SMARTER SAFETY SOLUTIONS

ACP

AUSTRALIAN CONSTRUCTION PRODUCTS

Sentryline II WRBS Terminal End - Universal

Anchoring for 3 & 4 cable barriers



Installation Manual

Installation Manual: Sentryline II WRBS Terminal End - Universal

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Sentryline II WRBS Terminal End - Universal

Introduction

The Sentryline II WRBS Terminal End - Universal is used to anchor a high tensioned 3 or 4 cable barrier to the ground. The Sentryline II WRBS Terminal End has been designed and tested to meet the evaluation criteria of NCHRP 350.

The Sentryline II WRBS Terminal End - Universal has been tested to the guidelines in NCHRP 350 for a gating, re-directive cable barrier terminal end. When correctly installed, the Sentryline II WRBS Terminal End - Universal allows a vehicle to over ride or gate through the high tensioned anchor area of the terminal end.

The unique Sentryline II WRBS Terminal End - Universal technology is based on a series of cables, special washers and a 'trigger' post. This setup offers exceptional vehicle control when the cables are impacted as they disconnect from the top of the trigger post and the cable barrier is de-tensioned immediately, thus eliminating any potential of the errant vehicle to vault, roll or snag.

Safety statements

General safety

All required traffic safety precautions should be complied with. All workers should wear required safety clothing (high visibility vests, steel capped footwear, gloves, hard hats, safety glasses etc.).

Only authorised trained personnel should operate any machinery. Where overhead machinery is used, care must be taken to avoid any overhead hazards.

Before auguring, always have the area checked for underground services by the appropriate service providers.

Gloves should be worn at all times.

Sentryline II WRBS Terminal End - Universal safety statements

All installers must be well clear of machinery while the holes are augured. The components are not heavy enough to require specialized lifting equipment, but due to the dimensions and bulky nature, care should be taken when lifting the larger components into position. A maximum weight of 38kg will be encountered when installing the ground strut and rebar cage assembly, two installers should do this.

Avoid placing hands or fingers in and around moving parts when components are being lifted and manoeuvred into place.

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Before installation

Design, selection and placement of the Sentryline II WRBS Terminal End - Universal shall be in accordance with the local road authority guidelines and the details shown in the construction drawings. Installation shall be in accordance with the installation instructions supplied for this product.

Before installing a Sentryline II WRBS Terminal End - Universal , ensure that all components required for the terminal end are on site and have been identified. The Sentryline II WRBS Terminal End - Universal is a highly engineered safety device made up of a relatively small number of parts. Before starting installation ensure that one is familiar with the make up of the terminal end. Refer to the 'Bill of materials' and 'Parts identification' sections in this manual for more information.

Depending on the application and circumstances at the site, installation and assembly of the system should take one person crew less than 15mins once the concrete foundation piles are poured and set.

Foundation piles

Two foundation options are available; the soil conditions that exist on site will determine which option to use.

NOTE: IF THE SOIL CONDITIONS ARE UNKNOWN THE 'DEFAULT' OPTION MUST BE USED AT ALL TIMES.

Default Option

The ground strut and rebar cage assembly must be cast into piles with the following dimensions. The augured holes for this option are 450mm diameter by 2500mm deep and required to be filled with 25mpa concrete. (Shown in figure A below.)

Shallow Option

ONLY if the soil has been verified as a particular soil using a DCP (dynamic cone penetrometer) or SV (shear vane) with results that match or exceed the required parameter can the 'shallow' pile option be used. The dimensions of these holes are 450mm diameter by 1000mm deep and required to be filled with 25mpa concrete.

Tools required

The same tools required to install the cable barrier will also install an Sentryline II WRBS Terminal End - Universal:

> Auger for drilling holes, 450mm and 300mm
> 300mm Wrench
> Measuring tape
> String line
> Cut off saw

Sentryline II WRBS Terminal End - Universal - Parts identification



Ground strut
(1 required)



Rebar cage
(3 required plus 12x M24 nuts)



Anchor cables
(2 required)



Washers and nuts
(Full set shown)



Trigger post
(1 required)



3 Wire cable barrier



4 Wire cable barrier

(Fittings may vary; the 3mm thick polyethylene washers and 6mm thick, 50mm ø galvanised steel washers are always required)

All steel components used in the Sentryline II WRBS Terminal End - Universal are hot dipped galvanised, except the rebar cages which are cast into the concrete piles.

Sentryline II WRBS Terminal End - Universal - Bill of materials

Sentryline II WRBS Terminal End - Universal (connected to a 4 cable barrier)

> 1 x Ground strut
> 3 x Rebar cages (c/w 12x M24 nuts)
> 1 x Trigger post
> 2 x Anchor cables (c/w 4 x M24 nuts)
> 1 x 10mm thick rectangular steel washer
> 1 x 6mm thick rectangular steel washer
> 1 x 3mm thick rectangular polyethylene washer
> 4 x 3mm thick square polyethylene washers
> 4 x 6mm thick 50mm ø steel washers

Sentryline II WRBS Terminal End - Universal (connected to a 3 cable barrier)

> 1 x Ground strut
> 3 x Rebar cages (c/w 12x M24 nuts)
> 1 x Trigger post
> 2 x Anchor cables (c/w 4 x M24 nuts)
> 1 x 10mm (thick) rectangular steel washer
> 1 x 6mm (thick) rectangular steel washer
> 1 x 3mm (thick) rectangular polyethylene washer
> 3 x 3mm (thick) square polyethylene washer
> 3 x 6mm thick 50mm ø steel washers

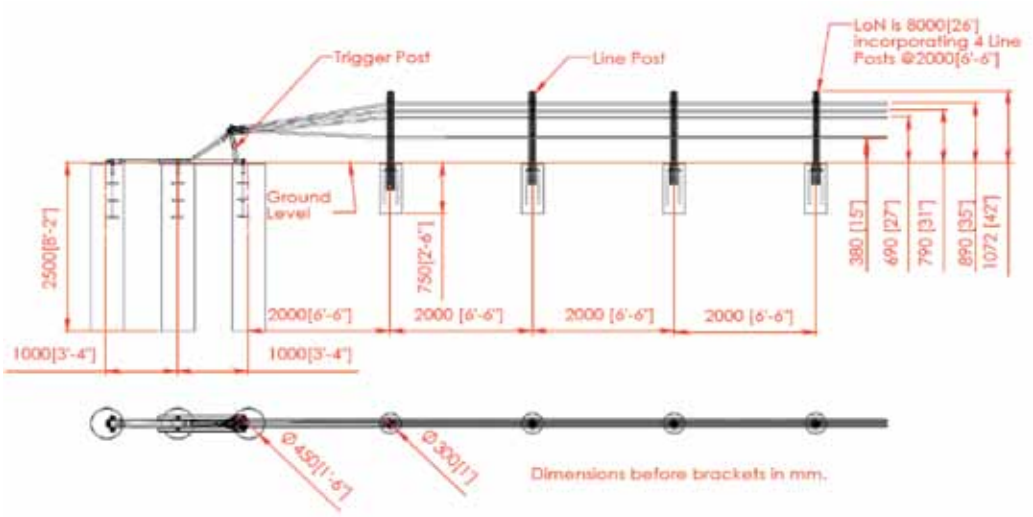
Sentryline II WRBS Terminal End - Universal - Installation instructions

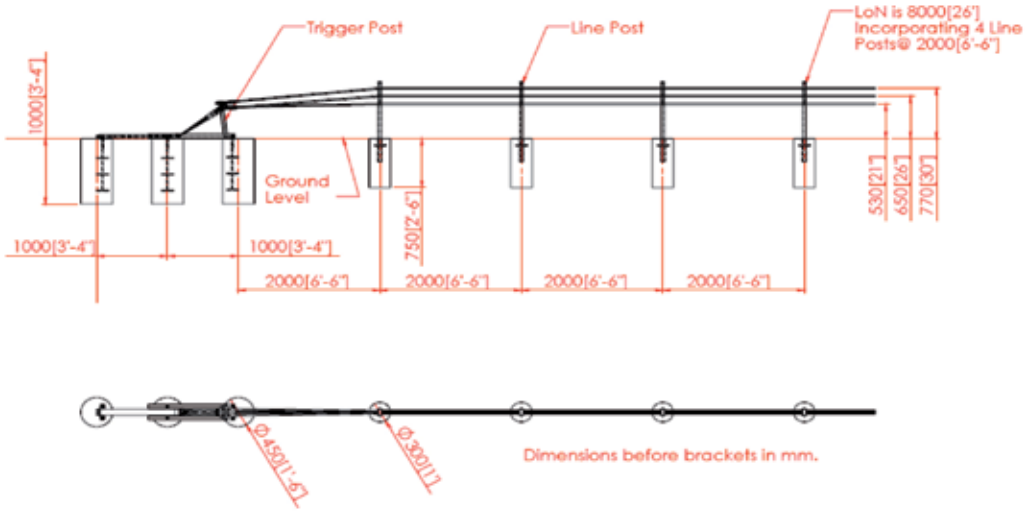
Step 1 – Site Preparation

The Sentryline II WRBS Terminal End - Universal should be installed on flat, level ground and some site grading may be required. The positioning of the 10m Sentryline II WRBS Terminal End - Universal in relation to the cable barrier will always be the same configuration.

The Sentryline II WRBS Terminal End - Universal is a continuation of the cable barrier and should be installed in a tangent position. If this is not possible, a maximum flare rate of 30:1 is preferred.

The line posts between the LoN and the Sentryline II WRBS Terminal End - Universal trigger post must always be at 2m spacing as shown below.





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Step 2 – Installing the ground strut

BEFORE DRILLING ALWAYS HAVE THE AREA CHECKED FOR UNDERGROUND SERVICES

Consult the construction drawings for which of the following foundation options to use.

Default foundation pile

Using an auger, drill 3 x 450mm diameter holes 2500mm deep at 1000mm centres. Theoretical volume of concrete required for all 3 piles is 1.2m³. (Shown in **photo 1**.)

OR

Shallow foundation pile

- for suitable ground conditions only. (Refer page 6.)

Using an auger, drill 3 x 450mm diameter holes 1000mm deep at 1000mm centres. Theoretical volume of concrete required for all 3 piles is 0.48m³. (Shown in **photo 1**.)

Ground strut and rebar cage assembly

Attach the rebar cages to the ground strut as shown using M24 nuts, one below and one above the ground strut. At least 15mm of thread above the top nut must be showing on ALL threads. (Shown in **photo 2**.)

Construction

Fill the holes to the top with 25mpa concrete, place the rebar cages connected to the ground strut into the foundation piles with the middle rebar cage centred into the centre pile. The end rebar cages will then both fit off-centre in their respective piles as per the Sentryline II WRBS Terminal End - Universal design.

The hollow RHS end of the ground strut is at the upstream end. Be careful that this end doesn't sink while the concrete is curing because there needs to be sufficient room to install the 10mm (thick) washer and anchor cables. (Shown in **photo 3** below.)

N.B. Due to the drilling and removing spoil the actual amount of concrete required is likely to be larger than the theoretical volume.



Photo 1



Photo 2



Photo 3

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Step 3 – Installing the anchor cables

Once the concrete has had sufficient time to harden, the cables can be connected to the ground strut. Holding both cables at once, slot one end down through the RHS end of the ground strut. The large 10mm (thick) washer is positioned onto the threads at the upstream end of the ground strut and the nuts attached as shown.

At the other end of the cables the 3mm (thick) polyethylene washer is positioned onto the threads first, followed by the 6mm (thick) steel washer. The nuts are wound onto the threads with 2 threads showing through as shown.

4)



6)



5)



7)



Installation Manual: Sentryline II WRBS Terminal End - Universal

Step 4 – Connecting the trigger post

To connect the trigger post, remove the two M24 nuts on the top side of the downstream end of the ground strut. The trigger post then drops over the exposed threads and the nuts re-attached and tightened with a wrench (trigger post is angled towards the ground strut).

Note: At least one thread must be wound through the nuts when re-attached.

Step 5 – Connecting the anchor cables to the trigger post

The cables with washers are positioned onto the triangular wedges on the trigger post. The anchor cables are then tightened using a wrench on the nuts at the upstream end of the ground strut until the anchor cables are taut.

Make sure the cables remain fully inside the trigger post.

8)



9)



10)



11)



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Step 6 – Connecting to a 3 cable barrier

The top cable from the cable barrier is placed in the top slot of the trigger post while the bottom two cables are placed in either side of the trigger post in the bottom slots. (either cable to either side) Make sure that the 3mm (thick) polyethylene washer is positioned between the 6mm (thick) 50mm ø steel washer and the trigger post on each cable.

12)



13)



OR

Step 6 – Connecting to a 4 cable barrier

The top two cables from the cable barrier are placed on either side of the trigger post in the top slots (either cable to either side) while the bottom two cables are placed in either side of the trigger post in the bottom slots (either cable to either side). Make sure that the 3mm (thick) polyethylene washer is positioned between the 6mm (thick) 50mm ø steel washer and the trigger post on each cable.

14)



15)



Sentryline II WRBS Terminal End - Universal - Installation examples

Installed Sentryline II WRBS Terminal End - Universal anchor assembly connected to a 3 cable barrier

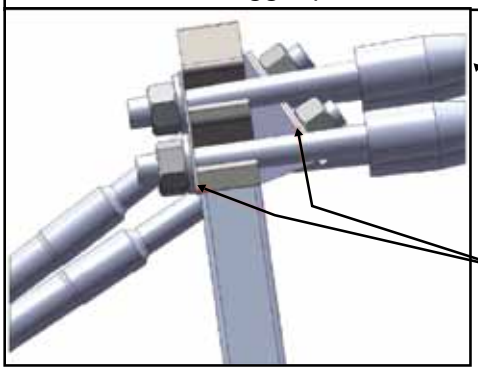


Installed Sentryline II WRBS Terminal End - Universal anchor assembly connected to a 4 cable barrier



Installation Manual: Sentryline II WRBS Terminal End - Universal

Installation Checklist	Y	N
General Ground is level for a 1500mm cord around ground strut The M24 nuts holding the ground strut to the foundation are spanner tight At least 1 thread is showing above the nuts holding the trigger post to the ground strut and rebar cage The 10mm (thick) steel washer has been used to fix the anchor cables to the upstream end of the ground strut The 3mm (thick) polyethylene washer and 6mm (thick) steel washer have been used to fix the anchor cables to the trigger post (see diagram below for orientation) The anchor cables are firmly held in the body of the triangular wedges on the trigger post and the M24 nuts at the upstream end of the ground strut are spanner tight		
Connected to a 3 Cable Barrier The top cable of the cable barrier is positioned in the top slot on the trigger post The two bottom cables are positioned on either side of the trigger post in the bottom slots The 3mm (thick) square polyethylene washer is between the 6mm round steel washers and the trigger post for all three cables (See diagram)		
Connected to a 4 Cable Barrier The two top cables of the cable barrier are positioned on either side of the trigger post in the top slots The two bottom cables are positioned on either side of the trigger post in the bottom slots The 3mm (thick) square polyethylene washer is between the 6mm round steel washer and the trigger post for all four cables (See diagram)		

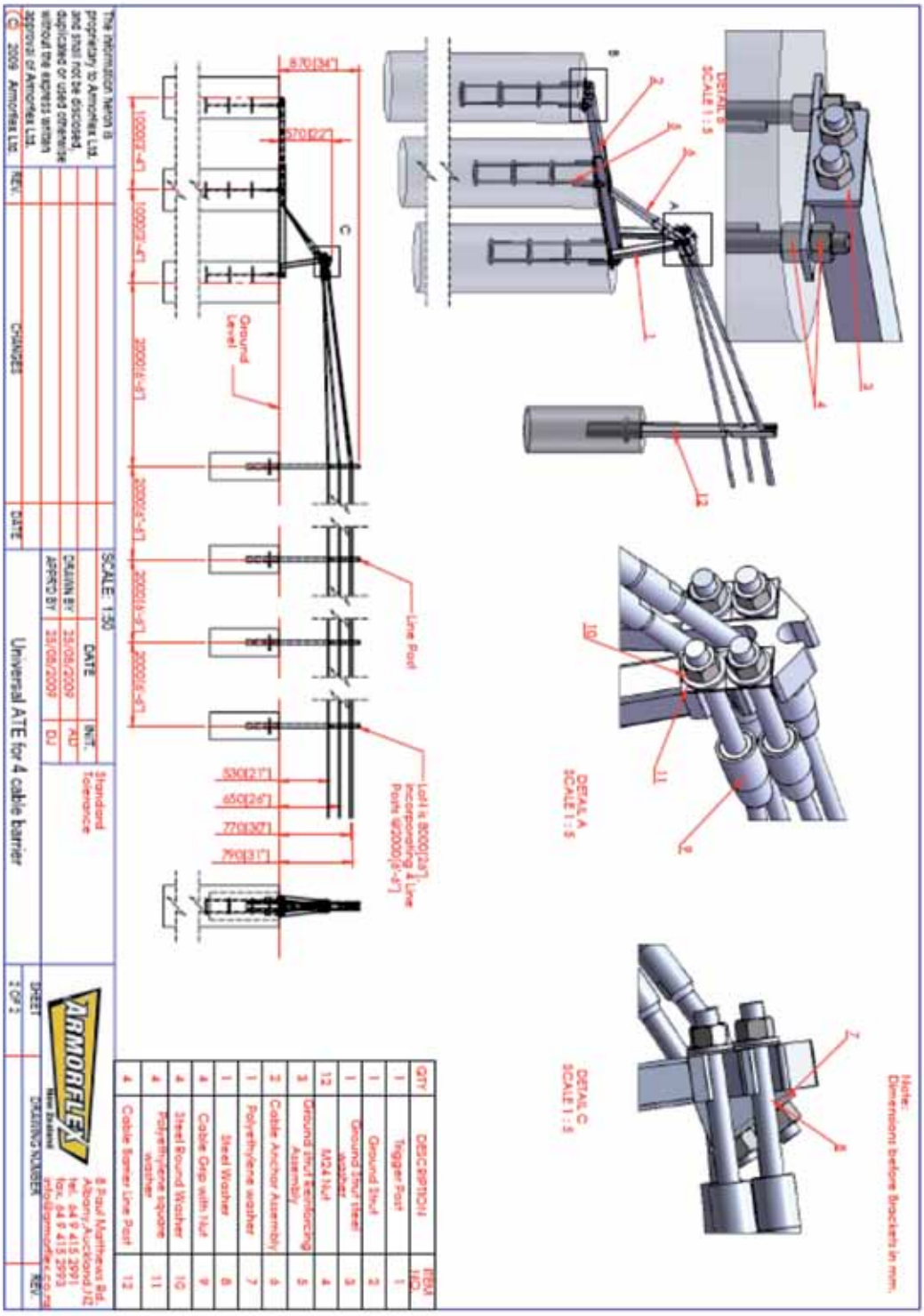


Location:			
Installed by:		Date:	
Inspected by:		Date:	

Contact ACP for more information on this or other road safety products

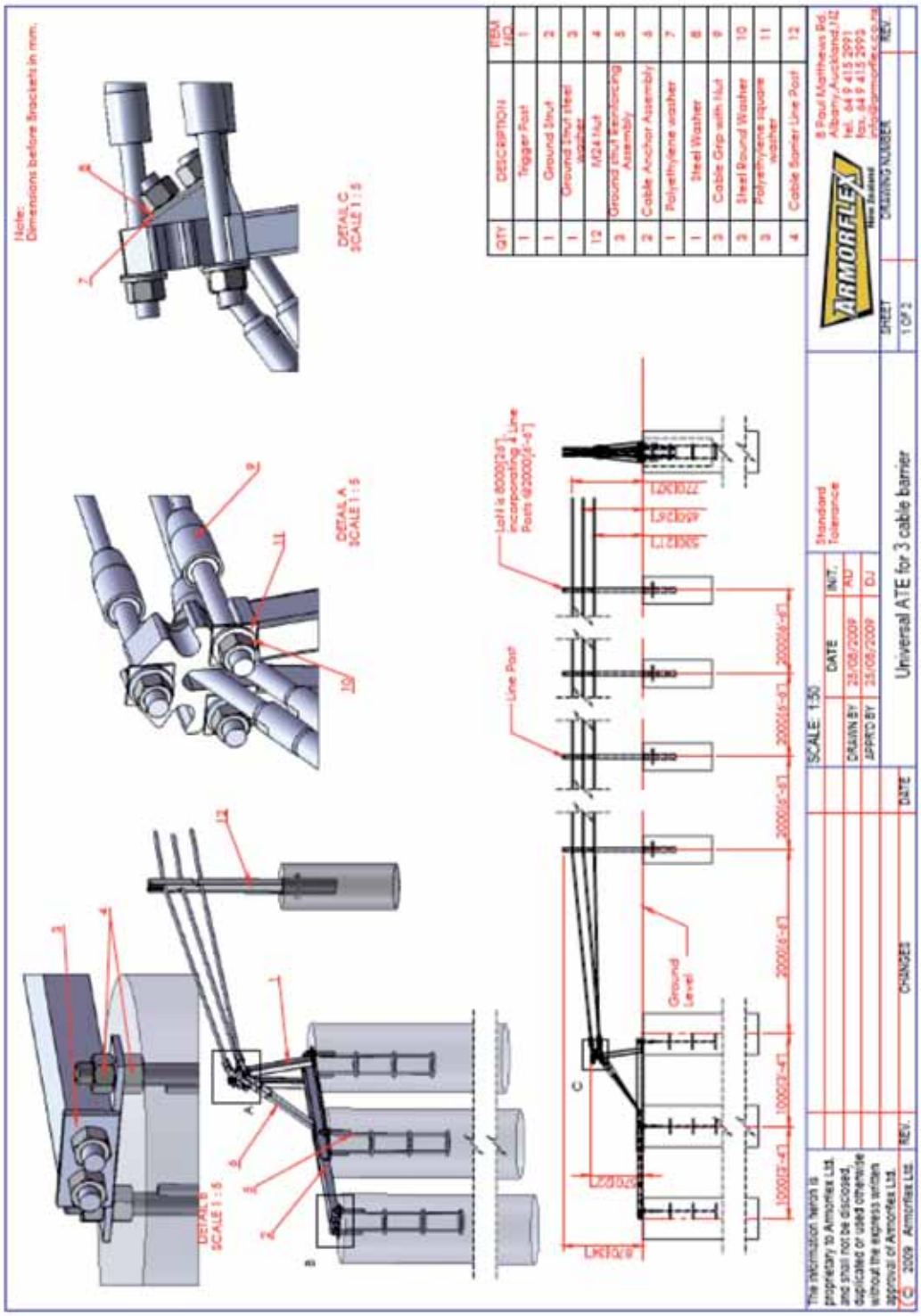
Appendix - Technical drawings

Sentryline II WRBS Terminal End - Universal – Connecting to a 4 cable barrier



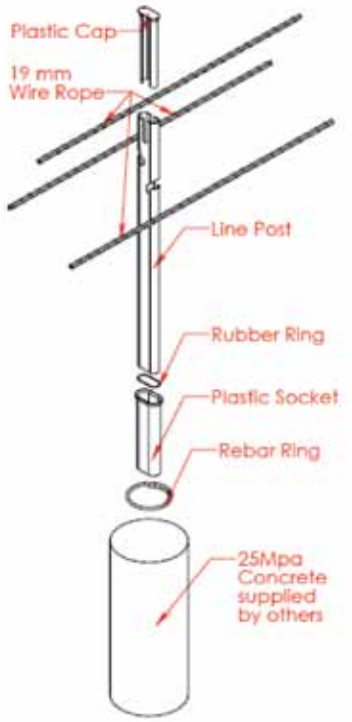
Appendix - Technical drawings

Sentryline II WRBS Terminal End - Universal – Connecting to a 3 cable barrier

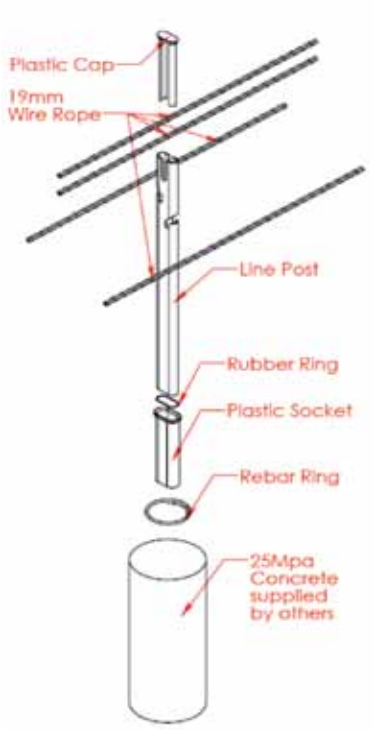


Appendix - Technical drawings

3 cables line post set up



4 cables line post set up



Line post 'batter hinge point' set up

