Rope Access Pty Ltd T/AS Safety Roof Anchors
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PO Box 758, Freshwater NSW 2096
sales@safetyroofanchors.com.au
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SPECIFICATION: SRA STATIC LINE - CONCRETE MOUNT

The System

Horizontal life line designed to operate horizontally and around the corners offers robust stainless steel construction for the toughest environmental conditions.

Special Features:

- Easy to install system
- All stainless steel components
- Up to 10 metres fixing intervals
- Hands free operation utilizing SRA glider
- Rugged stainless steel shock absorber

Uses:

SRA static line is suited to installation into concrete and steel structures to offer uninterrupted fall protection from unprotected edges in accordance with AS/NZS 1891.2.2001

Technical Data

Material Used:

Investment Cast 316 Stainless Steel & 316 Stainless Steel

Finish:

Electro polished

Number of Users:

2 Persons/Line

1 Person/Span

Dimensions:

- Cable – Stainless Steel 8 mm, 7x7 construction
- Cable height – 125 mm

Intermediate Spacing:

- 3 - 20m – min 3m: max 4m spacing
- 20 - 30m – min 3m; max 6m spacing
- 30 - 35m – min3m; max 8m spacing
- 35 - 305m – min 3; max 10m spacing

Fixing Details:

SRA static line can be attached to any horizontal concrete surface, using the appropriate fixings.

Maintenance:

Inspection and load testing required by competent person at intervals not exceeding 12 months as specified in AS 1891.4:2009

Standards:

Complies with WHS Act 2011 and relevant Codes of Practice.

Australian Standard – AS/NZS 1891.2:2001

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SPECIFICATION: SRA STATIC LINE – STEEL ROOF MOUNT

The System

Horizontal life line designed to operate horizontally and around the corners offers robust stainless steel construction for the toughest environmental conditions.

Special Features:

- Easy to install system
- All stainless steel components
- Up to 10 metres fixing intervals
- Hands free operation utilizing SRA glider
- Rugged stainless steel shock absorber
- Extra strong braced end anchors

Uses:

SRA static line is suited to installation into concrete and steel structures to offer uninterrupted fall protection from unprotected edges in accordance with AS/NZS 1891.2.2001

Technical Data

Material Used:

Investment Cast 316 Stainless Steel & 316 Stainless Steel

Finish:

Electro polished

Number of Users:

2 Persons/Line

1 Person/Span

Dimensions:

- Cable – Stainless Steel 8 mm, 7x7 construction
- Cable height – 125 mm

Intermediate Spacing:

- 3 - 20m – min 3m: max 4m spacing
- 20 - 30m – min 3m; max 6m spacing
- 30 - 35m – min3m; max 8m spacing
- 35 - 305m – min 3; max 10m spacing

Fixing Details:

SRA static line can be attached to most structurally sound steel roofs, using the supplied fixings.

Maintenance:

Inspection and load testing required by competent person at intervals not exceeding 12 months as specified in AS 1891.2:2001

Standards:

Complies with WHS Act 2011 and relevant Codes of Practice.

Australian Standard – AS/NZS 1891.2:2001

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SPECIFICATION: SLTR static line traveller

The System

The SLTR static line traveller provides users with hands free, uninterrupted access along the whole length of static line system without the need to re-connect when passing intermediate brackets.

It features easy to operate, reliable locking gate mechanism and self locking karabiner.

Special Features:

- Easy operation and reliability
- Complete traceability
- Engineered and made in Australia

Uses:

The SLTR static line traveller is engineered for SRA static lines with 8mm (7x7 construction) 316 s/s cable.

Only the karabiner supplied with the unit must be used. The SLTR traveller is suitable for single person use only!

Operation by trained and certified personnel in accordance with AS/NZS 1891.4:2009, AS/NZS 1891.2:2001 and manufacturer's instructions.

Technical Data

Material Used:

Body: 316 Stainless Steel

Finish:

Electro polish

Dimensions:

- Overall length – 107mm
- Width – 55 mm
- Thickness: 28mm
- Eye Diameter – 15mm x 13 mm
- Weight – 590g

Maintenance:

Inspection required by competent person at intervals not exceeding 3 months.

Standards:

Complies with WHS Act 2011 and relevant Codes of Practice.

Australian Standard – AS/NZS 1891.2:2001

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SPECIFICATION: SLSA Energy Absorber

The System

The SLSA Energy Absorber is custom engineered to reduce static line tension forces experienced in the cable, anchorages and the host structure. The 8mm thick stainless steel shock absorber is resistant to corrosion and encased in shrunken polymer providing protection from the rigors of outdoor exposure.

Special Features:

- Unique robust design
- Complete traceability
- Engineered and made in Australia

Uses:

SLSA Energy absorber is engineered to work with all SRA static lines using 8mm (7x7 construction) 316 s/s cable with Blue Wave swaged and swageless cable fittings.

Installation by trained and certified personnel in accordance with AS/NZS 1891.4:2009, AS/NZS 1891.2:2001 and manufacturer's instructions.

Technical Data

Material Used:

Body: Stirlings 316 Stainless Steel

Tandem links: Investment cast 316 Stainless steel

Finish:

Body: Rumbled

Tandem links: electro polished

Deployment force:

7.25 kN

Full extension:

33 kN

Ultimate strength:

49.128 kN

Dimensions:

- Overall length – 295mm
- Width – 80 mm
- Thickness: 8mm
- Eye Diameter – 12 mm
- Weight – 1005 g

Fixing Details:

- 2x Blue Wave Pins

Maintenance:

Inspection required by competent person at intervals not exceeding 12 months as specified in AS/NZS 1891.2:2001

Standards:

Complies with WHS Act 2011 and relevant Codes of Practice.

Australian Standard – AS/NZS 1891.2:2001

SLSA Energy Absorber Installation Instructions

Things to know:

The SLSA Energy Absorber is engineered to reduce static line tension forces experienced in the cable, anchorages and the host structure. It is optimized for all SRA static lines with 8mm (7x7 construction) 316 s/s cable with swaged and swageless BlueWave terminals. Do not use as a personal energy absorber! Damaged or deployed energy absorber must be removed from service and complete system inspected and re-certified.

Fixing options:

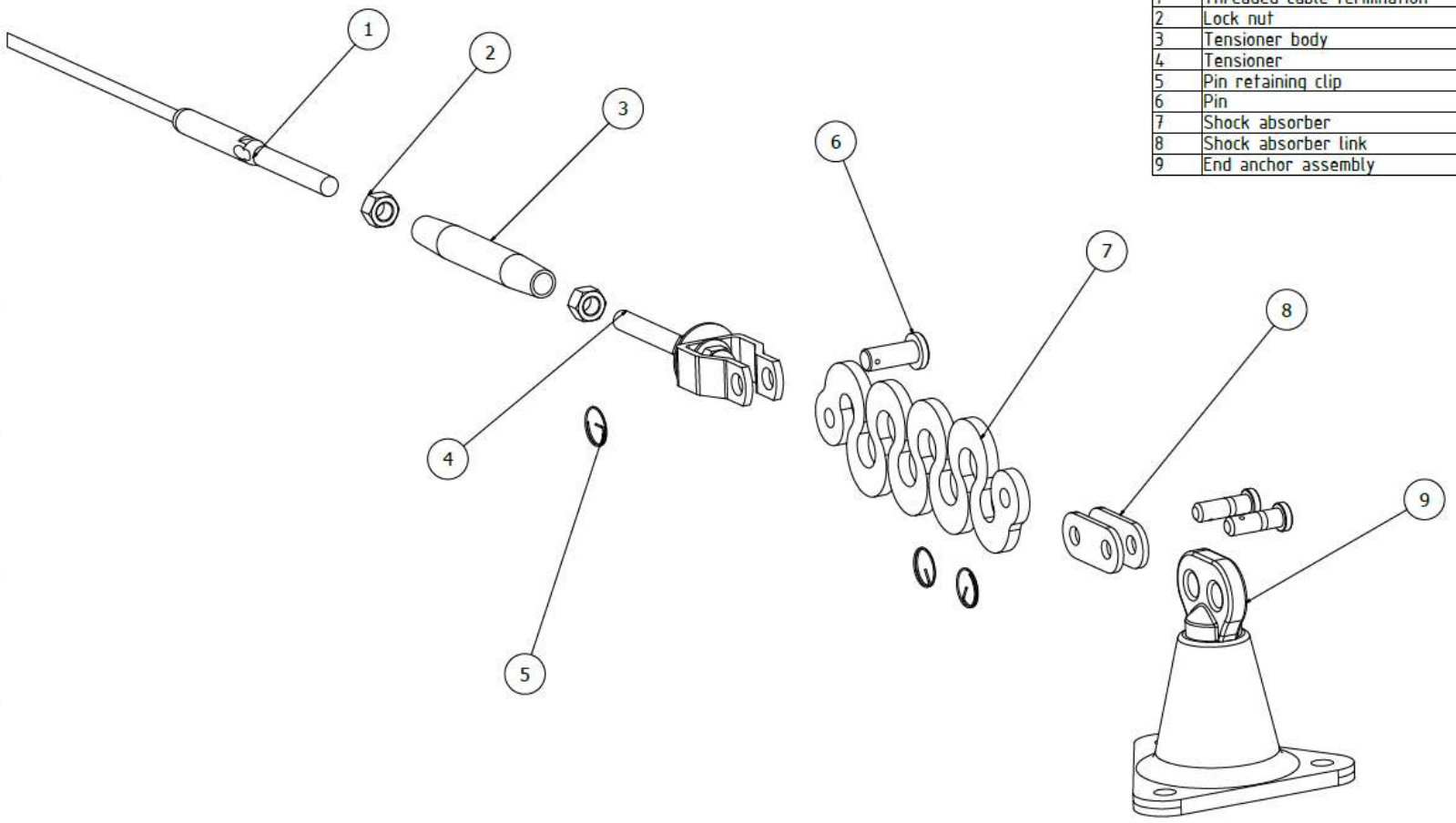
Blue Wave pins only (part number 062812)

Installation steps

- Align one hole of both Shock Absorber Links (8) with one hole of the Energy Absorber (7). Insert a Pin (6) through both Shock Absorber Links (8) and the Energy Absorber (7), ensuring that the Pin (6) is fully engaged
- Fit the Pin Retaining Clip (5) into the small hole located in the end of the Pin (6). Ensure that the Pin Retaining Clip is fully threaded through the hole and cannot fall out
- Align the available holes of both Energy Absorber Links (8) with inner hole of the End Anchor Assembly (9). Insert a Pin (6) through both Energy Absorber Links (8) and the End Anchor Assembly (9), ensuring that the Pin (6) is fully engaged
- Fit the Pin Retaining Clip (5) into the small hole located in the end of the Pin (6). Ensure that the Pin Retaining Clip is fully threaded through the hole and cannot fall out
- Align the holes of the Tensioner (4) with the available hole of the Energy Absorber (7). Insert a Pin (6) through both Tensioner (4) and the Energy Absorber (7), checking that the Pin (6) is fully engaged
- Fit the Pin Retaining Clip (5) into the small hole located in the end of the Pin (6). Ensure that the Pin Retaining Clip is fully threaded through the hole and cannot fall out

IF IN DOUBT ASK!

BILL OF MATERIALS	
ITEM	DESCRIPTION
1	Threaded cable termination
2	Lock nut
3	Tensioner body
4	Tensioner
5	Pin retaining clip
6	Pin
7	Shock absorber
8	Shock absorber link
9	End anchor assembly



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TITLE: Shock Absorber Assembly

PROJECT: Static Line System

TO BE READ IN CONJUNCTION WITH SRA PRODUCT DOCUMENTATION
INSTALLATION TO BE CONDUCTED IN ACCORDANCE WITH SRA DIRECTIONS AND RELEVANT AUSTRALIAN STANDARDS

DATE DRN
DR Dwg. N.
SCALE

DRAWING No.

REV No. A

FULL SIZE 0 50 100 150 200 250 300

www.safetyroofanchors.com.au Tel: 9939 3523 Fax: 9939 7868 Address: 4B/3-9 Kenneth Rd Manly Vale NSW 2093

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SPECIFICATION: PSL01 STATIC LINE END ANCHOR POINT (CONCRETE MOUNT)

The System

Anchorage is used as an end anchor point for static line installations in concrete.

Special Features:

- Robust design
- Full traceability
- Fully engineered and independently tested

Uses:

PSL01 can be used as a static line end anchor point or as a bracing to add strength to existing static line end anchor point.

Technical Data

Material Used:

Investment Cast 316 Stainless Steel

Finish:

Bead Blast or E-Polished

Ultimate Load:

28 kN

Dimensions:

- Height – 150 mm
- Eye Diameter – 2 x 16 mm attachment hole
- Weight – 1,565 g

Fixing Details:

- 1 x Through bolt M12 (HOLE 14 DIA)
- 1 x Chemical HILTI HVU M12 (HOLE 14 DIA)

Maintenance:

Permanent installed anchorages inspection required by competent person at intervals not exceeding 12 months as specified in AS 1891.4:2009/AS/NZS 4488.2:1997

Standards:

Complies with - WHS Act 2011

Australian Standard – AS/NZS 1891.4:2009, AS/NZS 4488.2:2001

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SPECIFICATION: SL01 STATIC LINE END ANCHOR POINT

The System

Anchorage is used as end anchor point for static lines in conjunction with SRA cone pedestal.

Special Features:

- Multipurpose anchor point
- Can be used for both Fall arrest/Rope access
- High breaking strain

Uses:

SL01 End anchor point can be used as end stanchion for static lines as well as individual anchorage point in accordance with AS/NZS 4488.2:2001 and 1891.4:2009

Technical Data

Material Used:

Investment Cast 316 Stainless Steel

Finish:

Bead Blast or E-Polished

Ultimate Load:

28 kN

Dimensions:

- Height – 50 mm
- Eye Diameter – 2 x 16 mm attachment hole
- Weight – 270 g

Fixing Details:

- Fits M12 rod

Maintenance:

Permanent installed anchorages inspection required by competent person at intervals not exceeding 12 months as specified in AS 1891.4:2009/AS/NZS 4488.2:1997

Standards:

Complies with - WHS Act 2011

Australian Standard – AS/NZS 1891.4:2009, AS/NZS 4488.2:2001

S.R.A Static Line Fall Arrest System

System Information & Installation Requirements

Issue 3, 2016

Safety Roof Anchors

www.safetyroofanchors.com.au

Contents

1 Introduction

Safety Roof Anchors is an Australian company established and operated by rope access technicians and certified riggers, with many years of hands on experience.

After numerous years spent working at heights, we decided it was time to put our practical knowledge to use and create better, safer products that are robust yet easy to install.

Our range of rope access and fall arrest anchor points and static lines has been fully engineered and rigorously tested. All parts are genuine SRA products, designed and manufactured specifically for use in industrial rope access and fall arrest applications.

Our unique way of fixing into light structures such as metal roofs and timber trusses, provides unrivalled strength due to the maximized use of the host structure working in unison with the anchor point. As a result, we have bridged the gap between rope access and fall arrest anchor points which means that many of our products can be used in both applications.

Our approach is different because we know that only the best will do when you are working at height. We are driven by innovation and quality to provide you with the products you can trust when it matters the most.

Please visit us at:

www.safetyroofanchors.com.au

or call us on 02 9939 3523 to discuss your project.

2 SRA Permanent Static Line System

The SRA Permanent Static Line System is a fully engineered safety system which can be adapted to provide effective fall protection across a wide range of elevated work sites. Features of the system include:

- A continuous secure connection between the personal shuttle attachment and the static line whilst allowing for freedom of movement around the work area
- Modular componentry, enabling the system configuration to be tailored for a variety of working environments
- Multiple user capability
- Compliance to AS 1891.2
- Simple installation with multiple attachment options catering for varying types of support structures
- A shock absorbing element to reduce the loads imposed on the support structure in the event of a fall
- High quality componentry made to provide security over a long life span

3 System Notes& Important Warnings

- It is the responsibility of the installer to ensure that the system installation is in accordance to AS/NZS 1891.4 and the requirements contained within this document. The installer is obliged to confirm that the system and its supporting structure is safe for operation by adhering to all relevant Australian Standards, SRA instructions and prudent engineering practises
- SRA strongly recommend completion of the Installers Training Course before installation of the system. This course is held by SRA and aims to provide installers with important information to assist with the configuration and installation of the static line system. Alternately, SRA can offer installation as part of a full service supply. For further details on Training Courses or installation services, please refer to www.safetyroofanchors.com.au or call 02 9939 3523
- The SRA static line system should only be used by people with the necessary training and competence level. All system operators must adhere to all relevant work health and safety regulations, safe working procedures and applicable Australian Standards
- System integrity and safety can only be assured through the appropriate service and maintenance regime. Refer to Section 5 for the maintenance requirements
- The safety of the system is highly dependent upon the integrity of the structure to which it is fixed and cannot be warranted by SRA. The support structure must be able to withstand the forces applied at the end and intermediate anchors in the event of a fall. Refer to Section 4 for further details on maximum anchor forces. It is recommended that the support structure be inspected for structural suitability by a structural engineer prior to installation of the system
- The static line system can only offer fall protection when used in conjunction with appropriate personal fall arrest equipment which meets the requirements specified in AS/NZS 1891.1 or AS/NZS 1891.3. Sufficient fall clearance is also required such that the equipment can fully deploy without the user impacting with any other objects or structures
- In the case of a fall, it is strongly recommended that the system be taken out of service until it is inspected, repaired (if required) and re-certified as safe by a competent person
- It is strongly recommended that any fibre ropes, webbing lines or components of the personal fall arrest equipment be destroyed or returned to the manufacturer directly after the occurrence of a fall
- Following any signs of activation of the systems energy absorption device, the system should be removed from service until such time that the device is replaced and the system re-certified as safe by a competent person
- Exposure to chemicals or hazardous environments may compromise the safety of the static line system. Should this be the case, SRA should be contacted to determine suitability for use in that environment
- SRA cannot be held responsible for any products that have not been installed, maintained or used in a correct manner. Great effort is made by SRA to ensure all documentation and guidance given by is clear and understandable, however SRA cannot be held accountable for any incorrect installation or use resulting from misinterpretations of SRA directives

If there are any uncertainties or assistance is required, please contact SRA.

4 System Design

When designing a static line system for a given application care must be taken such that the safety of the users is not compromised. To ensure system integrity the fundamental layout must remain within the defined limits. In addition, the support structure must have sufficient capacity to withstand the resulting loads in the event of a fall, as defined by the methodology of Section 4.2. Attention must also be paid to ensure that users will not experience an impact or excessive forces in the event of a fall. This section provides a guide to the design of an appropriate Static Line System; however SRA should be contacted if further clarification or guidance is required.

4.1 Configurations and Limitations

Table 4.1 details the range of permissible line configurations in terms of overall static line length and span length. The overall static line length is deemed as the total distance covered by the cable from end anchor to end anchor and may not lie outside the limits given in Table 4.1. The single span length is defined as the distance measured between any two adjacent anchor points (end or intermediate).The length of single spans may vary, however all single span lengths must adhere to the limits for the corresponding overall static line length as given in Table 4.1.

Table 4.1. Anchor Span Guide Table

Overall Static Line Length (m)	Minimum Single Span Length (m)	Maximum Single Span Length (m)
3 to 20	3	4
20 to 30	3	6
30 to 35	3	8
35 to 305	3	10

The SRA static line system allows a maximum of two (2) users to be coupled to it simultaneously. In the case of two users on a single system, only one person is permitted within a given span at any time.

4.2 Layout

In addition to the configuration limitations given in Section 4.1, the following considerations must be made when planning the layout of the static line system to be installed:

- Minimisation of fall distance
- Adequate fall clearance below the operator(s)
- Minimisation of swing/pendulum effects in the event of a fall

The above points must be considered with required operator tasks in mind. The location of the static line should be such that the operator can still perform the necessary tasks with adequate fall clearance and with minimal fall distance and pendulum effects.

In addition to this, the static line must be configured such that in the case of a fall it will not impart loads that cannot be reacted by the supporting structure. Two different applied loads must be considered independently; forces acting in the direction of the fall and loads resulting from the fall force being transmitted along the length of the line. These applied loads are indicated by the arrows shown in Figures 4.1 and 4.2.

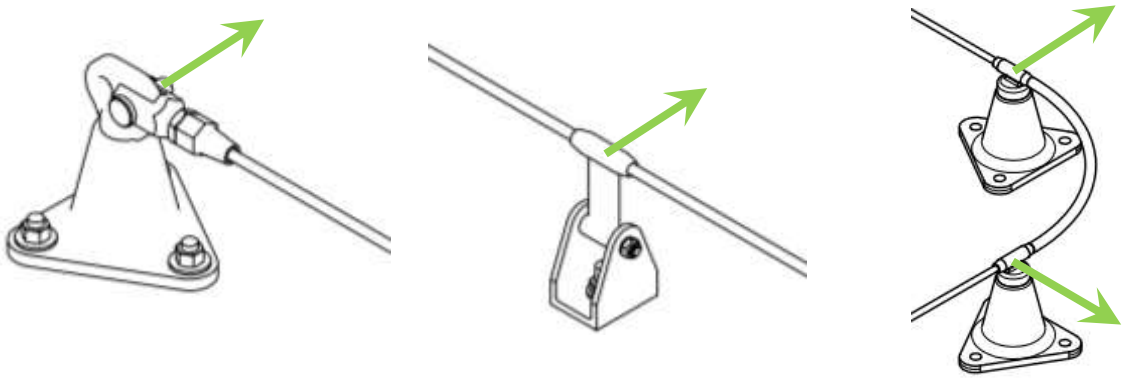


Figure 4.1 Loads acting in the fall direction

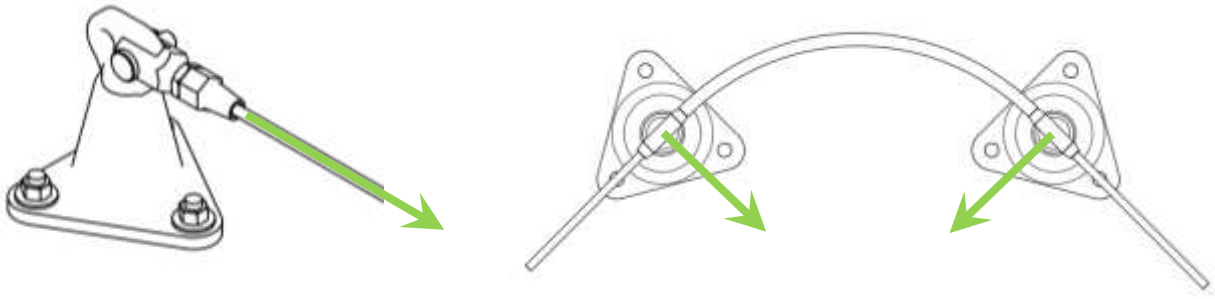


Figure 4.2Loadstransmitted along the line

As shown in Figure 4.1, intermediate support, corners and end anchors may be subject to a force acting perpendicular to the line in the direction of the fall.This represents the case where a fall occurs close to an anchorage and the load will applied in the direction of the fall (the arrows in Figure 4.1 are indicative only). The support structure at each intermediate support, corners and end anchors must be able to withstand a load of this type with a magnitude of 12kN.

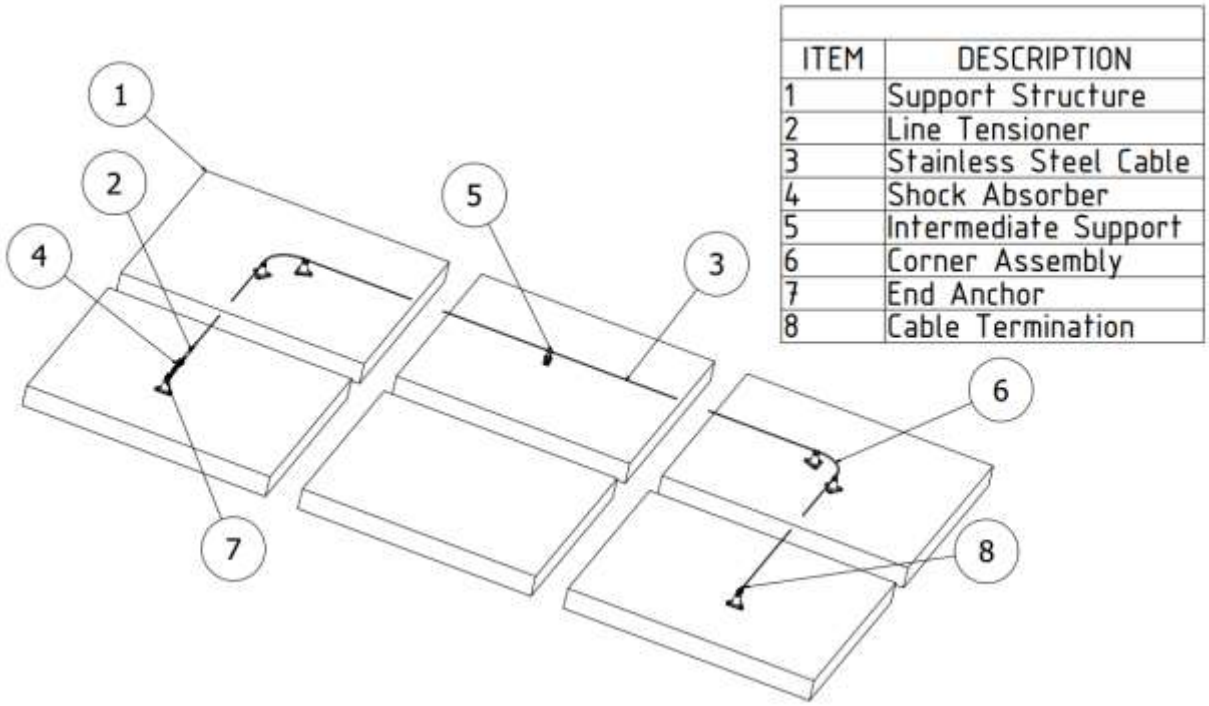
A separate case that must also be considered is that when a fall occurs at some location along the unsupported span of the static line. In this case, forces will be transmitted along the cable and applied to the end anchors and corners in the directions shown in Figure 4.2. The support structure must have sufficient strength to ensure that these forces can be withstood. The magnitude of these forces are dependentupon the configuration of the system installed and must be determined individually for each installation. SRA should be contacted for assistance in calculating the forces applied to the structure in the event of a fall.

It is highly recommended that the support structure be inspected for structural suitability by a structural engineer prior to installation of the system.

4.3 Required Componentry

The basic required components of the Static Line System are as follows:

- Two end anchors of a type suitable for attaching to the supporting structure (refer to Section 4.4)
- A sufficient length of stainless cable with end appropriate terminations- either supplied fitted by SRA or assembled on site (refer to Section 6.4)
- A line tensioner assembly
- Astatic line shock absorber
- A sufficient number of suitable intermediate anchors and corner assemblies to route the line through the required path. This must be determined such that the maximum line span does not exceed that given by Table 4.2 and does not result in loads exceeding the capacity of the support structure (refer to Section 4.2)



ITEM	DESCRIPTION
1	Support Structure
2	Line Tensioner
3	Stainless Steel Cable
4	Shock Absorber
5	Intermediate Support
6	Corner Assembly
7	End Anchor
8	Cable Termination

Figure 4.3 Basic system components

In addition to the fundamental static line components, safe operation of the system also requires

- One Static Line Shuttle per user of the system
- One personal harnesses & fall arrest device (including energy absorber) for each user
- One system information plate is required for each regular entry point to the system

Note that unless stated otherwise by SRA, all components of the Static Line System must be those supplied by SRA. Safe operation of the system cannot be guaranteed if any component(s) is substituted with those from another supplier. SRA generally supplies all the necessary fixings need to mount the end and intermediate anchors with the exception of those

which are to be affixed to concrete. In this case suitable fixings must be determined based on the specific mounting application. The fixings, mounting locations and installation methods must be selected in accordance with the manufacturer's guidelines such that the corresponding end anchor reaction forces (Section 4.1) can be withstood. SRA recommends the use of Hilti products and Section 6 provides further details on installation methods.

4.4 Anchor Types & Selection

SRA provides a range of end and intermediate anchor designs in order to accommodate fixation to range of roof/ support structure interfaces. The components designed for concrete mount permit use of varying fixings to suit the supporting concrete structure, while the 'Allfit' range of components allow mounting to a range of metal roof sheeting types.

Figure 4.4 Concrete Mount End Anchor (PSL01)

Figure 4.5 Metal Roof Mount End Anchor (PSL01)

5 Maintenance and Inspection

5.1 Inspection Intervals

Table 5.1 summarises the required inspection frequencies for the equipment associated with the SRA static line system.

Items	Inspection Frequency
Anchorages	12-monthly inspection by a height safety equipment inspector Proof loading test of concrete mount anchors
Steel rope, fittings, shock absorber and shuttle	12-monthly inspection by a height safety equipment inspector
Personal equipment including harnesses, lanyards, connectors, fall-arrest devices including common use devices	See manufacturer requirements, minimum inspection by a competent operator before and after each use.
Harnesses, lanyards, associated personal equipment Fall-arrest devices (external inspection only) Ropes and slings	6-monthly inspection by a height safety equipment inspector
All items of personal and common use equipment	Inspection by a height safety equipment inspector upon entry or re-entry into service or after any extended storage period
All items which have been stressed as a result of a fall.	Inspection by a height safety equipment inspector before further use

Table 5.1 Static Line Inspection Requirements

Notes:

If the system is used in harsh environments, more frequent inspection intervals may be required

A height safety equipment inspector refers to someone competent in detecting height safety equipment faults and determining remedial actions

All inspections except those by the operator are to be documented

5.2 Inspection & Maintenance Check List

Appendix A details a list of possible conditions or faults within the Static Line System which should be checked and addressed at the intervals listed in Table 5.1. It is by no means exhaustive; additional items of note should also be recognized and noted. Items identified which are unacceptable should acted upon, and the system be removed from service until the issue rectified and approved for further use. Records should be kept of any inspection or maintenance work and the system information plate should be updated accordingly.

5.3 Concrete Anchor Proof Testing

Concrete roof anchors must be proof load test before initial commissioning of the system and in accordance with the inspection schedule in Section 5.1. The testing is conducted in the axial (pull-out) direction to the minimum forces listed in Table 5.2

Anchor Type	Proof Load
Intermediate Anchorages	6kN
End Anchorages	50% of the maximum relevant anchor force identified, refer to Section 4.2

Table 5.2 Proof Load Testing Requirements

6 Installation

Installation of the system must be performed only by competent persons acting with due care and following the directions given in this document. Incorrect installation can compromise the safety of the system. SRA strongly recommend completion of the Installers Training Course before installation of the system. This course is held by SRA and aims to provide installers with important information to assist with the configuration and installation of the static line system. Alternately, SRA can offer installation as part of a full service supply. For further details on Training Courses or installation services, please refer to www.safetyroofanchors.com.au or call 02 9939 3523.

6.1 General Installation Requirements

Installation of the system must be conducted such that the fundamental layout and configuration follows the guides & limits detailed in Section 4. In addition, the following general requirements must be met to ensure safety of the system:

- At each regular entry point to the system, a system information plate must be installed (illustrated in Figure 6.1). Each information plate should be located such that it will remain easily legible for the service life of the system and cannot be easily tampered with

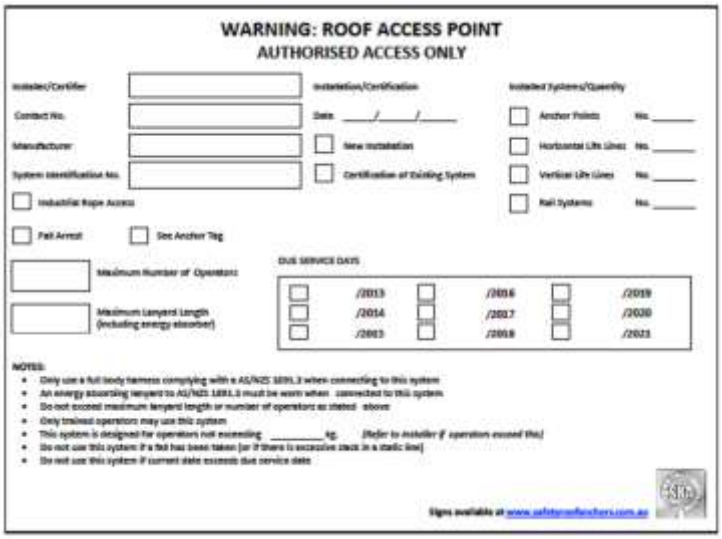


Figure 6.1 System Information Plate

- The installed roof may not have a pitch greater than 30°, as indicated in Figure 6.2

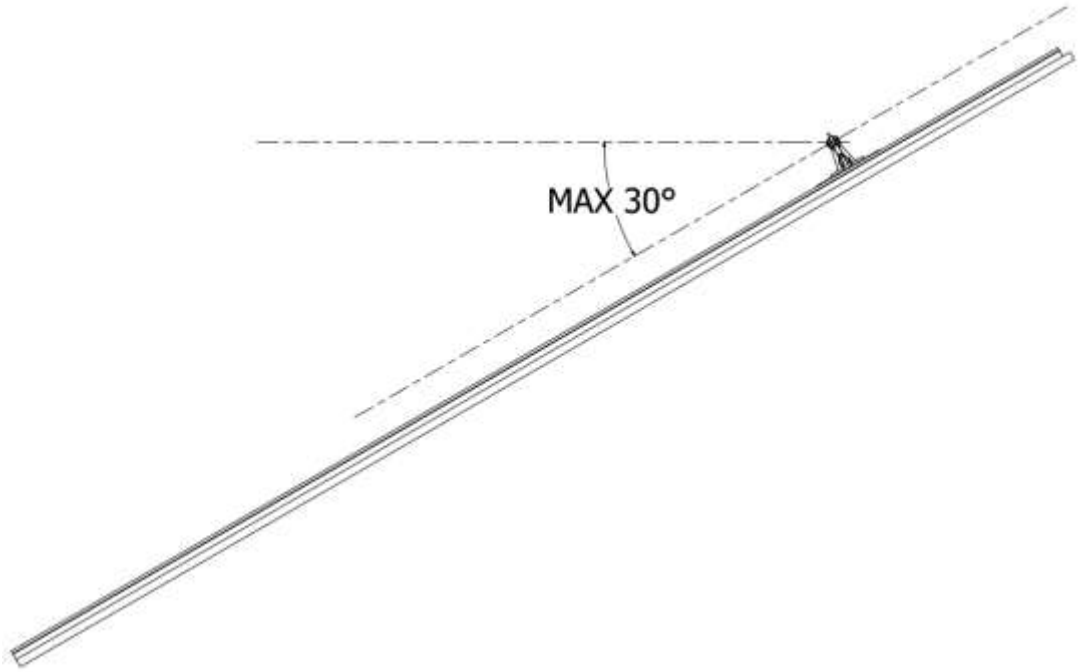


Figure 6.2 Maximum permissible roof pitch

- The maximum permissible misalignment between intermediate anchors and the line is 15°, as shown in Figures 6.3-6.4. However, in order to permit ease of motion of the shuttle, it is highly recommended to minimise any misalignment between the anchors and the cable.

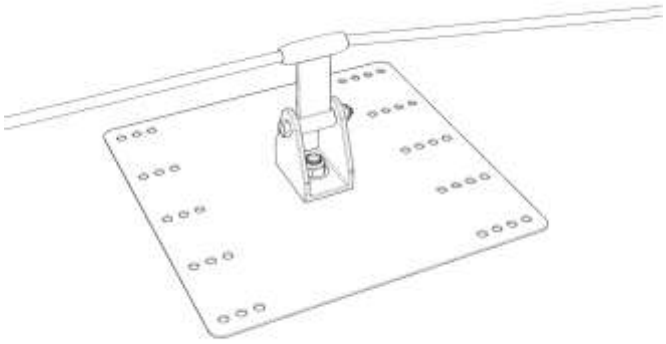


Figure 6.3 Straight intermediate anchor line deviation

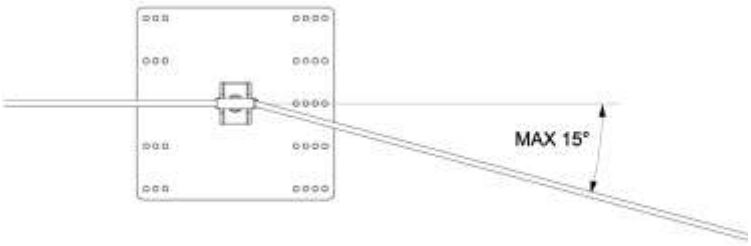


Figure 6.4Straight intermediate anchor line deviation

- All end anchors must be aligned such that the apex of the base triangle points inwards along the static line (see Figures 6.5-6.6)

Figure 6.5 End anchor to line alignment

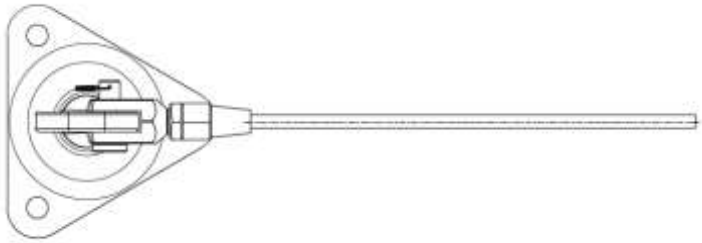


Figure 6.6End anchor to line alignment

- All corner anchors must be aligned such that the apex of the base triangle points inwards along the static line (see Figures 6.7-6.8)

Figure 6.7 Corner anchor to line alignment

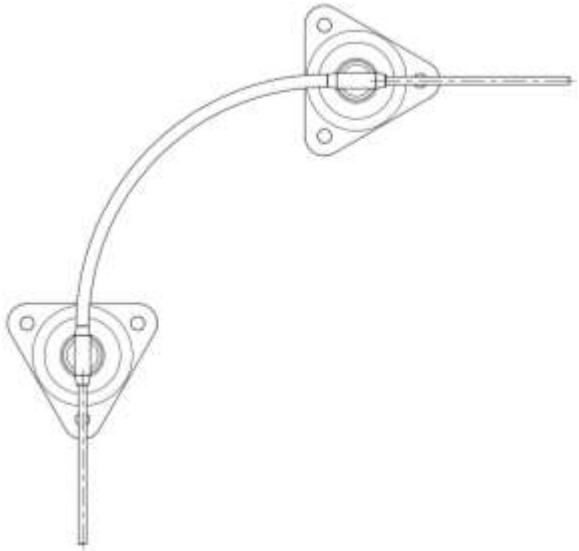


Figure 6.8 Corner anchor to line alignment

Furthermore, attention is required to ensure that each individual component is correctly installed as per the relevant specific requirements outlined in Sections 6.2-6.4.

6.2 Metal Roof Mount

6.2.1 General Requirements

Through correct selection of the 'Allfit plate (see Section 4.4), components can be fitted to metal roofs with both timber and steel underlying support structures. For all metal roof types, SRA supplies all necessary fasteners and must not be substituted with any third-party components. When installing Metal Roof Mount components the following general requirements must be observed:

- The minimum permitted roof sheet gauge is 0.42mm
- For roofs with a timber support structure the minimum required rafter/batten size is 70mm wide by 35mm high. For the orientation of the minimum rafter/batten, refer to Appendix C
- For roofs with a steel support structure the minimum allowable purlin section height is 150mm and the thickness must be no less than 1.2mm
- The supporting roof structure must be large enough such that it provides a minimum of 3 support purlins per roof sheet
- A 'Allfit' must never be fixed into the first purlin/batten on the edge of the roof. A minimum of one purlin/batten spacing is required between the roof edge and the nearest 'Allfit'
- When installing onto a roof consisting of clipped-in roof sheets (eg Klip-Lok®), SRA recommends adding additional restraint to the roof sheet supporting the 'Allfit. Attaching the roof sheet to a nearby purling using suitable screws reduces the likelihood of the roof sheet sliding in the event of a fall

6.2.2 Intermediate Support Pre-Assembly

Due to the variety of 'Allfit' styles available, the intermediate supports require some pre-assembly before they can be fixed to the metal roof. The following directions must be read in conjunction with Appendix B.

- Bolt the Allfit (1) to the Intermediate Support Base (2) using the M12 Bolt (3), M12 Washers (4) and M12 nut (5). Care should be exercised such that the Intermediate Support alignment is within the allowances given in Section 6.1. Loctite® 277™High Strength Threadlocker adhesive should be applied before assembling the nut in order to prevent potential loosening of the joint
- Fit the Line Guide (6) to the Intermediate Support Base using the M8 Bolt (7), M8 Washer (8) and M8 Nut (9).Apply . Loctite® 277™ High Strength Threadlocker before assembling the nut. The bolt should be snug tightened however the Line Guide must remain free to rotate within the Support Base

6.2.3 Corner Pre-Assembly

Pre-assembly of the corner units is required before they can be fixed to the metal roof. The following directions must be read in conjunction with Appendix C.

- For each end of the corner, insert the Corner Guide (3) into the Pedestal Mount (1) and through the Allfit (2). Ensure that each Pedestal Mount is aligned correctly as detailed in Section 6.1
- Fit a M12 Washer (5) and a M12 Nut (6) to the threaded rod of the Corner Guide. Apply Loctite® 277™ High Strength Threadlocker to prevent potential loosening of the joint. Use the Bend Tube (4) as a template to ensure that the Corner Guides correctly align with each end of the tube. Tighten the nuts

- After the corner is fixed to the roof, it may be necessary to make small adjustments to the alignment of the Corner Guides to facilitate installation of the cable or fitment of the tube. Ensure that both nuts are correctly tightened with thread locking adhesive before the system is commissioned

6.2.4 End Anchor Pre-Assembly and Installation

Metal roof End Anchors require a secondary support anchor to ensure the structural integrity of the system. Due to the variety of roof sheet profiles, pre-assembly is required before components can be fixed to the roof. Following fixation, the end anchor assembly must be completed before the system is ready for commissioning. The following directions describe the steps required for pre-assembly and must be read in conjunction with Appendix D.

- Insert the End Anchor Eye (3) into the Pedestal Mount (1) and through the Allfit (2).
- Apply Loctite® 277™ High Strength Threadlocker adhesive to the End Anchor Eye and loosely assemble a M12 Washer (4) and M12 Nut (5)
- After applying Threadlocker adhesive, loosely bolt the Support Anchor Eye (6) to the second Allfit
- Check the orientation of the End Anchor Eye and Support Anchor Eye to ensure that they will align after fixation to the roof. Tighten both the M12 Nut (5) and M12 Bolt (7) while maintaining alignment of the two Anchor Eyes
- The End Anchor and Support Anchors are to be installed adjacent to each other as per the instructions in Section 6.2.5

Following fixation to the roof, the End Anchor assembly must be finalized as per the following directions and Appendix E.

- With the turnbuckle locknuts (7) loose, fit one turnbuckle fork (2) to the Support Anchor Eye (5) using the Pin (3). Use the Support Anchor Eye hole closest to the End Anchor
- Adjust the Turnbuckle body (1) until the remaining fork aligns with the nearest hole of the End Anchor Eye (4)
- Fit the fork using the remaining pin
- Rotate the turnbuckle body to shorten the assembly until the pins are firmly seated in the anchor eye holes. There should be no free play between the turnbuckle assembly and the anchors. Ensure that the pins have no angular misalignment with the anchor eye holes.
- Tighten the locknuts against the Turnbuckle body to avoid loosening of the assembly
- Fit the Pin Retainers (6) to the holes in the pins

6.2.5 Fixation to Metal Roofs

Before attaching to a metal roof, the underlying support structure should be identified and inspected to ensure the correct fixings are used. The following directions must be read in conjunction with Appendix F. Note that while an intermediate support is illustrated, these instructions are applicable for fixing all metal roof components.

- Locate a suitable purlin or batten (1) to which the Allfit will be attached.
- Position the Allfit plate (3) such that the holes for the mounting screws (5) align with the centre of the underlying purlin or batten. For some roof sheet types (Custom Orb & selected tray deck roofs) it may be necessary to remove one or more existing roofing screws to allow for the Allfit to seat correctly in the necessary location. Allfit plates may be placed over roof sheet retaining clips. By fixing through these into the underlying purlin/batten helps to minimize the risk of roof sheet sliding in the case of a fall.

- When installing onto a roof consisting of clipped-in roof sheets (eg Klip-Lok®), SRA recommends adding additional restraint to the roof sheet supporting the 'Allfit. Attaching the roof sheet to a nearby purling using suitable screws reduces the likelihood of the roof sheet sliding in the event of a fall
- Select the fixing screws (5) from those supplied which suit the type of underlying support structure. For a support structure consisting of metal members use the self-drilling metal screw shown in Figure 6.9.Roofs with a timber support structure require the screw shown in Figure 6.10 to be used

Figure 6.9 Metal Roof Mounting screw- steel support structure

Figure 6.10 Metal Roof Mounting screw- timber support structure

- Install both screws through the Allfit plate, roof sheet and into the underlying purlin or batten. Ensure that they are not over-tightened and have effectively penetrated the purlin/batten
- Using the Allfit as a template, drill eight holes into the roof sheet using a 8mm drill bit for fitment of the Bulb-tite Rivets (4)
- Install the eight Bulb-tite rivets using a suitable rivet gun. Ensure that each rivet is fully home and that the Allfit is properly seated on the roof sheet
- Remove any steel shavings to prevent roof corrosion

6.3 Concrete Mount

6.3.1 General Requirements

Concrete Mount components offer the installer flexibility by allowing the use of varying fixation hardware; the selected fixing method depending on the specific application. As such, SRA do not supply set fixation hardware; rather the installer should determine and source suitable hardware for their individual application. It is the responsibility of the installer to select and install appropriate hardware to ensure the joint capacity exceeds the maximum anchor forces stipulated in Section 4.2. Note that the strength of the joint is heavily dependent upon various factors of the underlying concrete, such as:

- Nominal concrete strength
- Condition of the concrete
- The presence of any cracking
- Thickness
- Edge distances

In addition to this, the considered fastener will have directional load capacities that vary with the supplier and fastener type. As a result, it is recommended that the fixation be assessed and hardware type selected by a person with appropriate experience and qualifications. It is highly recommended that the installer considers the directions and guidance given by fastener suppliers in selecting appropriate hardware. Reference material and tools such as the Hilti PROFIS Anchor software are valuable in determining the fixing capacity to ensure it exceeds the predicted anchor loads (Section 4.2) before installing.

Regardless of the fixation hardware employed, all corners, end and intermediate anchor supports must be orientated such that a fall arrest force cannot be applied at an angle greater than 20° from the mounting plane. The installer must consider the arresting force acting through the line of action of the personal harness acting though an adjacent end or intermediate anchor, as illustrated in Figures6.11-6.12.

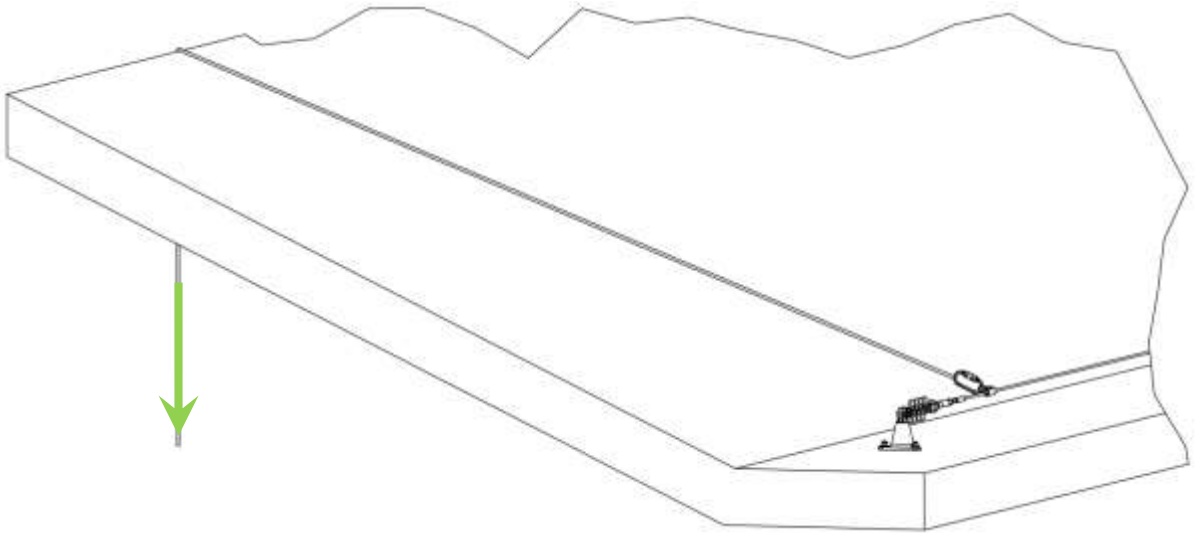


Figure 6.11 Maximum permitted fall force angularity

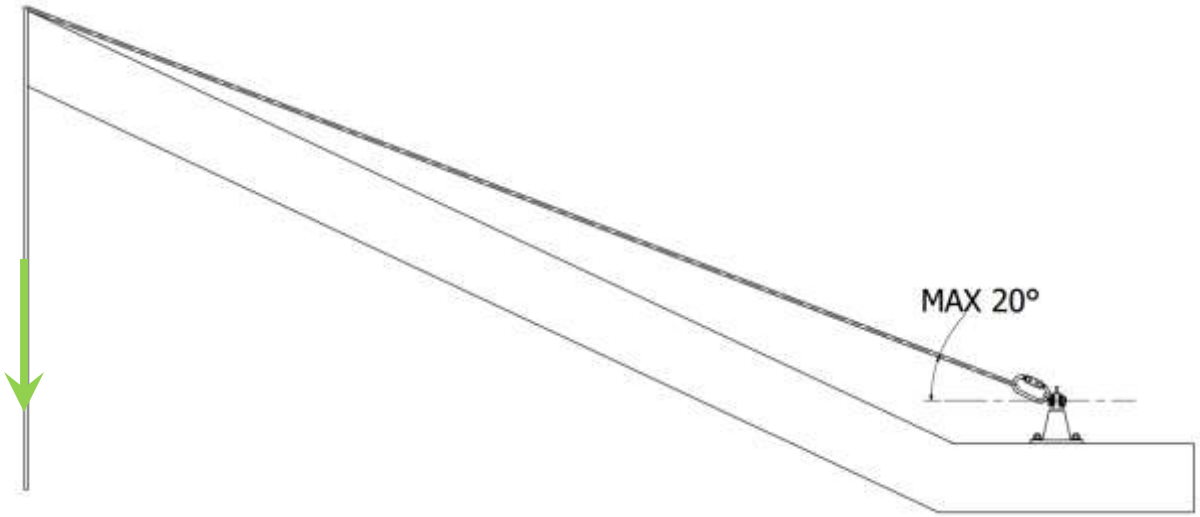


Figure 6.11 Maximum permitted fall force angularity

After installation, all concrete intermediate and friction anchors must be proof tested before the system can be used. Refer to Section 5.3 for further details of proof testing.

6.3.2 Intermediate Support Installation

The intermediate support will require final assembly after fixation to the concrete support structure. The following directions must be read in conjunction with Appendix G.

- Fix the Intermediate Support Base (2) to the support structure (1). The installation hardware used should consider their specific application and be capable of resisting the maximum forces given in Section 4.2. See Sections 6.3.1 and 6.3.5 for further details on fixation to concrete. A device such as a Hilti Reo Scan should be used to avoid conflict with underlying steel reinforcement members.
- Installation of the selected anchor hardware should be conducted as per the instructions of the manufacturer; with an example installation depicted in Appendix E. Care should be exercised such that the Intermediate Support alignment is within the allowances given in Section 6.1.
- Fit the Line Guide (3) to the Intermediate Support Base using the M8 Bolt (7), M8 Washer (8) and M8 Nut (9).Apply Loctite® 277™ High Strength Threadlocker before assembling the nut. The bolt should be snug tightened however the Line Guide must remain free to rotate within the Support Base

6.3.3 Corner Pre-Assembly

Pre-assembly of the corner units is required before it can be fixed to the concrete roof. The following directions must be read in conjunction with Appendix H.

- For each end of the corner, fit the Corner Guide (2) onto the Pedestal Mount (1). Ensure that each Pedestal Mount is aligned correctly as detailed in Section 6.1
- Apply Loctite® 277™ High Strength Threadlocker to the M12 Bolt (4) and loosely fit it together with a M12 Nut (5) through the Pedestal Mount and into Corner Guide. Use the Bend Tube (4) as a template to ensure that the Corner Guides correctly align with each end of the tube. Tighten the bolts

6.3.4 End Anchor Pre-Assembly

Before fixation to the concrete structure, End Anchors require pre-assembly as directed below and depicted in Appendix I.

- Insert the End Anchor Eye (2) into the Pedestal Mount (1), ensuring the End Anchor Eye meets the alignment requirements as given in Section 6.1
- Apply Loctite® 277™ High Strength Threadlocker adhesive to the End Anchor Eye and assemble a M12 Washer (3) and M12 Nut (4). Maintain correct alignment of the End Anchor Eye and tighten the M12 Nut

6.3.5 Fixation to Concrete

As detailed in Section 6.3.1, the methods for fixing to a concrete roof are highly dependent on the individual application and should be selected accordingly. The installer should consider their specific application and utilize appropriate hardware to withstand the maximum forces given in Section 4.2. Each joint should be assessed individually and a suitable fixation method selected based on its location and predicted maximum force.

SRA can supply high strength M12 threaded rod for use in a through-bolt application where underside access is available. Alternatively, SRA also recommends the use of Hilti engineered anchors and suggests the following as possible alternatives for fixation hardware:

- Hilti HAS-E-R M12x110/28 Anchor rod & relevant HVU adhesive
- Hilti HSL-GR M12 Heavy duty expansion anchor

Installation of the selected anchor hardware should be conducted as per the instructions of the manufacturer, with an example installation depicted in Appendix J. A device such as a Hilti Reo Scan should be used when selecting the location of the end anchor to avoid positioning directly over concrete steel reinforcement.

6.4 Cable installation

6.4.1 Cable terminations

Cable terminations are available with both thread and fork end types. A threaded end termination is required at the line end where the tensioner is to be installed, while a forked termination is needed at the line end which will affix directly to the end anchor. Both termination types are available as fixed (swaged) and removable (swageless) fittings, which can be selected based upon the preference and capabilities of the installer. Given that a minimum of one terminal must be assembled on in situ after the cable has been routed through all required supports, the fitting types must be chosen based on the installers onsite capabilities. Swaged fittings require a portable press or crimping tool to be assembled, while swageless fittings can be fitted using only hand tools. Where possible, SRA recommends the use of swaged terminations as, while they cannot be removed, they reduce the chance of miss-assembly and require less maintenance. Generally, the cable is supplied by SRA with a swaged terminal pre-fitted at one end however the customer may request otherwise.Figures 6.13 and 6.14illustrate the forms of cable terminations.

Figure 6.12 Swaged cable terminations: threaded (left) and forked (right)

Figure 6.13Swagelessforked cable termination

6.4.2 Cable General Assembly

After the installation of all end and intermediate supporting anchors, the cable may be fitted to the system. Starting at one end anchor position, feed the bare end of the cable through all intermediate supports until the second end anchor is reached. Ensure that the cable does not fray and that no kinking or twisting occurs during the process. Assemble a termination to one or both end of the cable following the instructions given in 6.4.5.Ensure that the resulting cable length will allow for fitment of the shock absorber and tensioner device with and enable full tensioning. Attach one cable end directly to an end anchor as per the details in 6.4.3. Attach a shock absorber and tensioner device to the other end of the cable end following the instructions in 6.4.4

6.4.3 Cable End to Anchor Assembly

The following directions must be read in conjunction with Appendix K

- Align the hole of the Forked Cable Termination (1) with the inner eye hole of the End Anchor Assembly (4)
- Insert the Pin (2) through both the Forked Cable Termination (1) and End Anchor Assembly. Check that the Pin is fully engaged
- Fit the Pin Retaining Clip (3) into the small hole located in the end of the Pin (2). Ensure that the Pin Retaining Clip is fully threaded through the hole and cannot fall out

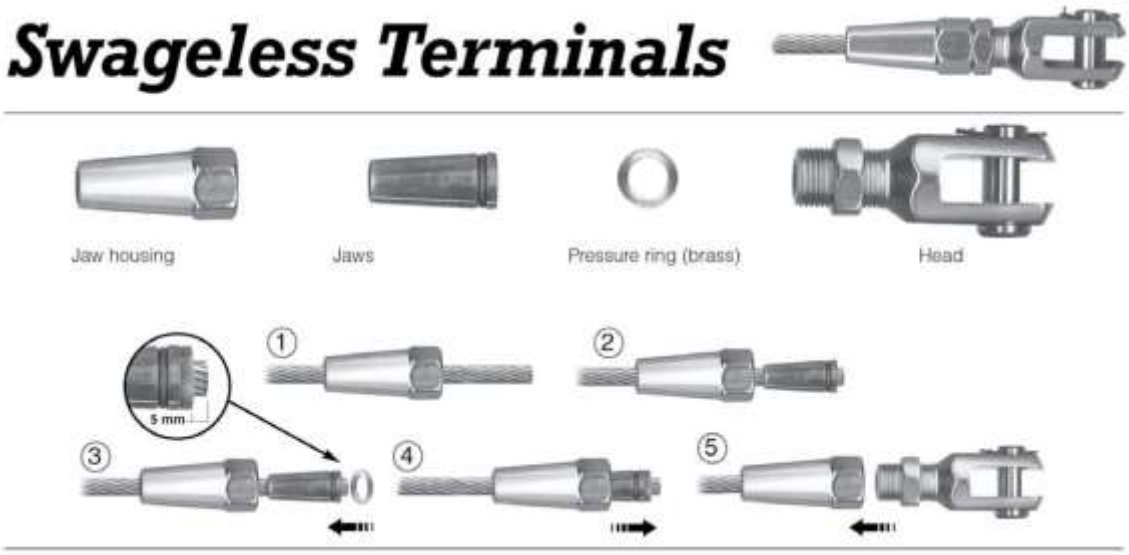
6.4.4 Tensioner and Shock Absorber Assembly

The following directions must be read in conjunction with Appendix L

- Fit one Lock Nut (2) to the Threaded Cable Termination (1) and wind it until the nut jams lightly against unthreaded portion of the Cable Termination (1)
- Assemble the Tensioner Body (3) onto the Threaded Cable Termination (1). Only wind the Tensioner Body until the Thread of Cable Termination (1) is fully engaged.
- Fit one Lock Nut (2) to the Tensioner (4) and wind it until the nut jam is 2 threads away from the indicator disk of the Tensioner (4)
- Screw the Tensioner (4) into the Tensioner Body (3). Only wind the Tensioner until the thread is fully engaged
- Align one hole of both Shock Absorber Links (8) with one hole of the Shock Absorber (7). Insert a Pin (6) through both Shock Absorber Links (8) and the Shock Absorber (7), ensuring that the Pin (6) is fully engaged
- Fit the Pin Retaining Clip (5) into the small hole located in the end of the Pin (6). Ensure that the Pin Retaining Clip is fully threaded through the hole and cannot fall out
- Align the available holes of both Shock Absorber Links (8) with inner hole of the End Anchor Assembly (9). Insert a Pin (6) through both Shock Absorber Links (8) and the End Anchor Assembly (9), ensuring that the Pin (6) is fully engaged
- Fit the Pin Retaining Clip (5) into the small hole located in the end of the Pin (6). Ensure that the Pin Retaining Clip is fully threaded through the hole and cannot fall out
- Align the holes of the Tensioner (4) with the available hole of the Shock Absorber (7). Insert a Pin (6) through both Tensioner (4) and the Shock Absorber (7), checking that the Pin (6) is fully engaged
- Fit the Pin Retaining Clip (5) into the small hole located in the end of the Pin (6). Ensure that the Pin Retaining Clip is fully threaded through the hole and cannot fall out
- Begin tensioning the cable by tightening the Tensioner Body (3) with a suitable tool. Periodically check the tension by attempting to rotate the indicator disk of the Tensioner (4). Correct tension is achieved when the indicator disk can freely spin on the Tensioner (4)
- Tighten both Locking Nuts (2) against the Tensioner Body (3), ensuring not to rotate it
- Re check the tension of the system by spinning the indicator disk. If required, loosen the Locking Nuts (2) and repeat the above two steps until the correct tension is achieved

6.4.5 Swageless Cable termination assembly

Care must be taken in assembling swageless cable terminations to ensure maximum strength of the connection. The following instructions detail the assembly process:



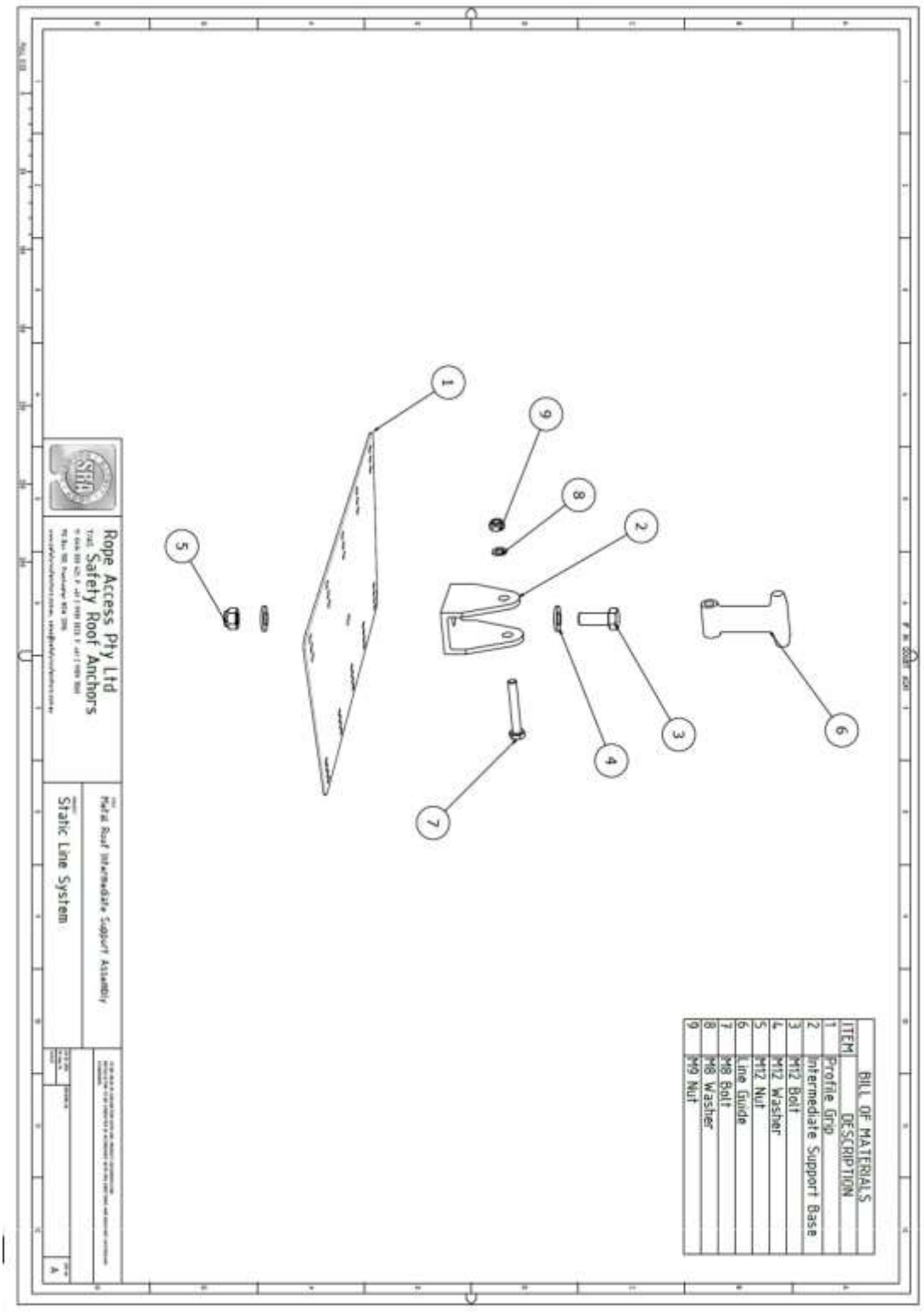
- First slide the jaw housing in place on the cable (Step 1)
- Next, slide the jaws onto the cable ensuring there is equal space between the jaws (2)
- Place the brass pressure ring on the end of the cable. Make sure that the distance from the pressure ring to the end of the cable is 5-8 mm (3)
- Slide the jaw housing over the jaws (4)
- The terminal can now be assembled. Screw the head on the jaw housing with a torque wrench to a minimum torque of 58 Nm (43 Lbfft). Tighten the lock nut to a minimum torque of 50 Nm (36 Lbfft) (5)

Note that after the first dynamic load terminals must be tightened again, however after a fall event SRA strongly recommends that the system be taken out of service until it is inspected, repaired (if required) and re-certified as safe by a competent person.

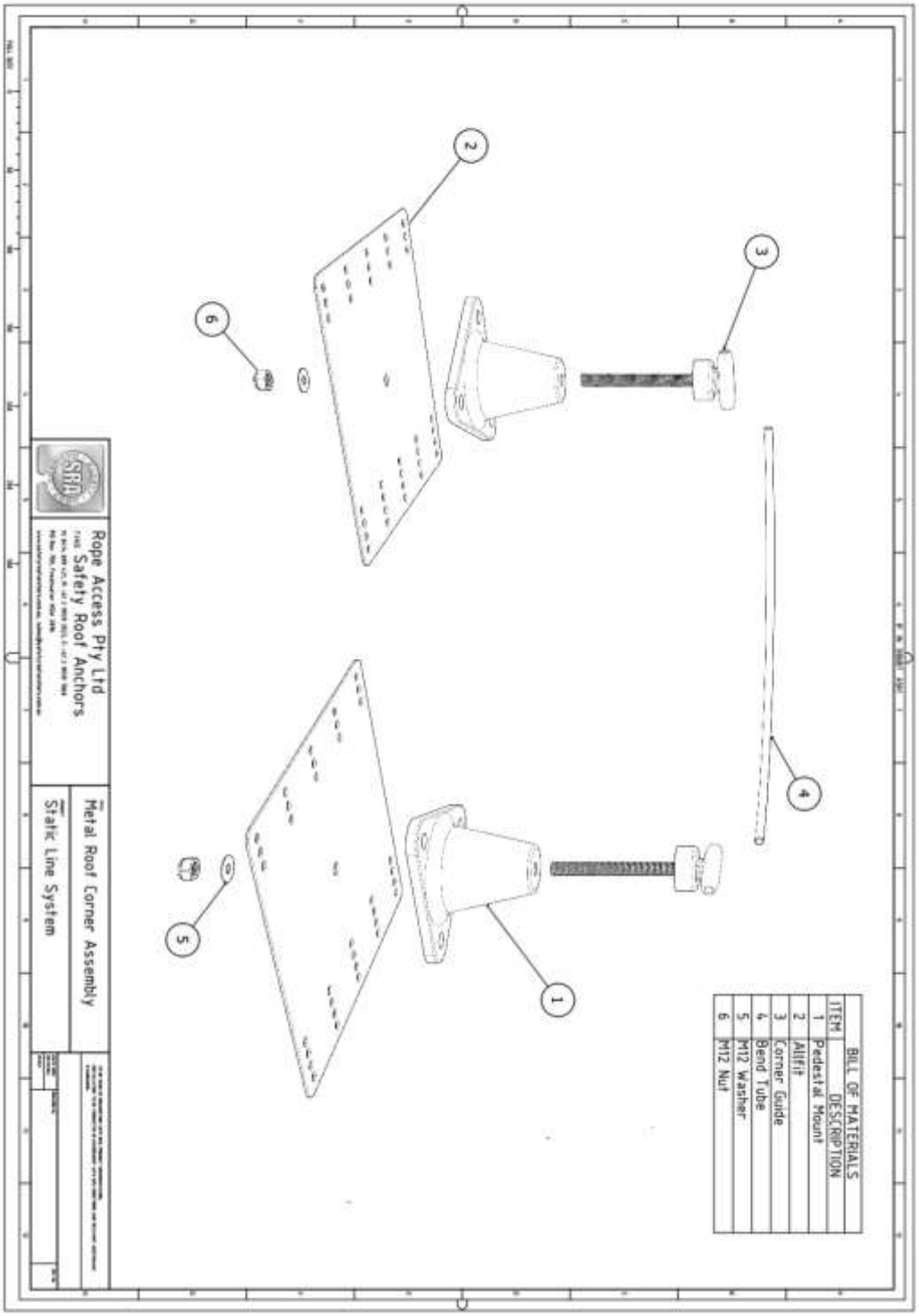
Appendix A Inspection Checklist

Component	Check criteria
Overall system	Total line length and anchor spacing in accordance to span guide Line deviation at intermediate supports or corners within allowable range System information plate in place and legible at each each regular entry point to the system Each system information plate updated with latest inspection / service information
Cable	No evidence of wear, cuts, corrosion or fraying Tensioned correctly
Anchorages	All Metal Roof Mount fixings as per SRA installation requirements All concrete anchors as per SRA installation requirements No evidence of broken, missing or loose fasteners No signs of bending, cracking or failure of any anchor components Metal Roof Mount end anchor turnbuckle correctly tensioned All chemical/friction anchors pass proof load test
Roof and support structure	Visual inspection of structural integrity No loose, bent or missing metal roofing sheets No cracking or chipping of concrete support structure in the region of anchors
Cable fittings and terminations	No evidence of deployment of the shock absorber All pins fully installed and retaining clips present No excessive wear on pins or line terminations No evidence of pull-through or twist of the line terminations All fittings and terminations correctly aligned and there is no signs of bending or kinking in any component All swageless line terminations checked and tightened if required (head to jaw housing = min 58 Nm, lock nut = min 50 Nm)
Shuttle	No excessive wear Correct operation of locking mechanism

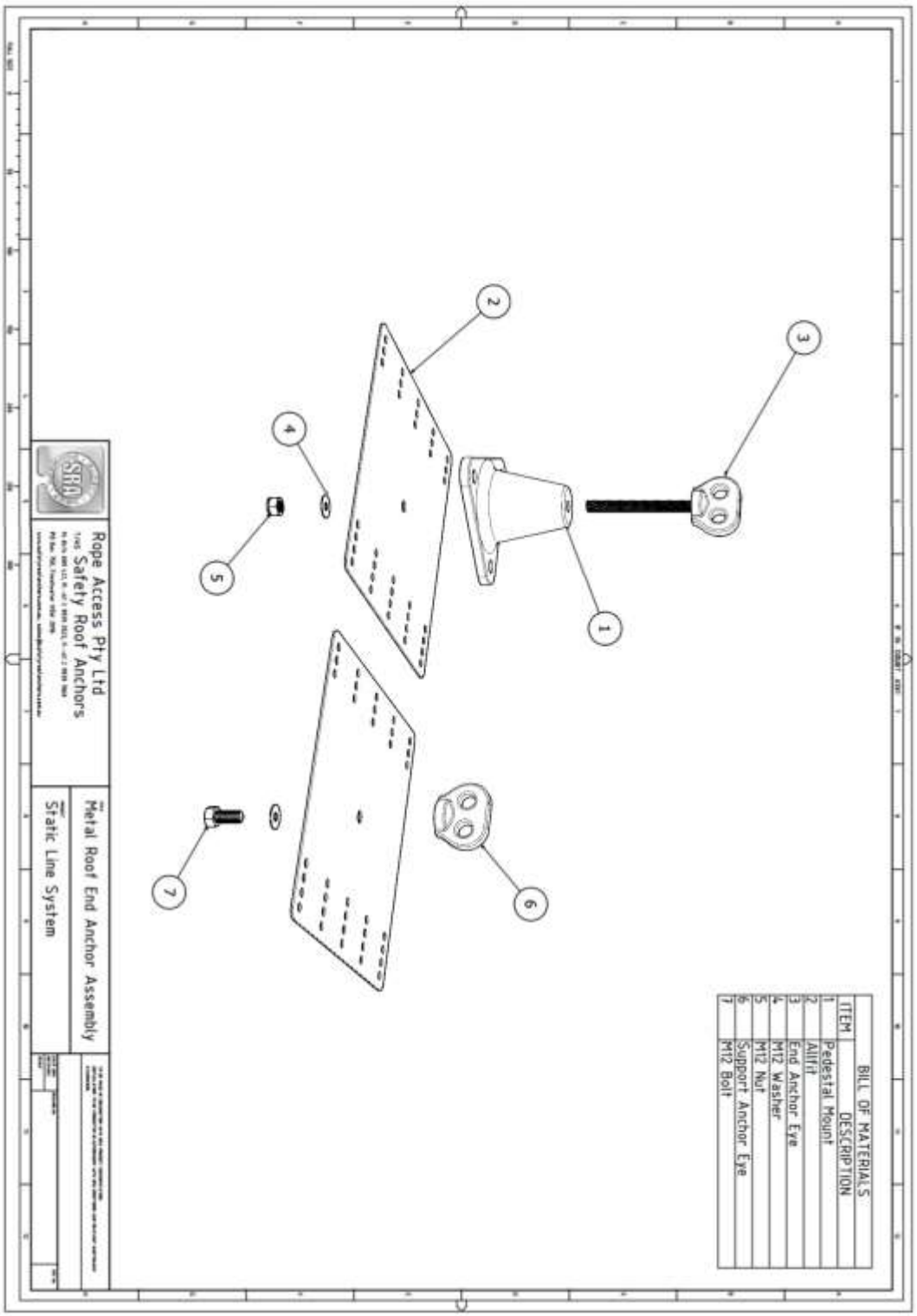
Appendix B Metal Roof Intermediate Support Assembly



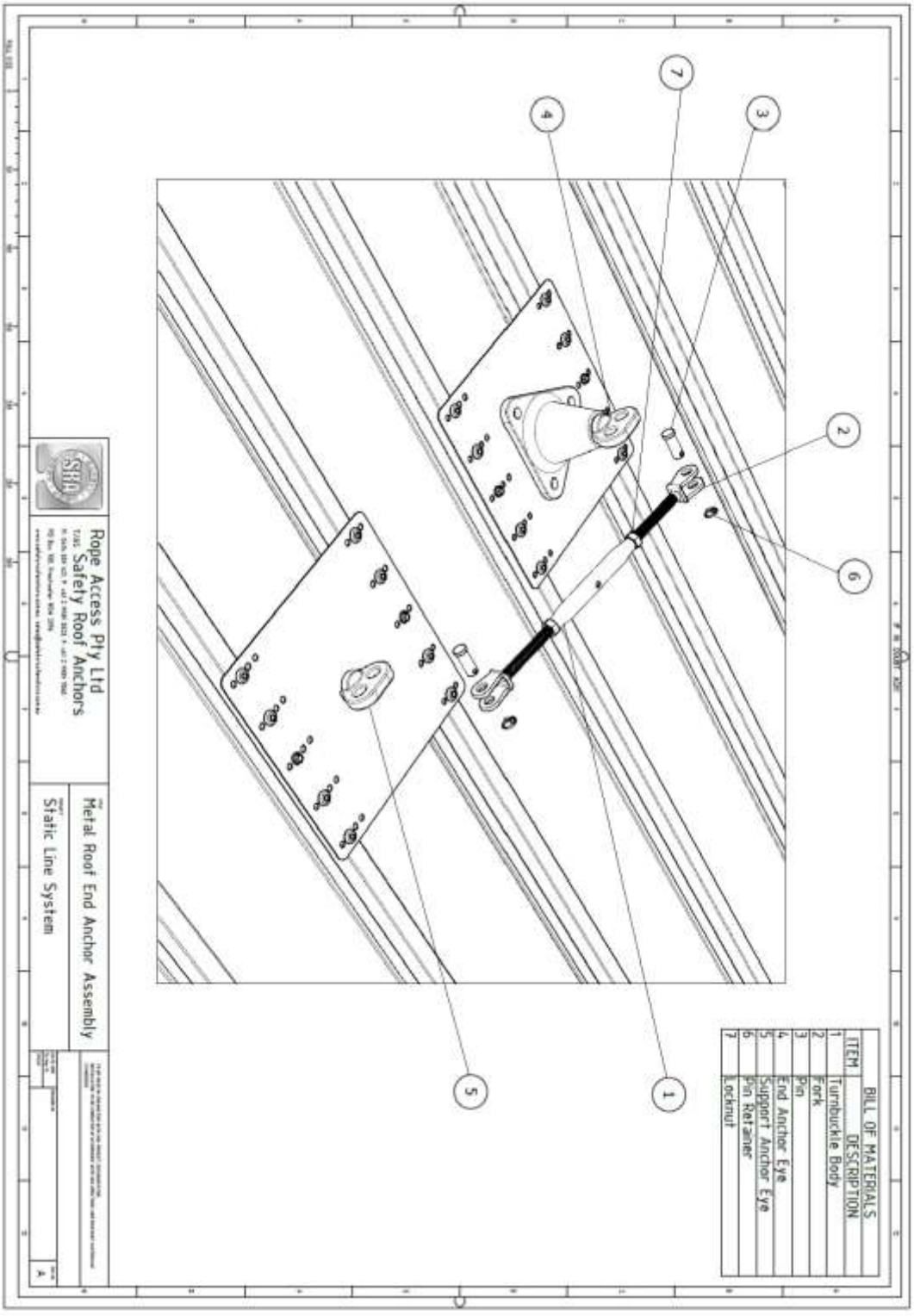
Appendix C Metal Roof Corner Pre-Assembly



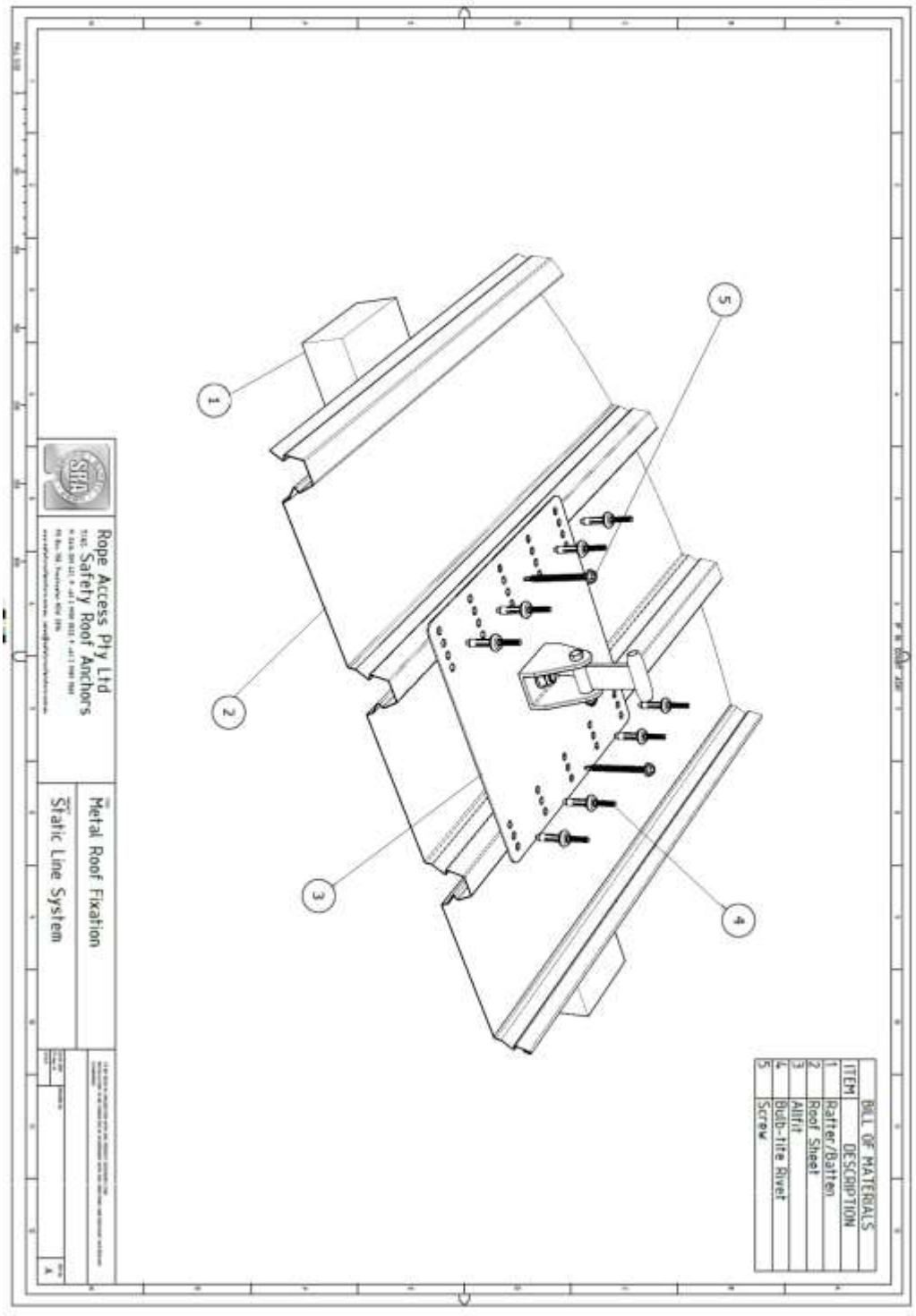
Appendix D Metal Roof End Anchor Pre-Assembly



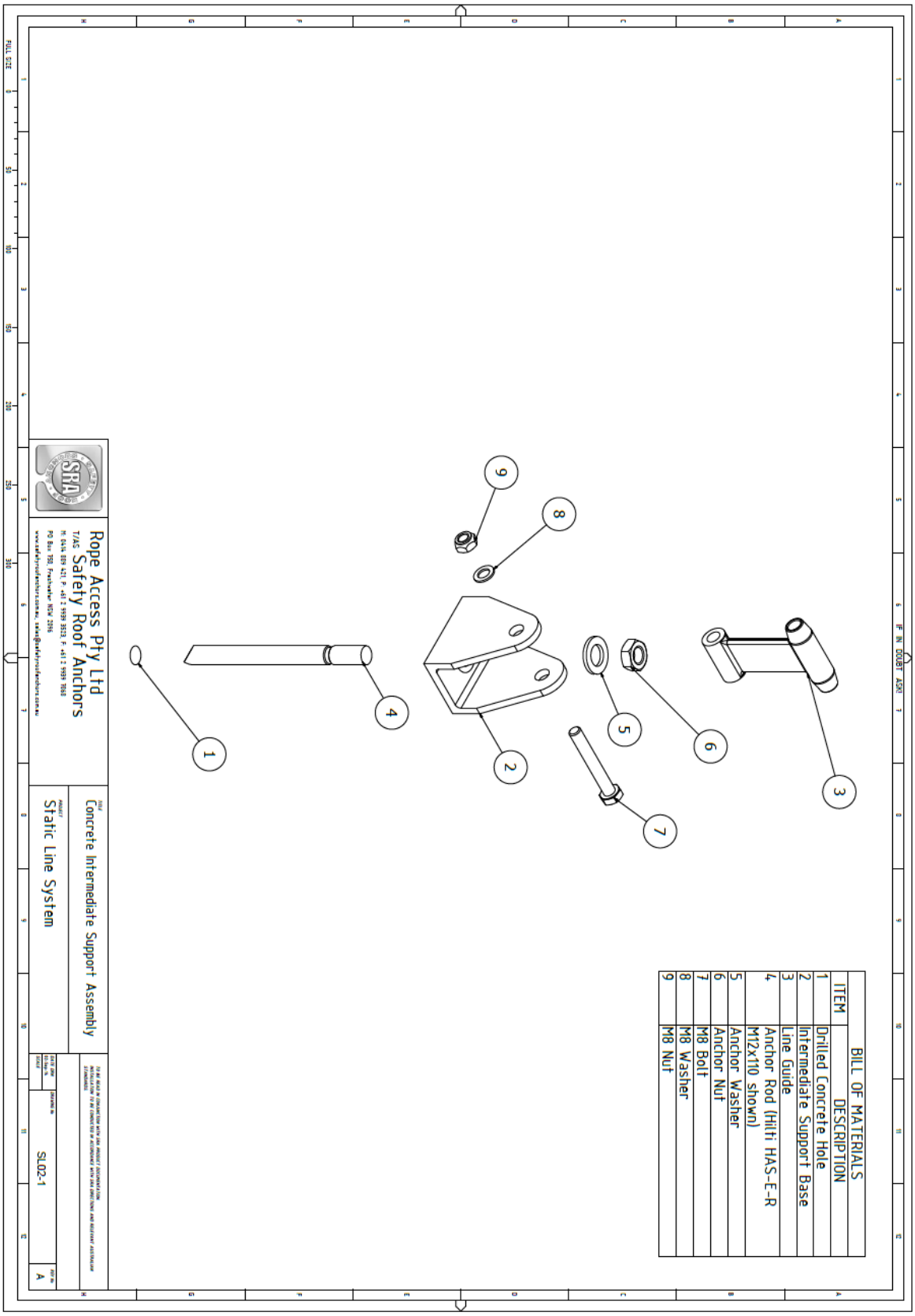
Appendix E Metal Roof End Anchor Installation



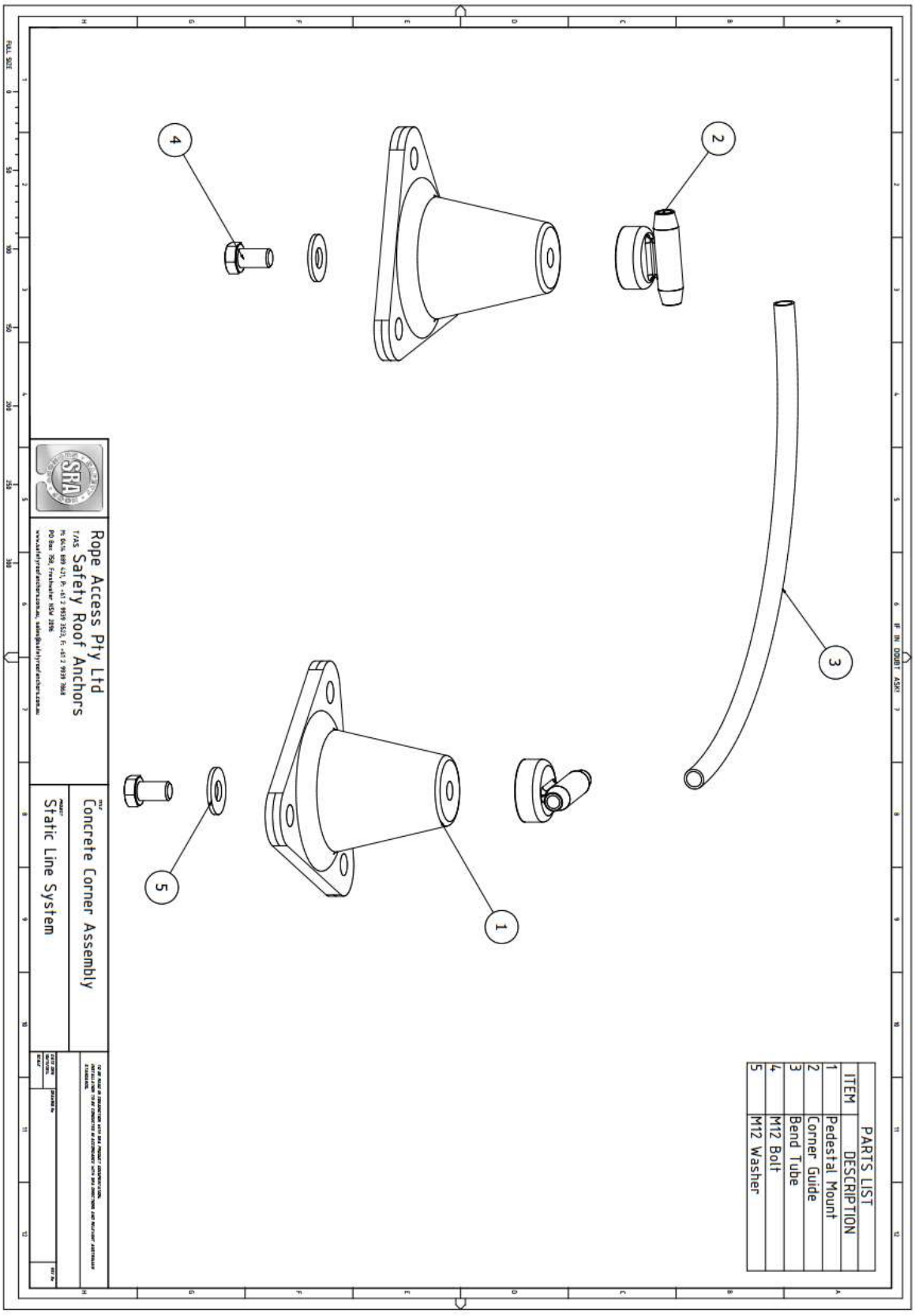
Appendix F Metal Roof Fixation



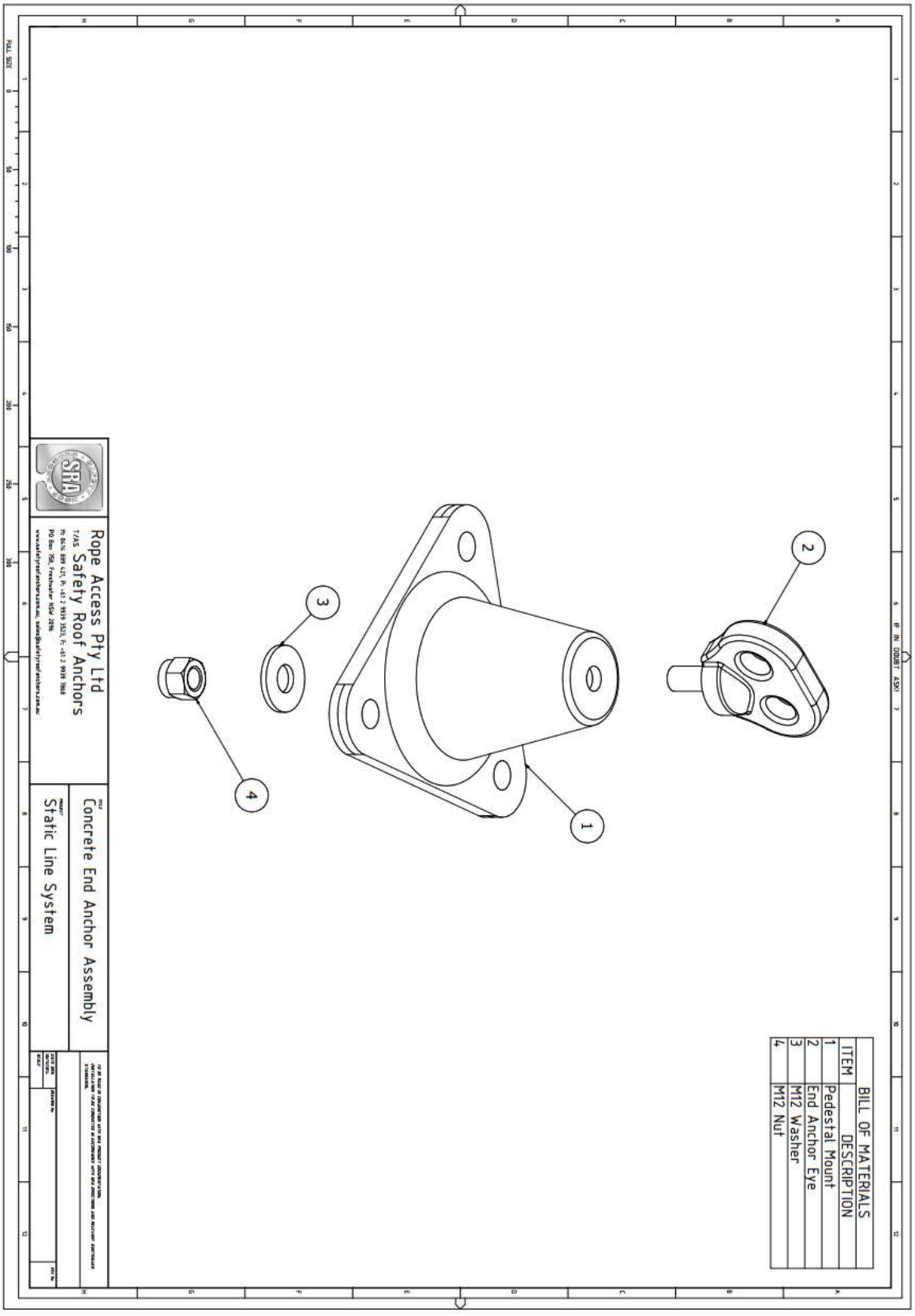
Appendix G Concrete Mount Intermediate Support Assembly



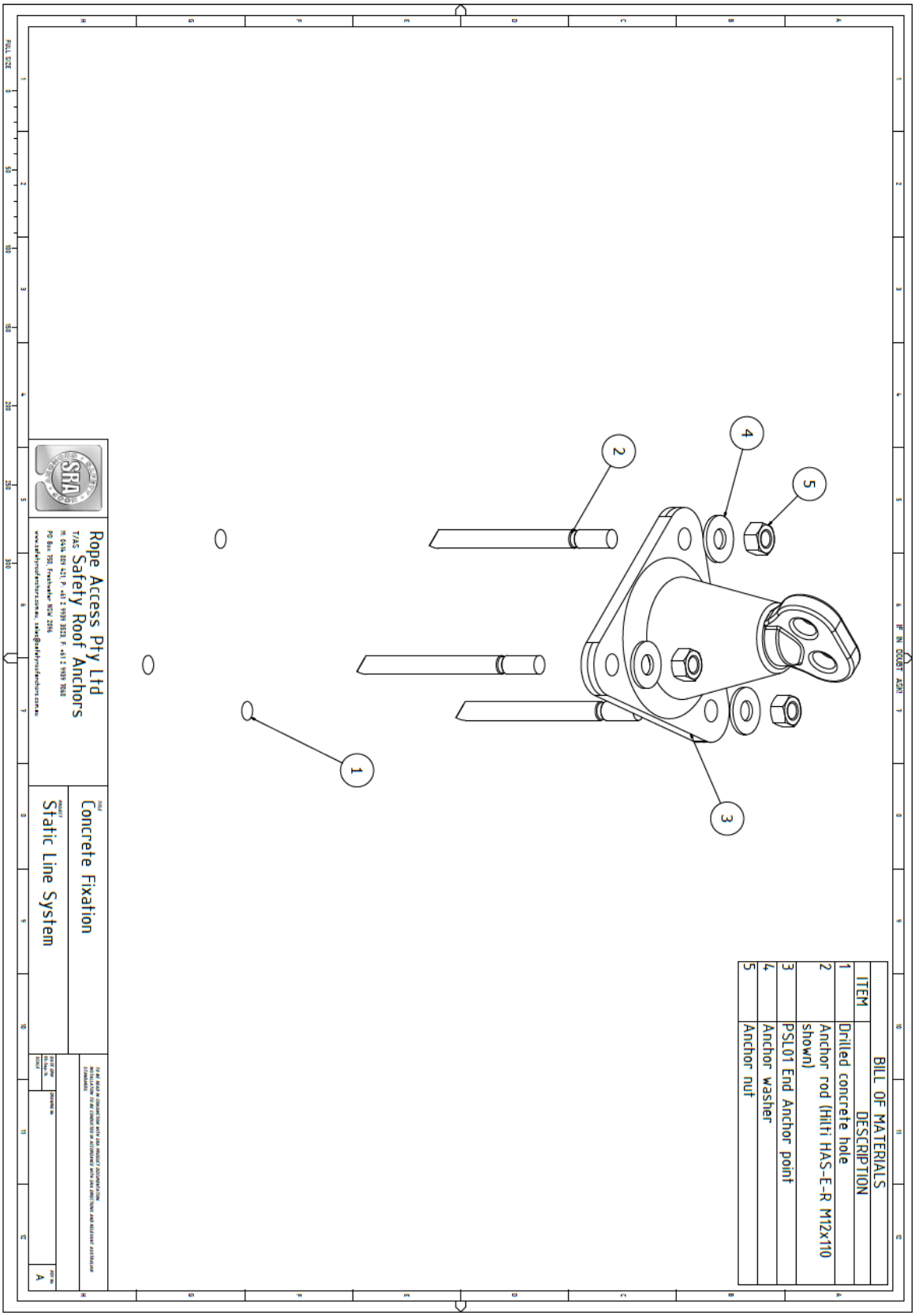
Appendix H Concrete Mount Corner Pre-Assembly



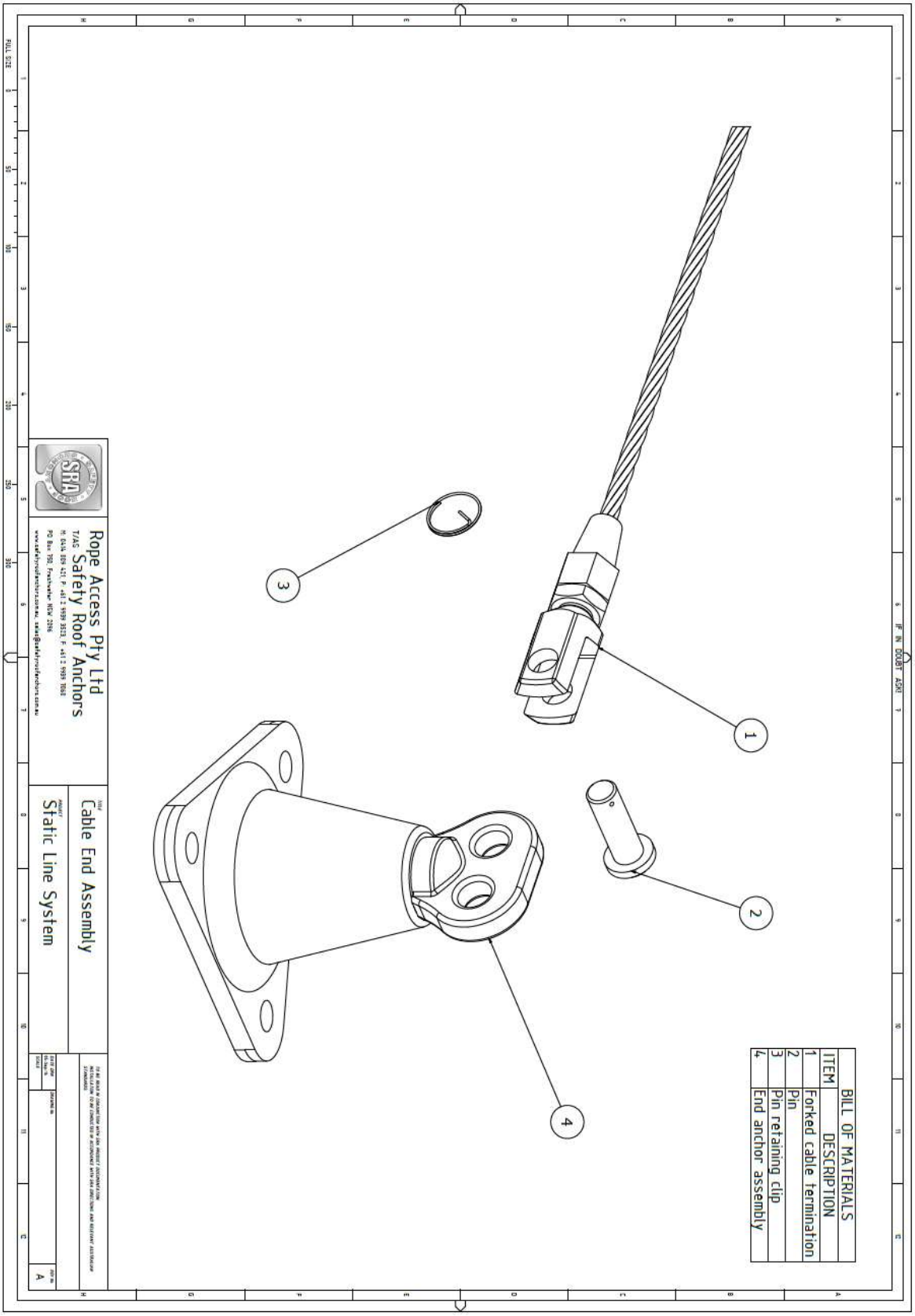
Appendix I Concrete Mount End Anchor Pre-Assembly



Appendix J Concrete Mount Fixation



Appendix K Cable End to Anchor Assembly



Appendix L Tensioner and Shock Absorber Assembly