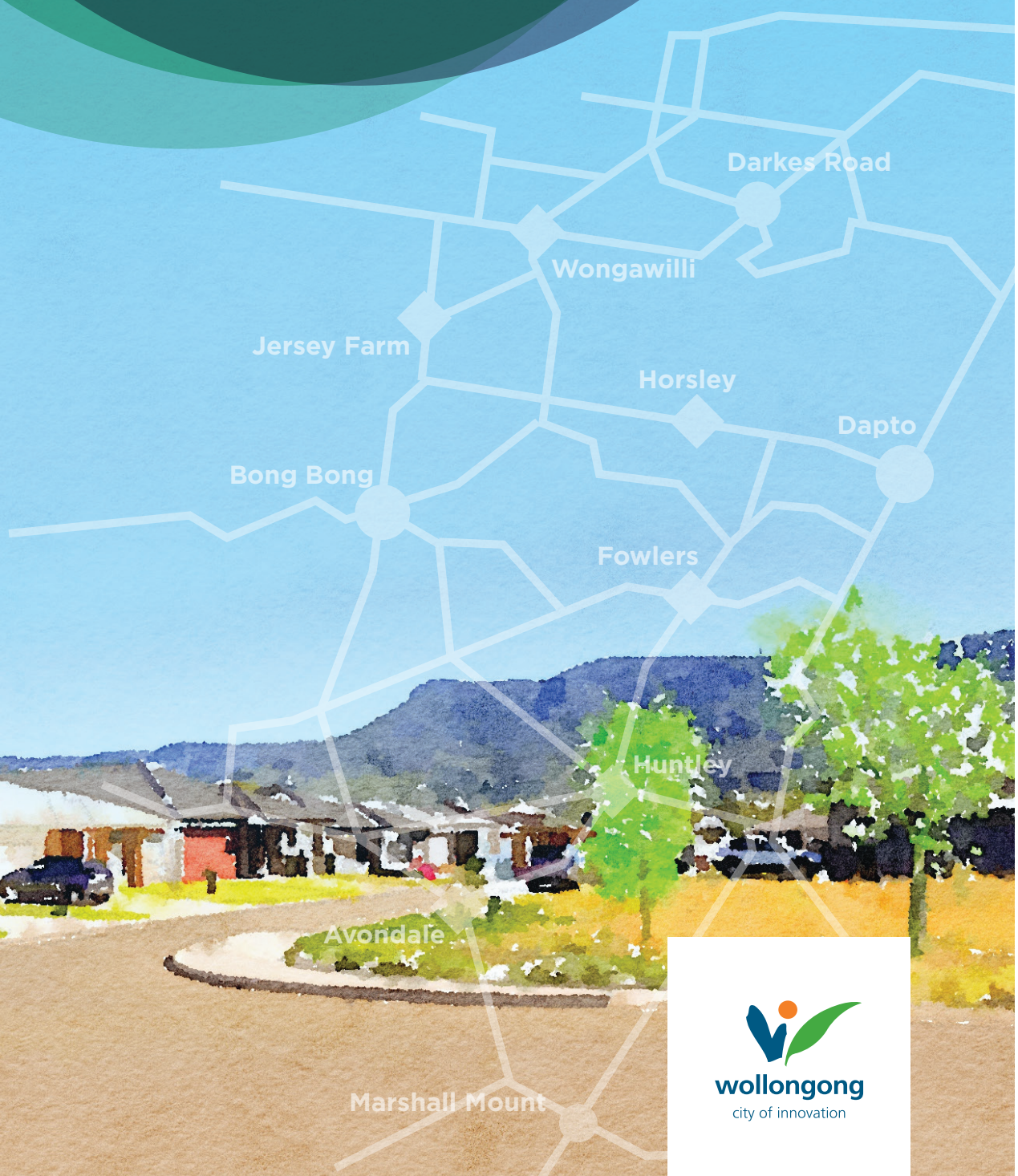


# WEST DAPTO OPEN SPACE TECHNICAL MANUAL



## 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
D.Pollock	Final- Post exhibition	A.Goldie	25/10/19

# 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.

### **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
28	BR2 – Post mounted Bike Rack						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	<b>F1</b> - Single rail timber barrier.	X	X	X			
34	<b>F2</b> - Vehicle access control			X			
35	<b>F3</b> - Sports Field Fencing		X				
40	<b>F4</b> - Play Space fencing						
41	<b>F5</b> - Safety Fencing		X				
42	<b>F6</b> - Dog Park Fence					X	
44	<b>G1</b> - 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
61	Street Tree Planting Detail	X	X		X	
62	Street Tree with guard Detail					X
63	Tree Planting with Mulch Ring	X	X		X	
64	Street Tree Planting in coal/clay	X	X	X	X	
65	Tree Planting With Edging	X	X		X	
66	Mass Planting Detail	X	X	X		X
67	Turf Detail	X	X		X	X
67	Sports Turf Detail		X			

## S1 - Seat

### LOCATION:

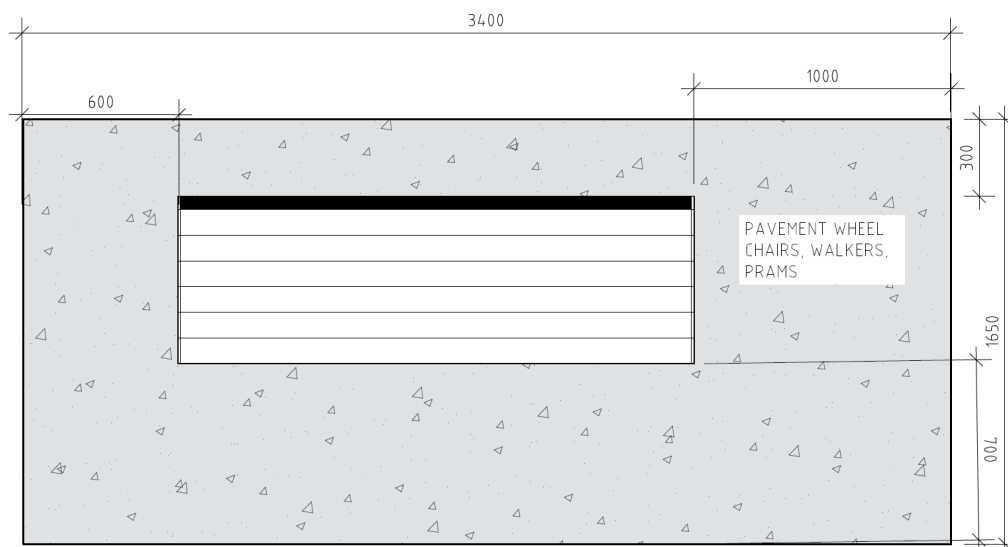
- Natural Areas, Dog Park, Transmission Easements, Local Parks, Neighbourhood Parks.

### 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: 1800mm long



### S1 SEAT

PLAN

NTS

## S2 – Bench

### LOCATION:

- Natural Areas, Local Parks, Neighbourhood Parks.

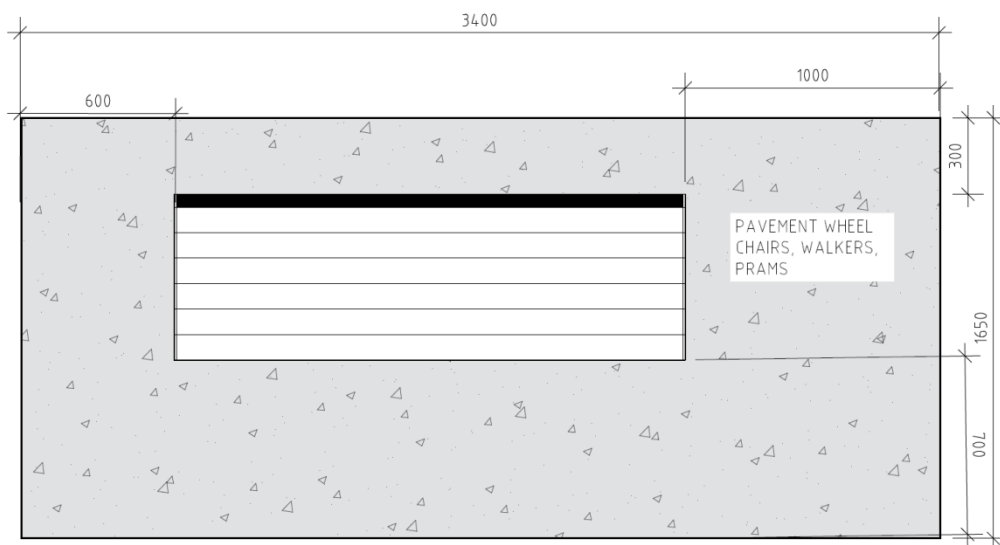
### INSTALLATION:

- 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

## S3 Seat

### LOCATION:

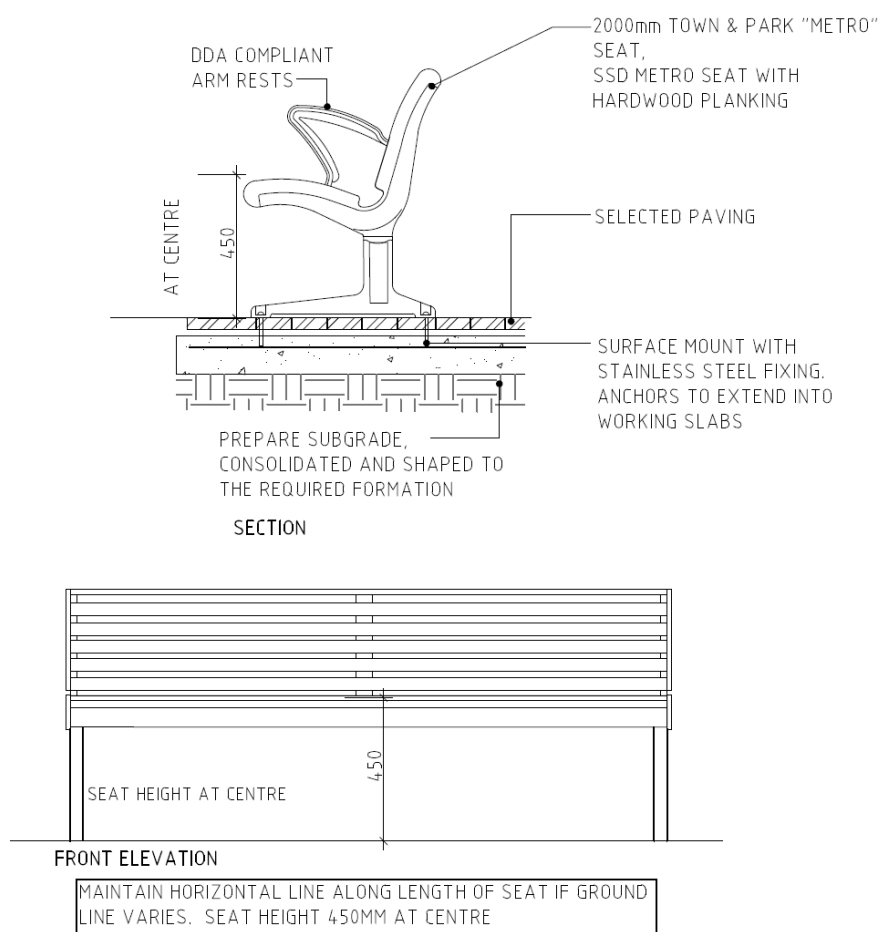
- Town, Village Centres.

### 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 (FSC) certified hardwood timber planks or approved equal.
- Size: 2000mm length.
- Leg type: leg foot surface mounted.



## S3 SEAT

SECTION & ELEVATION

NTS

## S4 Bench

### LOCATION:

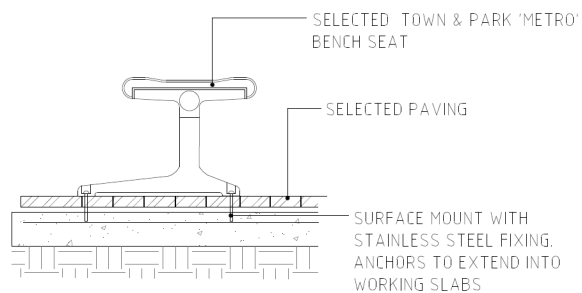
- Town Centres, Village Centres.

### 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



## S5 Picnic Setting

### LOCATION:

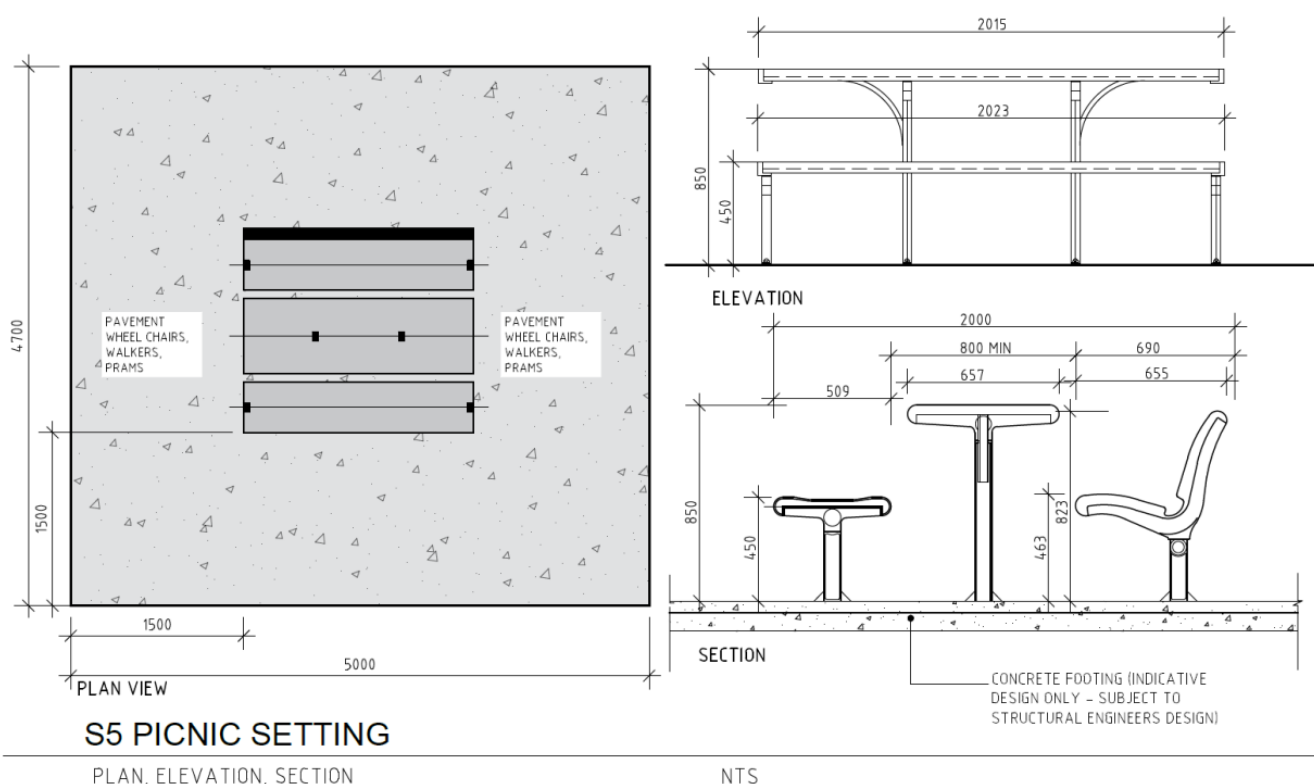
- Town Centres, Neighbourhood Parks

### 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.



## PS1 Picnic Shelter

### LOCATION:

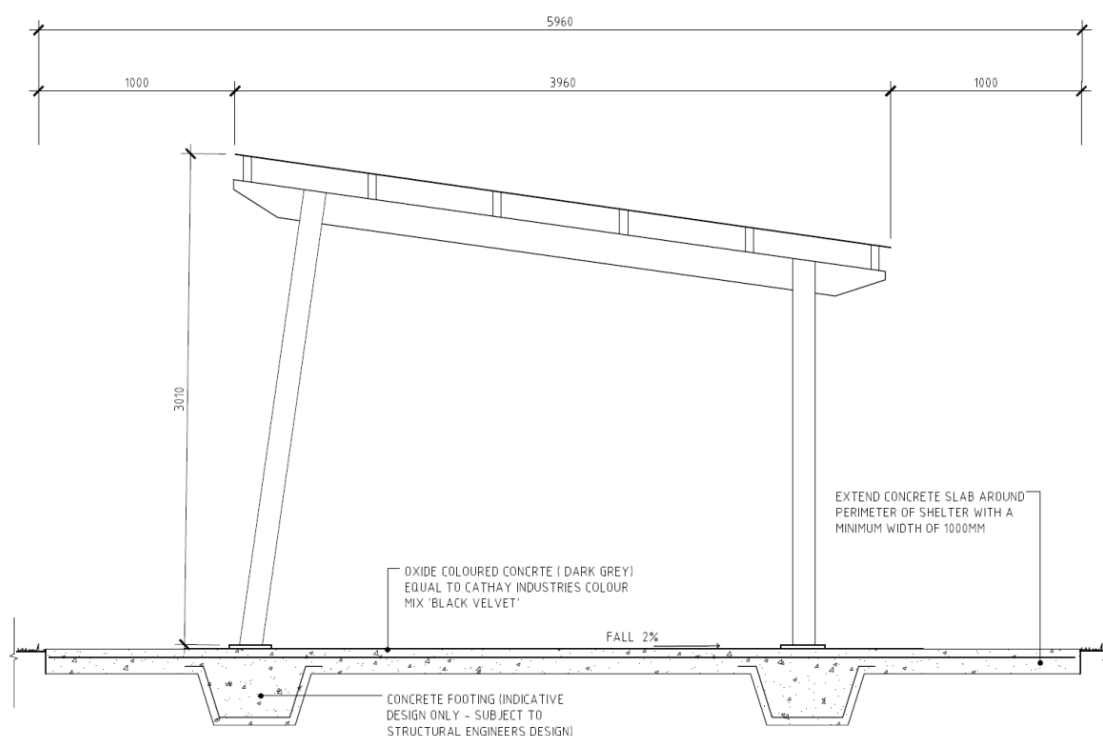
- Local Parks, Neighbourhood Parks

### 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

## PS2 Picnic Shelter

### LOCATION:

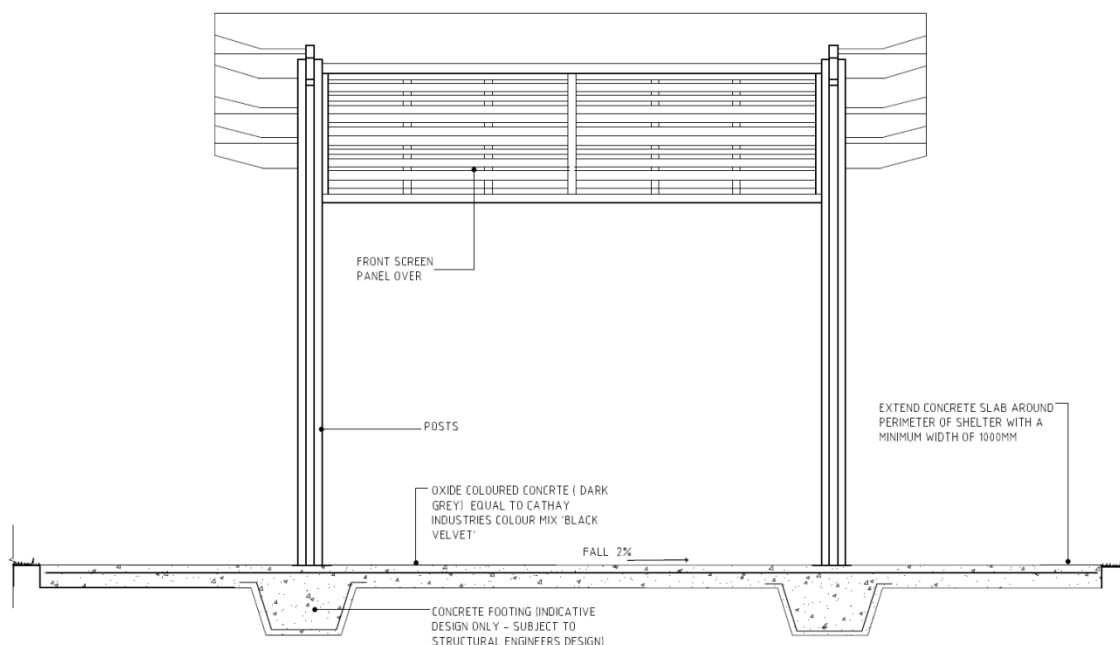
- Local Parks, Neighbourhood Parks

### 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.

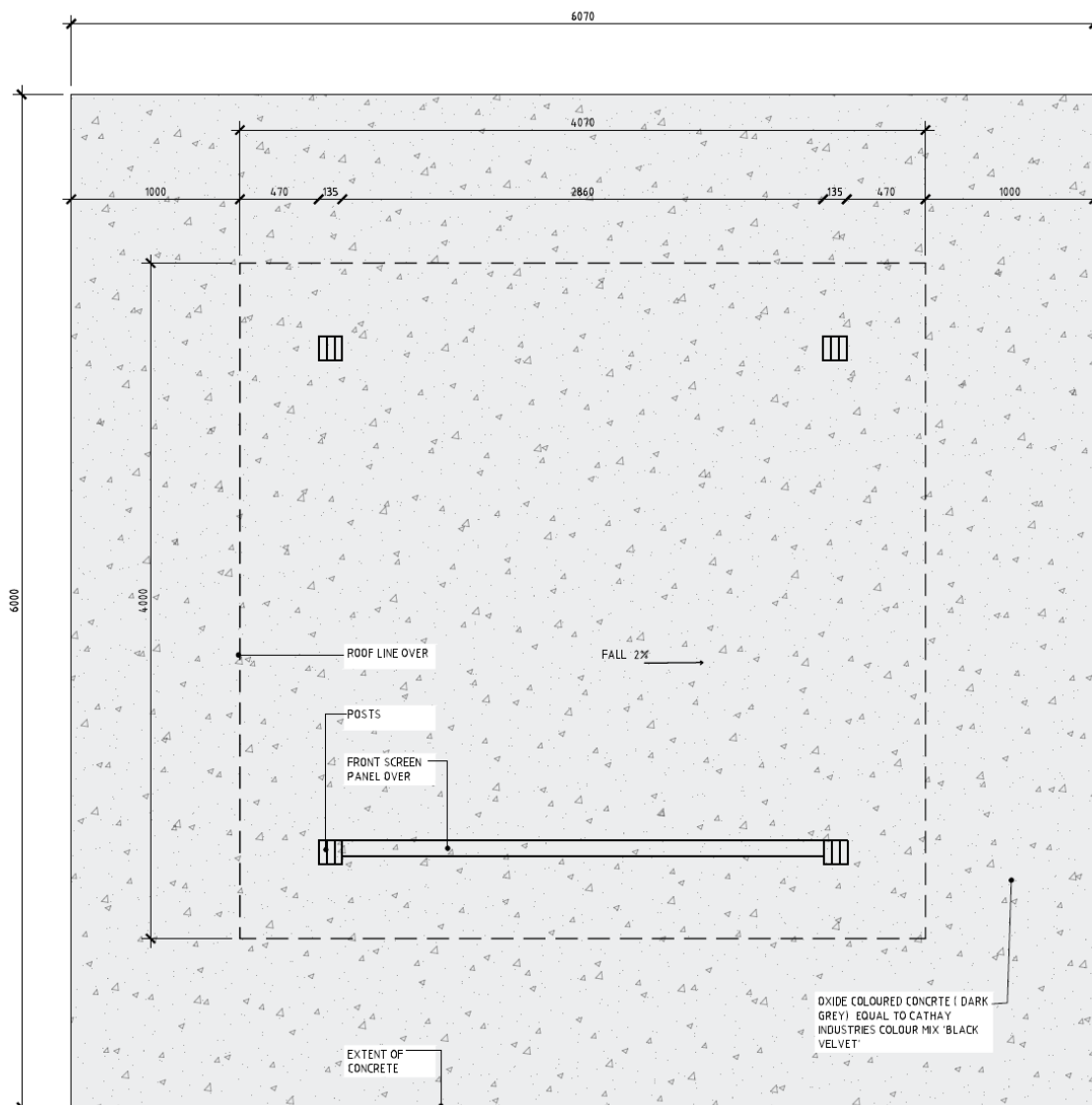


PS2 PICNIC SHELTER

ELEVATION

NTS

## PARK FURNITURE



PS2 PICNIC SHELTER

PLAN

NTS

## PS3 Large Picnic Shelter

### LOCATION:

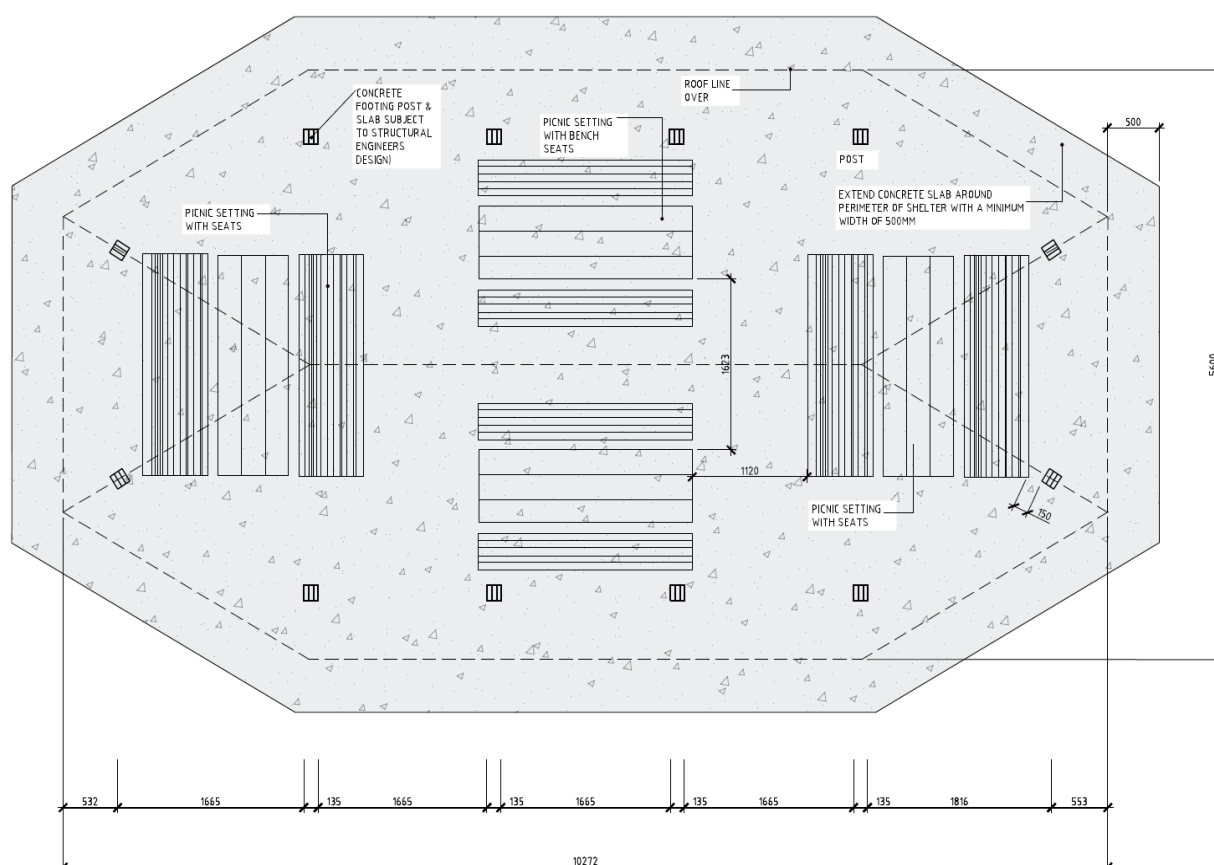
- Neighbourhood Parks.

### 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

## 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





## PS4 Barbecue Shelter

### LOCATION:

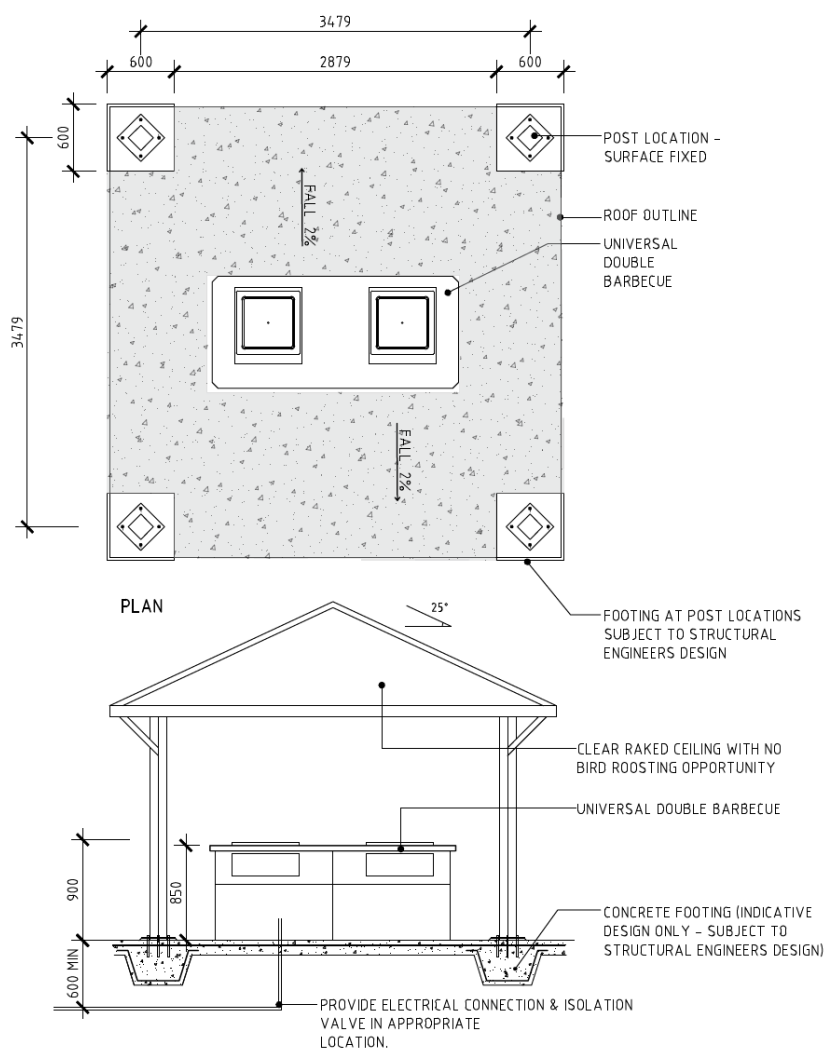
- Neighbourhood parks

### 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

## Barbecue

### LOCATION:

- Neighbourhood parks where need has been demonstrated.

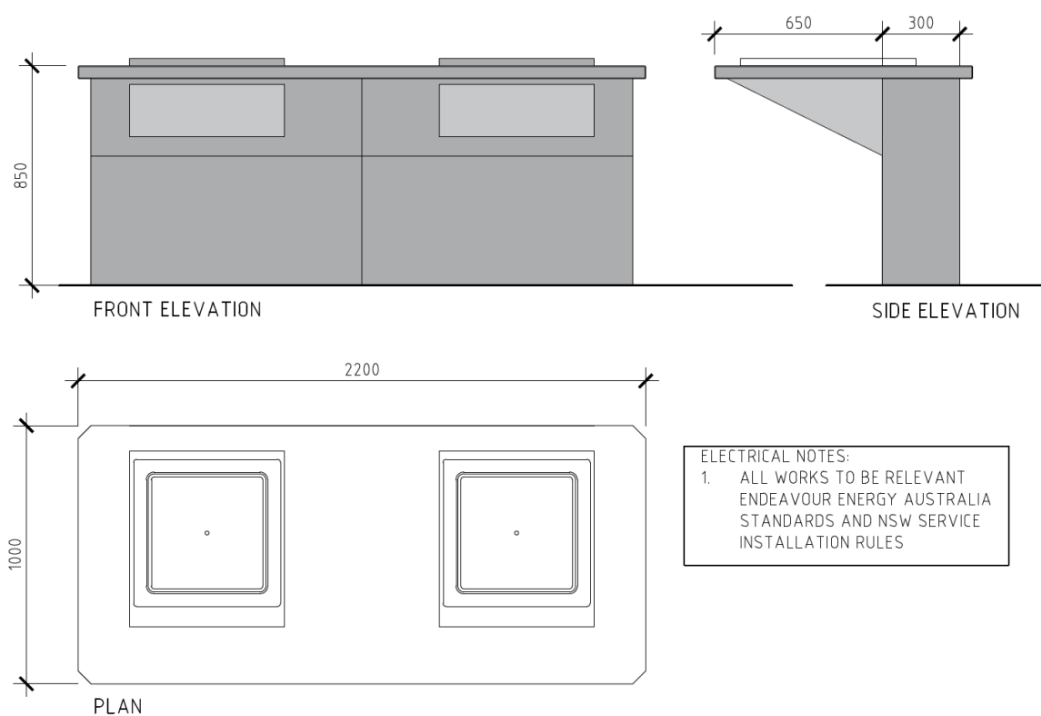
### INSTALLATION:

- 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

## GB1 Garbage Bin Post Mount

### LOCATION:

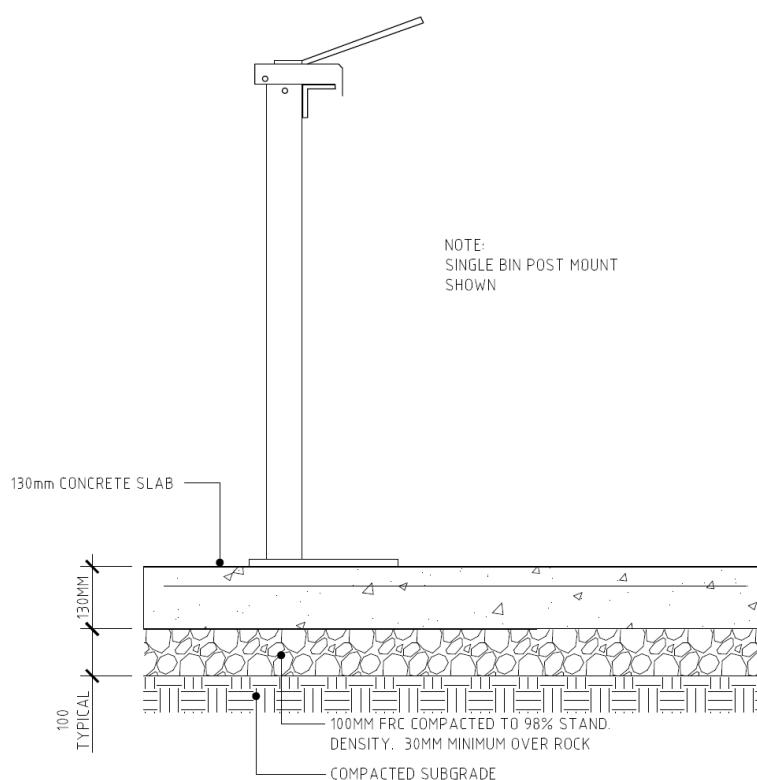
- Local Park, Neighbourhood and Dog Park

### 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.
- Double Wheelie Bin Post to be utilised in Neighbourhood Parks

### SPECIFICATION:

- 240 Litre Modular post lock system. Product code: 383 or 394 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

## GB2 Garbage Bin Enclosure

### LOCATION:

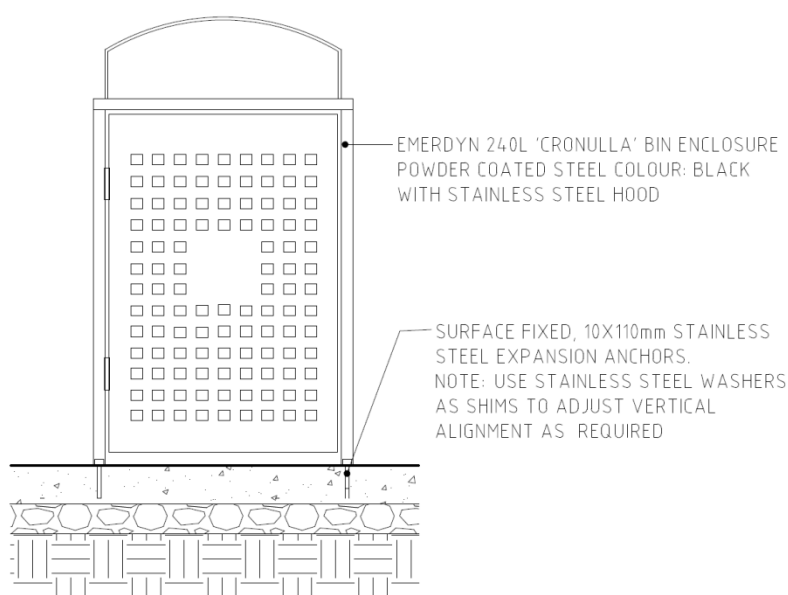
- Town Centres and Neighbourhood Parks

### 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.
- Note WCC may require a double bin arrangement for recycling.

### 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.
- Signage panel may be required to indicate recycling.



### 240L BIN ENCLOSURE

SECTION

NTS

## TAP

### LOCATION:

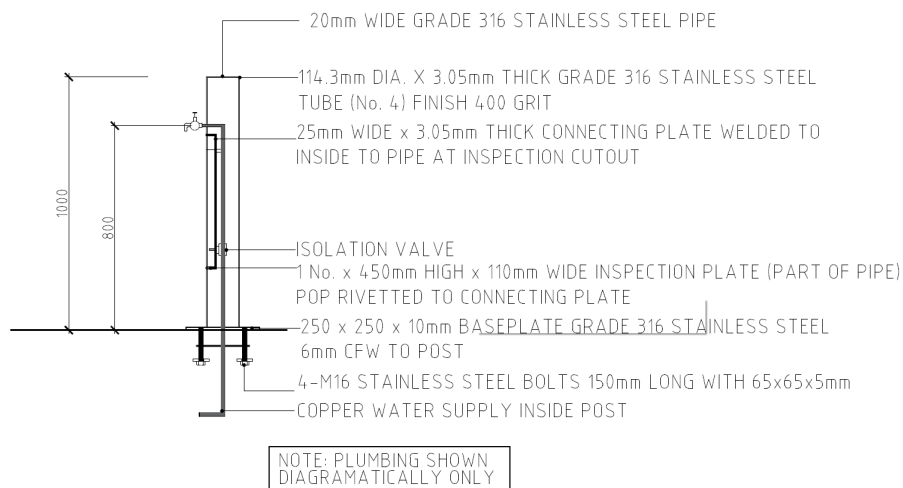
- Dog Park, Local and Neighbourhood Parks.

### 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

## BU1 BUBBLER

### LOCATION:

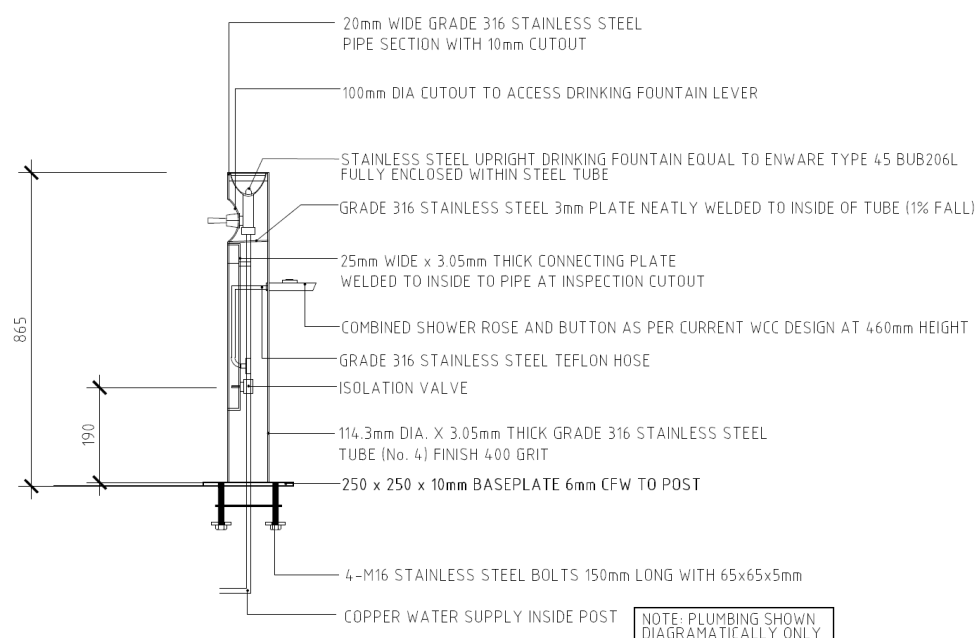
- Dog Park and Local Parks.

### INSTALLATION:

- Located in area of high activity in association with picnic shelter and or nodes of park furniture of play features

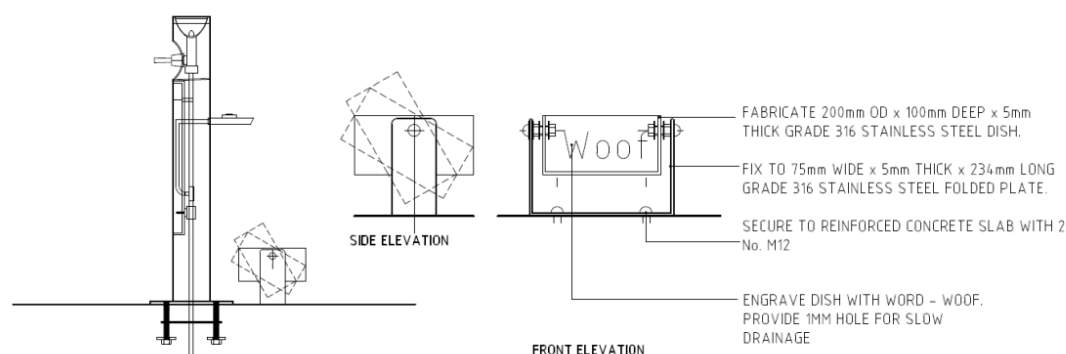
### SPECIFICATION

- 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



## 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.



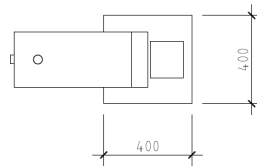
## BU3 - Equal Access Bubbler

### LOCATION:

- Neighbourhood Parks

### INSTALLATION:

- In area of high activity in association with picnic shelter and nodes of park furniture.



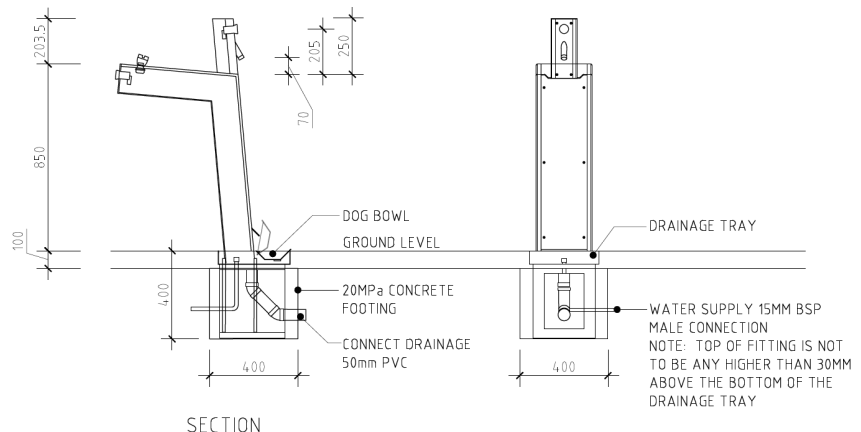
PLAN

BOLT THE DRINKING FOUNTAIN UNIT TO THE 4 X M12 BOLTS. DO NOT REMOVE THE M12 NUTS ON THE BOTTOM OF THE DRAINAGE TRAY. THESE PROVIDE CLEARANCE FOR THE WATER TO DRAIN.

REMOVE THE BACK OF THE DRINKING FOUNTAIN TO ACCESS THE INTERNAL PLUMBING. CONNECT THE DRINKING FOUNTAIN TO THE WATER SUPPLY VIA A 15mm BSD FLEXIBLE HOSE.

### 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.



SECTION

### EQUAL ACCESS BUBBLER

PLAN & SECTION

NTS

## 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.



## BR2 – POST MOUNTED BIKE RACK

### LOCATION:

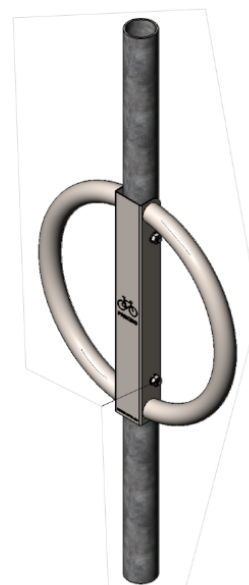
- Town Centres.

### INSTALLATION:

- Post Mounted bicycle rail to street sign posts
- 

### SPECIFICATION:

- Circular bike rack CORA © or approved equal.
- Material: 316 stainless steel
- Fixing: M10 Hex bolt G304 S/S with washer and M10 shear nut.



### BIKE RACK MOUNTED TO STREET SIGNS

ISO VIEW      NTS

## B1 –Timber Bollard

### LOCATION:

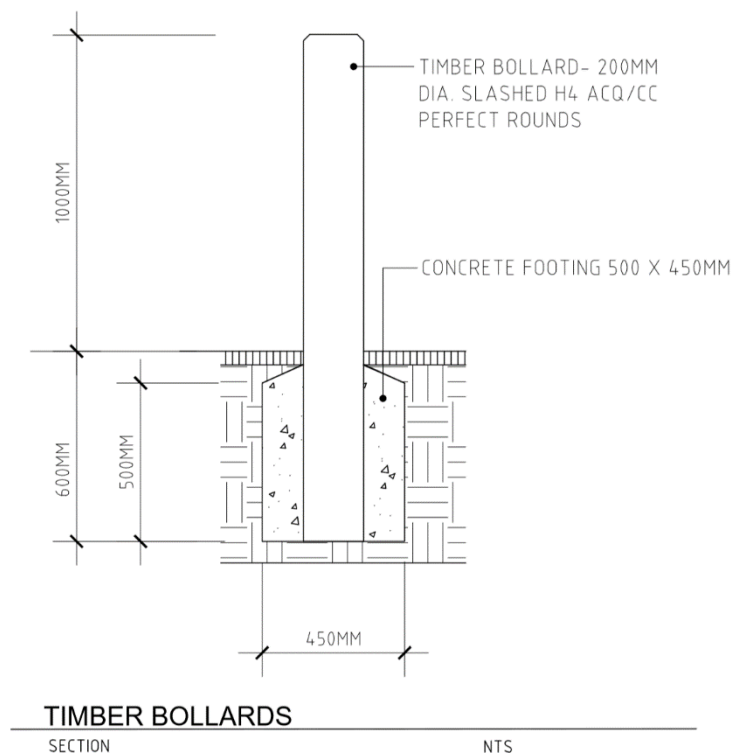
- Natural Areas, Local and Neighbourhood Parks.

### 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.



## B2 – Stainless Steel Bollard

### LOCATION:

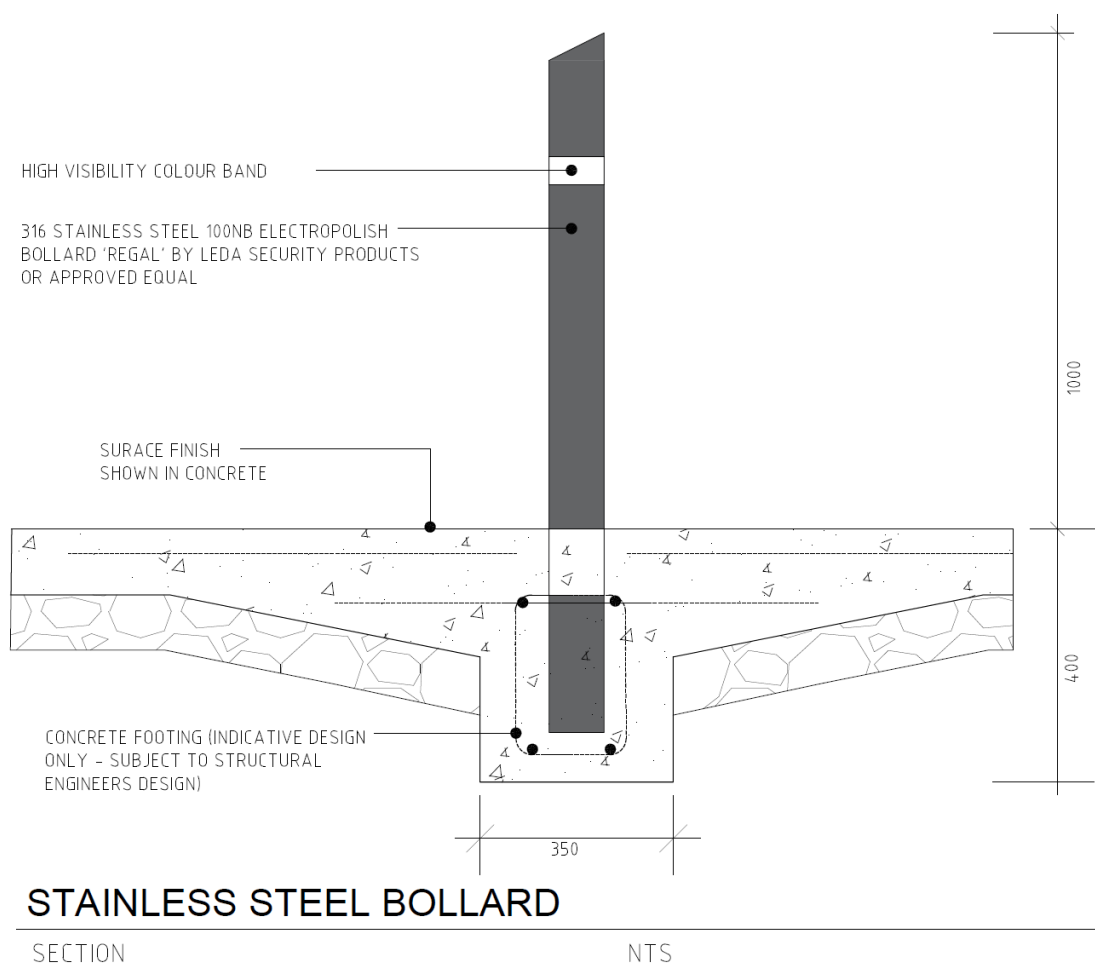
- Neighbourhood Parks and Town Centres.

### 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.



## B3 – Removable Bollard

### LOCATION:

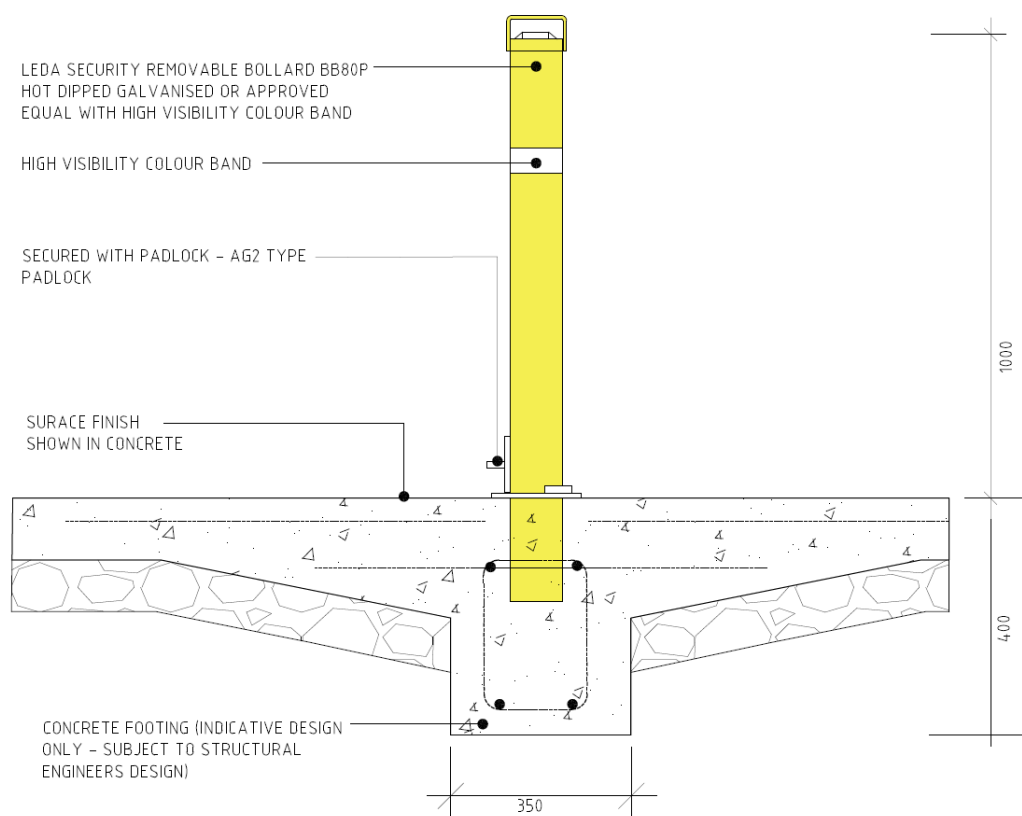
- Local, Neighbourhood and Town Centres.

### 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

## B4 – Sandstone Log

### LOCATION:

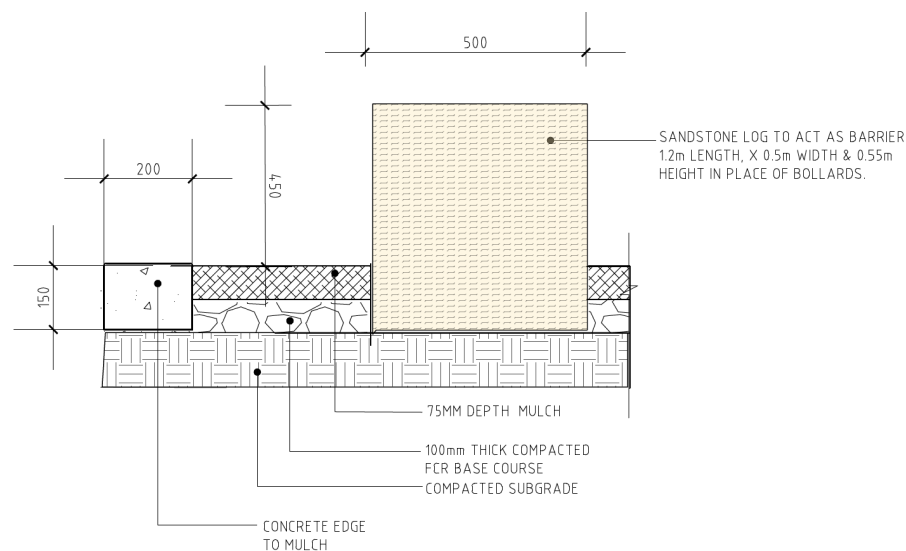
- Natural Areas, Local and Neighbourhood Parks.

### 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



## 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	
	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.

## F1 – Single Rail Timber Barrier



### LOCATION:

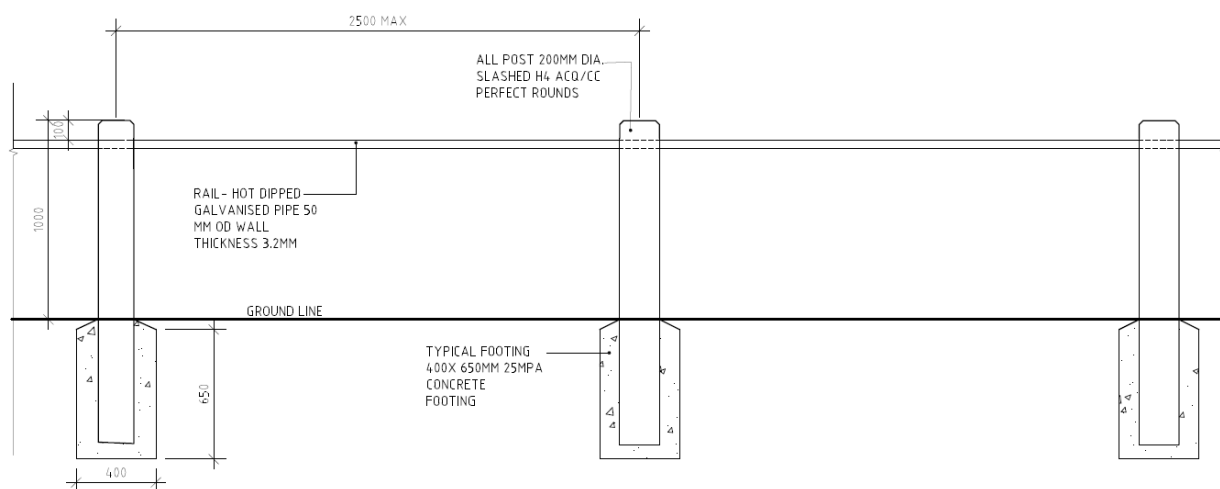
- Natural, Local, and Neighbourhood Parks where vehicle access control is required.

### 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

## F2 – Vehicle Access Control

### LOCATION:

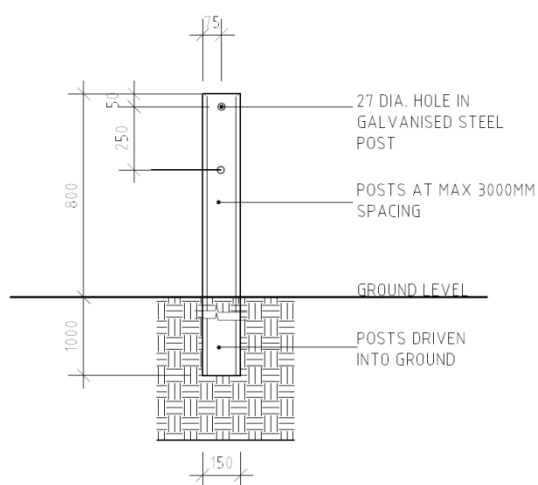
- Natural, Local, Neighbourhood Parks.

### 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

## F3 – Sports Field Fencing

### LOCATION:

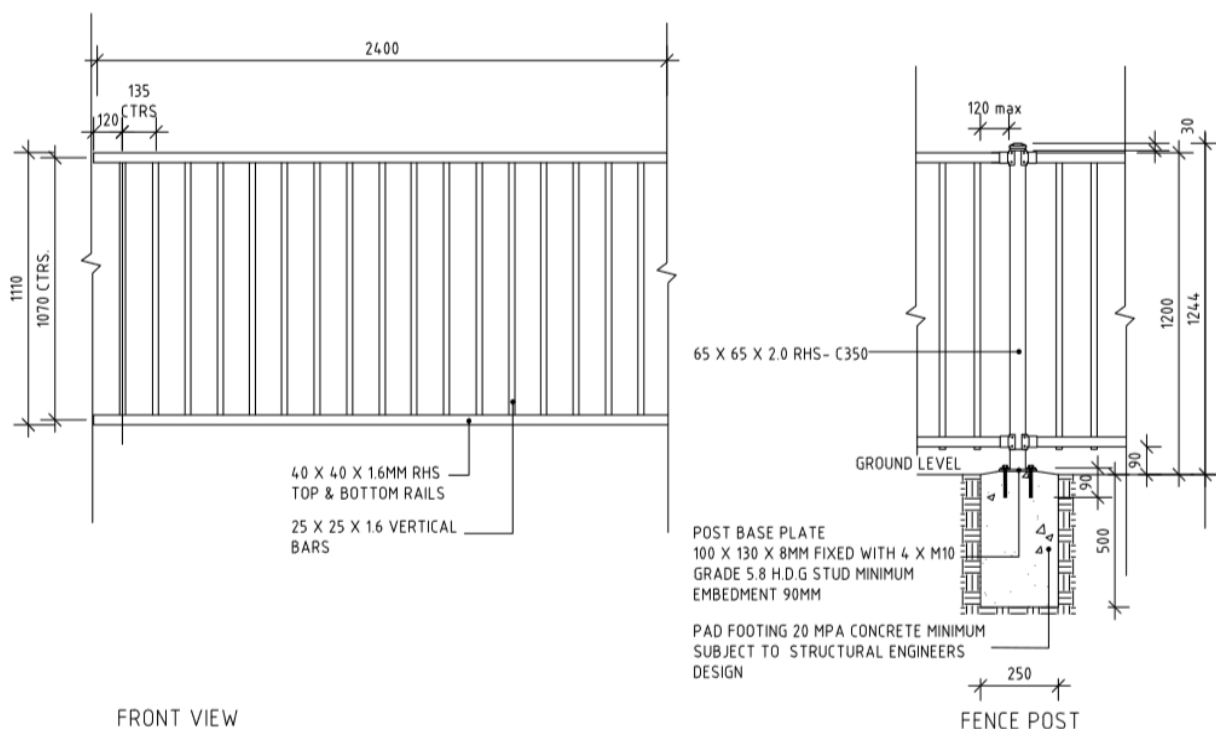
- Neighbourhood Parks.

### 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



## 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:

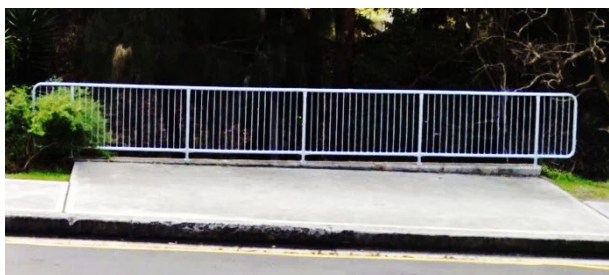
- Height: 1100mm
- All elements are to be manufactured from pre-galvanised steel tube, zinc coated inside and outside to AS 1450-2007 and AS 1397-2011, 100g/m<sup>2</sup> minimum average coating thickness.
- All powder coating to comply with AS5405 – A minimum warranty of 10 years shall be provided
- 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.



## F5 – Safety Fencing

### LOCATION:

- Natural Areas, stormwater infrastructure, Local and Neighbourhood Parks

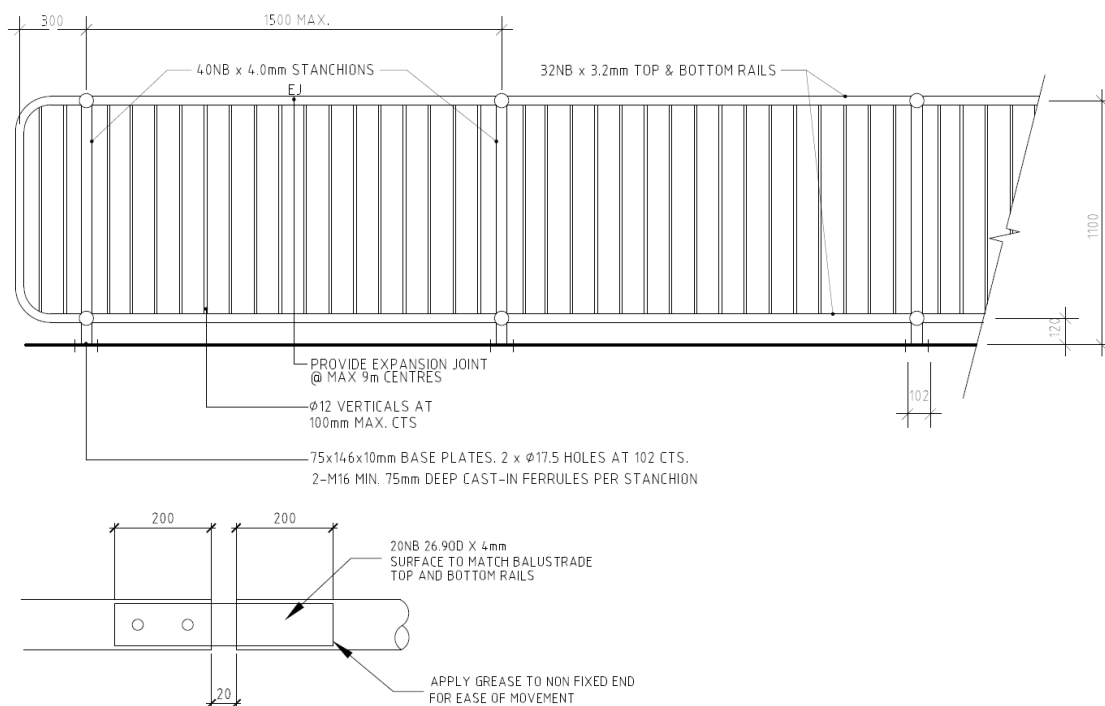


### APPLICATION:

- 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

## F6 – Dog Park Fence

### LOCATION:

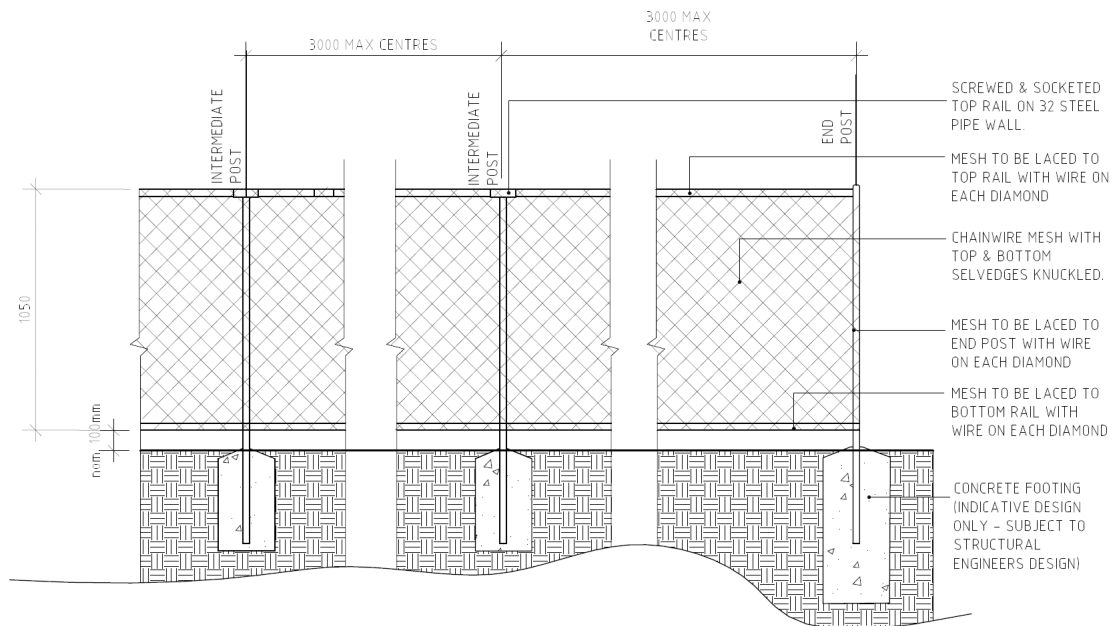
- Dog Park boundaries

### 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/m<sup>2</sup>)
  - 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

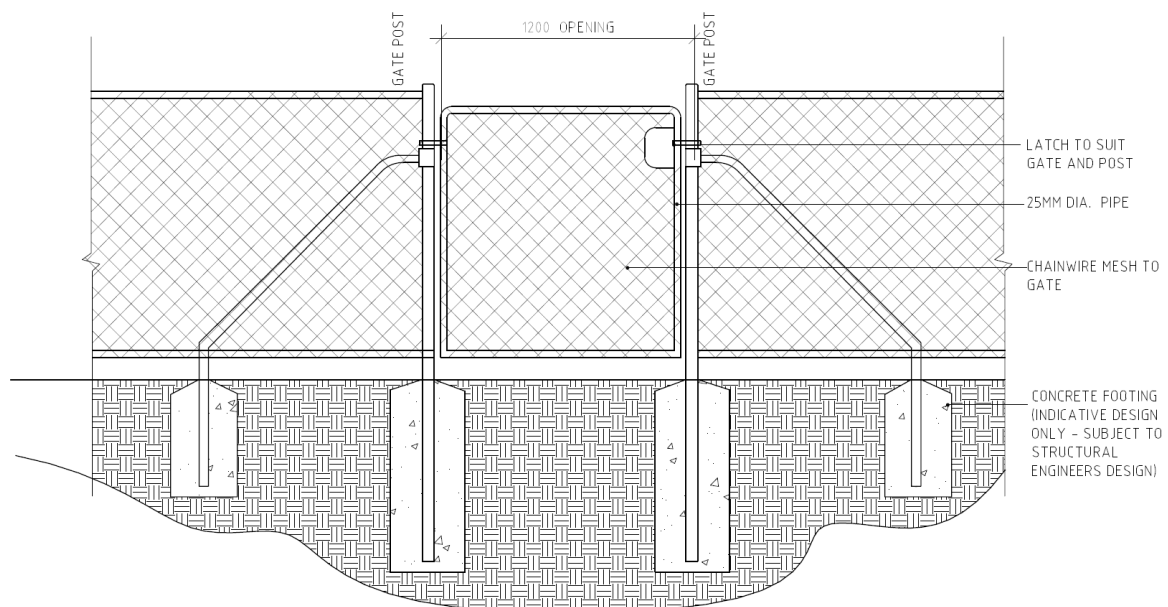


- Above ground concrete finish is to be domed with steel trowel finish to eliminate water lying at base of posts and is to be completed at time of original concrete pour. Ends of the support cable wire are to be firmly secured to all terminal posts.



## F6 FENCE

SECTION & ELEVATION NTS



## F6 FENCE- ENTRY GATE

SECTION & ELEVATION NTS

## G1 – Boom Gate

### LOCATION:

- Local parks, Neighbourhood Parks, natural areas, transmission easements.

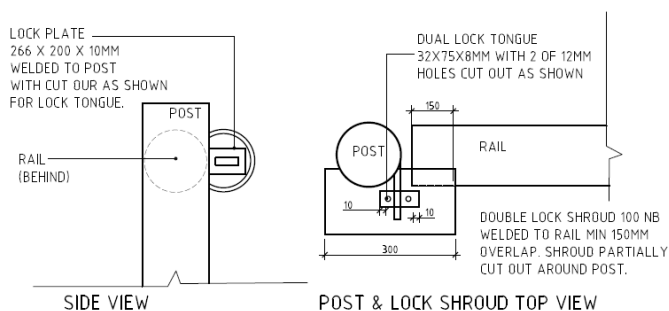
### APPLICATION:

- 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.



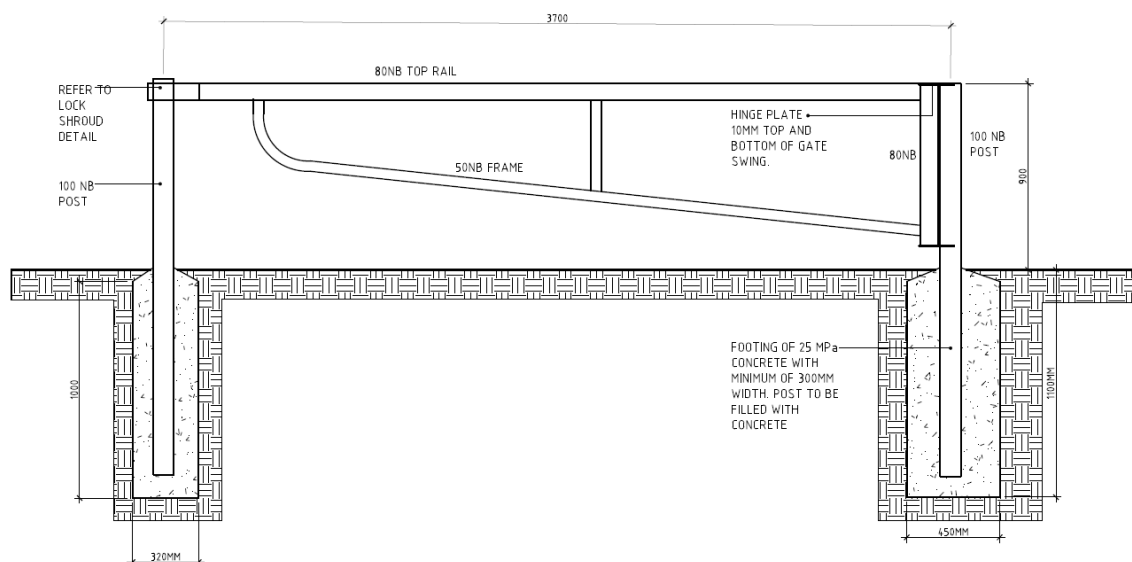
### SPECIFICATION:

- 5mm gauge hot dipped galvanised steel.



### MAINTENANCE ACCESS GATE- POST & LOCK SHROUD

SIDE & TOP VIEW NTS



### MAINTENANCE ACCESS GATE

TYPICAL ELEVATION NTS

- Construction and installation as shown below



## Decomposed Granite Path

### LOCATION:

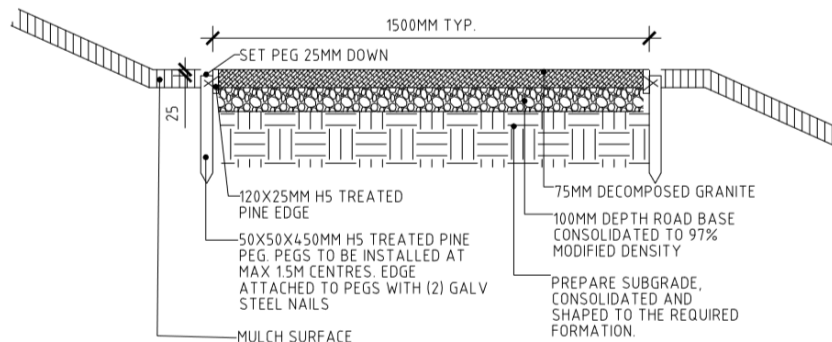
- Natural Areas, Local and Neighbourhood Parks.

### 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



## **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.

## Asphalt Pathway

### LOCATION:

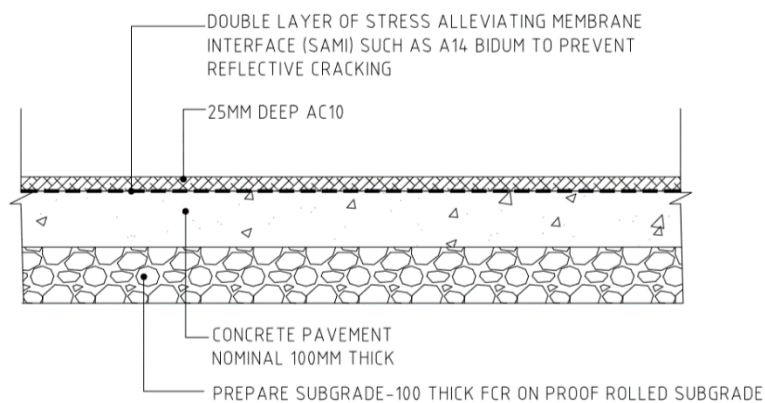
- Natural Areas, Local and Neighbourhood Parks.

### 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

## Broom Finished Concrete Pavement

### LOCATION:

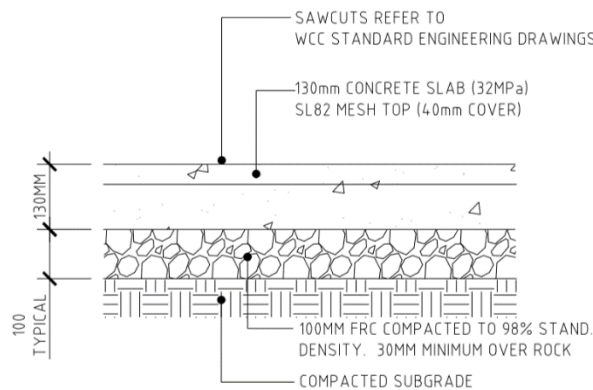
- Natural Areas, Local and Neighbourhood Parks.

### APPLICATION:

- Paths and high use walking trails within natural areas.

### SPECIFICATION:

- Slip resistance: P4.
- Approved oxide colour can be considered. Utilise light and natural colours for pavement and surfaces to reduce heat absorption.
- Refer to Wollongong City Council Standard Engineers Drawings 2019 for further details on jointing.



### BROOM FINISH CONCRETE

TYPICAL DETAIL NTS

## Coloured Honed Concrete Pavement

### LOCATION:

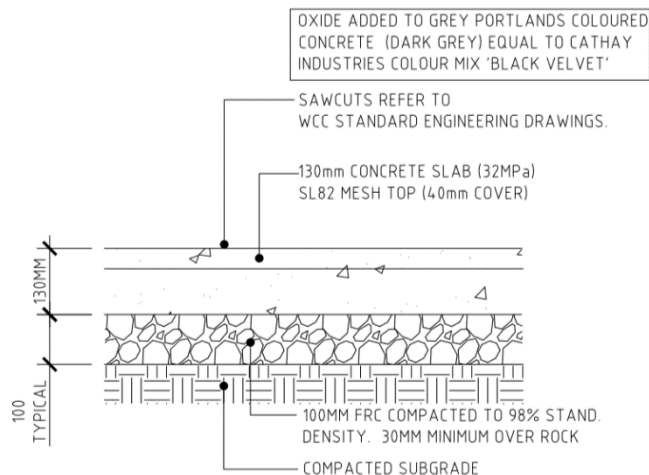
- Neighbourhood Parks, Town Centres

### 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

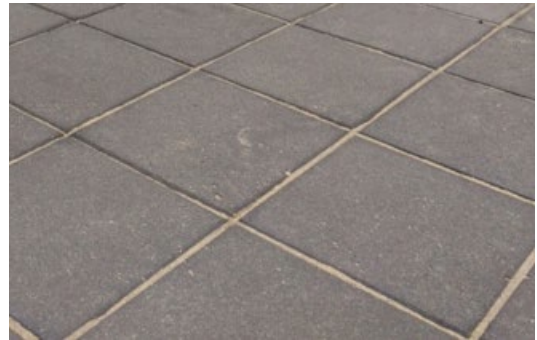
### Unit Paving

#### LOCATION:

- Neighbourhood Parks, Town and Village Centres

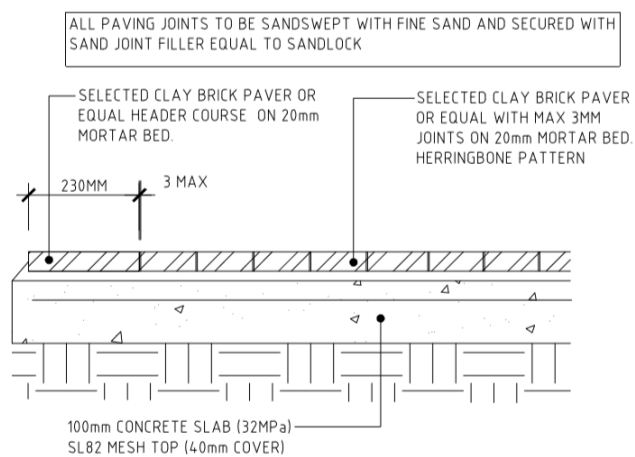
#### APPLICATION:

- 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

## 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 of 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 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.



## PS1 – Park Name Sign

### LOCATION:

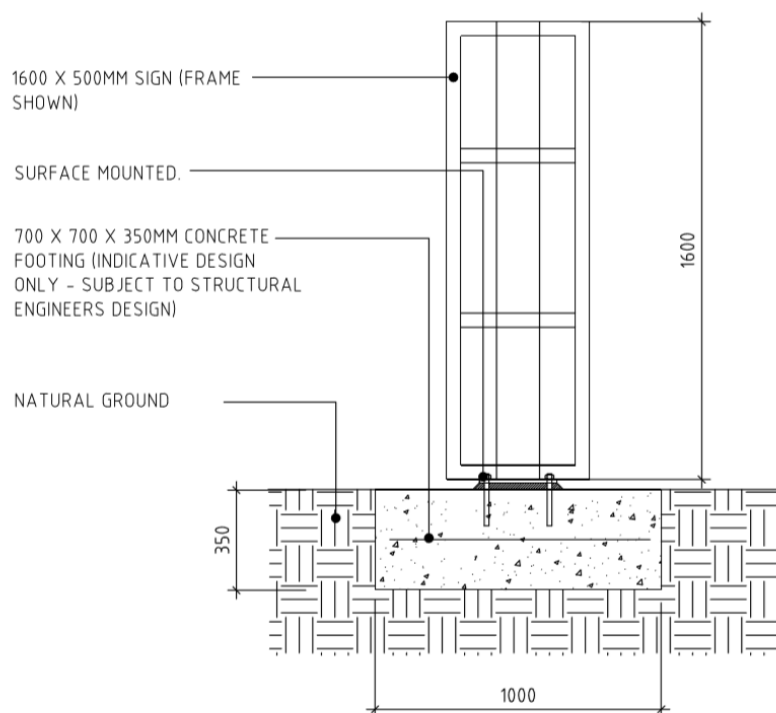
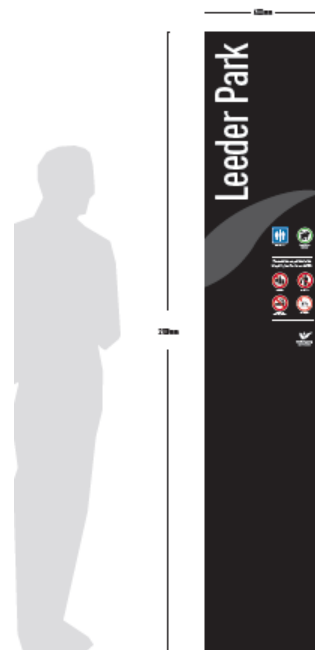
- Local and Neighbourhood Parks

### 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 interpretive information.



## PARK SIGNAGE

SECTIONAL ELEVATION NTS

## PS2 – Trail Marker

### LOCATION:

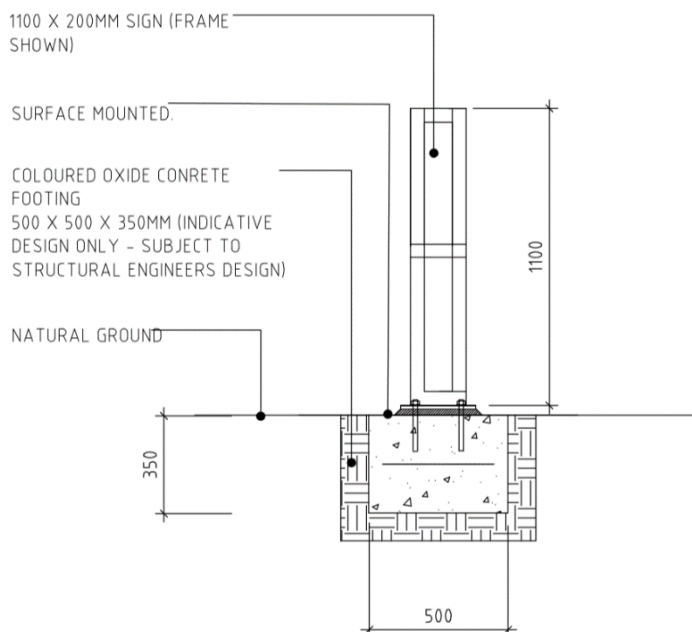
- Local, Natural Areas and Neighbourhood Parks

### APPLICATION:

- Track marker installed at track junctions and secondary entry points and along tracks at strategic locations.

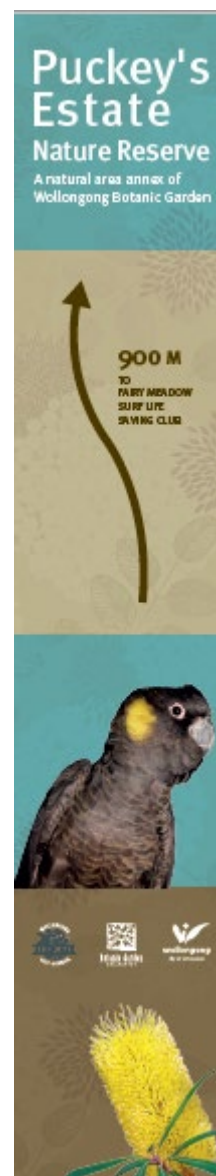
### SPECIFICATION:

- 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



## PS3 –Small Interpretive Sign

### LOCATION:

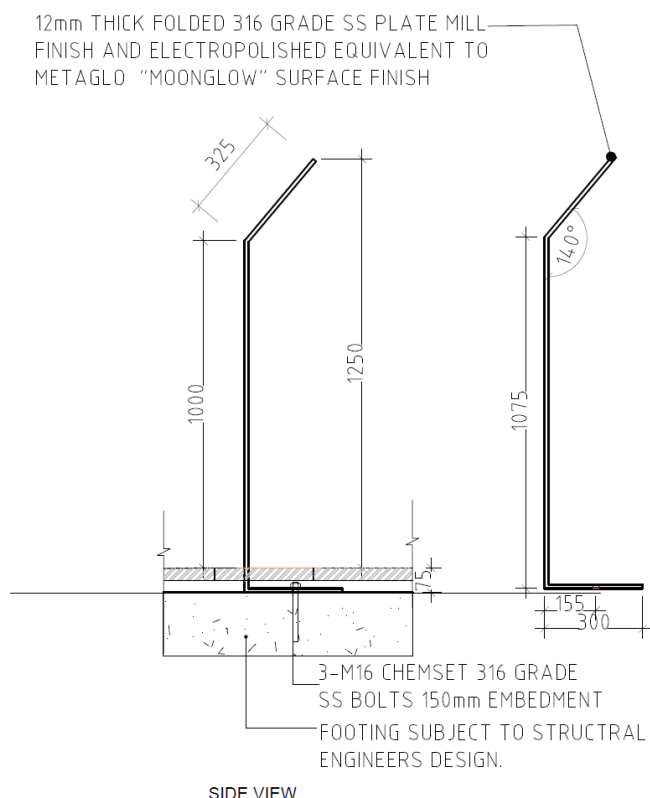
- Local and Neighbourhood Parks

### 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)



## SMALL INTERPRETATIVE SIGN

SECTIONAL NTS

## PS4- Large Interpretive Sign

### LOCATION:

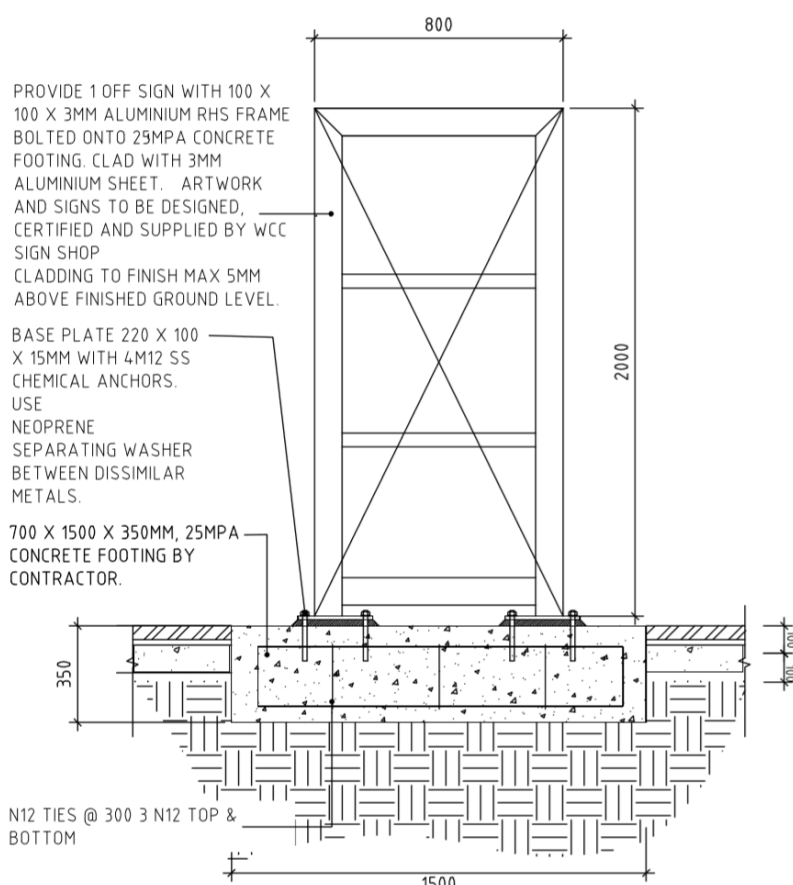
- Local and Neighbourhood Parks

### 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

## 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 rangeli*) 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.

## 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'  
*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

*Tristaniaopsis laurina* - Water Gum  
*Melaleuca linariifolia* - Snow in Summer  
*Waterhousia floribunda* - Waterhousia  
*Waterhousia floribunda* 'Amaroo'  
*Lophostemon confertus* - Brushbox  
*Elaeocarpus reticulatus* - Blueberry Ash  
*Elaeocarpus eumundii* - Quandong  
*Brachychiton acerifolium* - Flame Tree  
*Backhousia myrtifolia* - Grey myrtle  
*Ceratopetalum apetalum* - Coachwood  
*Syzygium leuhmannii* - Weeping Lily Pilly  
*Acmena smithii* var. - Minor Lily Pilly  
*Alphitonia excelsa* - Red Ash  
*Callistemon 'Kings Park'* - Kings Park Bottlebrush  
*Glochidion ferdinandi* - Cheese Tree  
*Polycias elegans* - Celery Wood  
*Planchonella australis* - Black Apple  
*Elaeodendron australis* - Red Fruited Olive Plum

*Guioa semiglauc*- Guioa

*Streblus brunonianus*- Whalebone Tree

*Celtis paniculata*- Native Celtis

*Toona ciliata*- Red Cedar

## 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'

*Podocarpus elatus* - Illawarra Plum

*Waterhousia floribunda* - Waterhousia

*Melaleuca decora* - Feather Honey Myrtle

*Melaleuca styphelioides* - Prickly Leaf Paperbark

*Livistona australis* - Cabbage Tree Palm

*Ulmus parvifolia* 'Todd' - Chinese Elm

*Lophostemon confertus* - Brushbox

*Lagerstroemia indica* - Crepe Myrtle

*Syzygium leuhmannii* - Weeping Lily Pilly

*Alphitonia excelsa* - Red Ash

*Backhousia citriodora* - Lemon Ironwood

*Callistemon* 'Kings Park' - Kings Park Bottlebrush

*Glochidion ferdinandi* - Cheese Tree

*Polycias elegans* - Celery Wood

*Planchonella australis*- Black Apple

*Elaeodendron austral*- Red Fruited Olive Plum

*Guioa semiglauc*- Guioa

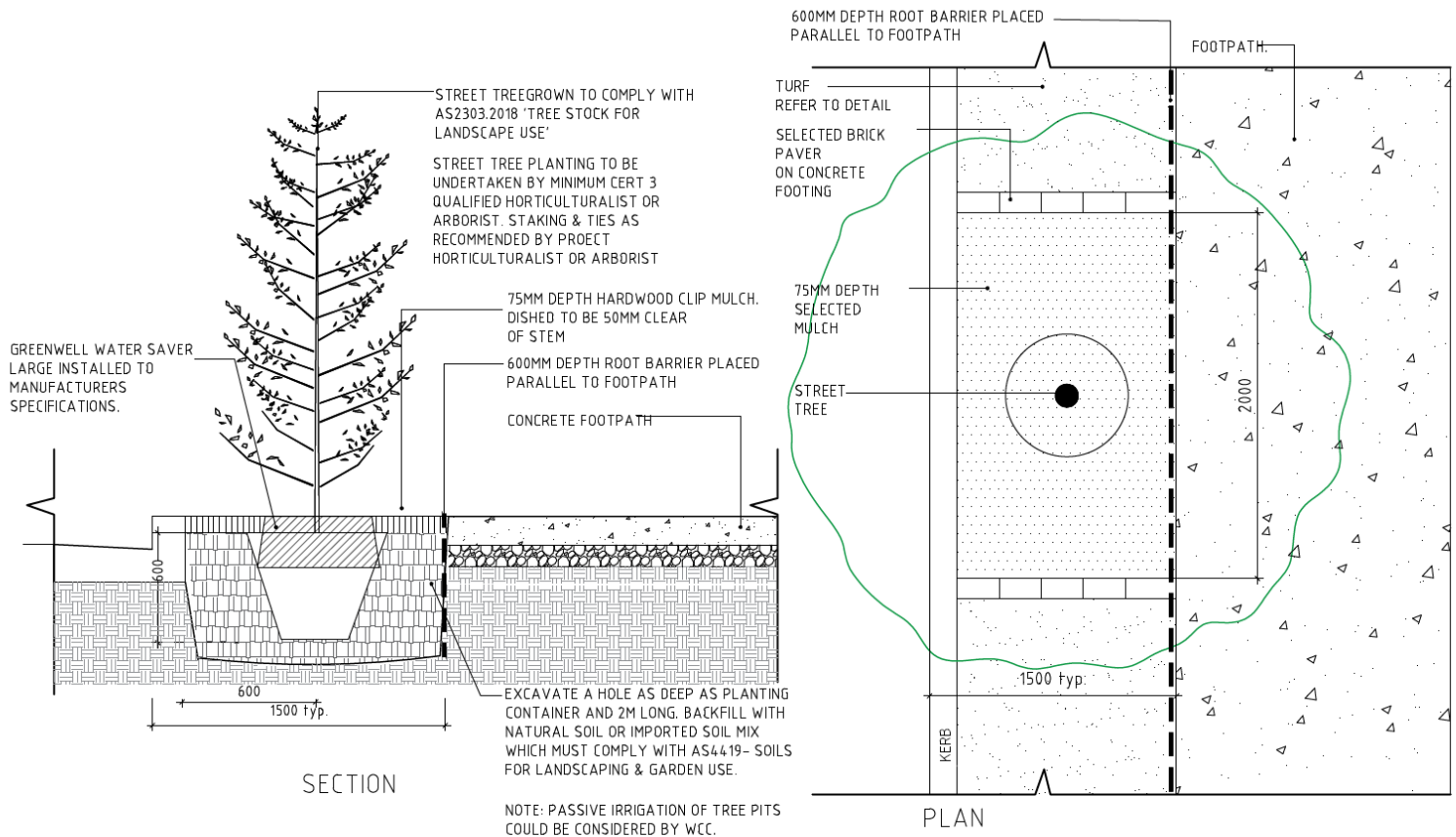
*Streblus brunonianus*- Whalebone Tree

*Celtis paniculata*- Native Celtis

*Toona ciliata*- Red Cedar



## Street Tree Planting Detail

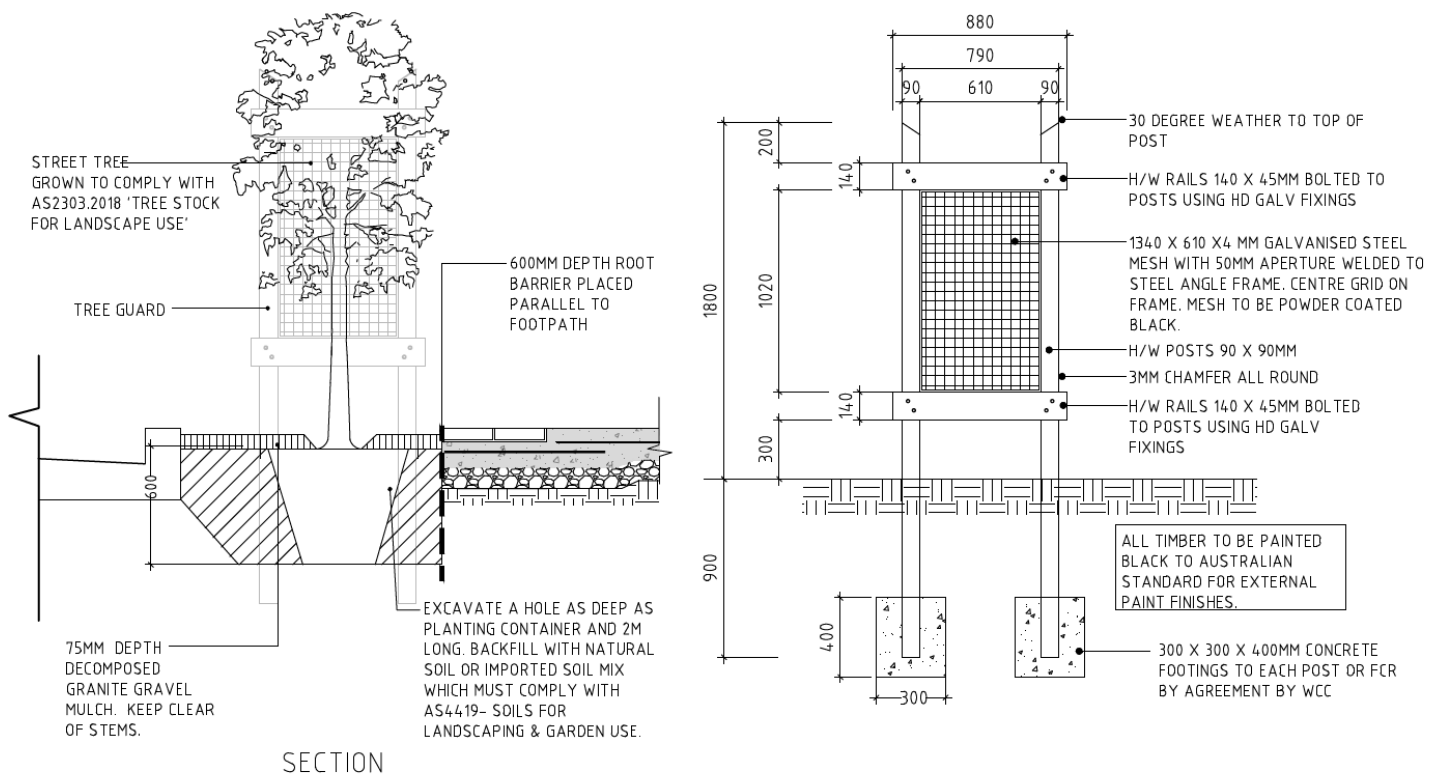


### STREET TREE IN NATURAL GROUND

PLAN & SECTION

NTS

# Street Tree Planting in Village and Town Centre Detail

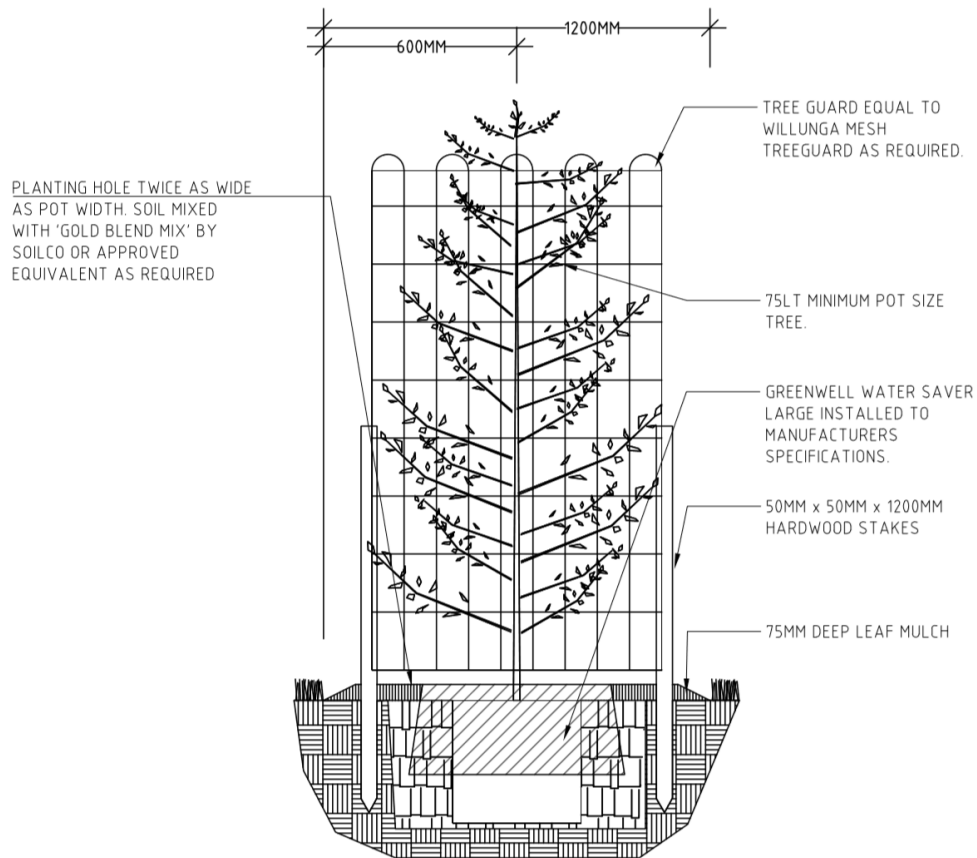


## STREET TREE IN TOWN & VILLAGE CENTRE WITH GUARD

PLAN & SECTION

NTS

## Tree Planting in Lawn Areas with Mulch Ring



### TREE PLANTING IN MULCH RING

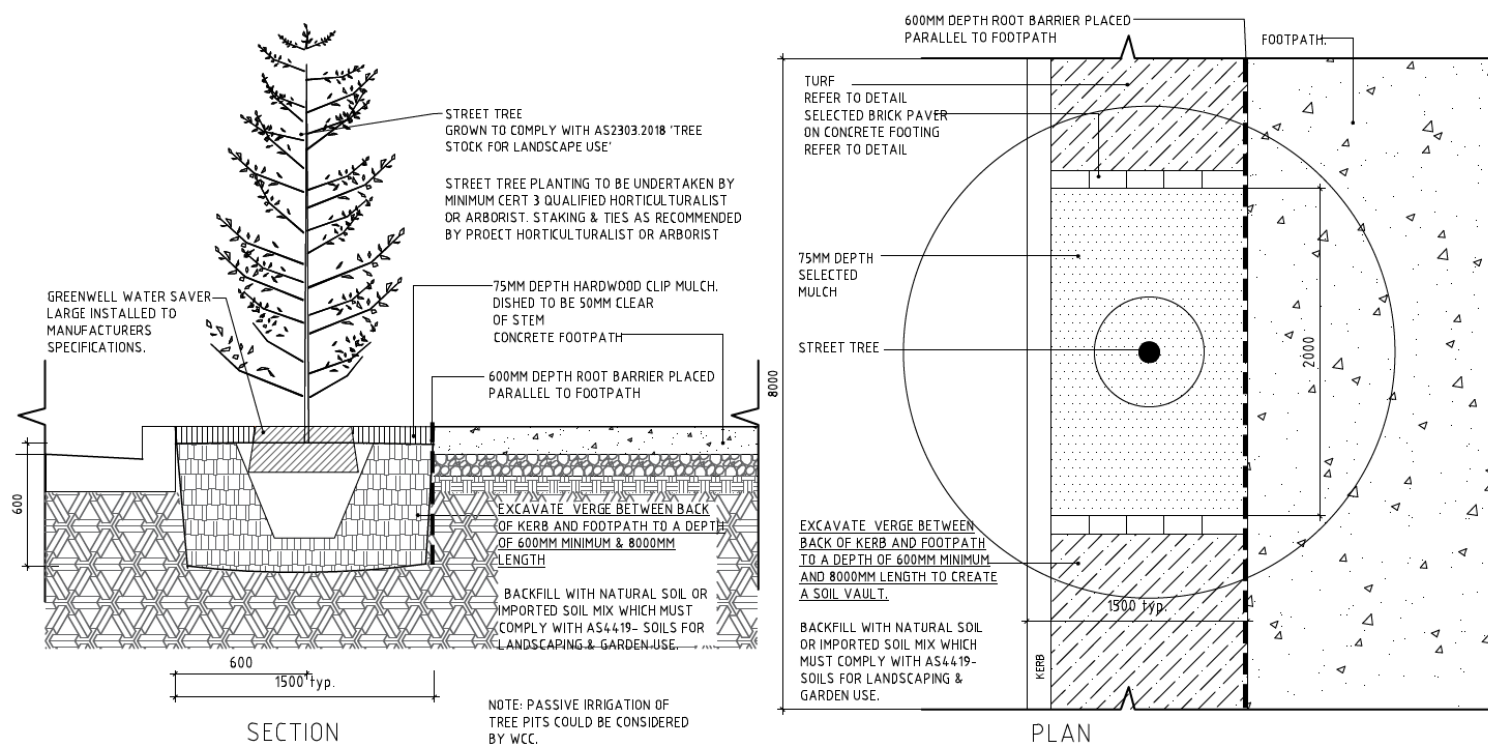
SECTION

NTS

## Street Tree Planting in Coal Wash / Clay soils

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.

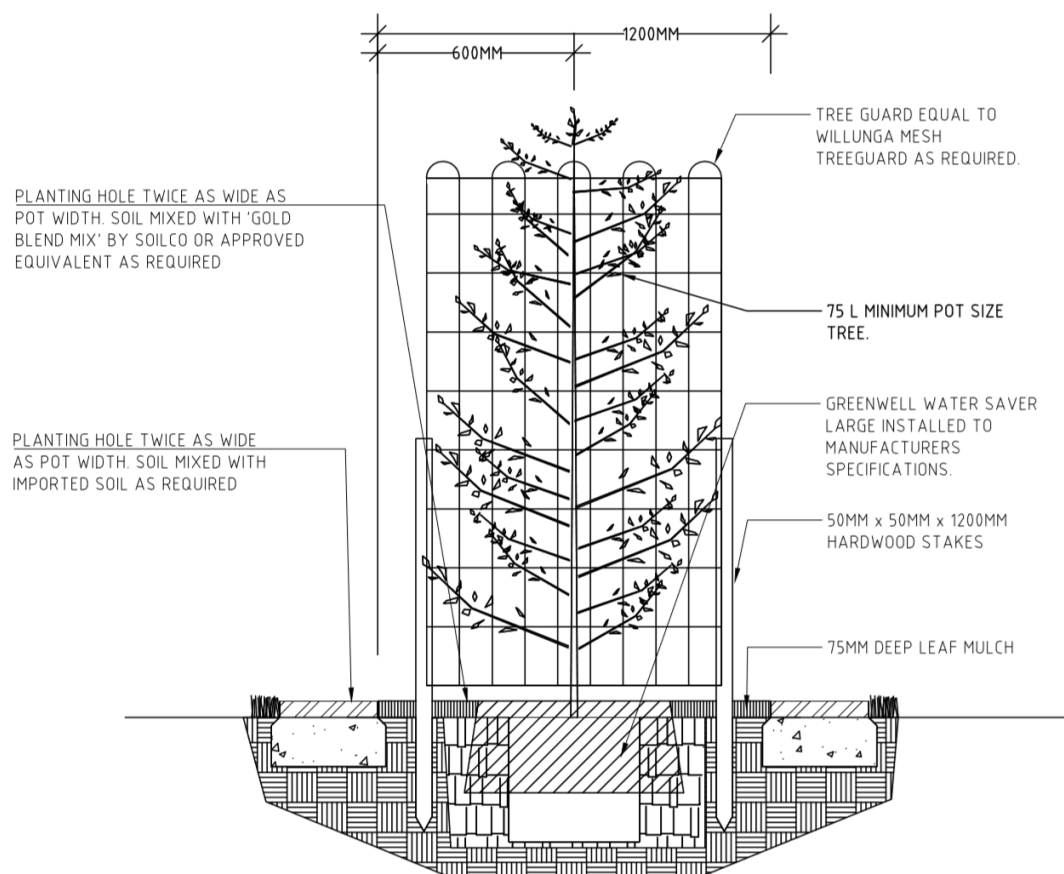


### STREET TREE IN COAL WASH/ CLAY SOILS

PLAN & SECTION

NTS

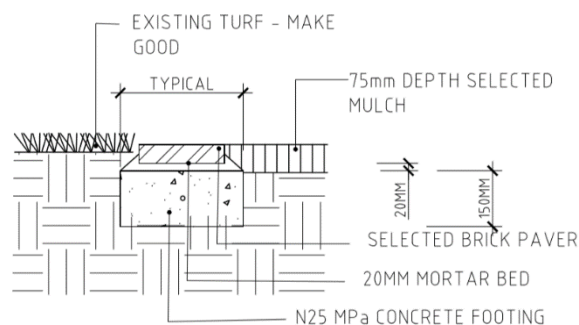
## Tree Planting with Edge Detail



### TREE PLANTING IN EDGING

SECTION

NTS

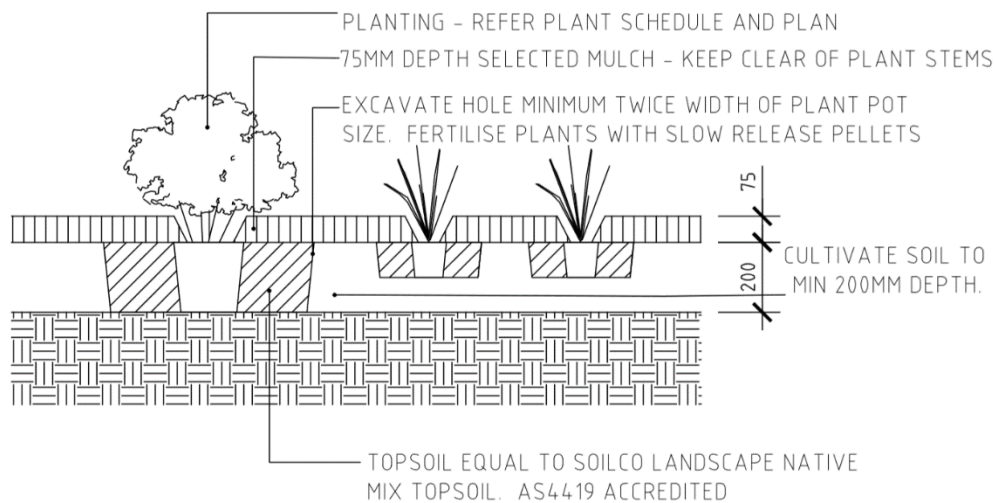


### BRICK PAVER - TREE PIT EDGE

TYPICAL DETAIL

NTS

## Mass Planting Detail



### MASS PLANTING

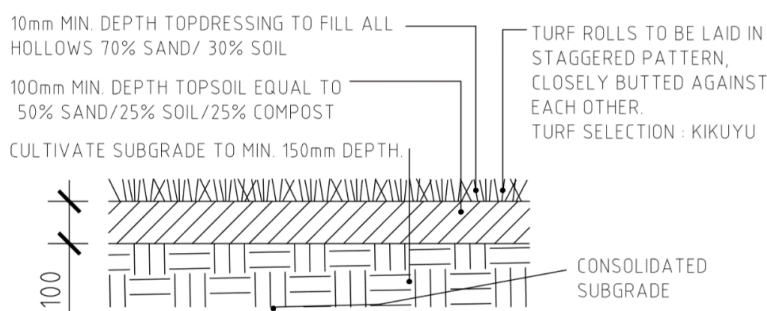
TYPICAL DETAIL

NTS



## Turf Detail

Turf Species to be Kikuyu for Open Space areas, and Buffalo adjacent to Natural Areas



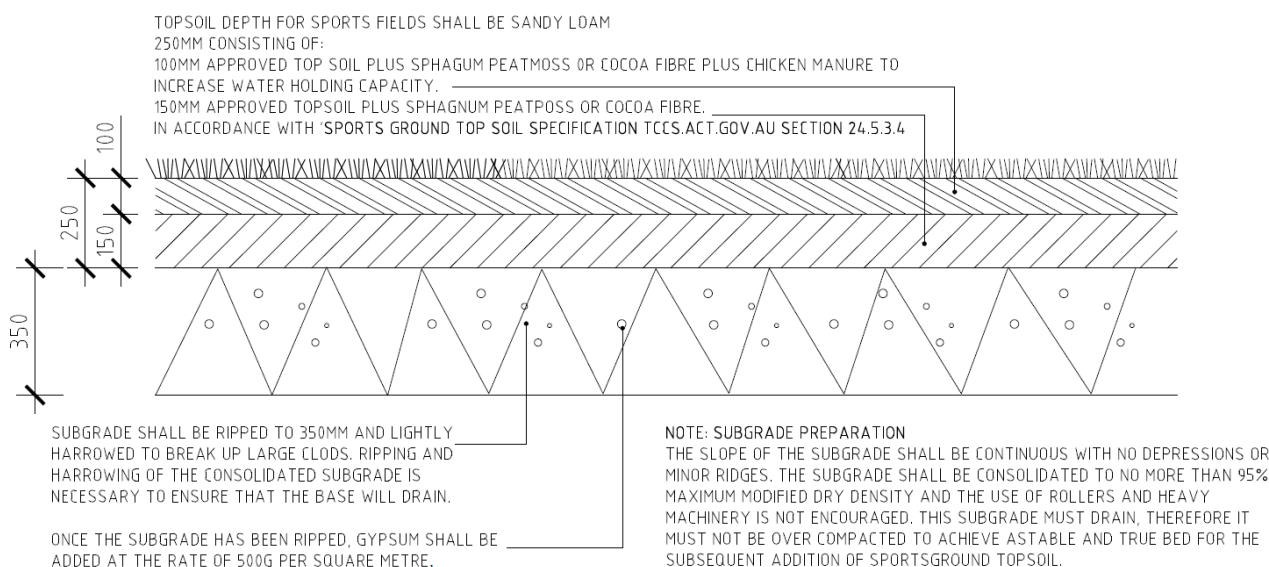
### TURF

TYPICAL SECTION

NTS

## Sports Turf Detail

Turf Species to be Kikuyu for Sports Fields



### SPORTS FIELD TURF

TYPICAL SECTION

NTS

# AMENDMENTS

The following table summarises the changes in the document since the last version on

Amendment Sequenced No.	Key Topic Addressed in Amendment	Amendment Location	Author Initials	Amendment Date
1	Change to Table 1- Park furniture- additional post mounted bike rack added	Page 6	DP	October 2019
2	Change to Table 5- Landscape details- additional Sports Turf Detail added	Page 10	DP	October 2019
3	Change to include reference for Double wheelie bin post for Neighbourhood Parks to allow for inclusion of recycling bin	Page 23	DP	October 2019
4	Change to detail to include bike rail mounted to post	Page 28	DP	October 2019
5	Change to text to clarify requirements for vehicle access control	Page 37	DP	October 2019
6	Add reference to the use of light colours in surfaces to reduce heat absorption	Page 49	DP	October 2019
7	Additional species added to indicative tree species list	Page 58-59	DP	October 2019
8	Street tree detail amended	Page 61	DP	October 2019
9	Street tree detail with tree guard	Page 62	DP	October 2019
10	Street tree detail amended	Page 64	DP	October 2019
11	Additional Sports Turf Detail	Page 67	DP	October 2019

exhibition August 2019





# WEST DAPTO OPEN SPACE TECHNICAL MANUAL

