20-272.1

13 October 2021

Ms Alicia Jones
Fabcot Pty Lty
135 Kewdale Road
KEWDALE WA 6105

Dear Alicia

Woolworths Two Rocks – Services Assessment

Pritchard Francis has been engaged to prepare this services report for Alicia Jones of Woolworths Group. The purpose of this report is to identify existing site conditions, existing services, and potential upgrades required in order to facilitate the Woolworths development on the corner of Lisford Ave and Azzurra St, Two Rocks.

The development area is located within the City of Wanneroo and is bordered by Lisford Ave to the east, and the abandoned Atlantis Marine Park to the west. Figure 1 below depicts an aerial photograph of the area. Figure 1 below depicts an aerial photograph of the area.

Figure 1 – Aerial Photograph of Proposed Development Site (June 2020)

1 Geology

Coffey Geosciences completed a detailed geotechnical investigation on the site in 2006. The subsurface conditions are generally consistent and can be typically described as:

- Topsoil: sandy and silty, brown, only at test pits near Enterprise Ave and Charnwood Ave, 0.15-0.20m
- Sandy FILL: fine to medium grained, orange, dark grey, pale orange/brown and grey to dark grey; inter-bedded with dry, medium dense to very dense sand; 0.8-1.8m
- SAND: fine to medium grained; pale yellow/brown, grey and brown; dry to moist; medium dense to very dense; 0.15-5.9m
- LIMESTONE: fine to medium grained; pale yellow; variably cemented, 0.6-5.9m, although not encountered at the proposed Woolworths development site.

A classification of Class 'P' is judged to be appropriate for the site based on the presence of fill material across the site. In order to achieve a site classification of 'A', the site will need to be prepared in accordance with the Coffey site preparation specification:

- All organic materials and uncontrolled fill to depths varying up to 0.25m should be stripped and stockpiled.
- Black plastic lining found in several test pits in the area of the abandoned superficial lakes should be removed from the site.

- Uncontrolled fill primarily located in the western and central parts of the site should be removed within the building footprints down to the natural sandy material and replaced with engineering fill to the founding level.

Pritchard Francis anticipate that JDSI will undertake the site remediation and bulk earthworks in a manner which achieves a site classification of 'A'.

An infiltration rate of 5m/day is anticipated, and stormwater detention structures will be located in the existing in-situ sand. Soakwells should not be located within 3.0m of footings.

2 Sewerage Reticulation

The Water Corporation Esinet data indicates that the Woolworths development area is located adjacent to the following sewer reticulation mains:

- Ø450mm existing glass reinforced plastic (GRP) sewer reticulation main located in the western verge of Lisford Ave, discharging to the south.
- Ø150mm existing PVC sewer reticulation main located in the southern verge of Azzurra St. This is a short 11m main that connects into the abovementioned Ø450mm GRP sewer, ultimately discharging south.

As part of the subdivision works, the JDSI sewer reticulation plan depicts that the Ø150mm existing PVC sewer within the southern verge of the northern road reserve will be removed and replaced with a new Ø225mm PVC reticulation main. The new sewer main will provide two Ø150mm lot connections into the Woolworths development site. A third lot connection will be provided within the northern verge of the southern road reserve.

3 Water Reticulation

The Water Corporation Esinet data indicates that the Woolworths development area is located in proximity to the following water reticulation mains:

- Ø150mm AC reticulation main located in the western verge of Enterprise Ave.
- Ø150mm PVC reticulation main located in the western verge of Lisford Ave.

As part of the subdivision works, the JDSI water reticulation plan shows that the abovementioned Ø150mm PVC main will be extended further south along Lisford Ave. Subsequently, a Ø150mm PVC main will also be constructed within the southern verge of the northern road reserve and link to the existing Ø150mm PVC in Enterprise Ave. It is anticipated that a future water and fire connection from this main can be utilised to service the Woolworths development.

Ultimately, Pritchard Francis anticipate that a water reticulation main will also be provided within the southern road reserve abutting the southern boundary of the Woolworths development, and a lot connection from this alternative main could also be utilised to service the Woolworths development.

Pritchard Francis do not have access to water pressure and flow test results. A hydraulic consultant will be required to assess each the development site in order to:

- Size the potable water and fire connections to the Woolworths development site.
- Review the water pressure and flow within the existing water mains to verify whether pumps and tanks are necessary to support the proposed Woolworths development.

4 Stormwater Drainage

4.1 City of Wanneroo Drainage Infrastructure

The City of Wanneroo stormwater drainage data indicates that the Woolworths development area is located in proximity to the following stormwater assets:

- Stormwater pit and pipe system located in the eastern verge of Lisford Ave. The JDSI stormwater drainage layout plan also depicts this data with additional invert levels and pipe sizes.

As part of the subdivision works, the JDSI drainage layout plan shows that a Ø300mm stormwater pit and pipe system will be constructed in the southern verge of the northern road reserve, discharging west towards a temporary basin. Pritchard Francis understand that the temporary basin will be ultimately be replaced with a POS abutting the western boundary of the Woolworth development, adjacent to the loading dock / service yard.

Pritchard Francis anticipate that a stormwater drainage pit and pipe network will also be installed within 'Road 3' abutting the southern boundary of the Woolworths development, discharging west towards the ultimate POS.

4.2 City of Wanneroo Drainage Requirements

The City of Wanneroo requires that stormwater drainage infrastructure for private, commercial properties cater for storm events up to the 1:100 ARI / 1% AEP 24-hour event, however the UWMP which is yet to be endorsed by the City of Wanneroo nominates that the development site only needs to detain a 20% AEP of 24 hour duration.

Given that Pritchard Francis will be able to implement an overland flow path to the north western corner of the site, we will not need to design for the critical storm event.

Pritchard Francis anticipates that stormwater drainage for this site will be retained on site and infiltrated via localised soakwells or detention cells.

5 Gas Supply

A Dial Before You Dig investigation indicates that there is existing gas infrastructure within the vicinity of the proposed Woolworths development as below:

- Ø225mm PE high pressure 700 kPa rated main, located within the eastern verge of Lisford Ave.

Pritchard Francis do not have access to any proposed gas design drawings. However, as part of the subdivision works, it is anticipated that a gas service will be constructed on the same alignment as the water reticulation main within the northern and southern road reserves. As such, it is expected that the Woolworths development site will be serviced via this new gas main.

6 Electrical Supply

A Dial Before You Dig investigation indicates there is existing power infrastructure within the vicinity of the proposed Woolworths development as below:

- High Voltage main (overhead) located within the eastern verge of Lisford Ave.
- Low Voltage main (overhead) located within the eastern verge of Lisford Ave.
- Low Voltage main (underground) located within the eastern verge of Enterprise Ave.
- Low Voltage main (underground) located within the eastern verge of Lisford Ave.
- Streetlighting located within the eastern verge of Enterprise Ave.
- Streetlighting located within the eastern verge of Lisford Ave.

Additionally, the JDSI power drawings include the following proposed services:

- Streetlighting located within the eastern verge of Enterprise Ave.
- Streetlighting located within the southern verge of the northern road reserve.
- 630kVA transformer and RMU site on the eastern boundary of the site, with high voltage underground cables connecting to the existing high voltage mains in the eastern verge of Lisford Ave.

The proposed 630kVA transformer site will be located at the Lisford Ave verge level, whilst the commercial tenancies on the eastern boundary of the Woolworths development site are likely to be set 2m above the verge level. Fire protection of the tenancies within close proximity to the transformer will need to be considered.

Based on past experience with Woolworths developments, it is anticipated that a 1 MVA substation including a HV switchgear and site main switchboard (SMSB) will be required to service the proposed development.

The Western Power Network Capacity Mapping Tool indicates that the land development area is fed by the Yanchep substation. The remaining capacity on the network is between 20-25 MVA – there should be sufficient capacity to service the Woolworths development. An electrical engineering consultant will be required to confirm the remaining capacity and any other potential upgrades required to facilitate the development.

7 Communications

A Dial Before You Dig investigation indicates that there is existing communications infrastructure within the vicinity of the proposed Woolworths development as below:

- NBN pit and pipe network (Ø100 mm, P3 pits) located within the eastern verge of Lisford Ave.
- Telstra pit and pipe network (Ø50 mm, D pits) located within the eastern verge of Lisford Ave.
- Various Telstra conduits and pits located within the abandoned Atlantis Marine Park.

There is also an existing Ø50mm Telstra lead-in to the western portion of the development site. It is anticipated that these connections were previously utilised for the abandoned Atlantis Marine Park development. Advice from NBN will need to be requested to confirm the extents of the removal/relocation of these existing services and/or if these connections can be utilised to facilitate the Woolworths development.

Additionally, the JDSI communications drawings include the following proposed services:

- NBN pit and pipe network (Ø100 mm, P5 pits) located within the western verge of Enterprise Ave.
- NBN pit and pipe network (Ø100 mm, P5 pits) located within the southern verge of the northern road reserve.

Furthermore, a Ø50mm lot connection has been provided at the northeast corner of the site. It is anticipated that this connection would be utilised to facilitate the Woolworths development. Ideally, the communications lot connection would be relocated by JDSI to the far western boundary of the development site to be in close proximity to the Woolworths box.

8 Conclusion

This report outlines the geotechnical conditions, existing road reserves and services supporting the proposed Woolworths development on Lismore Ave and Azzurra St. A geotechnical investigation has been completed, and the site is founded on sand, and is therefore geotechnically suitable for development. Pritchard Francis confirm that, based on the proposed JDSI subdivision works, the site is accessible and can be serviced with water, sewer, gas, stormwater drainage, electrical and communications infrastructure, and that additional service support may be required due to the increase in demand as a result of the proposed development.

Yours sincerely

JAMIE DE PALMA
Project Director - Civil
Perth

20-272.1

1 November 2021

Ms Alicia Jones
Fabcot Pty Lty
135 Kewdale Road
KEWDALE WA 6105

Dear Alicia

Woolworths Two Rocks – Civil Design Certification

We confirm that we have carried out the civil design for the above project for the roads and car parks in accordance with the requirements of Austroads and relevant Australian Standards.

The stormwater drainage design for the development has been undertaken in accordance with the City of Wanneroo requirements to contain a 100 ARI (1% AEP) event of 24 hour duration.

With a development area of 16,950m^2 including future south-eastern pad site, it is proposed that all stormwater be contained on site via 80 soakwells of Ø1800mm by 1800mm depth, which will provide an on-site detention of 366.4m^3.

We confirm a Geotechnical Consultant has undertaken a site investigation and the subsurface profile will be suitable for on site detention and infiltration, with an anticipated permeability rate of 5m/day.

The civil drawings adequately convey the intent of the civil design and are numbered as follows:

Drawing No.	Drawing Title	Rev
20272-C8-DG-03	Civil DA Plans	B

Please contact our office should you require further information.

Yours sincerely

JAMIE DE PALMA
Project Director - Civil
Perth

Geotechnical Data - Douglas Partners 13 August 2021

5 sets of infiltration tests undertaken returned values all in excess of 19m/day.

Utilise 5m/day for stormwater detention calculations.

Geotechnical Data - Coffey 24 May 2006

Typical subsurface profile

- Topsoil varies from 0.15-0.20m
- Sandy Fill varies from 0.8m - 1.8m
- Sand varies from 0.15m to 5.9m
- Limestone varies from 0.6m to 5.9m

Bulk Earthworks

Typically will require several metres of clean fill to achieve the desired pad level, therefore existing limestone will not impact the performance of the stormwater network.

Stormwater Calculations in accordance with anticipated geotechnical conditions

Stormwater Event: City of Wanneroo 100 ARI (1% AEP) of 24 Hour Duration

Development Impervious Area incl future pad site = 16,950 m2
Equivalent Impervious Area (@ 0.95) = 16,102 m2
Assumed permeability rate = 5m/day

Volume of a dia 1800mm x 1800mm deep soakwell = 4.58m3

Infiltration of a dia 1800mm x 1800mm deep soakwell
= πr2 + 2πrh@25%
= πx0.9x0.9 + 2πx0.9x1.8x0.25
= 5.09m2 of permeability area

Infiltration achieved for one soakwell
= 5.09m2 @ 5m/day
= 25.45m3/day of infiltration
Soakwell capacity over 24 hours = volume + infiltration = 30.03m3 per day

Stormwater Volume
= CIA/3600
= 0.95 x 6.17 x 16,950 / 3600
= 27.59 L/s
= 2,384.4 m3 over 24 hours

2,384.4 m3 / 30.03m3 = 80 (79.40) soakwells required to service the site.

SITE PLAN

1 : 500

0 5 10 15 20

1:500

DA ISSUE

ISSUED FOR DEVELOPMENT APPROVAL

Rev.	Amendment	Date
A	FOR INFORMATION	24/11/20
B	FOR INFORMATION	17/02/21
C	FOR INFORMATION	05/03/21
D	FOR INFORMATION	09/03/21
E	FOR CLIENT ISSUE	18/03/21
F	FOR INFORMATION	19/03/21
G	FOR INFORMATION	23/03/21
H	FOR CLIENT REVIEW	25/06/21
J	DRP PRESENTATION	08/07/21
K	DRP PRESENTATION 2	20/07/21
L	ISSUE FOR REVIEW	16/08/21
M	ISSUE FOR REVIEW	01/09/21
N	FOR REVIEW	09/09/21
P	FOR REVIEW	13/09/21
Q	FOR REVIEW	14/09/21
R	FOR CLIENT APPROVAL	17/09/21
S	FOR CLIENT APPROVAL	06/10/21
T	DA ISSUE	15/10/21

WOOLWORTHS SITE

TOTAL SITE AREA	16929m2
SITE AREA	15227m2
WOOLWORTHS (WITH EXPANSION)	3600m2
WOOLWORTHS (WITHOUT EXPANSION)	2942m2
FUTURE EXPANSION - INCL. OFFICE MEZZANINE	658m2
CAFE	85m2
SPECIALTY 1 (LIQUOR)	200m2
SPECIALTY 2	82m2
SPECIALTY 3	78m2
SPECIALTY 4	151m2
RETAIL / COMMERICAL	595 m2
TOTAL AREA	**4791m2**
PARKING REQUIRED WW - 5 BAYS/100m2 GLA	**240 BAYS**

FUTURE PAD SITE

SITE AREA	1702 m2

PARKING PROVIDED

GENERAL	226 BAYS
STREET PARKING	10 BAYS
PICKUP	6 BAYS
TOTAL	**242 BAYS**

pritchard francis
civil and structural engineering consultants

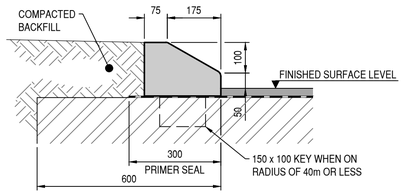
BROWN FALCONER
9/300 Rokeby Road, Subiaco, Western Australia 6004
Telephone : 08 6382 0303 ABN 65 007 846 586
brownfalconer.com.au

FABCOT PTY LTD

WOOLWORTHS TWO ROCKS

SITE PLAN

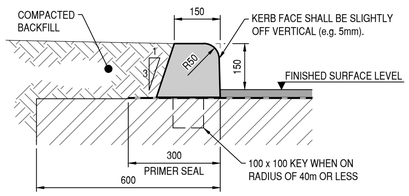
Scale	As indicated		
Drawn	DF	Checked	MJ
Date	15/10/21		
Job No.	2020050		
Dwg No.	**3353 02**	Rev:	**T** A1 SHEET



TYPICAL SEMI-MOUNTABLE KERB DETAIL

SCALE 1:10 0m 200mm 400mm

NOTE: ALL RADII ARE 20mm U.S.O.



TYPICAL BARRIER KERB DETAIL

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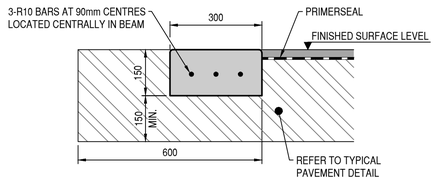
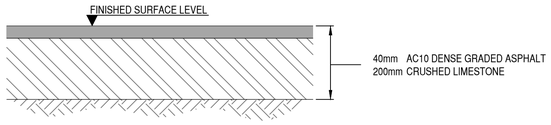


TYPICAL FLUSH KERB DETAIL

SCALE 1:10 0m 200mm 400mm

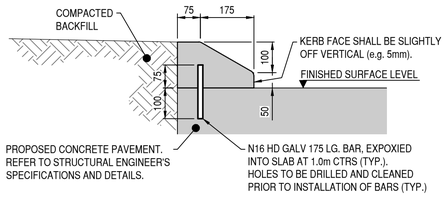
NOTE: ALL RADII ARE 10mm U.S.O.



TYPICAL CARPARK PAVEMENT DETAIL

SCALE 1:10 0m 200mm 400mm

NOTE:
THE CONTRACTOR SHALL CONSTRUCT PAVEMENT IN ACCORDANCE WITH AS2150 AND CIVIL SPECIFICATIONS AND DETAILS



TYPICAL SEMI-MOUNTABLE KERB CONCRETE PINNING DETAIL

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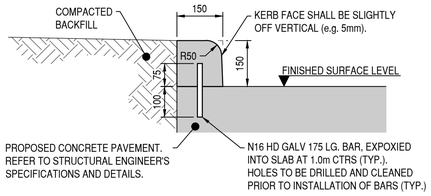
NOTE: ALL RADII ARE 20mm U.S.O.



TYPICAL BARRIER KERB CONCRETE PINNING DETAIL

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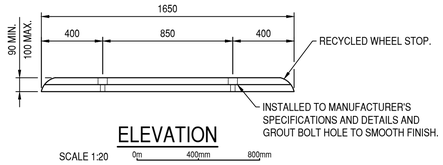
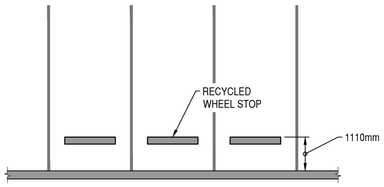
NOTE: ALL RADII ARE 50mm U.S.O.



ELEVATION

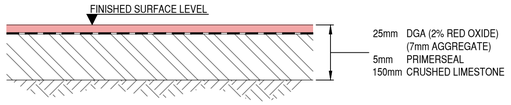
SCALE 1:20 0m 400mm 800mm



PLAN VIEW

TYPICAL RECYCLED WHEEL STOP DETAIL

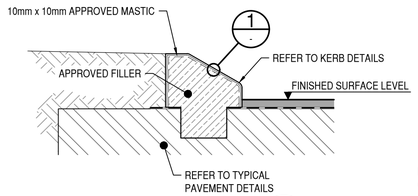
SCALE 1:100 0m 2m 4m



TYPICAL PSP PAVEMENT DETAIL

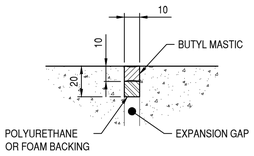
SCALE 1:10 0m 200mm 400mm

NOTE:
THE CONTRACTOR SHALL CONSTRUCT PAVEMENT IN ACCORDANCE WITH AS2150 AND CIVIL SPECIFICATIONS AND DETAILS



SECTION A

SCALE 1:10 0m 100mm 200mm

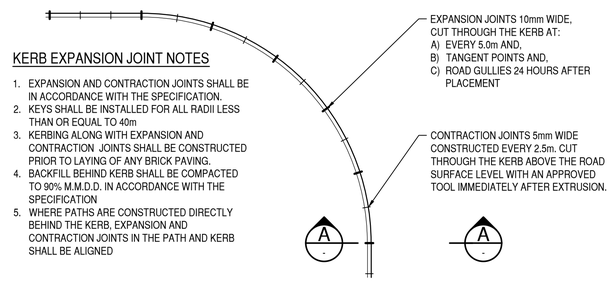


DETAIL 1

SCALE 1:2 0m 20mm 40mm

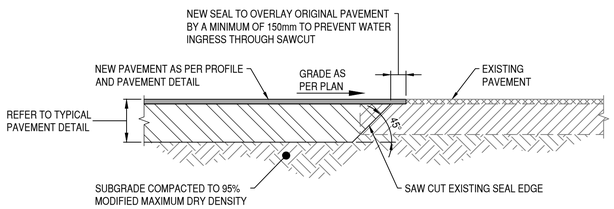
KERB EXPANSION JOINT NOTES

1. EXPANSION AND CONTRACTION JOINTS SHALL BE IN ACCORDANCE WITH THE SPECIFICATION.
2. KEYS SHALL BE INSTALLED FOR ALL RADII LESS THAN OR EQUAL TO 40m
3. KERBING ALONG WITH EXPANSION AND CONTRACTION JOINTS SHALL BE CONSTRUCTED PRIOR TO LAYING OF ANY BRICK PAVING.
4. BACKFILL BEHIND KERB SHALL BE COMPACTED TO 90% M.M.D.D. IN ACCORDANCE WITH THE SPECIFICATION
5. WHERE PATHS ARE CONSTRUCTED DIRECTLY BEHIND THE KERB, EXPANSION AND CONTRACTION JOINTS IN THE PATH AND KERB SHALL BE ALIGNED



KERB EXPANSION JOINT AND CRACK CONTROL DETAILS

SCALE 1:200 0m 4m 8m



TYPICAL SAW CUT DETAIL

SCALE 1:20 0m 400mm 800mm

ACCESIBLE PARKING SPACE NOTES

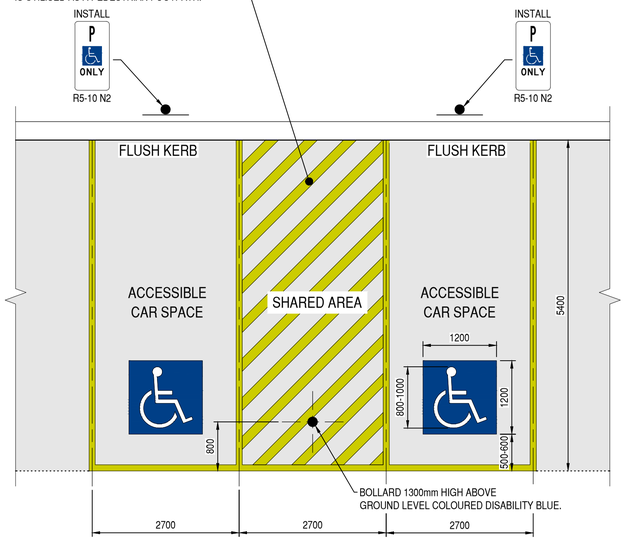
SPACE IDENTIFICATION
EACH DEDICATED SPACE SHALL BE IDENTIFIED BY MEANS OF A WHITE SYMBOL OF ACCESS IN ACCORDANCE WITH AS1428.1 BETWEEN 800mm AND 1000mm HIGH PLACED ON A BLUE RECTANGLE WITH NO SIDE MORE THAN 1200mm, PLACED AS A PAVEMENT MARKING IN THE CENTRE OF THE SPACE BETWEEN 500mm AND 600mm FROM ITS ENTRY POINT AS ILLUSTRATED.

SPACE DELINEATION
PAVEMENT MARKINGS SPECIFIED IN ITEMS (A) AND (B) OF THIS CLAUSE SHALL BE YELLOW AND SHALL HAVE A SLIP RESISTANT SURFACE. RAISED PAVEMENT MARKERS SHALL NOT BE USED FOR SPACE DELINEATION.

PAVEMENT MARKINGS SHALL BE PROVIDED AS FOLLOWS:

1. LINEMARKING:
   - 1.1. DEDICATED PARKING SPACES SHALL BE OUTLINED WITH UNBROKEN LINES 80 TO 100mm WIDE ON ALL SIDES EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL.
2. SHARED AREAS SHALL BE MARKED AS FOLLOWS:
   - 2.1. WALKWAYS WITHIN OR PARTLY WITHIN A SHARED AREA SHALL BE MARKED WITH UNBROKEN LONGITUDINAL LINES ON BOTH SIDES OF THE WALKWAY EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL.
   - 2.2. OTHER VACANT NON-TRAFFICKED AREAS, WHICH MAY BE INTENTIONALLY OR UNINTENTIONALLY OBSTRUCTED (E.G. BY UNINTENDED PARKING), SHALL BE OUTLINED WITH UNBROKEN LINES 80mm TO 100mm WIDE ON ALL SIDES EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL, AND MARKED WITH DIAGONAL STRIPES 150mm WIDE WITH SPACES 300mm BETWEEN STRIPES. THE STRIPES SHALL BE AT AN ANGLE OF 45° TO THE SIDE OF THE SPACE.
   - 2.3. NO SHARED AREA MARKINGS SHALL BE PLACED IN TRAFFICKED AREAS.
   - 2.4. ALL LINEMARKING MUST BE NON SLIP.
3. BOLLARDS:
   - 3.1. MINIMUM HEIGHT 1300mm.
   - 3.2. RECOMMENDED COLOUR BLUE TO CONTRAST AGAINST YELLOW LINE MARKING.

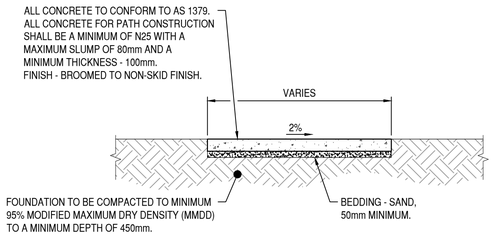
SHARED AREA DIAGONAL LINE MARKING TO BE IMPLEMENTED IF SHOWN ON ROADWORK DRAWINGS. CONTRACTOR SHALL NOT APPLY DIAGONAL LINE MARKING WHEN SHARED AREA IS UTILISED AS A PEDESTRIAN FOOTPATH.



PERPENDICULAR ACCESSIBLE CAR PARKING SPACES IN ACCORDANCE WITH AS2890.6

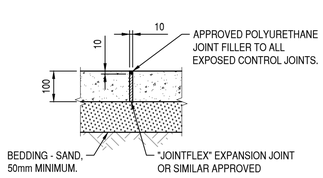
SCALE 1:50 0m 1m 2m

pritchard francis
civil and structural engineering consultants



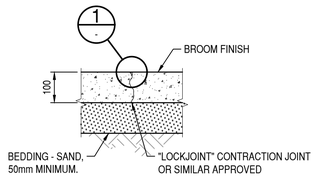
CONCRETE PATH SECTION

SCALE 1:25 0m 0.5m 1.0m



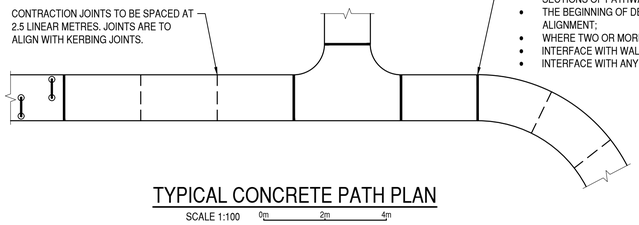
EXPANSION JOINT

SCALE 1:10 0m 200mm 400mm



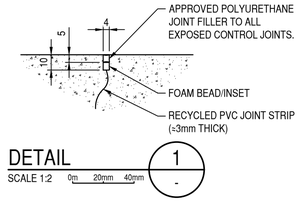
CONTRACTION JOINT

SCALE 1:10 0m 200mm 400mm



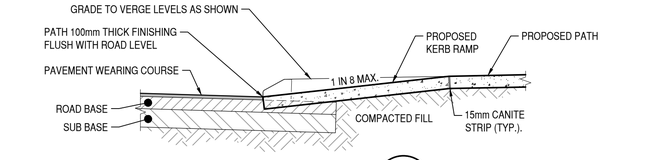
TYPICAL CONCRETE PATH PLAN

SCALE 1:100 0m 2m 4m



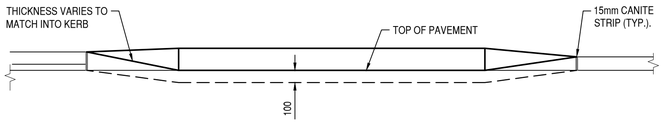
DETAIL 1/-

SCALE 1:2 0m 20mm 40mm



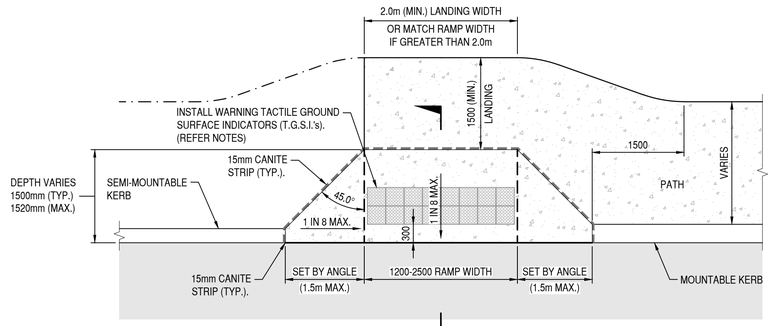
SECTION A/-

SCALE 1:25 0m 250mm 500mm



FRONT ELEVATION

SCALE 1:25 0m 0.5m 1.0m



PLAN

TYPICAL KERB RAMP DETAIL

SCALE 1:50 0m 1m 2m

NOTES

1. ALL CONCRETE TO BE A MINIMUM OF 25MPa, 20mm AGGREGATE AND A MAXIMUM SLUMP OF 80mm, FROM AN APPROVED PRE-MIX BATCH PLANT
2. MINIMUM THICKNESS - 100mm.
3. BEDDING - SAND, 50mm MINIMUM.
4. FINISH - BROOMED TO NON-SKID FINISH PARALLEL TO LINE OF KERB WITH TOOLED EDGES
5. EXPANSION JOINTS - APPROVED MATERIAL SHALL BE EXPANDITE-FLEXICELL.
6. TACTILE GROUND SURFACE INDICATORS (T.G.S.I.'s) SHALL BE IN ACCORDANCE WITH AS1428.1 AND AS1428.4.
7. CONTRACTOR TO INSTALL 2x ROWS OF TERRACOTTA WARNING T.G.S.I.'s (ADHESIVE TYPE) FOR FULL WIDTH OF CONCRETE KERB RAMP.
8. WARNING TGSI's ARE NOT TO BE CUT. CONTRACTOR SHALL SELECT SUITABLE SIZE TO EXTEND ACROSS FULL WIDTH OF KERB RAMP (EXCLUDING SPLAYS).
9. WHERE THE KERB RAMP IS CONSTRUCTED USING BLOCK PAVERS, THE CONTRACTOR SHALL INSTALL TGSI PAVERS IN A CONTRASTING COLOUR CONFORMING WITH AS1428.4 LUMINANCE REQUIREMENTS.

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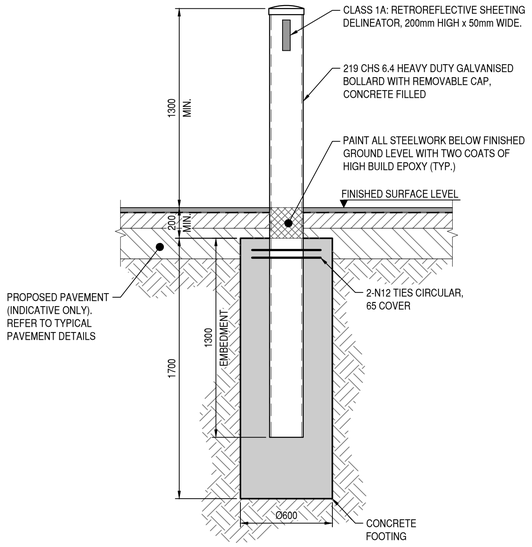
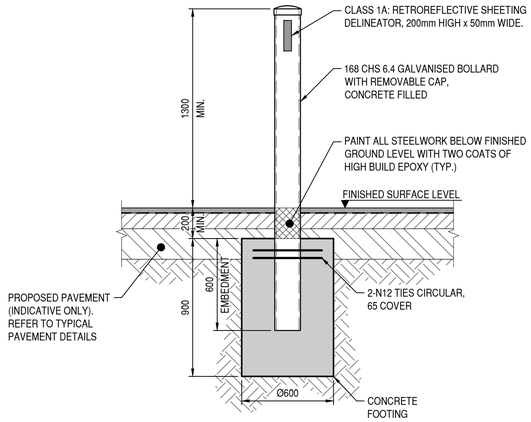


TYPICAL HEAVY DUTY BOLLARD DETAIL

SCALE 1:20 0m 400mm 800mm

NOTES

1. THE BOLLARD SHALL COMPLY WITH AS3845.
2. BOLLARD DESIGNED FOR 30kN LIGHT VEHICLE IMPACT BARRIER IN ACCORDANCE WITH AS1170.1 BARRIER LOADS.
3. REFER TO THE ARCHITECT'S DOCUMENTATION FOR LOCATIONS AND HEIGHTS.

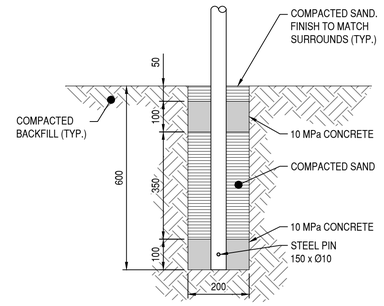


TYPICAL BOLLARD IN ASPHALT PAVEMENT DETAIL

SCALE 1:20 0m 400mm 800mm

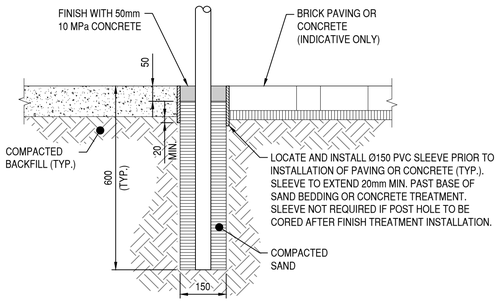
NOTES

1. THE BOLLARD SHALL COMPLY WITH AS3845.
2. BOLLARD DESIGNED FOR 10kN INCIDENTAL LOAD ONLY. NOT DESIGNED TO AS1170.1 BARRIER LOADS.
3. REFER TO THE ARCHITECT'S DOCUMENTATION FOR LOCATIONS AND HEIGHTS.



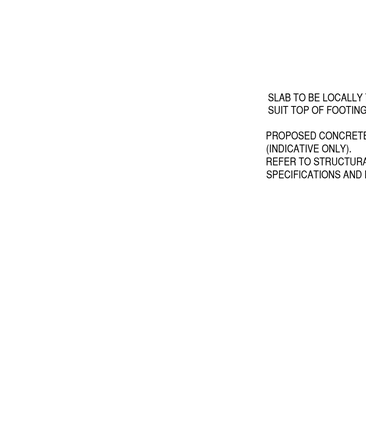
FOOTING DETAIL

GENERAL / VERGE



FOOTING DETAIL

TRAFFIC ISLAND, PATH OR OTHER PAVED / SURFACED AREA



TYPICAL BOLLARD IN CONCRETE PAVEMENT DETAIL

SCALE 1:20 0m 400mm 800mm

NOTES

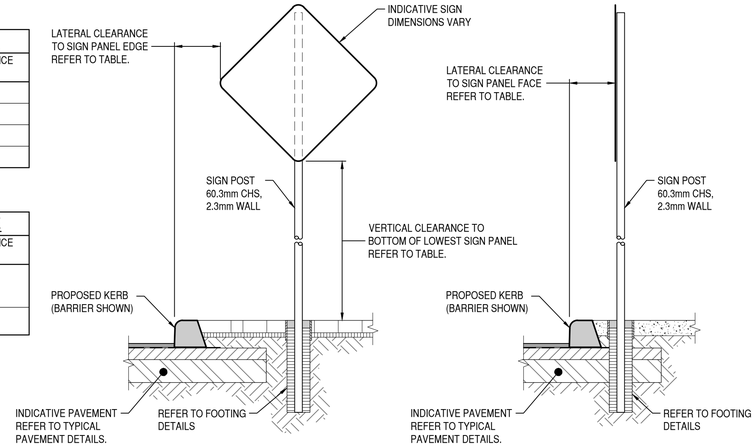
1. THE BOLLARD SHALL COMPLY WITH AS3845.
2. BOLLARD DESIGNED FOR 10kN INCIDENTAL LOAD ONLY. NOT DESIGNED TO AS1170.1 BARRIER LOADS.
3. REFER TO THE ARCHITECT'S DOCUMENTATION FOR LOCATIONS AND HEIGHTS.

SIGN PANEL LATERAL CLEARANCE

KERB TYPE	MIN. CLEARANCE (mm)
BARRIER KERB	300
SEMI-MOUNTABLE KERB	500
MOUNTABLE KERB	500
UNKERBED	2000

SIGN PANEL VERTICAL CLEARANCE

DESIGN SCENARIO	MIN. CLEARANCE (mm)
LOCATED IN UNPAVED VERGE - FROM VERGE LEVEL - FROM PAVEMENT LEVEL	 2000 2200
WHEN OVER HANGING OR LOCATED WITHIN FOOTWAY	2500



TYPICAL ROAD SIGN CLEARANCE AND FOOTING DETAILS

SCALE 1:10 0m 200mm 400mm

NOTES

1. LOCAL AUTHORITY OR CLIENT SPECIFICATIONS AND DETAILS TAKE PRECEDENCE.
2. DETAIL FOR USE IN WIND REGIONS 'A' AND 'B' ONLY. FOOTINGS FOR WIND REGIONS 'C' AND 'D' SHALL BE STRUCTURALLY ENGINEERED.
3. SIGN INSTALLATION SHALL COMPLY WITH AS2890 SERIES AND AS1742 SERIES
4. IF LOCATED WITHIN ROAD RESERVE, SIGN INSTALLATION SHALL COMPLY WITH MAIN ROADS W.A. SPECIFICATIONS AND DETAILS.

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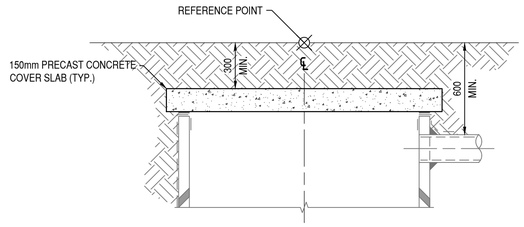
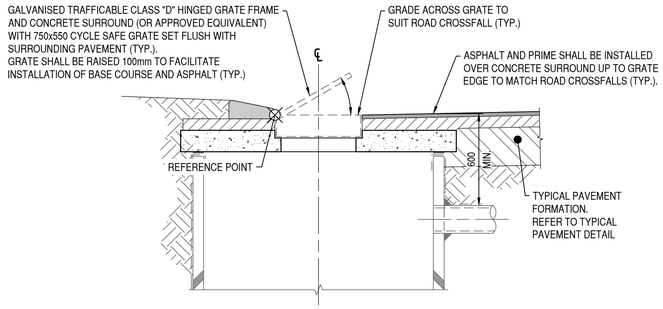


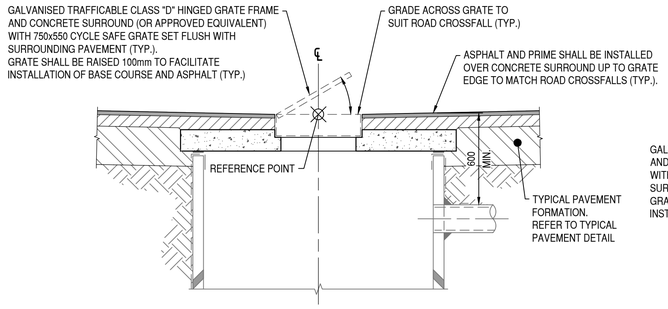
TYPICAL BURIED LID DETAIL

SCALE 1:20 0m 400mm 800mm



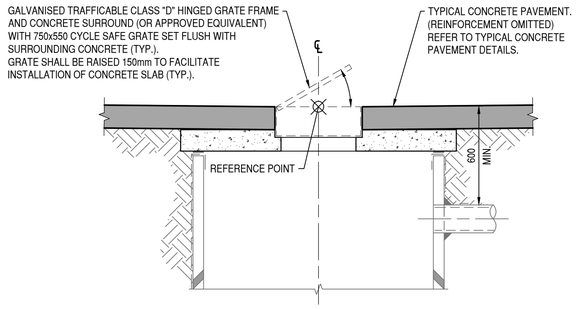
TYPICAL GULLY GRATE ON KERB LID DETAIL WITH ASPHALT PAVEMENT

SCALE 1:20 0m 400mm 800mm



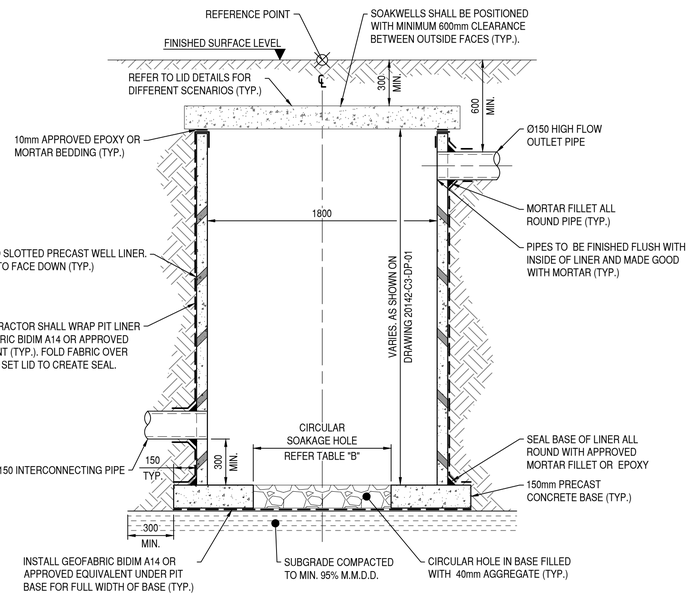
TYPICAL INVERTED GULLY GRATE LID DETAIL WITH ASPHALT PAVEMENT

SCALE 1:20 0m 400mm 800mm



TYPICAL INVERTED GULLY GRATE LID DETAIL WITH CONCRETE PAVEMENT

SCALE 1:20 0m 400mm 800mm



TYPICAL INTERCONNECTED SOAKWELL DETAIL

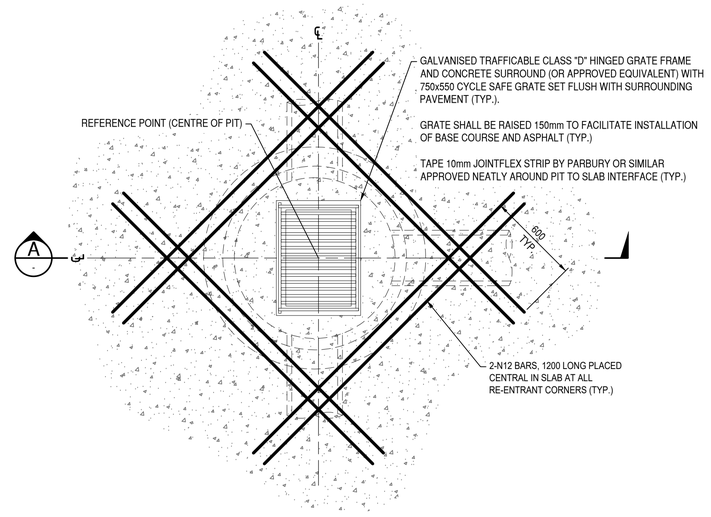
SCALE 1:20 0m 400mm 800mm

STORMWATER PIT NOTES

1. ALL INSITU CONCRETE SHALL BE CLASS N32 IN ACCORDANCE WITH A1379.
2. ALL INSITU CONCRETE CORNERS SHALL HAVE A 20mm CHAMFER UNLESS OTHERWISE NOTED.
3. CEMENT MORTAR SHALL CONSIST OF ONE PART CEMENT AND THREE PARTS SAND.
4. SL81 REINFORCEMENT SHALL CONFORM WITH HARD DRAWN FABRIC TO AS4671.
5. MINIMUM CLEAR COVER TO REINFORCEMENT SHALL BE 50mm.
6. THE LINER SHALL BE REINFORCED CONCRETE MANUFACTURED TO AS4058.
7. THE MAXIMUM INLET/OUTLET PIPE OUTSIDE DIAMETER SHALL BE LESS THAN 60% OF THE LINER INTERNAL DIAMETER.
8. MINIMUM OF 40% OF LINER SHALL REMAIN IN ANY HORIZONTAL PLANE.
9. MINIMUM INTERNAL LINER SPACE OF 200mm BETWEEN PUNCHED/CUT HOLES.
10. HOLES TO BE CUT/PUNCHED ON ACCORDANCE WITH MANUFACTURER'S SPECIFICATION.
11. THE LINER SHALL HAVE EQUIVALENT PROPERTIES AND REINFORCEMENT OF CLASS 2 R.C.P. EXCEPT THAT THE REINFORCEMENT SHALL BE CIRCULAR.
12. COVERS SHALL BE CLASS 'D' TO AS3996.

TABLE B
DRAINAGE PIT BASE SOAKAGE HOLE SIZE

LINER SIZE MIN. (mm)	SOAKHOLE DIAMETER (mm)
1050	600
1200	600
1500	900
1800	1200



TYPICAL SLAB CAST-IN ITEM

SCALE 1:20 0m 400mm 800mm

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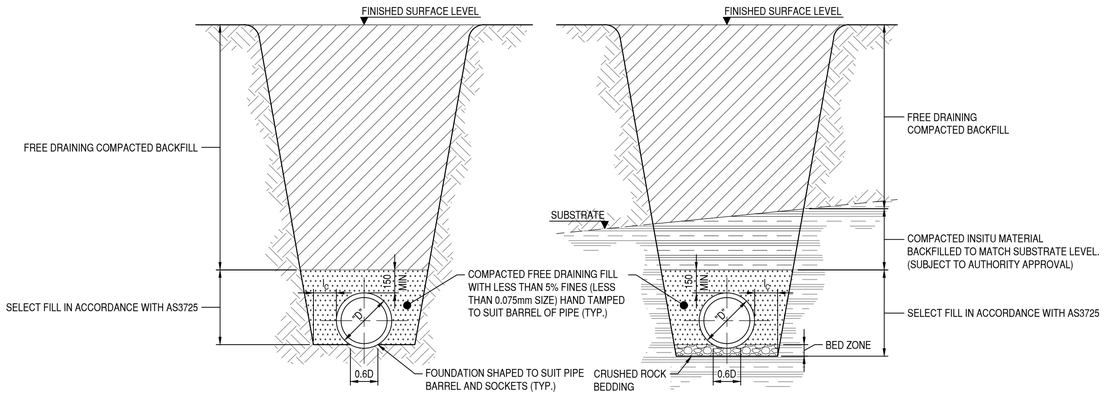


DRY CONDITIONS

WET CONDITIONS

TYPICAL CONCRETE PIPE TRENCH DETAILS (SUPPORT TYPE "U")

SCALE 1:20 0m 400mm 800mm

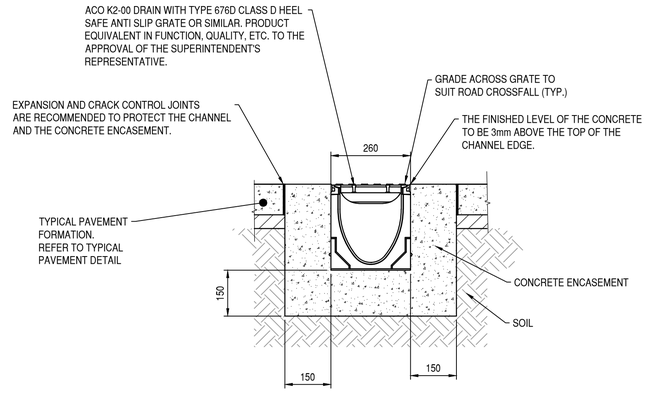
TRENCH DETAIL NOTES

1. ALL PIPE TRENCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AS3725 - DESIGN FOR INSTALLATION OF BURIED CONCRETE PIPES. SHOULD DISCREPANCIES EXIST, AS3725 TAKES PRECEDENCE.
2. DRY CONDITIONS SHALL BE SAND SOIL WHERE THE MAXIMUM PREDICTED GROUND WATER LEVEL (G.W.L.) IS A MINIMUM 300mm BELOW PIPE INVERT.
3. WET CONDITIONS SHALL BE CONSIDERED AS BEING IN ROCK, CLAY OR SAND WHERE THE MAXIMUM PREDICTED G.W.L. IS HIGHER THAN 300mm BELOW PIPE INVERT.
4. BEDDING CONDITION SHALL BE CARRIED PAST ALL MANHOLES, GULLIES & OTHER DRAINAGE STRUCTURES DOWNSTREAM.
5. WHERE PIPES HAVE PROTRUDING SOCKETS, SUITABLE RECESSES SHALL BE PROVIDED IN THE SUPPORTING MATERIALS TO ENSURE THAT THE PIPES DO NOT BEAR ON THE SOCKETS (TYP.)

MINIMUM BED ZONE DEPTHS	
SUPPORT TYPE	DEPTH (mm)
U	75
H / HS ≤ Ø1500	100
H / HS > Ø1500	150

MINIMUM SIDE CLEARANCE "L_C" (L_C = D/6 or 150, WHICHEVER IS GREATER)	
PIPE DIAMETER	L_C
≤600	150
>600 - ≤1200	200
>1200	D/6

NOTE:
THE MINIMUM L_C VALUES SHALL ONLY BE USED WHERE NECESSARY COMPACTION VALUES CAN BE ASSURED.



TYPICAL TRENCH GRATE

SCALE 1:10 0m 200mm 400mm

TRENCH DETAIL NOTES

1. ALL PIPE TRENCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AS3725 - DESIGN FOR INSTALLATION OF BURIED CONCRETE PIPES. SHOULD DISCREPANCIES EXIST, AS3725 TAKES PRECEDENCE.
2. DRY CONDITIONS SHALL BE SAND SOIL WHERE THE MAXIMUM PREDICTED GROUND WATER LEVEL (G.W.L.) IS A MINIMUM 300mm BELOW PIPE INVERT.
3. WET CONDITIONS SHALL BE CONSIDERED AS BEING IN ROCK, CLAY OR SAND WHERE THE MAXIMUM PREDICTED G.W.L. IS HIGHER THAN 300mm BELOW PIPE INVERT.
4. BEDDING CONDITION SHALL BE CARRIED PAST ALL MANHOLES, GULLIES & OTHER DRAINAGE STRUCTURES DOWNSTREAM.
5. WHERE PIPES HAVE PROTRUDING SOCKETS, SUITABLE RECESSES SHALL BE PROVIDED IN THE SUPPORTING MATERIALS TO ENSURE THAT THE PIPES DO NOT BEAR ON THE SOCKETS (TYP.)

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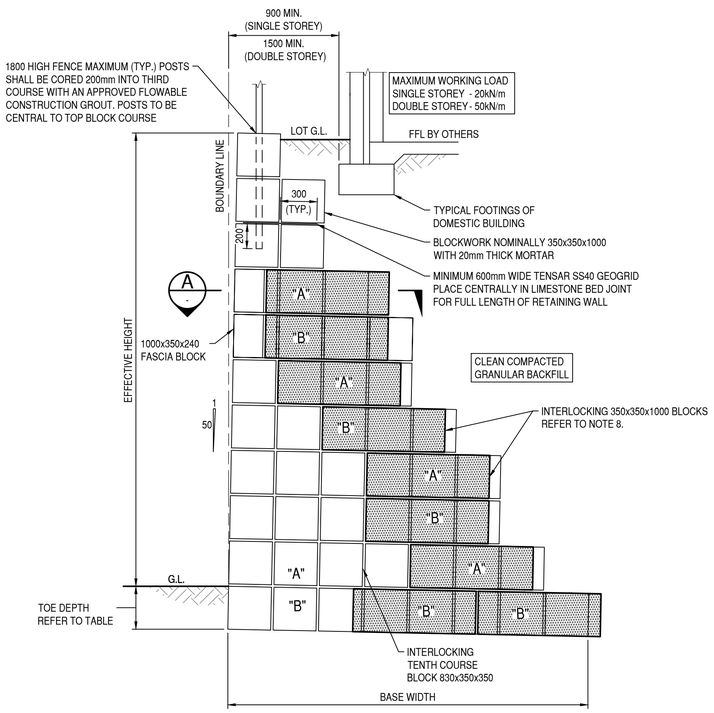
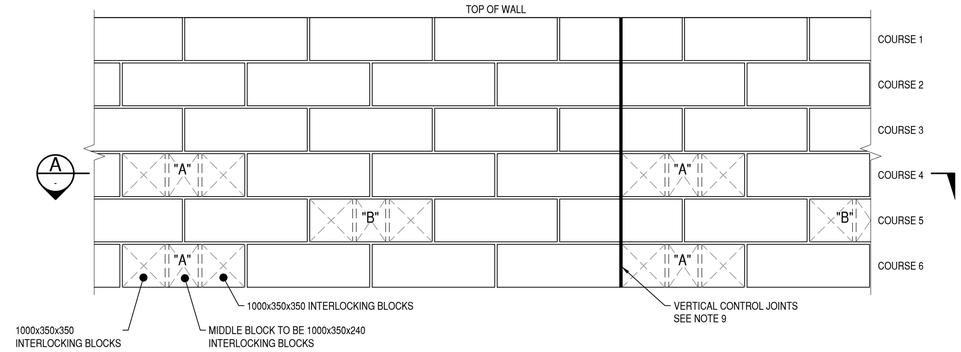


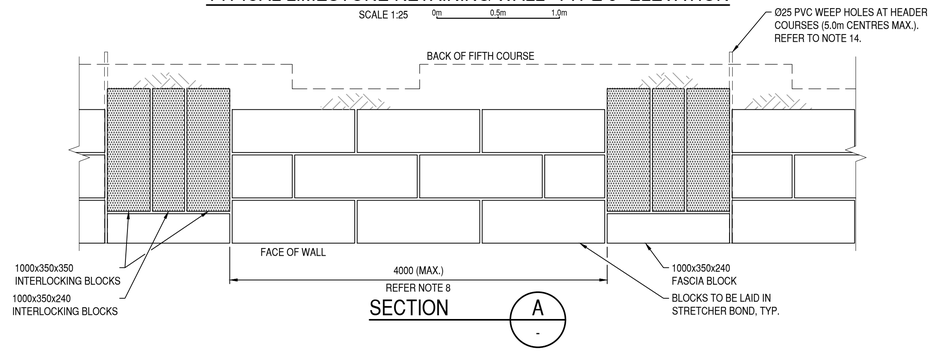
TYPICAL LIMESTONE RETAINING WALL DETAIL - TYPE 3 - CLASS "A"

SCALE 1:25 0m 0.5m 1.0m



TYPICAL LIMESTONE RETAINING WALL "TYPE 3" ELEVATION

SCALE 1:25 0m 0.5m 1.0m



TYPICAL LIMESTONE RETAINING WALL HEADER LAYOUT

PLAN SECTION FIFTH COURSE

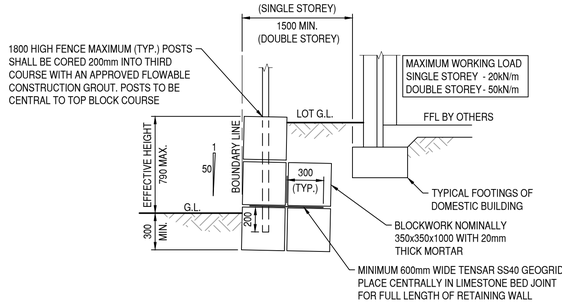
SCALE 1:25 0m 0.5m 1.0m

LIMESTONE RETAINING WALL AND FENCE NOTES

1. COMPACT GROUND UNDER FOOTING TO RESIST 8 BLOWS PER 300mm OF A STANDARD 16mm DIA PENETROMETER OVER A DEPTH OF 600mm
2. LIMESTONE BLOCKS TO BE A MINIMUM DENSITY OF 1500kg/m³ (DRY), RECONSTITUTED LIMESTONE BLOCKS TO BE A MINIMUM DENSITY OF 1800kg/m³ (DRY).
3. MORTAR MIX SHALL COMPRISE 1 PART WHITE CEMENT, 1 PART LIME PUTTY, AND 6 PARTS CLEAN YELLOW SAND OR 1 PART WHITE CEMENT, 0.5 PART LIME PUTTY AND 4.5 PARTS YELLOW SAND IF LESS THAN 1km FROM THE COAST. ALL BLOCK WORK SHALL BE FULLY MORTARED TO ADJACENT BLOCKS.
4. THESE WALLS ARE APPLICABLE FOR CLASS 'A' CONDITIONS ONLY TO AS 2870. ALL OTHER CONDITIONS TO BE REFERRED TO ENGINEER.
5. ALL RETAINING WALLS HAVE BEEN CALCULATED WITH A HORIZONTAL BACKFILL. ANY OTHER CIRCUMSTANCES TO BE ASSESSED INDIVIDUALLY.
6. THE RETAINING WALL HAS BEEN DESIGNED TO SUPPORT A 5kPa SURCHARGE.
7. INTERLOCKING BLOCK COURSING TO BE STAGGERED AS PER TYPICAL DETAIL.
8. WALL TO HAVE INTERLOCKING BLOCKS COMMENCING AT 4th COURSE FROM TOP, PERPENDICULAR TO FACING AT MAXIMUM 4m SPACING TO ACHIEVE INTERLOCK OF STRUCTURE.
9. WALLS SHALL HAVE VERTICAL CONTROL JOINTS AT INTERVALS OF NO MORE THAN 10 METRES FOR TYPE 1 WALLS, 15 METRES FOR TYPE 2 AND 3 WALLS, PREFERABLY LOCATED AT PROPERTY BOUNDARIES. JOINTS REQUIRED ALSO ON CORNERS AS PER ATTACHED DETAIL. JOINTS SHALL BE 20mm WIDE, BE FILLED WITH A 25mm CLOSED CELL FOAM AND SEALED WITH AN APPROVED POLYURETHANE JOINT FILLER.
10. NO BACKFILLING UNTIL 7 DAYS AFTER WALLS HAVE BEEN BUILT. COMPACT USING LIGHT EQUIPMENT TO DISTANCE BACK FROM THE FACE OF WALL EQUAL TO THE EFFECTIVE HEIGHT.
11. FENCE TO BE PROPRIETARY SYSTEM BY OTHERS - WALL DESIGNED FOR WIND REGION A ONLY.
12. FENCE POSTS SHALL BE AT 2400mm MAXIMUM CENTRES.
13. A NON SACRIFICIAL ANTI GRAFFITI COATING IS TO BE APPLIED TO WALLS FACING A ROAD, P.A.W. OR P.O.S.

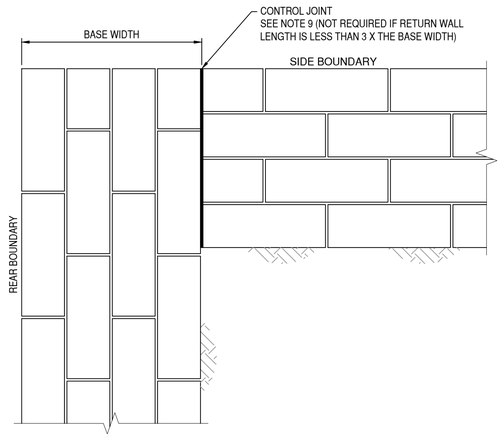
WALL TYPE "3"

COURSES	TOTAL HEIGHT	EFFECTIVE HEIGHT RANGE	BASE WIDTH	MIN. TOE DEPTH
4	1460	790 - 1110	1090	350
5	1830	1111 - 1480	1460	350
6	2200	1481 - 1850	1460	350
7	2570	1851 - 2170	1830	400
8	2940	2171 - 2540	2200	400
9	3310	2541 - 2810	2200	500
10	3680	2811 - 3180	2570	500
11	4050	3181 - 3550	2940	500



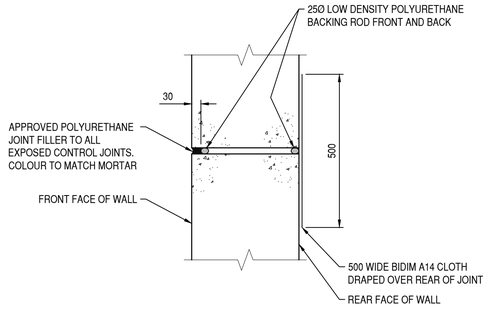
TYPICAL LIMESTONE RETAINING WALL DETAIL - TYPE 2 - CLASS "A"

SCALE 1:25 0m 0.5m 1.0m



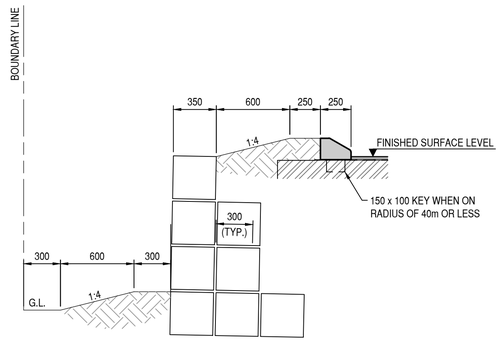
PLAN VIEW OF CORNER CONTROL JOINT LOCATION

SCALE 1:25 0m 0.5m 1.0m



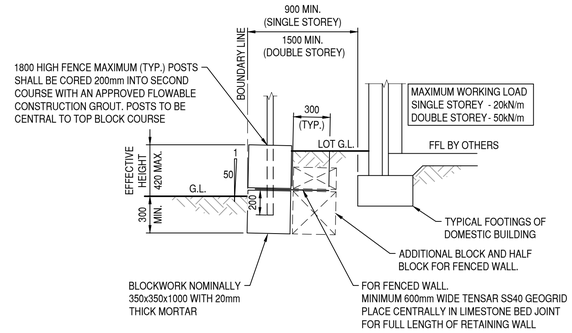
VERTICAL CONTROL JOINT DETAIL

SCALE 1:10 0m 200mm 400mm



SECTION

SCALE 1:25 0m 250mm 500mm



TYPICAL LIMESTONE RETAINING WALL DETAIL - TYPE 1

SCALE 1:25 0m 0.5m 1.0m

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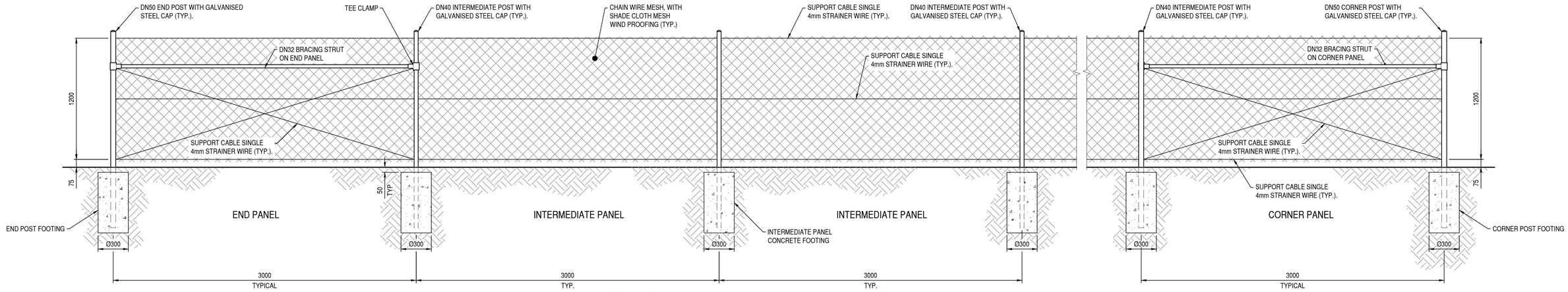
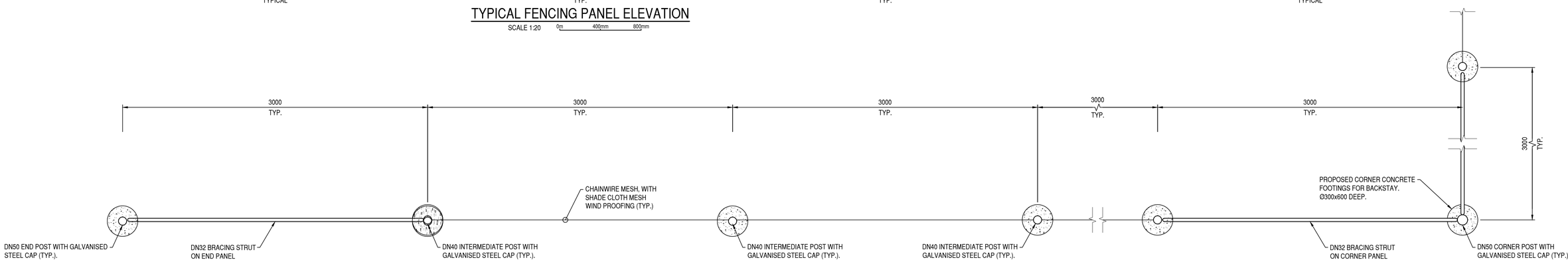


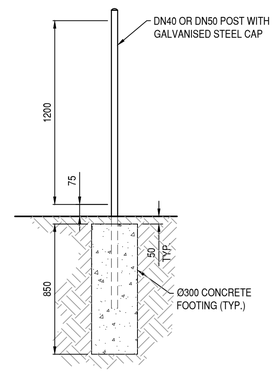
TYPICAL FENCING PANEL ELEVATION

SCALE 1:20 0m 400mm 800mm



TYPICAL FENCING PANEL PLAN SPACING

SCALE 1:20 0m 400mm 800mm



TYPICAL POST BACKSTAY SECTION

SCALE 1:20 0m 400mm 800mm

GENERAL NOTES

1. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED
2. ALL FENCING SHALL BE IN ACCORDANCE WITH AS1725.1-2010
3. FOR ALL FENCE MATERIAL CLASSES AND TREATMENTS AND CONCRETE CLASS AND DENSITY REFER TO SPECIFICATION AND/OR MANUFACTURER'S SPECIFICATIONS
4. COATING REQUIREMENTS FOR FENCE TYPE 1 CONSISTS OF THE FOLLOWING:
   - 4.1. CHAIN WIRE MESH - 1800 x 50 x Ø3.15 PVC COATED
   - 4.2. STRAINER WIRE - SINGLE Ø4.0 HELICOIL PVC COATED
   - 4.3. Ø2.0 MESH TIE WIRE - PVC COATED
   - 4.4. STEEL PIPE - GALVANISED
   - 4.5. PRESSED CAP - GALVANISED
   - 4.6. CLIP TEE - GALVANISED
5. THE CONCRETE FOOTINGS SHALL BE N25 CONCRETE.
6. 50% SHADE CLOTH POROSITY.

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