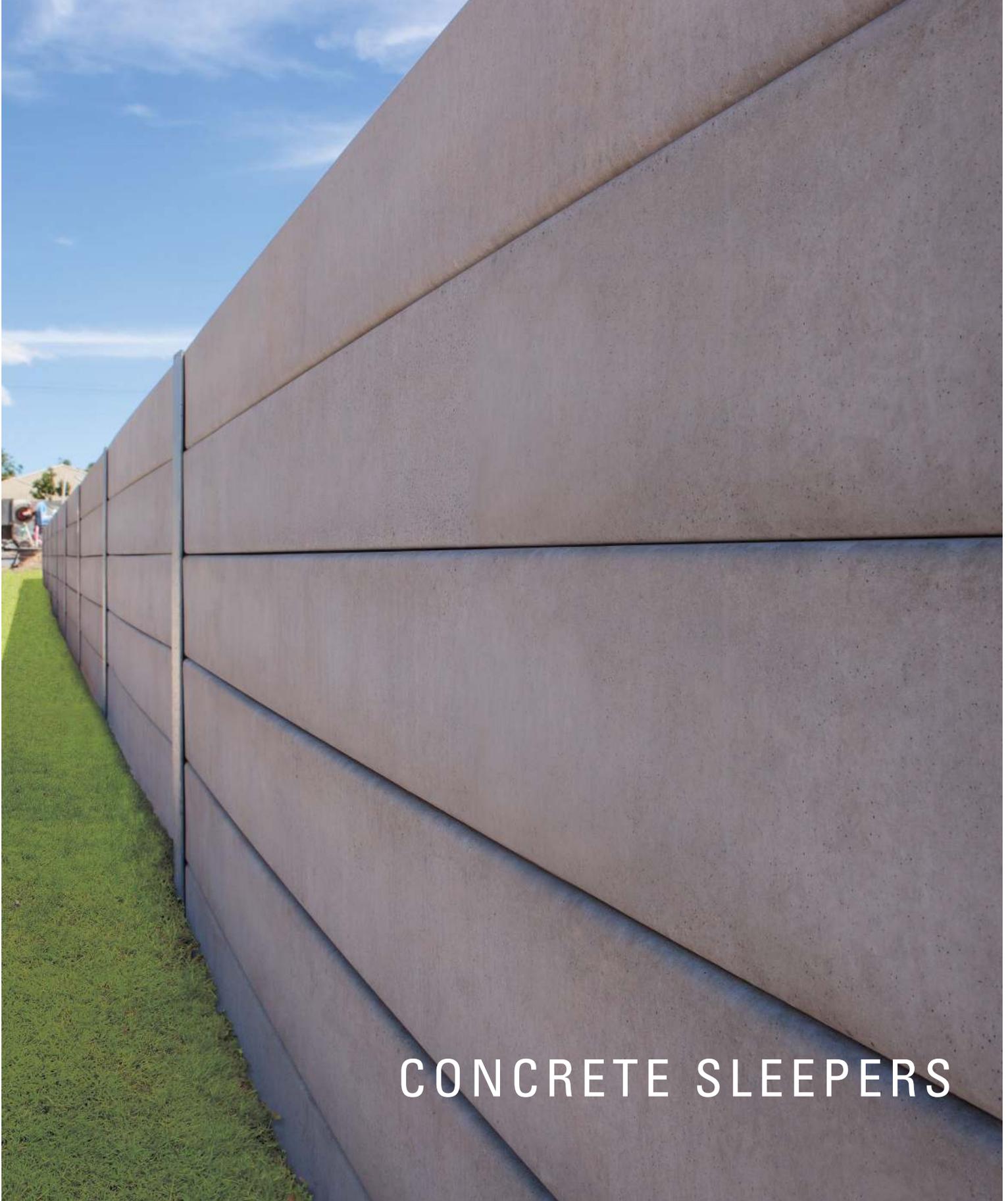


**adbri**MASONRY  
working together



CONCRETE SLEEPERS

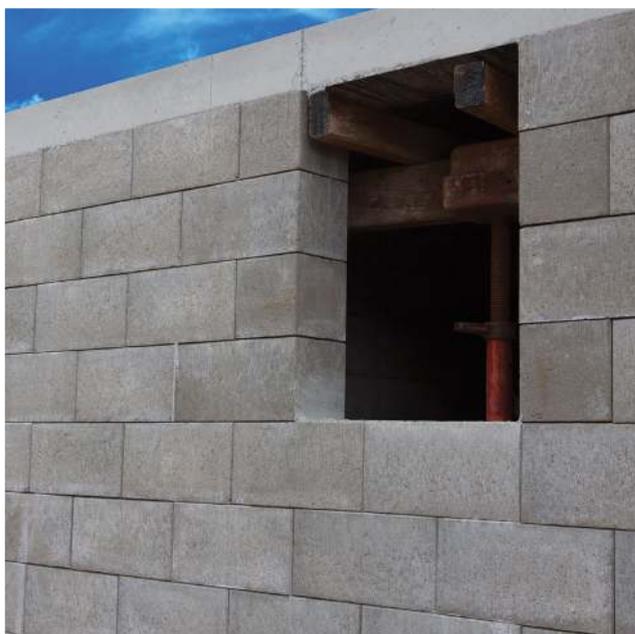
# Adbri Masonry

Adbri Masonry is Australia's leading masonry manufacturer supplying quality concrete bricks, blocks, pavers, retaining walls, erosion control products and architectural masonry solutions from 14 sites throughout New South Wales, Queensland, Victoria, South Australia and Tasmania. Adbri Masonry is a wholly owned subsidiary of Adelaide Brighton Limited, a leading integrated construction materials and lime producing group of companies and a member of the S&P/ASX 200 Index.

Adbri Masonry first produced concrete Besser™ blocks in 1957 and since then has traded as many household brand names including Besser, Rocla Pavers and Masonry, Pioneer Building Products, Hanson Building Products Pty Ltd and C&M Brick before rebranding as Adbri Masonry in 2009.

In addition to supplying a full collection of quality concrete building and landscaping products, there are a range of valuable benefits to working with Adbri Masonry including:

- ✓ Access to our Contracting Services Team (in-house design, supply, installation and certification team for commercial projects).
- ✓ Confidence that all product lines are tested for quality in our N.A.T.A accredited laboratory
- ✓ Our commitment to environmental sustainability and environmental building products.
- ✓ Support from experienced in-house engineers who can provide technical advice and design solutions for civil, commercial and industrial projects
- ✓ Service from dedicated architectural and engineering consultants
- ✓ The benefit of dealing with knowledgeable local sales teams
- ✓ The ability to create customised product and colour solutions specific to individual projects *(conditions apply)*.

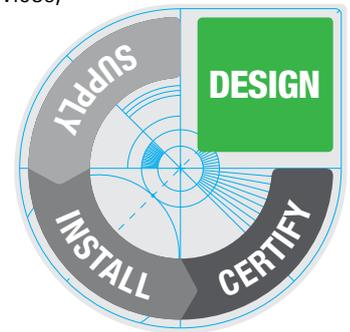


# Contracting Services

Adbri Masonry's Contracting Services Division has been providing solutions in the market for over 20 years. They offer a range of construction and project management services, including a complete design, supply, install and certification package for segmental retaining walls, pavements, erosion control and wall cladding products.

Operating on the East Coast the Adbri Masonry team can provide the following civil contracting services;

- ✓ The supply and installation of concrete masonry products
- ✓ Preliminary design and technical assistance
- ✓ Preliminary costings
- ✓ Certified design
- ✓ Ongoing project management



*By utilising these services, the quality and structural adequacy of the finished project can be professionally managed and officially certified on your behalf.*

QLD Building License Number - 61929



Please Note: These services are limited to commercial and industrial projects and are not available for residential works.

# Concrete Sleepers

Adbri Masonry manufacture high quality concrete sleepers in a fully automated specialised sleeper production plant. This state-of-the-art machine provides increased quality control, precision steel placement and high strength concrete sleepers in a variety of shapes, sizes and textures.

Adbri Masonry's range of Concrete Sleepers have been designed with versatility and ease of construction in mind. Capitalise on the system's small base footprint, and the ability to build over 3.0m high (with an engineered design). Adbri Masonry's range of concrete sleepers are a proven solution for boundary wall and traditional retaining wall applications.

Our engineered sleeper design solutions are used for

- Low footprint retaining walls
- Detention basins
- Tiered retaining walls
- Site specific product and engineering solutions
- Residential sub divisions and commercial walls

With wall designs from our in-house engineering team and utilising steel posts specifically designed for Adbri's concrete sleepers, the system can be constructed to suit various applications in a range of heights.

## FEATURES

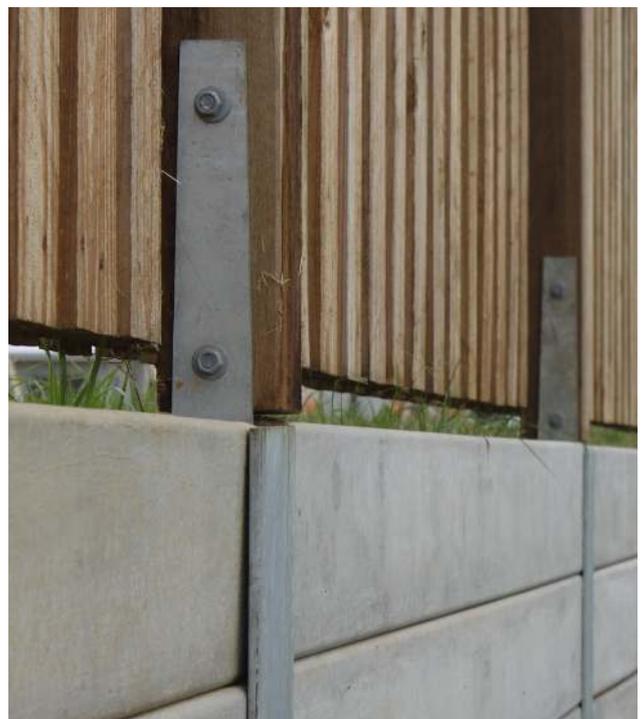
- ✓ Vertical Walls
- ✓ Small footprint at base of structure
- ✓ Steel post uprights

\* Sleeper length is nominal.

Sleepers have a small taper at the ends from face to back of sleeper to aid in the demoulding of the sleeper during the production process.

PRODUCT	Length x Height (mm)	Depth (mm)	Av. Weight (kg)	Compressive Strength
2000mm Unit	2000 x 200	80	78	40 MPa Minimum
		100	98	
		120	118	
		140	138	
2400mm Unit	2400 x 200	80	94	40 MPa Minimum
		100	117	
		120	141	
		140	165	

## FENCE BRACKET





The designs provided in this brochure are for Concrete Sleeper Retaining Wall systems designed in accordance with the requirements of AS4678 "Earth-retaining Structures" and AS3600 "Concrete Structures".

This brochure has been prepared by Adbri Masonry. All designs in this brochure have been checked and approved by Arlene Nardone, CPEng RPEQ 7777 and Wojtek Kasinski Eng. NER RPEQ 8869.

**Disclaimer:**

It is the responsibility of the customer to ensure that all assumed properties (Note 2 of Technical Parameters) are achieved on site, and that all retaining walls are installed as per requirements of designs and cross sectional details. Adbri Masonry accepts no liability for any walls outside the scope of designs included in this brochure, or for installation of the products contained within.

# 1.0 Technical Parameters

1. Designed in accordance with the following standards unless noted otherwise.

<i>AS4678:2002</i>	Earth retaining structures
<i>AS1170.1:2002</i>	Loading Code
<i>AS3600:2018</i>	Concrete Structures
<i>Concrete</i>	Grade N25, min. 80mm slump, 20mm max. aggregate. For bored pier only.
<i>Aggregate</i>	12 - 20mm max.

2. The soil types and properties assumed in design are:

Material	Unit Weight (kN/m <sup>3</sup> )	Internal Friction Angle (°)	Cohesive Strength
	19	30	3
	19	28	5
	19	25	5
Gravel Backfill	19	37	0
Concrete	24	N/A	0

**Notes:** A geotechnical engineer will be able to assist you in evaluating your in-situ material.

No design consideration has been given for rock excavation. With the assumed founding soil properties, the allowable bearing capacity under a normal load has been taken at 150kPa.

The properties of the materials should be checked by a geotechnical engineer. Design has been based on assumed average conditions for a concrete sleeper retaining wall and is considered applicable to soils where the site is classified as S, M, H or E with “ys” less than 70mm, where the wall is founded in natural undisturbed material.

3. These details are not applicable to the following designs and require the specific design input of a registered professional engineer:

- (a) Wall heights greater than shown in the tables
- (b) Surface slopes greater than 1V:4H at top of wall (14°).
- (c) Site ground sloping away from the retaining wall toe.
- (d) Retained material properties differing from those assumed in the design.
- (e) Walls partially or completely founded on fill.
- (f) Site classified as “E” Ys greater than 70mm or “P”. For “E” sites where Ys exceeds 70mm a geotechnical engineer should be engaged. For “P” sites, you must ensure that a safe bearing capacity of 150kPa is achieved, and satisfy yourself that no long term settlement will occur.
- (g) Site has major drainage or seepage problems, is subject to water forces including flooding, or groundwater exists.
- (h) Lack of global stability. Global stability should be checked by a qualified geotechnical engineer.
- (i) The founding material has a bearing capacity less than 150kPa.
- (j) Where the possibility of failure of the toe of the wall exists due to location of building or service pipe trenches in front of the wall prior to or after construction of the retaining wall.
- (k) Where fences are detailed to be installed at the top of the wall which do not comply with the fence post installation detail included in this brochure, or fence heights or wind loads are expected to exceed nominated parameters.
- (l) Surcharge loads are higher than values nominated in design tables.
- (m) Where walls are terraced within structural load line.
- (n) These tables are applicable to cuts in insitu soils. The tables are not applicable to cohesive fill.
- (o) All retaining walls are designed for a maximum surcharge load of 5 kPa. If surcharge loads greater than 5 kPa are expected, these designs will not be appropriate.
- (p) These walls have been designed in accordance with Coulomb Methodology and Brinch Hansen for Pier Designs.
- (q) Concrete sleepers are designed and manufactured to a B1 durability classification to AS3600:2018. Where concrete sleepers are to be installed in coastal areas within 1km of the coast or in salt water immersion, a made to order sleeper (MTO) should be manufactured using 50 MPa concrete and suitable cover to steel.
- (r) Full scale testing of Adbri Masonry concrete sleepers has been undertaken by UQ. The design of Adbri Masonry concrete sleepers are based on the most conservative outcomes of either testing parameters and AS3600 for bending and to testing results for shear.

## 2.0 General Notes

1. Wall construction to be executed in accordance with the requirements of this brochure.
2. The walls have been designed for the following surcharge loads (including construction loads) :
  - 5 kPa for all walls up to 3m in height.
  - No Dead Loads have been allowed for.
  - Cohesion as nominated for the various soil types:  
Where there are any variations to the materials, soil conditions, loadings, drainage, geometry of the site or retaining wall, a registered engineer should be engaged to design the wall.
3. Where a fence is required at the top of the wall, the fence shall be installed in accordance with the detail in this manual.
4. Structures such as building footings, swimming pools, other retaining walls, storage facilities or solid panel fencing and loads such as from heavy access vehicles must be kept clear such that the load is not placed within a line projected behind the wall from the founding level at 1V:1.5H. Where structures or driveways do intrude within this line a registered professional engineer should be engaged to design the wall.
5. Precautions must be taken where other building work or service trenches are excavated around the retaining wall, as it may be necessary to modify bored pier depths or other alternatives. No excavations shall be made below the 'zone of influence' line extending at 45° from the base of the retaining wall structure.
6. Precautions should be taken if cutting back the existing bank to ensure such excavation does not destabilize the footing of another structure.
7. Walls may be constructed to greater heights in specific applications with special engineering design.
8. Check with your local council whether building approval is required.
9. Where these walls impose loads on other structures those other structures must be checked for strength and stability.
10. External interface friction angle is calculated as being equal to 2/3 of the internal interface friction angle.
11. Subsoil drains should be flushed at regular intervals to ensure continuous proper functioning of the retaining wall drainage system.
12. Subsoil drains shall have outlet points at maximum 20m centres for dry application and maximum 5m centres for wet application.
13. Steel posts noted in design tables are from Adbri Masonry fabricated post sections.  
Steel posts sections have been considered in the preparation of the design and are available direct from Adbri Masonry.
14. Pier holes shall be located to allow posts to be installed centrally, provide sufficient post/sleeper contact (at least 35mm) and ensure at least 50mm cover to steel components.
15. Pier holes shall be firm, dry, and free of loose material prior to placement of concrete.
16. All cut sleepers to be treated with a high build epoxy or inorganic zinc silicate to AS2312.1:2014. Cut surface to be treated is to be dry, clean and free of dust, debris and slurry.

### Efflorescence

Efflorescence is a white powdery deposit that forms as a result of soluble salts migrating out of concrete and travelling to the surface, from excessive exposure to water onsite.

Efflorescence is a naturally occurring phenomenon that can occur with any concrete product exposed to wetting and drying. The potential for efflorescence to occur can be reduced by ensuring concrete products are installed in a dry or free draining environment.

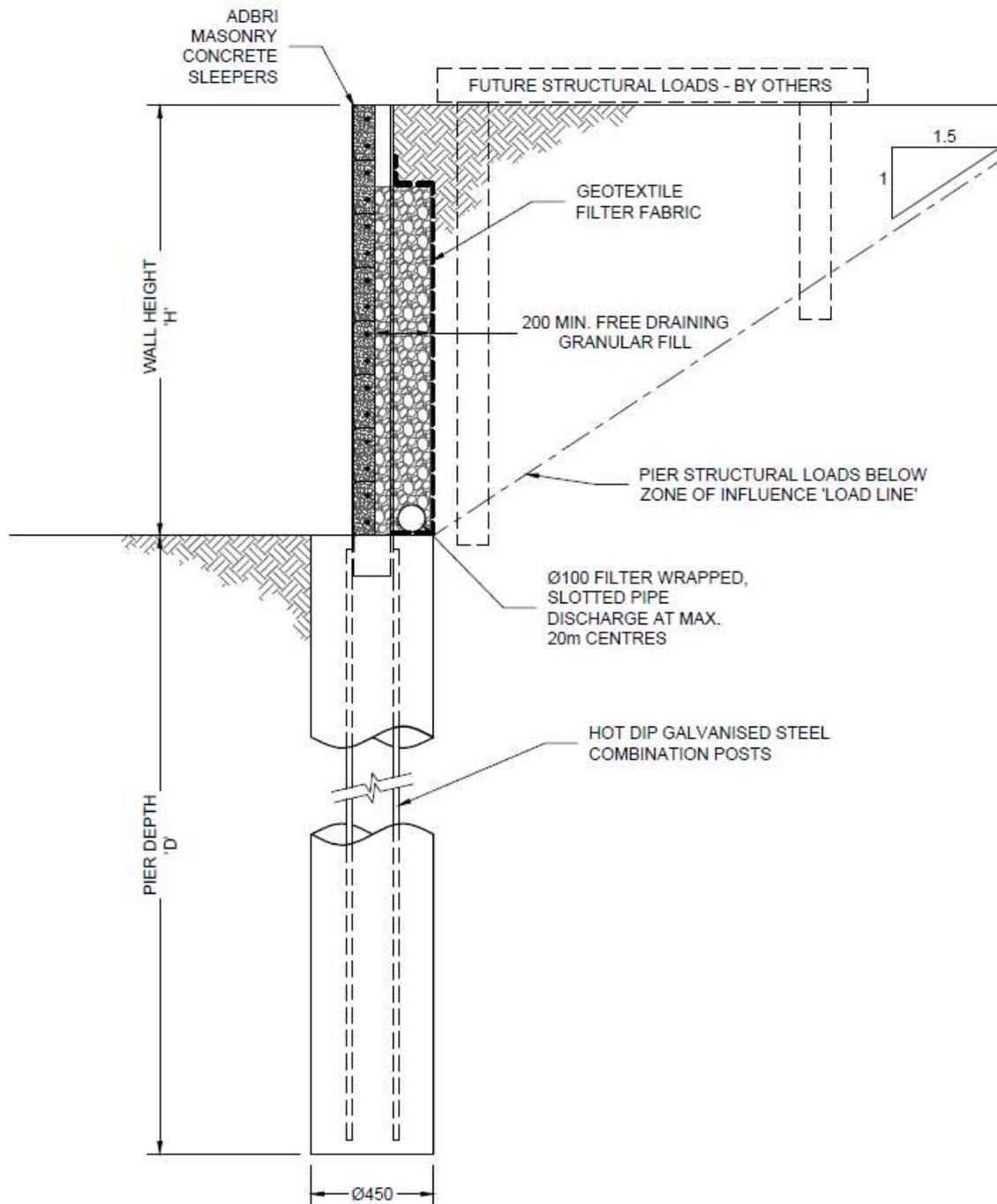
Efflorescence will usually disappear over time and removal can be assisted by dry brushing off any surface salts before scrubbing with a brush and clean water.

### Product Colour

Products are manufactured using natural raw materials which may vary over time and impact colour from batch to batch. It is recommended to sight a physical product sample before purchase. Where large quantities of product are required, these will be manufactured across a range of batches and consistency of colour cannot be guaranteed.

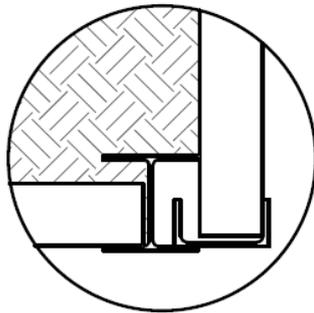
# 3.0 Typical Details for Concrete Sleeper Walls

## 3.1 TYPICAL CONCRETE SLEEPER WALL DETAIL (LEVEL CREST SLOPE SHOWN)

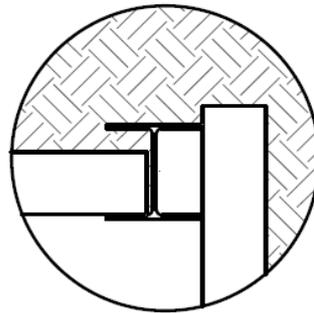


Diagrams not to scale

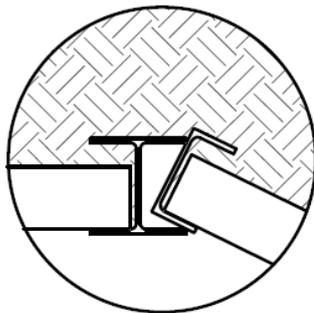
### 3.2 TYPICAL POST CORNER DETAIL



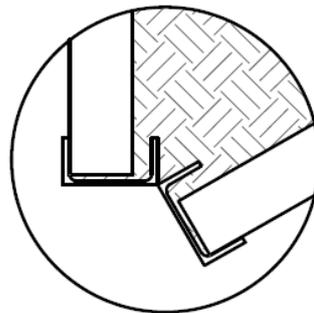
TYPICAL EXTERNAL  
90° CORNER DETAIL  
NTS



TYPICAL INTERNAL  
90° CORNER DETAIL  
NTS



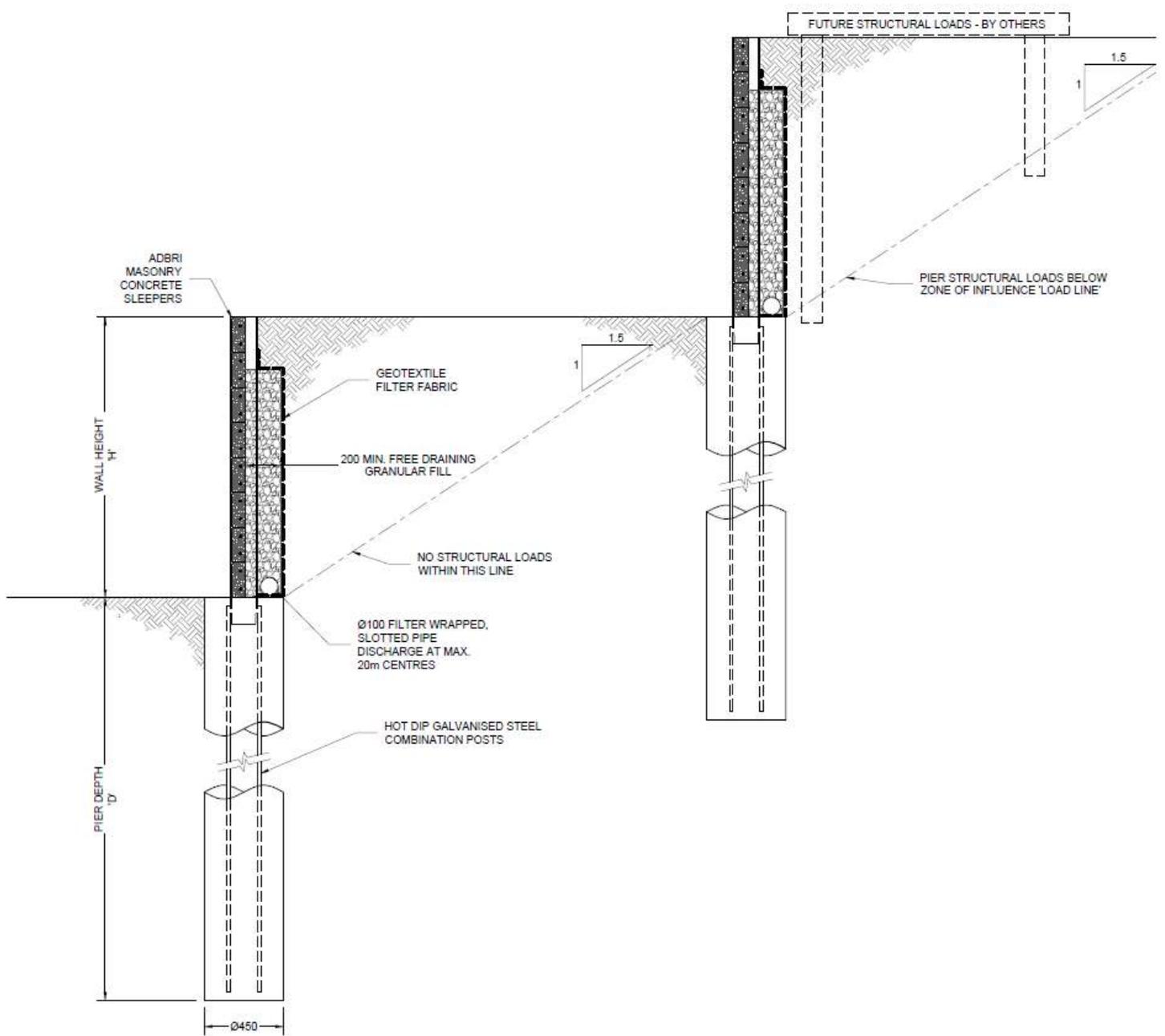
TYPICAL OBTUSE  
ANGLE DETAIL  
NTS



TYPICAL ACUTE  
ANGLE DETAIL  
NTS

# 4.0 Typical Details for Terraced Walls

Where upper tier is within zone of influence, refer to Adbri Engineering or an Independent Engineer for project specific design advice.



# Adbri Masonry Steel Posts

Post designation	Post Size	Length Post (mm)	Length Reo (mm)	Total Length (mm)
A-1300	65x100UB	1300	-	1300
A-1700	65x100UB	1700	-	1700
A-2100	65x100UB	2100	-	2100
A-2500	65x100UB	2500	-	2500
B-2600	100x100UC	1400	1350	2600
B-2900	100x100UC	1600	1450	2900
B-3200	100x100UC	1600	1750	3200
C-3500	125x125UC	1800	1850	3500
C-3900	125x125UC	2100	2000	3900
C-4400	125x125UC	2400	2200	4400
D-4900	150x150UC	2700	2500	4900
D-5500	150x150UC	2900	2900	5500
E-5900	150x150UC	3300	2900	5900
E-6600	175x175UC	3500	3400	6600
F-7000	200x200UC	3900	3400	7000

## SINGLE TIERED CONCRETE SLEEPER WALLS FOR WIND REGIONS A1 to A7, $\phi = 25$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure to 1.8m high fence =  $0.56\text{kPa}$

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 25$  degrees  
 Characteristic cohesion (for foundation),  $c = 5\text{kPa}$   
 Pier diameter =  $450\text{mm}$  unless noted otherwise as  $600\text{mm}$  diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>	2 @ 80	A-1700	1000
600	Level	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>	3 @ 80	A-2100	1200
800	Level	4 @ 80	A-2500	1500	4 @ 80	A-2500	1400
1000	Level	5 @ 80	B-2600	1700	5 @ 80	B-2600	1600
1200	Level	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	6 @ 80	B-2900	1900
1400	Level	top 5 @ 80, 2 @ 100 btm	C-3500	2300	top 6 @ 80, 1 @ 100 btm	C-3500	2100
1600	Level	top 5 @ 80, 3 @ 100 btm	C-3900	2600	top 6 @ 80, 2 @ 100 btm	C-3900	2400
1800	Level	top 5 @ 80, 4 @ 100 btm	C-4400	2800	top 6 @ 80, 3 @ 100 btm	C-3900	2600
2000	Level	top 5 @ 80, 5 @ 100 btm	D-4900	3100	top 6 @ 80, 4 @ 100 btm	C-4400	2900
2200	Level	top 6 @ 80, 5 @ 100 btm	D-4900	3400	top 6 @ 80, 5 @ 100 btm	D-4900	3100
2400	Level	top 6 @ 80, 5 @ 100, 1 @ 120 btm	D-5500	3700	top 6 @ 80, 6 @ 100 btm	D-5500	3400
2600	Level	top 6 @ 80, 5 @ 100, 2 @ 120 btm	E-5900	4000	top 7 @ 80, 6 @ 100 btm	E-5900	3600
2800	Level	top 6 @ 80, 5 @ 100, 3 @ 120 btm	E-6600	4300	top 7 @ 80, 7 @ 100 btm	E-5900	3800
3000	Level	top 6 @ 80, 6 @ 100, 3 @ 120 btm	F-7000	4100 (600 dia)	top 7 @ 80, 8 @ 100 btm	E-6600	4100

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>
600	1:4 max	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>	3 @ 80	A-2100	1200
800	1:4 max	4 @ 80	B-2600	1700	4 @ 80	A-2500	1500
1000	1:4 max	top 3 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2000 (2500) <sup>+</sup>	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2500) <sup>+</sup>
1200	1:4 max	top 4 @ 80, 2 @ 100 btm	C-3500	2300	top 4 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2100 (2300) <sup>+</sup>
1400	1:4 max	top 4 @ 80, 3 @ 100 btm	C-3500	2600	top 4 @ 80, 3 @ 100 btm	C-3500	2400
1600	1:4 max	top 4 @ 80, 4 @ 100 btm	C-4400	2900	top 4 @ 80, 4 @ 100 btm	C-3900	2700
1800	1:4 max	top 4 @ 80, 4 @ 100, 1 @ 120 btm	D-4900	3200	top 4 @ 80, 5 @ 100 btm	C-4400	3000
2000	1:4 max	top 4 @ 80, 4 @ 100, 2 @ 120 btm	D-4900	3500	top 4 @ 80, 6 @ 100 btm	D-4900	3200
2200	1:4 max	top 4 @ 80, 4 @ 100, 3 @ 120 btm	D-5500	3800	top 4 @ 80, 7 @ 100 btm	D-5500	3500
2400	1:4 max	top 4 @ 80, 4 @ 100, 3 @ 120, 1 @ 140 btm	E-5900	4200	top 5 @ 80, 7 @ 100 btm	E-5900	3800
2600	1:4 max	top 4 @ 80, 5 @ 100, 2 @ 120, 2 @ 140 btm	F-7000 <sup>^</sup>	4000 (600 dia) (4400) <sup>+</sup>	top 5 @ 80, 7 @ 100, 1 @ 120 btm	E-5900	4100
2800	1:4 max	top 4 @ 80, 5 @ 100, 2 @ 120, 3 @ 140 btm	F-7000	4300 (600 dia)	top 5 @ 80, 7 @ 100, 2 @ 120 btm	F-7000 <sup>^</sup>	4000 (600 dia) (4200) <sup>+</sup>
3000	1:4 max	-	-	-	top 5 @ 80, 7 @ 100, 2 @ 120, 1 @ 140 btm	F-7000	4200 (600 dia)

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS FOR WIND REGIONS A1 to A7, $\phi = 28$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure to 1.8m high fence =  $0.56\text{kPa}$

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 28$  degrees  
 Characteristic cohesion (for foundation),  $c = 5\text{kPa}$   
 Pier diameter =  $450\text{mm}$  unless noted otherwise as  $600\text{mm}$  diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-1700	1000	2 @ 80	A-1700	900
600	Level	3 @ 80	A-2100	1200	3 @ 80	A-2100	1100
800	Level	4 @ 80	A-2500	1300	4 @ 80	A-2500	1200
1000	Level	5 @ 80	B-2600	1500	5 @ 80	B-2600 <sup>^</sup>	1400 (1600) <sup>+</sup>
1200	Level	6 @ 80	B-2900	1800	6 @ 80	B-2600	1600
1400	Level	top 6 @ 80, 1 @ 100 btm	C-3500	2000	7 @ 80	B-3200	1900
1600	Level	top 6 @ 80, 2 @ 100 btm	C-3500	2300	top 7 @ 80, 1 @ 100 btm	C-3500	2100
1800	Level	top 6 @ 80, 3 @ 100 btm	C-3900	2500	top 7 @ 80, 2 @ 100 btm	C-3900	2300
2000	Level	top 6 @ 80, 4 @ 100 btm	C-4400	2700	top 7 @ 80, 3 @ 100 btm	C-4400	2500
2200	Level	top 6 @ 80, 5 @ 100 btm	D-4900	3000	top 7 @ 80, 4 @ 100 btm	D-4900	2800
2400	Level	top 6 @ 80, 6 @ 100 btm	D-5500	3200	top 7 @ 80, 5 @ 100 btm	D-4900	2900
2600	Level	top 7 @ 80, 6 @ 100 btm	E-5900	3400	top 7 @ 80, 6 @ 100 btm	D-5500	3200
2800	Level	top 7 @ 80, 6 @ 100, 1 @ 120 btm	E-5900	3700	top 7 @ 80, 7 @ 100 btm	E-5900	3300
3000	Level	top 7 @ 80, 6 @ 100, 2 @ 120 btm	F-7000 <sup>^</sup>	3600 (600 dia) (4000) <sup>+</sup>	top 7 @ 80, 8 @ 100 btm	E-5900	3600

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup> "A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-1700	1000	2 @ 80	A-1700	1000
600	1:4 max	3 @ 80	A-2100	1200	3 @ 80	A-2100	1100
800	1:4 max	4 @ 80	A-2500	1400	4 @ 80	A-2500	1300
1000	1:4 max	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1700 (2500) <sup>+</sup>	5 @ 80	B-2600	1600
1200	1:4 max	top 4 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2300) <sup>+</sup>
1400	1:4 max	top 4 @ 80, 3 @ 100 btm	C-3500	2300	top 5 @ 80, 2 @ 100 btm	C-3500	2100
1600	1:4 max	top 5 @ 80, 3 @ 100 btm	C-3900	2500	top 5 @ 80, 3 @ 100 btm	C-3500	2300
1800	1:4 max	top 5 @ 80, 4 @ 100 btm	C-4400	2800	top 5 @ 80, 4 @ 100 btm	C-3900	2600
2000	1:4 max	top 5 @ 80, 5 @ 100 btm	D-4900	3100	top 5 @ 80, 5 @ 100 btm	C-4400	2800
2200	1:4 max	top 5 @ 80, 5 @ 100, 1 @ 120 btm	D-4900	3300	top 5 @ 80, 6 @ 100 btm	D-4900	3000
2400	1:4 max	top 5 @ 80, 5 @ 100, 2 @ 120 btm	E-5900	3600	top 5 @ 80, 7 @ 100 btm	D-5500	3300
2600	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120 btm	E-6600	3900	top 6 @ 80, 7 @ 100 btm	E-5900	3600
2800	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120, 1 @ 140 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4200) <sup>+</sup>	top 6 @ 80, 7 @ 100, 1 @ 120 btm	E-6600	3700
3000	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120, 2 @ 140 btm	F-7000	4000 (600 dia)	top 6 @ 80, 8 @ 100, 1 @ 120 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4000) <sup>+</sup>

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup> "A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS FOR WIND REGIONS A1 to A7, $\phi = 30$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure to 1.8m high fence =  $0.56\text{kPa}$

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 30$  degrees  
 Characteristic cohesion (for foundation),  $c = 3\text{kPa}$   
 Pier diameter =  $450\text{mm}$  unless noted otherwise as  $600\text{mm}$  diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>	2 @ 80	A-1700	1000
600	Level	3 @ 80	A-2100	1200	3 @ 80	A-2100	1100
800	Level	4 @ 80	A-2500	1400	4 @ 80	A-2500	1200
1000	Level	5 @ 80	B-2600	1500	5 @ 80	B-2600 <sup>^</sup>	1400 (1600) <sup>+</sup>
1200	Level	6 @ 80	B-2900	1800	6 @ 80	B-2600	1600
1400	Level	7 @ 80	B-3200	2000	7 @ 80	B-2900	1800
1600	Level	top 7 @ 80, 1 @ 100 btm	C-3500	2200	top 7 @ 80, 1 @ 100 btm	C-3500	2000
1800	Level	top 7 @ 80, 2 @ 100 btm	C-3900	2400	top 7 @ 80, 2 @ 100 btm	C-3900	2200
2000	Level	top 7 @ 80, 3 @ 100 btm	C-4400	2600	top 8 @ 80, 2 @ 100 btm	C-4400	2500
2200	Level	top 7 @ 80, 4 @ 100 btm	D-4900	2900	top 8 @ 80, 3 @ 100 btm	C-4400	2600
2400	Level	top 7 @ 80, 5 @ 100 btm	D-4900	3100	top 8 @ 80, 4 @ 100 btm	D-4900	2900
2600	Level	top 7 @ 80, 6 @ 100 btm	D-5500	3300	top 8 @ 80, 5 @ 100 btm	D-5500	3100
2800	Level	top 7 @ 80, 7 @ 100 btm	E-5900	3500	top 8 @ 80, 6 @ 100 btm	E-5900	3200
3000	Level	top 7 @ 80, 7 @ 100, 1 @ 120 btm	E-6600	3700	top 8 @ 80, 7 @ 100 btm	E-5900	3500

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>	2 @ 80	A-1700	1000
600	1:4 max	3 @ 80	A-2100	1200	3 @ 80	A-2100	1100
800	1:4 max	4 @ 80	A-2500	1400	4 @ 80	A-2500	1300
1000	1:4 max	5 @ 80	B-2600	1700	5 @ 80	B-2600	1600
1200	1:4 max	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2300) <sup>+</sup>
1400	1:4 max	top 5 @ 80, 2 @ 100 btm	C-3500	2200	top 6 @ 80, 1 @ 100 btm	C-3500	2000
1600	1:4 max	top 5 @ 80, 3 @ 100 btm	C-3900	2500	top 6 @ 80, 2 @ 100 btm	C-3500	2300
1800	1:4 max	top 5 @ 80, 4 @ 100 btm	C-4400	2700	top 6 @ 80, 3 @ 100 btm	C-3900	2500
2000	1:4 max	top 5 @ 80, 5 @ 100 btm	C-4400	2900	top 6 @ 80, 4 @ 100 btm	C-4400	2700
2200	1:4 max	top 5 @ 80, 6 @ 100 btm	D-4900	3200	top 6 @ 80, 5 @ 100 btm	D-4900	3000
2400	1:4 max	top 5 @ 80, 6 @ 100, 1 @ 120 btm	E-5900	3400	top 6 @ 80, 6 @ 100 btm	D-4900	3100
2600	1:4 max	top 5 @ 80, 6 @ 100, 2 @ 120 btm	E-5900	3600	top 6 @ 80, 7 @ 100 btm	E-5900	3400
2800	1:4 max	top 6 @ 80, 5 @ 100, 3 @ 120 btm	F-7000 <sup>^</sup>	3600 (600 dia) (4200) <sup>+</sup>	top 6 @ 80, 8 @ 100 btm	E-5900	3700
3000	1:4 max	top 6 @ 80, 5 @ 100, 4 @ 120 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4000) <sup>+</sup>	top 6 @ 80, 9 @ 100 btm	F-7000 <sup>^</sup>	3500 (600 dia) (4000) <sup>+</sup>

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS FOR WIND REGIONS B, $\phi = 25$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure to 1.8m high fence =  $0.77\text{kPa}$

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 25$  degrees  
 Characteristic cohesion (for foundation),  $c = 5\text{kPa}$   
 Pier diameter =  $450\text{mm}$  unless noted otherwise as  $600\text{mm}$  diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-2100	1200 (1300) <sup>+</sup>	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>
600	Level	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>
800	Level	4 @ 80	B-2600 <sup>^</sup>	1600 (1800) <sup>+</sup>	4 @ 80	A-2500	1400
1000	Level	5 @ 80	B-2600	1800	5 @ 80	B-2600	1600
1200	Level	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	6 @ 80	B-2900	1900
1400	Level	top 5 @ 80, 2 @ 100 btm	C-3500	2300	top 6 @ 80, 1 @ 100 btm	C-3500	2100
1600	Level	top 5 @ 80, 3 @ 100 btm	C-3900	2600	top 6 @ 80, 2 @ 100 btm	C-3900	2400
1800	Level	top 5 @ 80, 4 @ 100 btm	C-4400	2800	top 6 @ 80, 3 @ 100 btm	C-3900	2600
2000	Level	top 5 @ 80, 5 @ 100 btm	D-4900	3100	top 6 @ 80, 4 @ 100 btm	C-4400	2900
2200	Level	top 6 @ 80, 5 @ 100 btm	D-4900	3400	top 6 @ 80, 5 @ 100 btm	D-4900	3100
2400	Level	top 6 @ 80, 5 @ 100, 1 @ 120 btm	D-5500	3700	top 6 @ 80, 6 @ 100 btm	D-5500	3400
2600	Level	top 6 @ 80, 5 @ 100, 2 @ 120 btm	E-5900	4000	top 7 @ 80, 6 @ 100 btm	E-5900	3600
2800	Level	top 6 @ 80, 5 @ 100, 3 @ 120 btm	E-6600	4300	top 7 @ 80, 7 @ 100 btm	E-5900	3800
3000	Level	top 6 @ 80, 6 @ 100, 3 @ 120 btm	F-7000	4100 (600 dia)	top 7 @ 80, 8 @ 100 btm	E-6600	4100

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-2100	1200	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>
600	1:4 max	3 @ 80	A-2500	1400	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>
800	1:4 max	4 @ 80	B-2600	1700	4 @ 80	A-2500	1500
1000	1:4 max	top 3 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2000 (2500) <sup>+</sup>	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2500) <sup>+</sup>
1200	1:4 max	top 4 @ 80, 2 @ 100 btm	C-3500	2300	top 4 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2100 (2300) <sup>+</sup>
1400	1:4 max	top 4 @ 80, 3 @ 100 btm	C-3500	2600	top 4 @ 80, 3 @ 100 btm	C-3500	2400
1600	1:4 max	top 4 @ 80, 4 @ 100 btm	C-4400	2900	top 4 @ 80, 4 @ 100 btm	C-3900	2700
1800	1:4 max	top 4 @ 80, 4 @ 100, 1 @ 120 btm	D-4900	3200	top 4 @ 80, 5 @ 100 btm	C-4400	3000
2000	1:4 max	top 4 @ 80, 4 @ 100, 2 @ 120 btm	D-4900	3500	top 4 @ 80, 6 @ 100 btm	D-4900	3200
2200	1:4 max	top 4 @ 80, 4 @ 100, 3 @ 120 btm	D-5500	3800	top 4 @ 80, 7 @ 100 btm	D-5500	3500
2400	1:4 max	top 4 @ 80, 4 @ 100, 3 @ 120, 1 @ 140 btm	E-5900	4200	top 5 @ 80, 7 @ 100 btm	E-5900	3800
2600	1:4 max	top 4 @ 80, 5 @ 100, 2 @ 120, 2 @ 140 btm	F-7000	4000 (600 dia)	top 5 @ 80, 7 @ 100, 1 @ 120 btm	E-5900	4100
2800	1:4 max	top 4 @ 80, 5 @ 100, 2 @ 120, 3 @ 140 btm	F-7000	4300 (600 dia)	top 5 @ 80, 7 @ 100, 2 @ 120 btm	F-7000	4000 (600 dia)
3000	1:4 max	-	-	-	top 5 @ 80, 7 @ 100, 2 @ 120, 1 @ 140 btm	F-7000	4200 (600 dia)

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS FOR WIND REGIONS B, $\phi = 28$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure to 1.8m high fence =  $0.77\text{kPa}$

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 28$  degrees  
 Characteristic cohesion (for foundation),  $c = 5\text{kPa}$   
 Pier diameter =  $450\text{mm}$  unless noted otherwise as  $600\text{mm}$  diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>	2 @ 80	A-1700	1000
600	Level	3 @ 80	A-2100	1200	3 @ 80	A-2100	1200
800	Level	4 @ 80	A-2500	1400	4 @ 80	A-2500	1300
1000	Level	5 @ 80	B-2600	1600	5 @ 80	B-2600	1500
1200	Level	6 @ 80	B-2900	1800	6 @ 80	B-2600	1600
1400	Level	top 6 @ 80, 1 @ 100 btm	C-3500	2000	7 @ 80	B-3200	1900
1600	Level	top 6 @ 80, 2 @ 100 btm	C-3500	2300	top 7 @ 80, 1 @ 100 btm	C-3500	2100
1800	Level	top 6 @ 80, 3 @ 100 btm	C-3900	2500	top 7 @ 80, 2 @ 100 btm	C-3900	2300
2000	Level	top 6 @ 80, 4 @ 100 btm	C-4400	2700	top 7 @ 80, 3 @ 100 btm	C-4400	2500
2200	Level	top 6 @ 80, 5 @ 100 btm	D-4900	3000	top 7 @ 80, 4 @ 100 btm	D-4900	2800
2400	Level	top 6 @ 80, 6 @ 100 btm	D-5500	3200	top 7 @ 80, 5 @ 100 btm	D-4900	2900
2600	Level	top 7 @ 80, 6 @ 100 btm	E-5900	3400	top 7 @ 80, 6 @ 100 btm	D-5500	3200
2800	Level	top 7 @ 80, 6 @ 100, 1 @ 120 btm	E-5900	3700	top 7 @ 80, 7 @ 100 btm	E-5900	3300
3000	Level	top 7 @ 80, 6 @ 100, 2 @ 120 btm	F-7000 <sup>^</sup>	3600 (600 dia) (4000) <sup>+</sup>	top 7 @ 80, 8 @ 100 btm	E-5900	3600

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>
600	1:4 max	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>	3 @ 80	A-2100	1200
800	1:4 max	4 @ 80	A-2500	1500	4 @ 80	A-2500	1400
1000	1:4 max	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1700 (2500) <sup>+</sup>	5 @ 80	B-2600	1600
1200	1:4 max	top 4 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2300) <sup>+</sup>
1400	1:4 max	top 4 @ 80, 3 @ 100 btm	C-3500	2300	top 5 @ 80, 2 @ 100 btm	C-3500	2100
1600	1:4 max	top 5 @ 80, 3 @ 100 btm	C-3900	2500	top 5 @ 80, 3 @ 100 btm	C-3500	2300
1800	1:4 max	top 5 @ 80, 4 @ 100 btm	C-4400	2800	top 5 @ 80, 4 @ 100 btm	C-3900	2600
2000	1:4 max	top 5 @ 80, 5 @ 100 btm	D-4900	3100	top 5 @ 80, 5 @ 100 btm	C-4400	2800
2200	1:4 max	top 5 @ 80, 5 @ 100, 1 @ 120 btm	D-4900	3300	top 5 @ 80, 6 @ 100 btm	D-4900	3000
2400	1:4 max	top 5 @ 80, 5 @ 100, 2 @ 120 btm	E-5900	3600	top 5 @ 80, 7 @ 100 btm	D-5500	3300
2600	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120 btm	E-6600	3900	top 6 @ 80, 7 @ 100 btm	E-5900	3600
2800	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120, 1 @ 140 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4200) <sup>+</sup>	top 6 @ 80, 7 @ 100, 1 @ 120 btm	E-6600	3700
3000	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120, 2 @ 140 btm	F-7000	4000 (600 dia)	top 6 @ 80, 8 @ 100, 1 @ 120 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4000) <sup>+</sup>

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS FOR WIND REGIONS B, $\phi = 30$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure to 1.8m high fence =  $0.77\text{kPa}$

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 30$  degrees  
 Characteristic cohesion (for foundation),  $c = 3\text{kPa}$   
 Pier diameter =  $450\text{mm}$  unless noted otherwise as  $600\text{mm}$  diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-2100	1200	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>
600	Level	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>	3 @ 80	A-2100	1200
800	Level	4 @ 80	A-2500	1400	4 @ 80	A-2500	1300
1000	Level	5 @ 80	B-2600	1600	5 @ 80	B-2600	1500
1200	Level	6 @ 80	B-2900	1800	6 @ 80	B-2900	1700
1400	Level	7 @ 80	B-3200	2000	7 @ 80	B-2900	1800
1600	Level	top 7 @ 80, 1 @ 100 btm	C-3500	2200	top 7 @ 80, 1 @ 100 btm	C-3500	2000
1800	Level	top 7 @ 80, 2 @ 100 btm	C-3900	2400	top 7 @ 80, 2 @ 100 btm	C-3900	2200
2000	Level	top 7 @ 80, 3 @ 100 btm	C-4400	2600	top 8 @ 80, 2 @ 100 btm	C-4400	2500
2200	Level	top 7 @ 80, 4 @ 100 btm	D-4900	2900	top 8 @ 80, 3 @ 100 btm	C-4400	2600
2400	Level	top 7 @ 80, 5 @ 100 btm	D-4900	3100	top 8 @ 80, 4 @ 100 btm	D-4900	2900
2600	Level	top 7 @ 80, 6 @ 100 btm	D-5500	3300	top 8 @ 80, 5 @ 100 btm	D-5500	3100
2800	Level	top 7 @ 80, 7 @ 100 btm	E-5900	3500	top 8 @ 80, 6 @ 100 btm	E-5900	3200
3000	Level	top 7 @ 80, 7 @ 100, 1 @ 120 btm	E-5900	3500 (600 dia)	top 8 @ 80, 7 @ 100 btm	E-5900	3500

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-2100	1200	2 @ 80	A-2100 <sup>^</sup>	1100 (1300) <sup>+</sup>
600	1:4 max	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>	3 @ 80	A-2100	1200
800	1:4 max	4 @ 80	A-2500	1500	4 @ 80	A-2500	1400
1000	1:4 max	5 @ 80	B-2600	1700	5 @ 80	B-2600	1600
1200	1:4 max	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2300) <sup>+</sup>
1400	1:4 max	top 5 @ 80, 2 @ 100 btm	C-3500	2200	top 6 @ 80, 1 @ 100 btm	C-3500	2000
1600	1:4 max	top 5 @ 80, 3 @ 100 btm	C-3900	2500	top 6 @ 80, 2 @ 100 btm	C-3500	2300
1800	1:4 max	top 5 @ 80, 4 @ 100 btm	C-4400	2700	top 6 @ 80, 3 @ 100 btm	C-3900	2500
2000	1:4 max	top 5 @ 80, 5 @ 100 btm	C-4400	2900	top 6 @ 80, 4 @ 100 btm	C-4400	2700
2200	1:4 max	top 5 @ 80, 6 @ 100 btm	D-4900	3200	top 6 @ 80, 5 @ 100 btm	D-4900	3000
2400	1:4 max	top 5 @ 80, 6 @ 100, 1 @ 120 btm	E-5900	3400	top 6 @ 80, 6 @ 100 btm	D-4900	3100
2600	1:4 max	top 5 @ 80, 6 @ 100, 2 @ 120 btm	E-5900	3600	top 6 @ 80, 7 @ 100 btm	E-5900	3400
2800	1:4 max	top 6 @ 80, 5 @ 100, 3 @ 120 btm	F-7000 <sup>^</sup>	3600 (600 dia) (4200) <sup>+</sup>	top 6 @ 80, 8 @ 100 btm	E-5900	3700
3000	1:4 max	top 6 @ 80, 5 @ 100, 4 @ 120 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4000) <sup>+</sup>	top 6 @ 80, 9 @ 100 btm	F-7000 <sup>^</sup>	3500 (600 dia) (4000) <sup>+</sup>

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS FOR WIND REGIONS C, $\phi = 25$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure to 1.8m high fence = 1.16kPa

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 25$  degrees  
 Characteristic cohesion (for foundation),  $c = 5\text{kPa}$   
 Pier diameter = 450mm unless noted otherwise as 600mm diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-2100	1400	2 @ 80	A-2100	1300
600	Level	3 @ 80	A-2500	1500	3 @ 80	A-2500	1400
800	Level	4 @ 80	B-2600	1700	4 @ 80	B-2600 <sup>^</sup>	1600 (1800) <sup>+</sup>
1000	Level	5 @ 80	B-2600	1900	5 @ 80	B-2600	1700
1200	Level	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2100 (2300) <sup>+</sup>	6 @ 80	B-2900	1900
1400	Level	top 5 @ 80, 2 @ 100 btm	C-3500	2300	top 6 @ 80, 1 @ 100 btm	C-3500	2100
1600	Level	top 5 @ 80, 3 @ 100 btm	C-3900	2600	top 6 @ 80, 2 @ 100 btm	C-3900	2400
1800	Level	top 5 @ 80, 4 @ 100 btm	C-4400	2800	top 6 @ 80, 3 @ 100 btm	C-3900	2600
2000	Level	top 6 @ 80, 4 @ 100 btm	D-4900	3100	top 6 @ 80, 4 @ 100 btm	C-4400	2900
2200	Level	top 6 @ 80, 5 @ 100 btm	D-4900	3400	top 6 @ 80, 5 @ 100 btm	D-4900	3100
2400	Level	top 6 @ 80, 5 @ 100, 1 @ 120 btm	D-5500	3700	top 6 @ 80, 6 @ 100 btm	D-5500	3400
2600	Level	top 6 @ 80, 5 @ 100, 2 @ 120 btm	E-5900	4000	top 7 @ 80, 6 @ 100 btm	E-5900	3600
2800	Level	top 6 @ 80, 5 @ 100, 3 @ 120 btm	E-6600	4300	top 7 @ 80, 7 @ 100 btm	E-5900	3800
3000	Level	top 6 @ 80, 6 @ 100, 3 @ 120 btm	F-7000	4100 (600 dia)	top 7 @ 80, 8 @ 100 btm	E-6600	4100

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-2100	1400	2 @ 80	A-2100	1300
600	1:4 max	3 @ 80	A-2500	1600	3 @ 80	A-2500	1500
800	1:4 max	top 3 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2700) <sup>+</sup>	4 @ 80	B-2600	1700
1000	1:4 max	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2000 (2500) <sup>+</sup>	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1900 (2500) <sup>+</sup>
1200	1:4 max	top 4 @ 80, 2 @ 100 btm	C-3500	2300	top 4 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2100 (2300) <sup>+</sup>
1400	1:4 max	top 4 @ 80, 3 @ 100 btm	C-3500	2600	top 4 @ 80, 3 @ 100 btm	C-3500	2400
1600	1:4 max	top 4 @ 80, 4 @ 100 btm	C-4400	2900	top 4 @ 80, 4 @ 100 btm	C-3900	2700
1800	1:4 max	top 4 @ 80, 4 @ 100, 1 @ 120 btm	D-4900	3200	top 4 @ 80, 5 @ 100 btm	C-4400	3000
2000	1:4 max	top 4 @ 80, 4 @ 100, 2 @ 120 btm	D-4900	3500	top 4 @ 80, 6 @ 100 btm	D-4900	3200
2200	1:4 max	top 4 @ 80, 4 @ 100, 3 @ 120 btm	D-5500	3800	top 4 @ 80, 7 @ 100 btm	D-5500	3500
2400	1:4 max	top 4 @ 80, 4 @ 100, 3 @ 120, 1 @ 140 btm	E-5900	4200	top 5 @ 80, 7 @ 100 btm	E-5900	3800
2600	1:4 max	top 4 @ 80, 5 @ 100, 2 @ 120, 2 @ 140 btm	F-7000 <sup>^</sup>	4000 (600 dia) (4400) <sup>+</sup>	top 5 @ 80, 7 @ 100, 1 @ 120 btm	E-5900	4100
2800	1:4 max	top 4 @ 80, 5 @ 100, 2 @ 120, 3 @ 140 btm	F-7000	4300 (600 dia)	top 5 @ 80, 7 @ 100, 2 @ 120 btm	F-7000 <sup>^</sup>	4000 (600 dia) (4200) <sup>+</sup>
3000	1:4 max	-	-	-	top 5 @ 80, 7 @ 100, 2 @ 120, 1 @ 140 btm	F-7000	4200 (600 dia)

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS FOR WIND REGIONS C, $\phi = 28$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure to 1.8m high fence = 1.16kPa

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 28$  degrees  
 Characteristic cohesion (for foundation),  $c = 5\text{kPa}$   
 Pier diameter = 450mm unless noted otherwise as 600mm diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-2100	1300	2 @ 80	A-2100	1200
600	Level	3 @ 80	A-2500	1400	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>
800	Level	4 @ 80	B-2600 <sup>^</sup>	1500 (1800) <sup>+</sup>	4 @ 80	A-2500	1400
1000	Level	5 @ 80	B-2600	1700	5 @ 80	B-2600	1600
1200	Level	6 @ 80	B-2900	1900	6 @ 80	B-2900	1700
1400	Level	top 6 @ 80, 1 @ 100 btm	C-3500	2100	7 @ 80	B-3200	1900
1600	Level	top 6 @ 80, 2 @ 100 btm	C-3500	2300	top 7 @ 80, 1 @ 100 btm	C-3500	2100
1800	Level	top 6 @ 80, 3 @ 100 btm	C-3900	2500	top 7 @ 80, 2 @ 100 btm	C-3900	2300
2000	Level	top 6 @ 80, 4 @ 100 btm	C-4400	2700	top 7 @ 80, 3 @ 100 btm	C-4400	2500
2200	Level	top 6 @ 80, 5 @ 100 btm	D-4900	3000	top 7 @ 80, 4 @ 100 btm	D-4900	2800
2400	Level	top 6 @ 80, 6 @ 100 btm	D-5500	3200	top 7 @ 80, 5 @ 100 btm	D-4900	2900
2600	Level	top 7 @ 80, 6 @ 100 btm	E-5900	3400	top 7 @ 80, 6 @ 100 btm	D-5500	3200
2800	Level	top 7 @ 80, 6 @ 100, 1 @ 120 btm	E-5900	3700	top 7 @ 80, 7 @ 100 btm	E-5900	3300
3000	Level	top 7 @ 80, 6 @ 100, 2 @ 120 btm	F-7000 <sup>^</sup>	3600 (600 dia) (4000) <sup>+</sup>	top 7 @ 80, 8 @ 100 btm	E-5900	3600

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup>"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-2100	1300	2 @ 80	A-2100	1200
600	1:4 max	3 @ 80	A-2500	1400	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>
800	1:4 max	4 @ 80	B-2600 <sup>^</sup>	1600 (1800) <sup>+</sup>	4 @ 80	A-2500	1500
1000	1:4 max	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2500) <sup>+</sup>	5 @ 80	B-2600	1700
1200	1:4 max	top 4 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1900 (2300) <sup>+</sup>
1400	1:4 max	top 4 @ 80, 3 @ 100 btm	C-3500	2300	top 5 @ 80, 2 @ 100 btm	C-3500	2100
1600	1:4 max	top 5 @ 80, 3 @ 100 btm	C-3900	2500	top 5 @ 80, 3 @ 100 btm	C-3500	2300
1800	1:4 max	top 5 @ 80, 4 @ 100 btm	C-4400	2800	top 5 @ 80, 4 @ 100 btm	C-3900	2600
2000	1:4 max	top 5 @ 80, 5 @ 100 btm	D-4900	3100	top 5 @ 80, 5 @ 100 btm	C-4400	2800
2200	1:4 max	top 5 @ 80, 5 @ 100, 1 @ 120 btm	D-4900	3300	top 5 @ 80, 6 @ 100 btm	D-4900	3000
2400	1:4 max	top 5 @ 80, 5 @ 100, 2 @ 120 btm	E-5900	3600	top 5 @ 80, 7 @ 100 btm	D-5500	3300
2600	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120 btm	E-6600	3900	top 6 @ 80, 7 @ 100 btm	E-5900	3600
2800	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120, 1 @ 140 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4200) <sup>+</sup>	top 6 @ 80, 7 @ 100, 1 @ 120 btm	E-6600	3700
3000	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120, 2 @ 140 btm	F-7000	4000 (600 dia)	top 6 @ 80, 8 @ 100, 1 @ 120 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4000) <sup>+</sup>

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup>"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS FOR WIND REGIONS C, $\phi = 30$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure to 1.8m high fence = 1.16kPa

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 30$  degrees  
 Characteristic cohesion (for foundation),  $c = 3\text{kPa}$   
 Pier diameter = 450mm unless noted otherwise as 600mm diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-2100	1300	2 @ 80	A-2100	1200
600	Level	3 @ 80	A-2500	1400	3 @ 80	A-2500 <sup>^</sup>	1300 (1500) <sup>+</sup>
800	Level	4 @ 80	B-2600 <sup>^</sup>	1600 (1800) <sup>+</sup>	4 @ 80	A-2500	1500
1000	Level	5 @ 80	B-2600	1700	5 @ 80	B-2600	1600
1200	Level	6 @ 80	B-2900	1900	6 @ 80	B-2900	1800
1400	Level	7 @ 80	B-3200	2100	7 @ 80	B-3200	1900
1600	Level	top 7 @ 80, 1 @ 100 btm	C-3500	2300	top 7 @ 80, 1 @ 100 btm	C-3500	2100
1800	Level	top 7 @ 80, 2 @ 100 btm	C-3900	2400	top 8 @ 80, 1 @ 100 btm	C-3900	2300
2000	Level	top 7 @ 80, 3 @ 100 btm	C-4400	2600	top 8 @ 80, 2 @ 100 btm	C-4400	2500
2200	Level	top 7 @ 80, 4 @ 100 btm	D-4900	2900	top 8 @ 80, 3 @ 100 btm	C-4400	2600
2400	Level	top 7 @ 80, 5 @ 100 btm	D-4900	3100	top 8 @ 80, 4 @ 100 btm	D-4900	2900
2600	Level	top 7 @ 80, 6 @ 100 btm	E-5900	3300	top 8 @ 80, 5 @ 100 btm	D-5500	3100
2800	Level	top 7 @ 80, 7 @ 100 btm	E-5900	3500	top 8 @ 80, 6 @ 100 btm	E-5900	3200
3000	Level	top 7 @ 80, 7 @ 100, 1 @ 120 btm	E-5900	3500 (600 dia)	top 8 @ 80, 7 @ 100 btm	E-5900	3500

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-2100	1300	2 @ 80	A-2100	1200
600	1:4 max	3 @ 80	A-2500	1500	3 @ 80	A-2500	1400
800	1:4 max	4 @ 80	B-2600 <sup>^</sup>	1600 (1800) <sup>+</sup>	4 @ 80	A-2500	1500
1000	1:4 max	5 @ 80	B-2600	1800	5 @ 80	B-2600	1700
1200	1:4 max	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2000	6 @ 80	B-2900	1900
1400	1:4 max	top 5 @ 80, 2 @ 100 btm	C-3500	2200	top 6 @ 80, 1 @ 100 btm	C-3500	2100
1600	1:4 max	top 5 @ 80, 3 @ 100 btm	C-3900	2500	top 6 @ 80, 2 @ 100 btm	C-3500	2300
1800	1:4 max	top 5 @ 80, 4 @ 100 btm	C-4400	2700	top 6 @ 80, 3 @ 100 btm	C-3900	2500
2000	1:4 max	top 5 @ 80, 5 @ 100 btm	D-4900	2900	top 6 @ 80, 4 @ 100 btm	C-4400	2700
2200	1:4 max	top 5 @ 80, 6 @ 100 btm	D-4900	3200	top 6 @ 80, 5 @ 100 btm	D-4900	3000
2400	1:4 max	top 5 @ 80, 6 @ 100, 1 @ 120 btm	E-5900	3400	top 6 @ 80, 6 @ 100 btm	D-4900	3100
2600	1:4 max	top 5 @ 80, 6 @ 100, 2 @ 120 btm	E-5900	3600	top 6 @ 80, 7 @ 100 btm	E-5900	3400
2800	1:4 max	top 6 @ 80, 5 @ 100, 3 @ 120 btm	F-7000 <sup>^</sup>	3600 (600 dia) (4200) <sup>+</sup>	top 6 @ 80, 8 @ 100 btm	E-5900	3700
3000	1:4 max	top 6 @ 80, 5 @ 100, 4 @ 120 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4000) <sup>+</sup>	top 6 @ 80, 9 @ 100 btm	F-7000 <sup>^</sup>	3500 (600 dia) (4000) <sup>+</sup>

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

"A" profile steel assemblies have been detailed to create a minimum 400mm high upstand to allow connection of fence posts (refer detail on Page 11).

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS WITHOUT FENCE WIND LOADS, $\phi = 25$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure = nil

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 25$  degrees  
 Characteristic cohesion (for foundation),  $c = 5\text{kPa}$   
 Pier diameter = 450mm unless noted otherwise as 600mm diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-1300	900	2 @ 80	A-1300	800
600	Level	3 @ 80	A-1700	1200	3 @ 80	A-1700	1100
800	Level	4 @ 80	A-2100	1500	4 @ 80	A-2100	1300
1000	Level	5 @ 80	A-2500	1700	5 @ 80	A-2500	1600
1200	Level	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	6 @ 80	B-2900	1900
1400	Level	top 5 @ 80, 2 @ 100 btm	C-3500	2300	top 6 @ 80, 1 @ 100 btm	C-3500	2100
1600	Level	top 5 @ 80, 3 @ 100 btm	C-3900	2600	top 6 @ 80, 2 @ 100 btm	C-3900	2400
1800	Level	top 5 @ 80, 4 @ 100 btm	C-4400	2800	top 6 @ 80, 3 @ 100 btm	C-3900	2600
2000	Level	top 5 @ 80, 5 @ 100 btm	D-4900	3100	top 6 @ 80, 4 @ 100 btm	C-4400	2900
2200	Level	top 6 @ 80, 5 @ 100 btm	D-4900	3400	top 6 @ 80, 5 @ 100 btm	D-4900	3100
2400	Level	top 6 @ 80, 5 @ 100, 1 @ 120 btm	D-5500	3700	top 6 @ 80, 6 @ 100 btm	D-5500	3400
2600	Level	top 6 @ 80, 5 @ 100, 2 @ 120 btm	E-5900	4000	top 7 @ 80, 6 @ 100 btm	E-5900	3600
2800	Level	top 6 @ 80, 5 @ 100, 3 @ 120 btm	E-6600	4300	top 7 @ 80, 7 @ 100 btm	E-5900	3800
3000	Level	top 6 @ 80, 6 @ 100, 3 @ 120 btm	F-7000	4100 (600 dia)	top 7 @ 80, 8 @ 100 btm	E-6600	4100

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-1300	1000	2 @ 80	A-1300	900
600	1:4 max	3 @ 80	A-2100 <sup>^</sup>	1300 (1500) <sup>+</sup>	3 @ 80	A-1700	1200
800	1:4 max	4 @ 80	A-2500	1700	4 @ 80	A-2100	1500
1000	1:4 max	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2000 (2500) <sup>+</sup>	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2500) <sup>+</sup>
1200	1:4 max	top 4 @ 80, 2 @ 100 btm	C-3500	2300	top 4 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2100 (2300) <sup>+</sup>
1400	1:4 max	top 4 @ 80, 3 @ 100 btm	C-3500	2600	top 4 @ 80, 3 @ 100 btm	C-3500	2400
1600	1:4 max	top 4 @ 80, 4 @ 100 btm	C-4400	2900	top 4 @ 80, 4 @ 100 btm	C-3900	2700
1800	1:4 max	top 4 @ 80, 4 @ 100, 1 @ 120 btm	D-4900	3200	top 4 @ 80, 5 @ 100 btm	C-4400	3000
2000	1:4 max	top 4 @ 80, 4 @ 100, 2 @ 120 btm	D-4900	3500	top 4 @ 80, 6 @ 100 btm	D-4900	3200
2200	1:4 max	top 4 @ 80, 4 @ 100, 3 @ 120 btm	D-5500	3800	top 4 @ 80, 7 @ 100 btm	D-5500	3500
2400	1:4 max	top 4 @ 80, 4 @ 100, 3 @ 120, 1 @ 140 btm	E-5900	4200	top 5 @ 80, 7 @ 100 btm	E-5900	3800
2600	1:4 max	top 4 @ 80, 5 @ 100, 2 @ 120, 2 @ 140 btm	F-7000 <sup>^</sup>	4000 (600 dia) (4400) <sup>+</sup>	top 5 @ 80, 7 @ 100, 1 @ 120 btm	E-5900	4100
2800	1:4 max	top 4 @ 80, 5 @ 100, 2 @ 120, 3 @ 140 btm	F-7000	4300 (600 dia)	top 5 @ 80, 7 @ 100, 2 @ 120 btm	F-7000 <sup>^</sup>	4000 (600 dia) (4200) <sup>+</sup>
3000	1:4 max	-	-	-	top 5 @ 80, 7 @ 100, 2 @ 120, 1 @ 140 btm	F-7000	4200 (600 dia) (4000) <sup>+</sup>

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS WITHOUT FENCE WIND LOADS, $\phi = 28$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure = nil

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 28$  degrees  
 Characteristic cohesion (for foundation),  $c = 5\text{kPa}$   
 Pier diameter = 450mm unless noted otherwise as 600mm diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-1300	800	2 @ 80	A-1300 <sup>^</sup>	700 (900) <sup>+</sup>
600	Level	3 @ 80	A-1700	1000	3 @ 80	A-1700	1000
800	Level	4 @ 80	A-2100	1300	4 @ 80	A-2100	1200
1000	Level	5 @ 80	A-2500	1500	5 @ 80	A-2500	1400
1200	Level	6 @ 80	B-2900	1800	6 @ 80	B-2600	1600
1400	Level	top 6 @ 80, 1 @ 100 btm	C-3500	2000	top 6 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1900 (2100) <sup>+</sup>
1600	Level	top 6 @ 80, 2 @ 100 btm	C-3500	2300	top 7 @ 80, 1 @ 100 btm	C-3500	2100
1800	Level	top 6 @ 80, 3 @ 100 btm	C-3900	2500	top 7 @ 80, 2 @ 100 btm	C-3900	2300
2000	Level	top 6 @ 80, 4 @ 100 btm	C-4400	2700	top 7 @ 80, 3 @ 100 btm	C-4400	2500
2200	Level	top 6 @ 80, 5 @ 100 btm	D-4900	3000	top 7 @ 80, 4 @ 100 btm	D-4900	2800
2400	Level	top 6 @ 80, 6 @ 100 btm	D-5500	3200	top 7 @ 80, 5 @ 100 btm	D-4900	2900
2600	Level	top 7 @ 80, 6 @ 100 btm	E-5900	3400	top 7 @ 80, 6 @ 100 btm	D-5500	3200
2800	Level	top 7 @ 80, 6 @ 100, 1 @ 120 btm	E-5900	3700	top 7 @ 80, 7 @ 100 btm	E-5900	3300
3000	Level	top 7 @ 80, 6 @ 100, 2 @ 120 btm	F-7000 <sup>^</sup>	3600 (600 dia) (4000) <sup>+</sup>	top 7 @ 80, 8 @ 100 btm	E-5900	3600

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-1300	900	2 @ 80	A-1300	800
600	1:4 max	3 @ 80	A-1700	1200	3 @ 80	A-1700	1100
800	1:4 max	4 @ 80	A-2100	1400	4 @ 80	A-2100	1300
1000	1:4 max	top 4 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1700 (2500) <sup>+</sup>	5 @ 80	A-2500	1600
1200	1:4 max	top 4 @ 80, 2 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2300) <sup>+</sup>
1400	1:4 max	top 4 @ 80, 3 @ 100 btm	C-3500	2300	top 5 @ 80, 2 @ 100 btm	C-3500	2100
1600	1:4 max	top 5 @ 80, 3 @ 100 btm	C-3900	2500	top 5 @ 80, 3 @ 100 btm	C-3500	2300
1800	1:4 max	top 5 @ 80, 4 @ 100 btm	C-4400	2800	top 5 @ 80, 4 @ 100 btm	C-3900	2600
2000	1:4 max	top 5 @ 80, 5 @ 100 btm	D-4900	3100	top 5 @ 80, 5 @ 100 btm	C-4400	2800
2200	1:4 max	top 5 @ 80, 5 @ 100, 1 @ 120 btm	D-4900	3300	top 5 @ 80, 6 @ 100 btm	D-4900	3000
2400	1:4 max	top 5 @ 80, 5 @ 100, 2 @ 120 btm	E-5900	3600	top 5 @ 80, 7 @ 100 btm	D-5500	3300
2600	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120 btm	E-6600	3900	top 6 @ 80, 7 @ 100 btm	E-5900	3600
2800	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120, 1 @ 140 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4200) <sup>+</sup>	top 6 @ 80, 7 @ 100, 1 @ 120 btm	E-6600	3700
3000	1:4 max	top 5 @ 80, 5 @ 100, 3 @ 120, 2 @ 140 btm	F-7000	4000 (600 dia)	top 6 @ 80, 8 @ 100, 1 @ 120 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4000) <sup>+</sup>

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

## SINGLE TIERED CONCRETE SLEEPER WALLS WITHOUT FENCE WIND LOADS, $\phi = 30$ degrees

### DESIGN LOADS:

Dead Load,  $g = \text{nil}$   
 Live load,  $q = 5\text{kPa}$   
 Wind pressure = nil

### SOIL PARAMETERS:

Characteristic internal friction angle,  $\phi = 30$  degrees  
 Characteristic cohesion (for foundation),  $c = 3\text{kPa}$   
 Pier diameter = 450mm unless noted otherwise as 600mm diameter

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	Level	2 @ 80	A-1300	800	2 @ 80	A-1300 <sup>^</sup>	700 (900) <sup>+</sup>
600	Level	3 @ 80	A-1700	1100	3 @ 80	A-1700	1000
800	Level	4 @ 80	A-2100	1300	4 @ 80	A-2100	1200
1000	Level	5 @ 80	A-2500	1500	5 @ 80	A-2500	1400
1200	Level	6 @ 80	B-2900	1800	6 @ 80	B-2600	1600
1400	Level	7 @ 80	B-3200	2000	7 @ 80	B-2900	1800
1600	Level	top 7 @ 80, 1 @ 100 btm	C-3500	2200	top 7 @ 80, 1 @ 100 btm	C-3500	2000
1800	Level	top 7 @ 80, 2 @ 100 btm	C-3900	2400	top 7 @ 80, 2 @ 100 btm	C-3900	2200
2000	Level	top 7 @ 80, 3 @ 100 btm	C-4400	2600	top 8 @ 80, 2 @ 100 btm	C-4400	2500
2200	Level	top 7 @ 80, 4 @ 100 btm	D-4900	2900	top 8 @ 80, 3 @ 100 btm	C-4400	2600
2400	Level	top 7 @ 80, 5 @ 100 btm	D-4900	3100	top 8 @ 80, 4 @ 100 btm	D-4900	2900
2600	Level	top 7 @ 80, 6 @ 100 btm	D-5500	3300	top 8 @ 80, 5 @ 100 btm	D-5500	3100
2800	Level	top 7 @ 80, 7 @ 100 btm	E-5900	3500	top 8 @ 80, 6 @ 100 btm	E-5900	3200
3000	Level	top 7 @ 80, 7 @ 100, 1 @ 120 btm	E-5900	3500 (600 dia)	top 8 @ 80, 7 @ 100 btm	E-5900	3500

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.

Design Height 'H' (mm)	Crest Slope (maximum)	2400 SLEEPER LENGTH			2000 SLEEPER LENGTH		
		Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)	Sleeper designation* (qty @ thickness in mm)	Steel Post Required	Pier Depth (mm)
400	1:4 max	2 @ 80	A-1300	900	2 @ 80	A-1300	800
600	1:4 max	3 @ 80	A-1700	1200	3 @ 80	A-1700	1100
800	1:4 max	4 @ 80	A-2100	1400	4 @ 80	A-2100	1300
1000	1:4 max	5 @ 80	A-2500	1700	5 @ 80	A-2500	1600
1200	1:4 max	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	2000 (2300) <sup>+</sup>	top 5 @ 80, 1 @ 100 btm	C-3500 <sup>^</sup>	1800 (2300) <sup>+</sup>
1400	1:4 max	top 5 @ 80, 2 @ 100 btm	C-3500	2200	top 6 @ 80, 1 @ 100 btm	C-3500	2000
1600	1:4 max	top 5 @ 80, 3 @ 100 btm	C-3900	2500	top 6 @ 80, 2 @ 100 btm	C-3500	2300
1800	1:4 max	top 5 @ 80, 4 @ 100 btm	C-4400	2700	top 6 @ 80, 3 @ 100 btm	C-3900	2500
2000	1:4 max	top 5 @ 80, 5 @ 100 btm	C-4400	2900	top 6 @ 80, 4 @ 100 btm	C-4400	2700
2200	1:4 max	top 5 @ 80, 6 @ 100 btm	D-4900	3200	top 6 @ 80, 5 @ 100 btm	D-4900	3000
2400	1:4 max	top 5 @ 80, 6 @ 100, 1 @ 120 btm	E-5900	3400	top 6 @ 80, 6 @ 100 btm	D-4900	3100
2600	1:4 max	top 5 @ 80, 6 @ 100, 2 @ 120 btm	E-5900	3600	top 6 @ 80, 7 @ 100 btm	E-5900	3400
2800	1:4 max	top 6 @ 80, 5 @ 100, 3 @ 120 btm	F-7000 <sup>^</sup>	3600 (600 dia) (4200) <sup>+</sup>	top 6 @ 80, 8 @ 100 btm	E-5900	3700
3000	1:4 max	top 6 @ 80, 5 @ 100, 4 @ 120 btm	F-7000 <sup>^</sup>	3700 (600 dia) (4000) <sup>+</sup>	top 6 @ 80, 9 @ 100 btm	F-7000 <sup>^</sup>	3500 (600 dia) (4000) <sup>+</sup>

THICKER SLEEPERS TO BE INSTALLED AT BOTTOM OF WALL PANEL

Sleepers thickness designation in table refers to quantity of sleepers @ thickness (mm)

<sup>^</sup> Steel reinforcement at base of post assembly will need to be trimmed to fit bored pier depth.

<sup>+</sup> Depth of bored pier required if trimming of steel is not to occur.



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