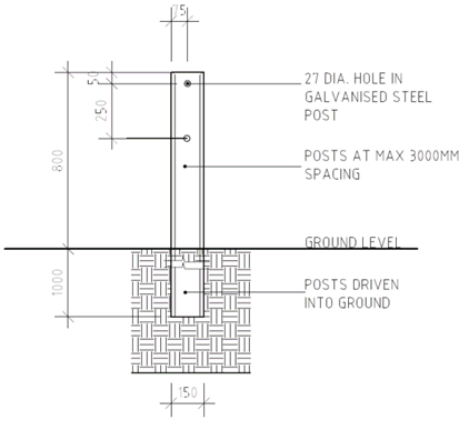
- Natural, Local, Neighbourhood Parks.

APPLICATION:

- Restriction of vehicle and motor bike access to natural areas in open space.

SPECIFICATION:

- Galvanised steel post and steel cable by Ingal © or approved equal. The distance from the ground to the bottom steel cable is 500mm.
- Height 800mm
- Twin 19mm diameter cables pass through pre-punched holes in each post Hot dipped galvanized (HDG500) for improved durability
- Rigid C posts driven into the ground. Posts are at 3m centres



F2 FENCE

SECTION & ELEVATION NTS

OPEN SPACE FENCING REQUIREMENTS

F3 – Sports Field Fencing

LOCATION:

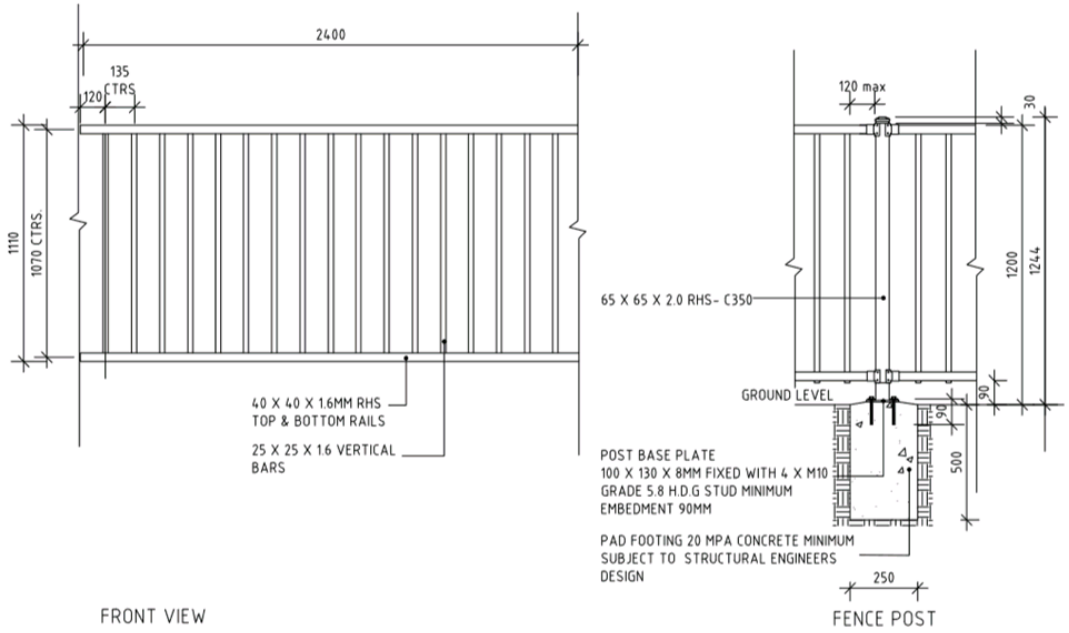
- Neighbourhood Parks.

APPLICATION:

- Installation of fencing to sports fields

SPECIFICATION:

- Incorporate one or more self-closing single pedestrian access gates, and lockable maintenance/emergency vehicle access gates
- HDG500 in accordance with AS4680
- Height 1244mm
- Consideration for drain holes required during the hot-dip galvanising process
- All fixing screws to be Class 3 (or better)
- Expansion joints are to be provided in the fence rails at maximum spacing of 9m.
- All Brackets etc. shall have protective coating to match fence
- Expansion joints shall accommodate longitudinal movement whilst maintaining structural integrity, e.g. provide internal spigots at joints.



F3 FENCE

SECTION & ELEVATION NTS

OPEN SPACE FENCING REQUIREMENTS

F4 – Play Space Fencing

LOCATION:

- Local and Neighbourhood Parks

APPLICATION:

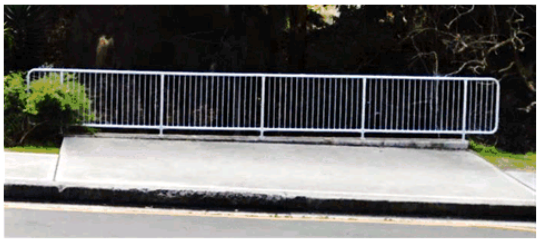
- Installation of fencing to play spaces where identification of risk to children such as proximity to a road or water body.

SPECIFICATION:

- Height: 1100mm
- All elements are to be manufactured from pre-galvanised steel tube, zinc coated inside and outside to AS 1450-2007 and AS 1397-2011, 100g/m2 minimum average coating thickness.
- All powder coating to comply with AS5405 – A minimum warranty of 10 years shall be provided
- All welding to be silicone bronze
- All fixing screws to be Class 3 (or better)
- All Brackets etc. shall have protective coating to match fence
- Expansion joints are to be provided in the fence rails at maximum spacing of 9m.
- Expansion joints shall accommodate longitudinal movement whilst maintaining structural integrity, e.g. provide internal spigots at joints.
- Unless otherwise specified the fence must be raked to follow the ground contour.
- The bottom of picket to ground level clearance is to be 100mm minimum and 150mm
- maximum
- Where ground clearance exceeds 150mm, the panels are to be stepped or raked to achieve the foregoing level of clearance. Stepped panels must be a minimum length of 1200mm. After stepping or raking, in-fills are to be fitted rigidly beneath panels where the ground clearance still exceeds 150mm. This practice should not be utilised in covering designated waterways where such installation would obstruct the natural flow of water.

OPEN SPACE FENCING REQUIREMENTS

F5 – Safety Fencing



LOCATION:

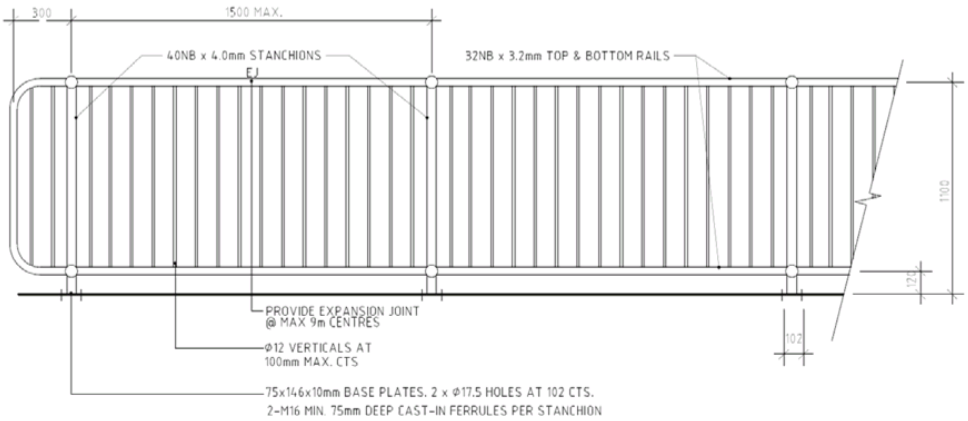
- Natural Areas, stormwater infrastructure, Local and Neighbourhood Parks

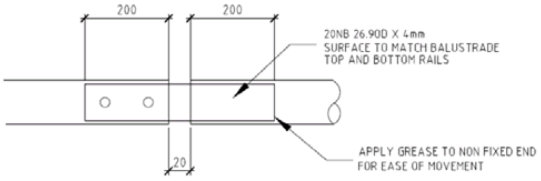
APPLICATION:

- To restrict access to high risk areas (eg around stormwater drain head walls, outlets and stormwater quality improvement devices), or where the drop height exceeds 1.0 m.

SPECIFICATION:

- All materials to be Grade C250LO in accordance with AS/NZS 1163.
- Minimum thickness of pipe to be 3.2mm.
- Height: 1100mm.
- HDG500 in accordance with AS4680.
- Consideration for drain holes required during the hot-dip galvanising process.
- All nuts, bolts and washers to be hot dip galvanised in accordance with AS4680.
- Bolts to be Grade 4.6 to AS1111, installed snug tight, minimum size M12.
- Expansion joints are to be provided in the fence rails at maximum spacing of 9m.
- Expansion joints shall accommodate longitudinal movement whilst maintaining structural integrity, e.g. provide internal spigots at joints.





TYPICAL EXPANSION JOINT DETAIL

F5 FENCE

SECTION & ELEVATION NTS

OPEN SPACE FENCING REQUIREMENTS

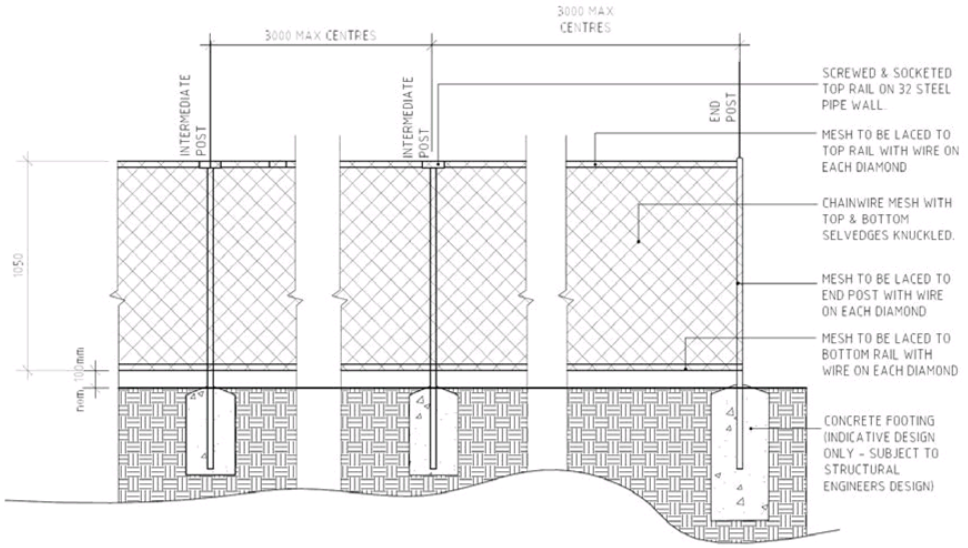
F6 – Dog Park Fence

LOCATION:

- Dog Park boundaries

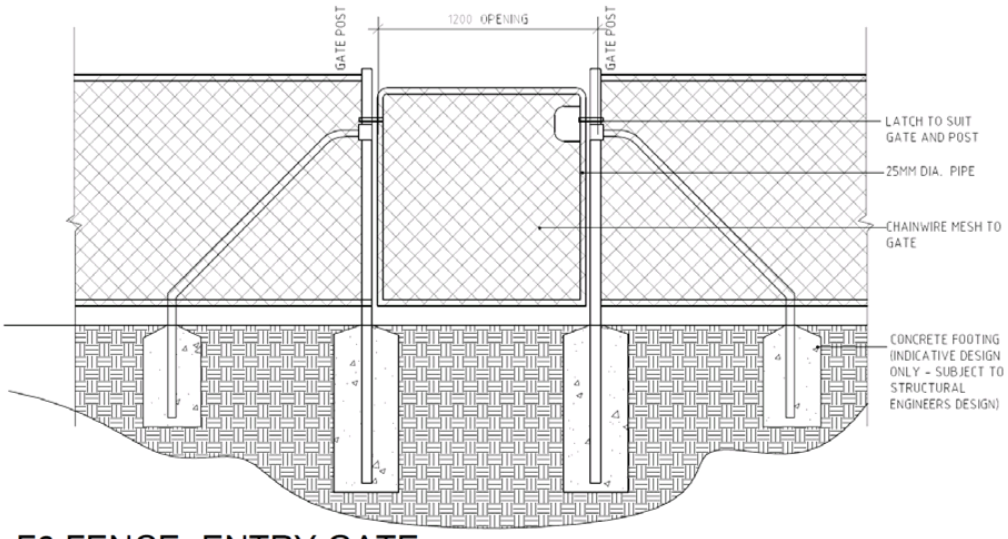
SPECIFICATION:

- Height: 1150mm
- Incorporate one or more self-closing single pedestrian and dog access gates, and lockable maintenance vehicle access gates. Provision of concrete threshold pavement at all gate entries due to high pedestrian activity.
- Black PVC coated chain mesh fence with galvanised pipe top and bottom rails.
- Min thickness of pipe to be 3.6mm in accordance with AS1725.1
- Chain link and fencing construction to comply with AS1725 – 2003 and AS1163 grade (C250LO)
- Galvanising:
  - Wire: Heavy galvanised coating W10Z/HG (240g/m2)
  - Pipe: HDG500 in accordance with AS4680
- All nuts, bolts and washers to be hot dip galvanised in accordance with AS4680
- All powder coating to comply with AS5405 – A minimum warranty of 10 years shall be provided
- All items welded or cut on site must be primed followed by galvanising or black paint.
- Panel dimensions to be 1050mm height by 3000mm length maximum.
- Chain link fabric is to be 3.15mm PVC coated galvanised 50 pitch. Chain link fabric is to be finished with knuckled top and bottom selvedge.
- Post footings shall be in accordance with AS1725.1
- Above ground concrete finish is to be domed with steel trowel finish to eliminate water lying at base of posts and is to be completed at time of original concrete pour. Ends of the support cable wire are to be firmly secured to all terminal posts.



F6 FENCE

SECTION & ELEVATION NTS



F6 FENCE- ENTRY GATE

SECTION & ELEVATION NTS

OPEN SPACE FENCING REQUIREMENTS

G1 – Boom Gate

LOCATION:

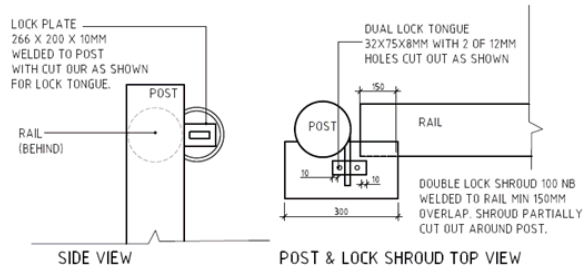
- Local parks, Neighbourhood Parks, natural areas, transmission easements.

APPLICATION:

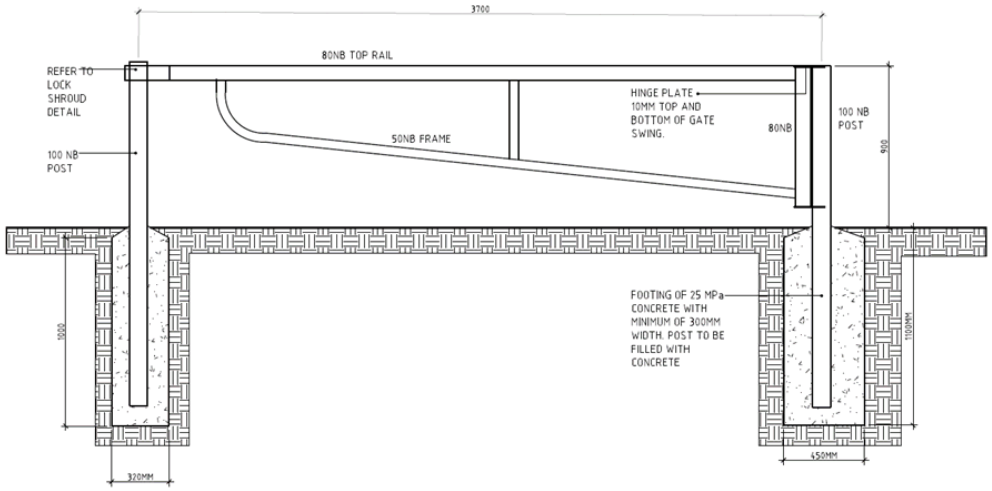
- Boom gate to be used for maintenance access. Minimum distance of eight (8) metres is required as a threshold to the gate for service vehicles.

SPECIFICATION:

- 5mm gauge hot dipped galvanised steel.
- Construction and installation as shown below



MAINTENANCE ACCESS GATE- POST & LOCK SHROUD
SIDE & TOP VIEW NTS



MAINTENANCE ACCESS GATE
TYPICAL ELEVATION NTS

PATHWAY & PAVEMENT REQUIREMENTS

Decomposed Granite Path

LOCATION:

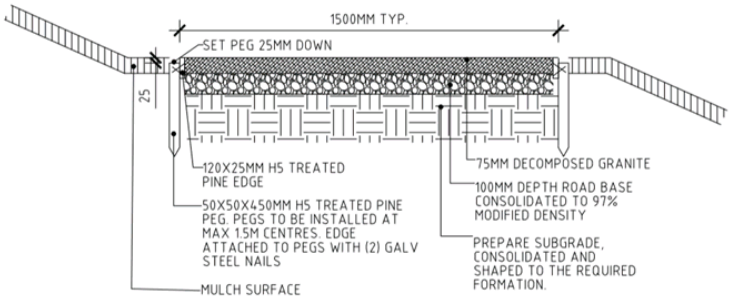
- Natural Areas, Local and Neighbourhood Parks.

APPLICATION:

- Walking trails within natural areas only.

SPECIFICATION:

- 75mm stabilised compacted decomposed granite pathways with timber edges refer to detail.



DECOMPOSED GRANITE PATH

TYPICAL DETAIL NTS

PATHWAY & PAVEMENT REQUIREMENTS

Raised Walkways

LOCATION:

- Natural Areas, Local and Neighbourhood Parks.

APPLICATION:

- High use walking trails within natural areas that are low lying or boggy.

SPECIFICATION:

- Fibre reinforced polymer (FRP) walkway decking with FRP or galvanised steel support structure.

PATHWAY & PAVEMENT REQUIREMENTS

Asphalt Pathway

LOCATION:

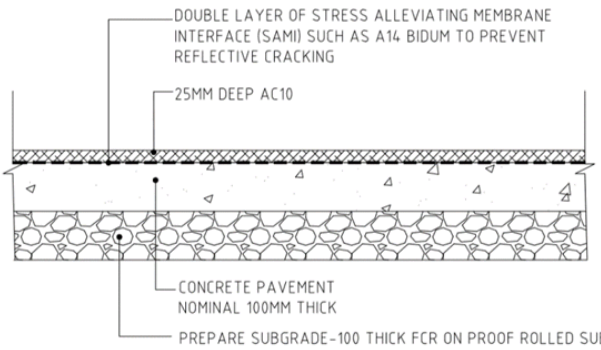
- Natural Areas, Local and Neighbourhood Parks.

APPLICATION:

- High use walking trails requiring unobtrusive, flexible, and semi permeable surfaces adjacent to existing vegetation.

SPECIFICATION:

- Asphalt AC10 as shown below



ASPHALT
TYPICAL SECTION NTS

PATHWAY & PAVEMENT REQUIREMENTS

Broom Finished Concrete Pavement

LOCATION:

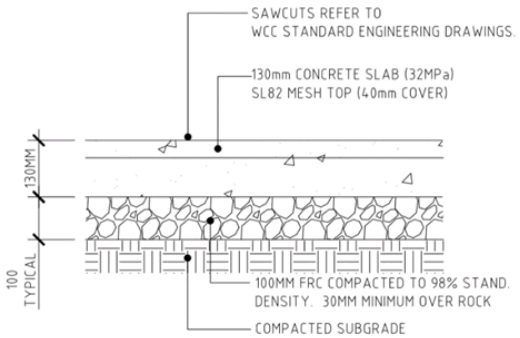
- Natural Areas, Local and Neighbourhood Parks.

APPLICATION:

- Paths and high use walking trails within natural areas.

SPECIFICATION:

- Slip resistance: P4.
- Approved oxide colour can be considered.
- Refer to Wollongong City Council Standard Engineers Drawings 2019 for further details on jointing.



BROOM FINISH CONCRETE

TYPICAL DETAIL NTS

PATHWAY & PAVEMENT REQUIREMENTS

Coloured Honed Concrete Pavement

LOCATION:

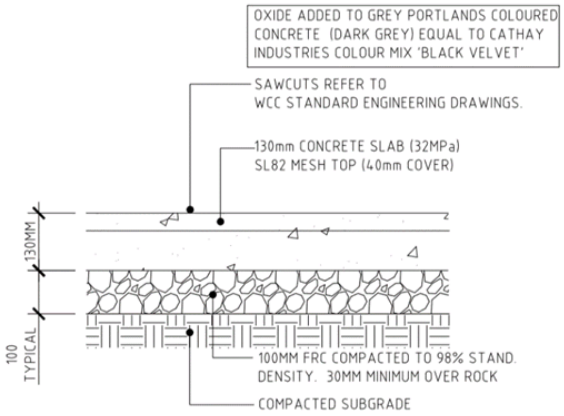
- Neighbourhood Parks, Town Centres

APPLICATION:

- Paving within open space that require a high finish or coloured to reduce surface staining.

SPECIFICATION:

- Slip resistance: P4.
- Refer to Wollongong City Council Standard Engineers Drawings 2019 for further details on jointing.
- Refer to detail below.



OXIDE CONCRETE

TYPICAL DETAIL NTS

PATHWAY & PAVEMENT REQUIREMENTS

Unit Paving

LOCATION:

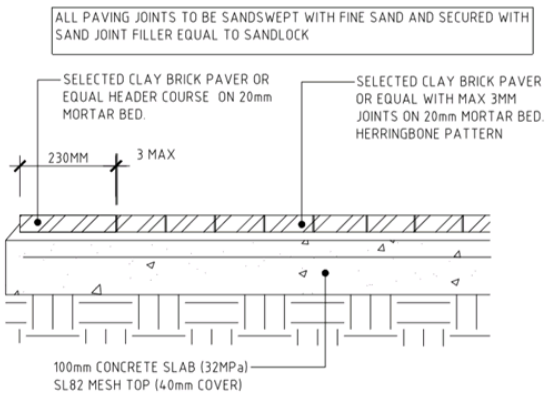
- Neighbourhood Parks, Town Centres

APPLICATION:

- Paving within open space that require a high finish. Town and village centres treatment to footpaths.

SPECIFICATION:

- As shown below



BRICK PAVING ON CONCRETE SUBGRADE

TYPICAL DETAIL NTS

PATHWAY & PAVEMENT REQUIREMENTS

Softfall to play spaces/ fitness stations

LOCATION:

- Local, Neighbourhood Parks.

APPLICATION:

- Softfall to play spaces and fitness equipment

SPECIFICATION:

- As per AS 4685 series.
- Colour: CBSR Rubber with a 50/50mix if Mid Blue and Mid Green
- Construct an extruded 200 x 200mm reinforced concrete edge around the perimeter of the playground under surfacing and fill the entire area with an appropriate impact attenuation material, in accordance with *AS/NZS 4422*. The edge must be set back at least 2.5 m from any item of play equipment to provide adequate circulation and maintenance space.

PARK SIGNAGE

Park Signage Guidelines

The Landscape Plan should incorporate a signage strategy to provide locations for park naming signage, walking trail markers and interpretive signage. A standard Blank Council PS1 Park name sign shall be provided at the park's primary public access point(s). Any sites of special interest in the park, such as heritage sites should have interpretive signage (PS3 or PS4).

Park naming signage infrastructure can be installed at completion of the park construction. The final naming of the park and associated graphics can be determined when the Park naming has been approved in accordance with the WCC Management Policy *'Naming of Community Facilities and Parks (including sports grounds and natural areas)'* May 2017 and the name is gazetted.

Interpretive Signage

Interpretive signage should be developed as part of the Heritage Interpretation Plan for the development site. The interpretive signage should use both text and images to reference the European and Aboriginal history of the site and its significance to the history of West Dapto.

The location and proposed type of all signage should be indicated on the submitted Landscape Plan.

The details of images and text proposed for any interpretive signage must be provided to Councils Heritage Officer for written approval. We would recommend the text to be limited between 200- 300 words.

PARK SIGNAGE

PS1 – Park Name Sign

LOCATION:

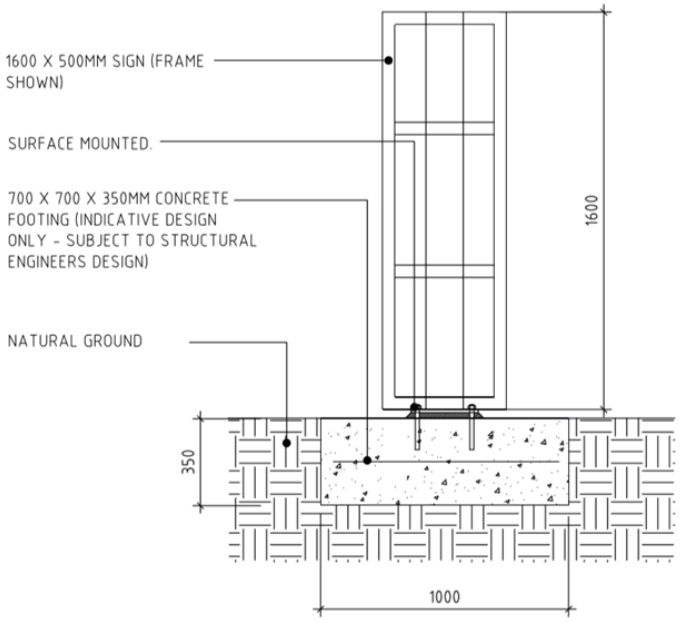
- Local and Neighbourhood Parks

APPLICATION:

- Installed at major entry points to park to maximise pedestrian exposure to information.

SPECIFICATION:

- Galvanised steel frame fixed with aluminium composite panel top sheets. Steel frame painted in black.
- Vinyl graphics prepared by WCC. Rear panel of the sign can also be utilised for the display of intrepretive information.



PARK SIGNAGE
SECTIONAL ELEVATION NTS

PARK SIGNAGE

PS2 – Trail Marker

LOCATION:

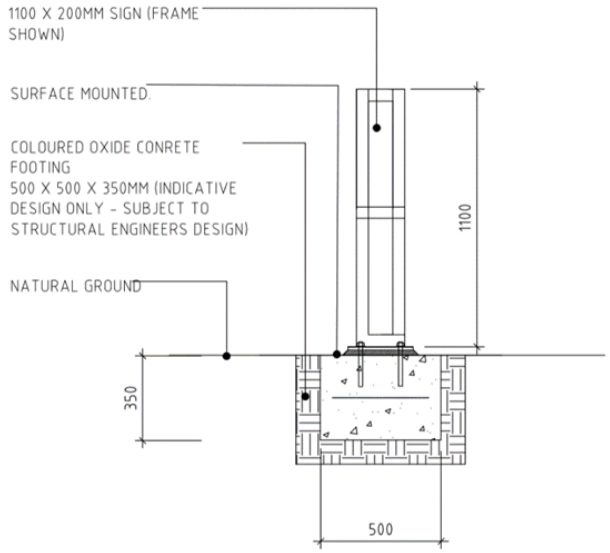
- Local,Natural Areas and Neighbourhood Parks

APPLICATION:

- Track marker installed at track junctions and secondary entry points and along tracks at strategic locations.

SPECIFICATION:

- Galvanised steel frame fixed with aluminium composite panel top sheets. Steel frame painted in black.
- Vinyl graphics prepared by WCC.



TRACK MARKER
SECTIONAL ELEVATION NTS

PARK SIGNAGE

PS3 –Small Interpretive Sign

LOCATION:

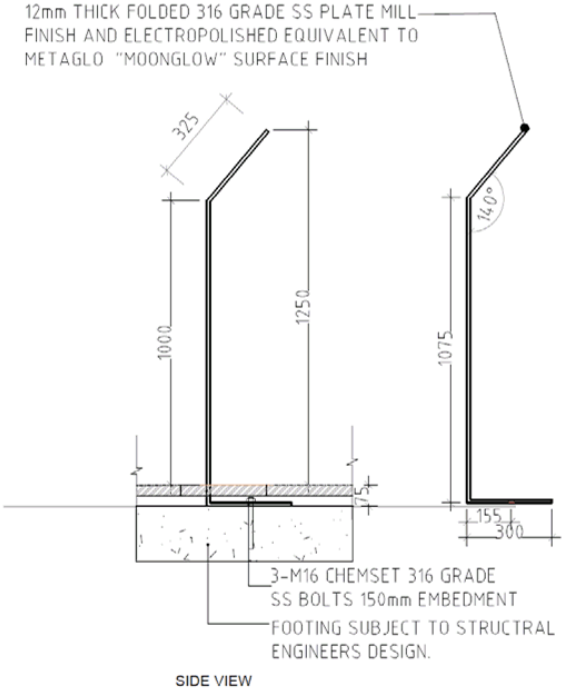
- Local and Neighbourhood Parks

APPLICATION:

- Small format signage to display interpretative information.

SPECIFICATION:

- Stainless steel plate with milled finish.
- The details of images and text proposed for any interpretive signage must be provided to Councils Heritage Officer for written approval. Vinyl graphics prepared by applicant.
- Recommend maximum word count for text (200-300)



SIDE VIEW

SMALL INTERPRETATIVE SIGN

SECTIONAL NTS

PARK SIGNAGE

PS4- Large Interpretive Sign

LOCATION:

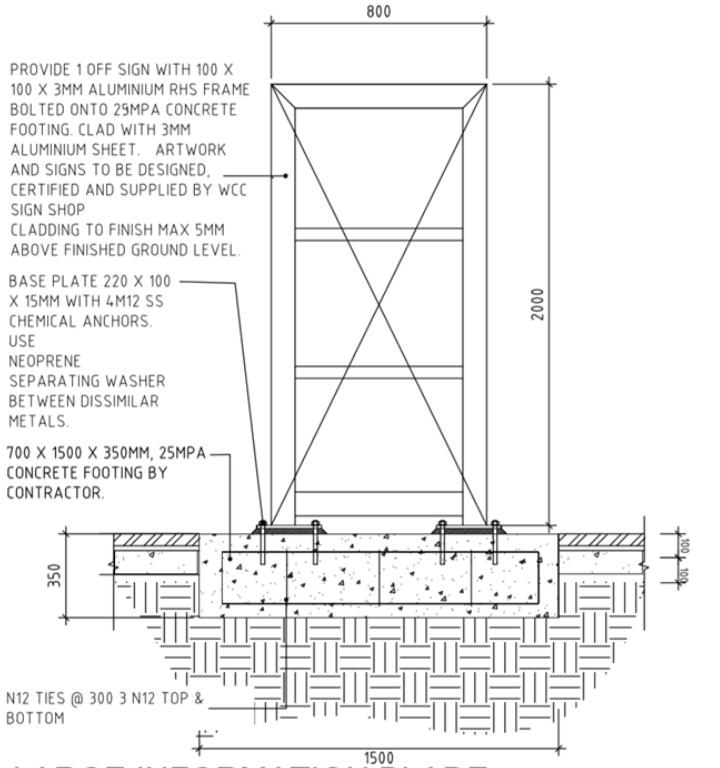
- Local and Neighbourhood Parks

APPLICATION:

- Large format signage to display interpretative signage.

SPECIFICATION:

- Galvanised steel frame fixed with aluminium composite panel top sheets. Steel frame painted in black.
- The details of images and text proposed for any interpretive signage must be provided to Councils Heritage Officer for written approval. Vinyl graphics prepared by the applicant.



LARGE INFORMATION BLADE

SECTIONAL ELEVATION NTS

LANDSCAPE DETAILS

Tree planting Guidelines

TREE SELECTION CRITERIA

Trees are to be selected in accordance with AS2303:2018. Tree Stock for Landscape Use. All stock is to be inspected for Myrtle rust (*Uredo rangelii*) prior to delivery to site. No transactions should be conducted if the nursery is not compliant with the Nursery Industry Myrtle Rust Management Plan.

STREET TREE LAYOUT

The limitations to the positioning of street trees on footways immediately behind the kerb line are listed below:

CLEARANCE NEEDED

- Street intersection 10m from intersection kerb line
- Telegraph pole 5m from centre of pole.
- Storm water inlet 2m from edge of inlet
- Major underground service junction 3m from edge of junction box
- Bus stops - no trees planted along length of stop.
- Traffic lights - 10m from pole of traffic lights.
- Driveways - 4m from vehicle crossing

TREE PLANTING SPECIFICATION

SOIL TYPES

Soil mixes to be used as the growing medium in tree pits as minimum all soils must comply with AS4419 – Soils for Landscaping and Garden Use.

MAINTENANCE

Newly planted street trees require deep watering once a week for a minimum of 52 weeks from Practical Completion. At each watering the guards should be checked and repaired or tightened as necessary.

LANDSCAPE DETAILS

Indicative Tree Species List

Indicative species list only with additional species as recommended by Park and Open Space Manager.

STREET TREES

Exotic

Pyrus ussuriensis - Manchurian pear.

Zelkova serrata 'Green Vase'

Acer negundo 'Sensation'

Fraxinus pennsylvanica 'Urbanite'

Pistacia chinensis - Pistachio

Ulmus parvifolia – 'Todd 'Chinese Elm

Lagerstroemia indica x L. fauriei - 'Sioux' Crepe Myrtle

Lagerstroemia indica

Geijera parvifolia

Hibiscus tiliaceus 'Rubra'

Native

Tristaniopsis laurina - Water Gum

Melaleuca linariifolia – Snow in Summer

Waterhousia floribunda - Waterhousia

Waterhousia floribunda 'Amaroo'

Lophostemon confertus - Brushbox

Elaeocarpus reticulatus - Blueberry Ash

Elaeocarpus eumundii - Quandong

Bracychiton acerifolium - FlameTree

Backhousia myrtifolia - Grey myrtle

Ceratopetalum apetalum- Coachwood

Syzygium leuhmanii - Weeping Lily Pily

Acmena smithii var. - Minor Lily Pily

Alphitonia exclesa - Red Ash

Callistemon 'Kings Park' - Kings Park Bottlebrush

Glochidion ferdinandi - Cheese Tree

LANDSCAPE DETAILS

TREE PLANTING IN OPEN SPACE

Ficus macrophylla - Moreton Bay Fig

Ficus obliqua - Small leaf fig

Ficus rubiginosa - Port Jackson Fig

Ficus coronata - Sand Paper Fig

Araucaria cookii - Column Pine

Fraxinus pennsylvanica 'Urbanite'

Zelkova serrata 'Green Vase'

Acer negundo 'Sensation'

Podocarpus elatus - Illawarra Plum

Waterhousia floribunda - Waterhousia

Melaleuca decora – Feather Honeymyrtle

Melaleuca styphelioides – Prickly Leaf Paperbark

Livistona australis - Cabbage Tree Palm

Ulmus parvifolia 'Todd' - Chinese Elm

Lophostemon confertus - Brushbox

Lagerstroemia indica - Crepe Myrtle

Syzygium leuhmanii - Weeping Lily Pily

Alphitonia exclesa - Red Ash

Backhousia citriodora - Lemon Ironwood

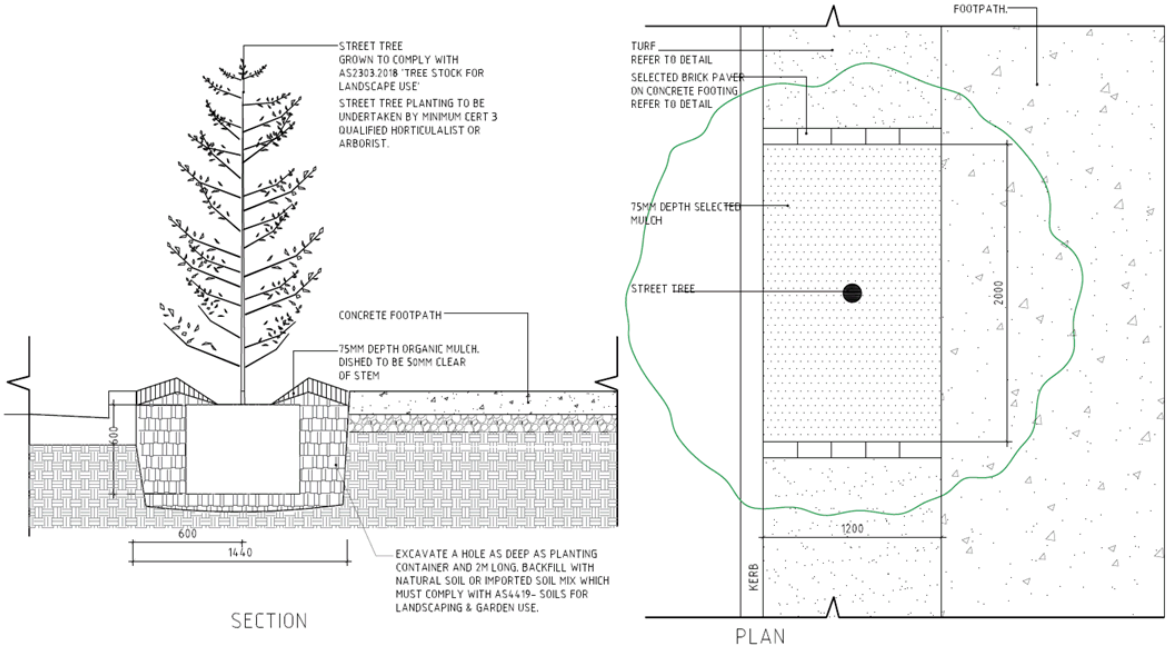
Callistemon 'Kings Park' - Kings Park Bottlebrush

Glochidion ferdinandi - Cheese Tree

Polycias elegans - Celery Wood

LANDSCAPE DETAILS

Street Tree Planting Detail

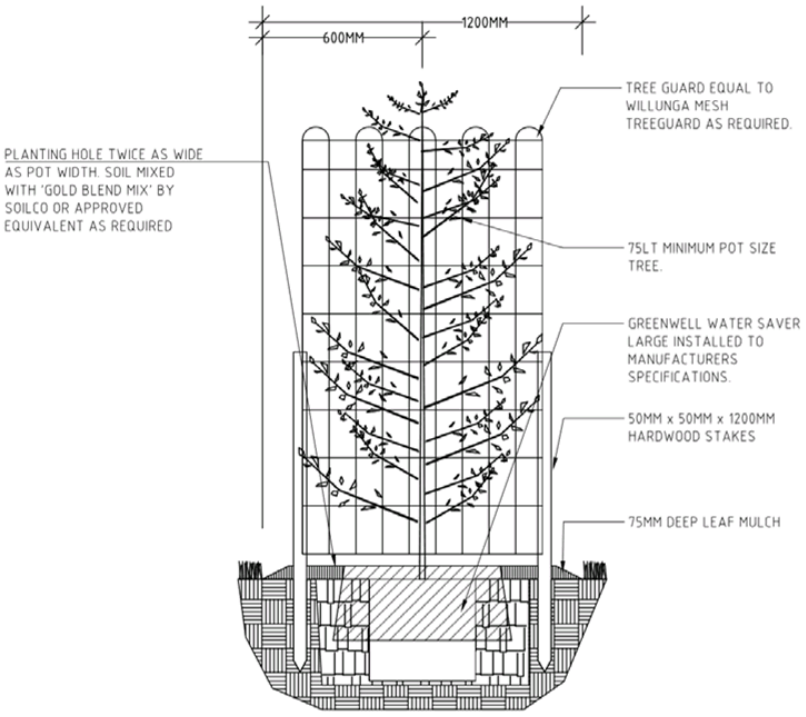


STREET TREE IN NATURAL GROUND

PLAN & SECTION NTS

LANDSCAPE DETAILS

Tree Planting in Lawn Areas with Mulch Ring



TREE PLANTING IN MULCH RING

SECTION NTS

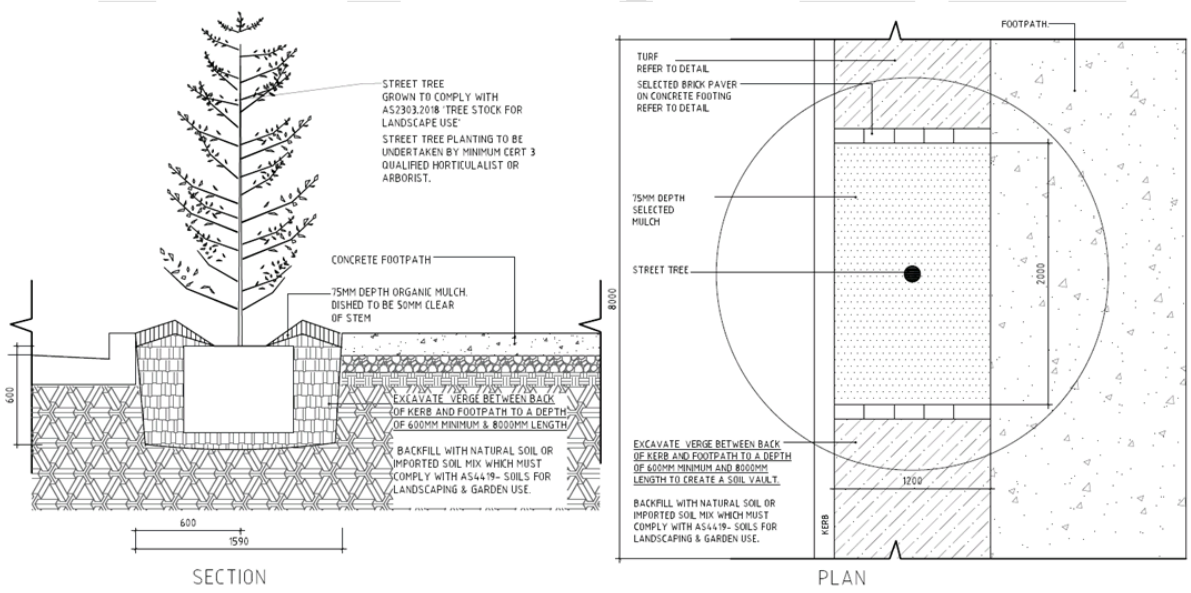
LANDSCAPE DETAILS

Street Tree Planting in Coal Wash

TREE PLANTING IN SITES WHERE COAL WASH IS PRESENT

To ensure the establishment of trees and ensure their long term health and life expectancy it is required that a minimum top soil depth be established in streetscapes and open space. A minimum depth of 600mm of top soil must be installed in all open spaces to establish street trees, mass planting beds and turf areas.

Refer to the following details for street tree planting.

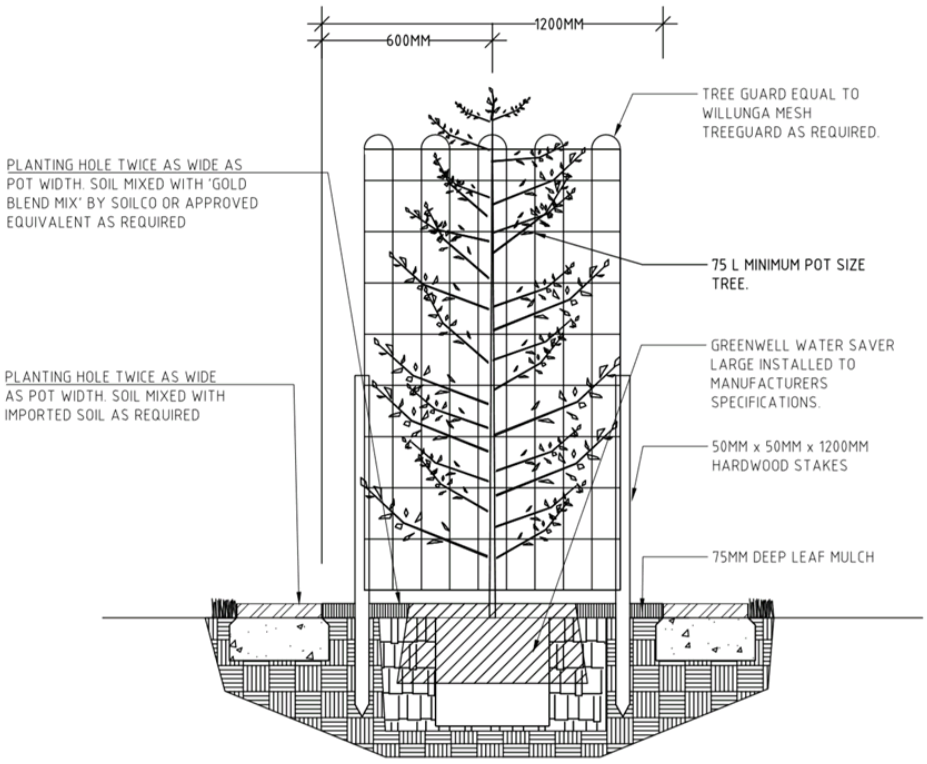


STREET TREE IN COAL WASH

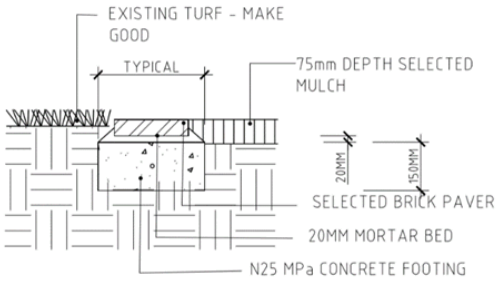
PLAN & SECTION NTS

LANDSCAPE DETAILS

Tree Planting with Edge Detail



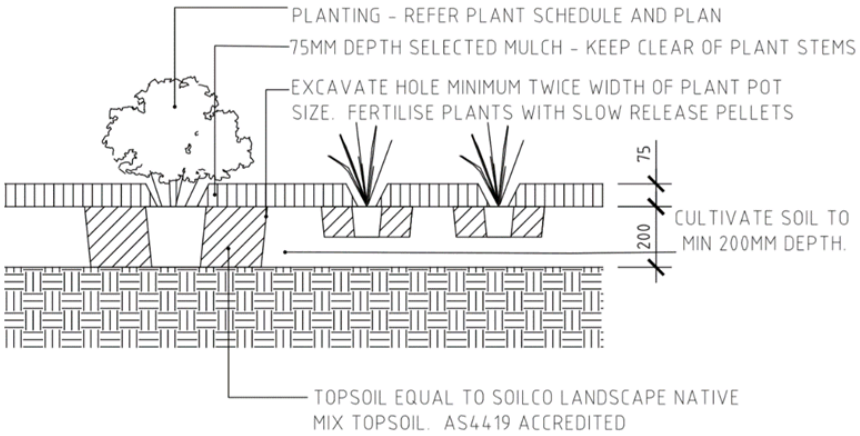
TREE PLANTING IN EDGING
SECTION NTS



BRICK PAVER -TREE PIT EDGE
TYPICAL DETAIL NTS

LANDSCAPE DETAILS

Mass Planting Detail

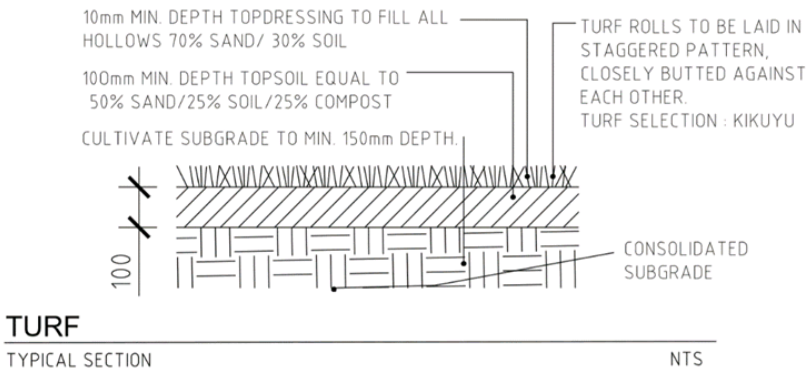


MASS PLANTING
TYPICAL DETAIL NTS

LANDSCAPE DETAILS

Turf Detail

Turf Species to be Kikuyu for Open Space areas, and Buffalo adjacent to Natural Areas



TURF
TYPICAL SECTION NTS