SAFEROAD

Manual for the Installation, Maintenanace and Repair of SNH4a Parapet

Revision 2 2025

www.saferoad-rs.com/uk

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System Information

Product Information

The SNH4a parapet is a modular system made of Steel posts, rails, deformation brackets & rail joints. These are bolted together with M16 galvanized fixings & held down with M27 Stainless Steel holding down bolts into approved cast-in / resin bonded anchors to create a permanent vehicle restraint system.

The standard SNH4a parapet post spacings are = **4500mm**.

There is no statutory requirement to install safety fences or barriers but if they are provided risk assessments must show that they create no additional hazard.

The SNH4a has been crash tested in accordance with **BS EN 1317-1:2010** and **BS EN 1317-2:2010**.

Containment Level	Test	Total Mass KG	Vehicle Type	Impact Speed KM/H	Impact Angle
H4a	TB71	30000	Rigid HGV	65	20 Degrees
	TB11	900	Car	100	20 Degrees

The values returned from the TB71 and TB11 tests were:-

Containment Level = **H4a**
Working Width = **W3**
Impact Severity Level = **B**

The minimum plinth dimensions shall be 590mm wide with a minimum up-stand at traffic face of 50mm and should not exceed 100mm.

When used on motorways and trunk roads it must conform to the current requirements of National Highways. Locations and usage will be determined by an appropriately qualified design engineer.

This manual does not include design criteria and is therefore to be used only to provide reference in the handling and installation of the Parapet components.

SNH4A GENERAL ARRANGEMENT DRAWINGS

SNH4A-GA-001 Rev 01 – GA 1.5m High
SNH4A-GA-002 Rev 01 – GA 1.5m high with coping
SNH4A-GA-003 Rev 01 – GA 1.5m high with coping and anti-access

SNH4A SYSTEM WEIGHTS

1.5m high with cladding weight per metre = 176.93 kg/m
1.8m high with cladding and coping weight per metre = 195.76 kg/m

The system weights above may vary due to material, fabrication and protective finish but should be used as a guide for design purposes.

POST CAPACITY

UNFACTORED MOMENT OF RESISTANCE OF POST

The unfactored moment of resistance of the posts at the underside of the post baseplate is 99.76 kNm

CO-EXISTING SHEAR

The co-existing shear of the post is 85.39 kN

ULTIMATE SHEAR FORCE

The ultimate shear force of the post is 444.0 kN

The bridge, retaining wall or structure shall be designed to withstand the above loadings.

ANCHORAGE CAPACITY PER BOLT

The anchor test load for SNH4a parapet = 166.27 kN

APPROVED ANCHORAGE SYSTEMS

The anchorage systems below are approved for use for the installation of the SNH4a Parapet system

SSR-170 Cast in Cradle

SSR-122-VDP-TI Resin Bonded Anchor (SSR-VDP Glass Capsules)

Requirements for Installation, Inspection and Repair

REQUIREMENTS TO INSTALL, INSPECT & REPAIR SNH4A PARAPETS

Persons intending to install bridge Parapets on motorways and trunk roads must do so in line with the specifications laid out in the National Highways Sector Scheme 10B document. This will ensure compliance with National Highways requirement for Quality Management.

This course has been designed by Saferoad and registered with Lantra Awards and is compliant with National Highways Sector Scheme 10B. Those who successfully complete the course will be issued with a Lantra Awards Certificate of attendance to provide evidence of training in the installation of the SNH4a Parapet system.

To ensure that the installation, inspection & repair is both appropriate and adequate all installers must also be qualified to the standards laid out within the National Highways Sector Scheme document 10B.

All sector scheme documents are published by UKAS (United Kingdom Accreditation Service) and can be viewed on LANTRAS website www.lantra.co.uk

SYSTEM DRAWINGS

- Site specific drawings

OTHER INFORMATION REQUIRED

- Delivery instruction sheet – Site address & general details.
- Delivery Note – Record of components sent to site.
- Layout drawing – Specific drawing for parapet location.
- Parts list – list of all components required for the parapet.
- Erection check sheet – completed on site as a record of installation.

TOOLS REQUIRED FOR INSTALLATION

- Ratchet wrench and sockets
- Open jaw/ring spanners
- Drill, drill bits & taps
- Hammer / mallet
- Hand /Mechanical Saws
- Torque wrench
- Tape measure
- File

IF INSTALLING M27 RESIN FIXED ANCHORAGES A WET CORE DRILLING RIG AND CORE BITS WILL ALSO BE REQUIRED.

SNH4a Parapet Component Schedule

SNH4a Component Schedule

Component	Dimensions	Weight
SNH4a Top and Middle Rail	250mm x 150mm x 8990mm Long	272.2KG
SNH4a Bottom Rail	250mm x 150mm x 8990mm Long	272.2KG
SNH4a Post	180mm x 180mm x 1490mm	142.1KG
Top and Middle Rail Joint	236mm x 136mm x 650mm	21.73KG
Bottom Rail Joint	236mm x 136mm x 650mm	21.73KG
Rail Expansion Joint	236mm x 136mm x 670mm	22KG
Washer Plate “A”	120mm x 50mm x 6mm	280G
Washer Plate “B”	150mm x 60mm x 6mm	420G
M27 Holding Down Fixings	M27 x 120mm c/w Washers	500G
M20 Top and Middle Rail Joint Fixings	M20 x 180mm c/w Washer & Nut	760G
M20 Bottom Rail Fixings	M20 x 280mm c/w Washer & Nut	1.18KG
M16 Post to Rail Fixing - Top & Middle Rails	M16 x 40mm c/w Washer & Nut	120G
M16 Post to Rail Fixingss - Bottom Rail	M16 x 50mm c/w Washer & Nut	150G
Deformation Bracket	220mm x 228mm x 160mm	6.05KG
Cladding Panel	1500mm x 1000mm	35.64KG

SNH4a Component Schedule

As indicated in the chart on the previous page the weights of the SNH4a posts and the rails exceed that which can be safely lifted using manual handling techniques. Therefore, mechanical lifting equipment such as a lorry loader crane, forklift or an excavator will be required to undertake the installation operation. When using these types of lifting equipment, there are separate regulations that must be followed to protect the health and safety of all personnel involved.

Lifting Operations Lifting Equipment Regulations (LOLER) 1998 says:-

All lifting operations must be properly planned, Supervised, and carried out safely by competent persons.

For all lifting operations specific training is required for persons to undertake a role within a lifting team and a lift plan must be in place, the lift plan sets out the operations to be undertaken and must identify the below:

- The lifting equipment being used, including the make and model, serial number or ID number, safe working load (SWL), and thorough examination certificate details.
- The lifting accessories required for the lifting operation including ID numbers and the method to be used to sling the loads
- The loads being lifted, this must include the dimensions and weights of the loads
- The lifting team personnel, information must include the name, their role, and training / competency card details
- Lifting operation details including the required radius and height of loads to be positioned.

If you have not received specific training in lifting operations, you must never undertake any role within a lifting team.

A lift plan can only be produced by a trained **Appointed Person** for lifting operations

SNH4a Parapet Component Identification

SNH4a Component Identification

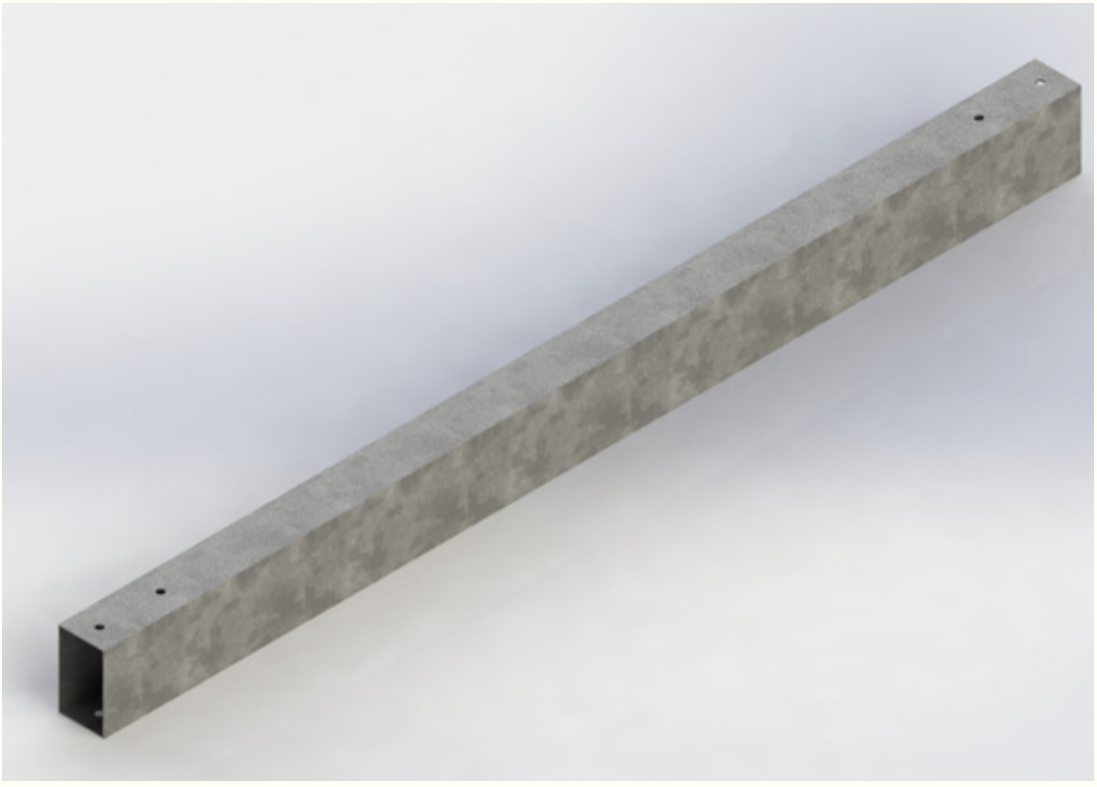
SNH4a Parapet Post without Deformation Bracket Fitted

SNH4a Parapet Post with attached Deformation Bracket

SNH4a Component Identification

SNH4a Top and Middle Rail

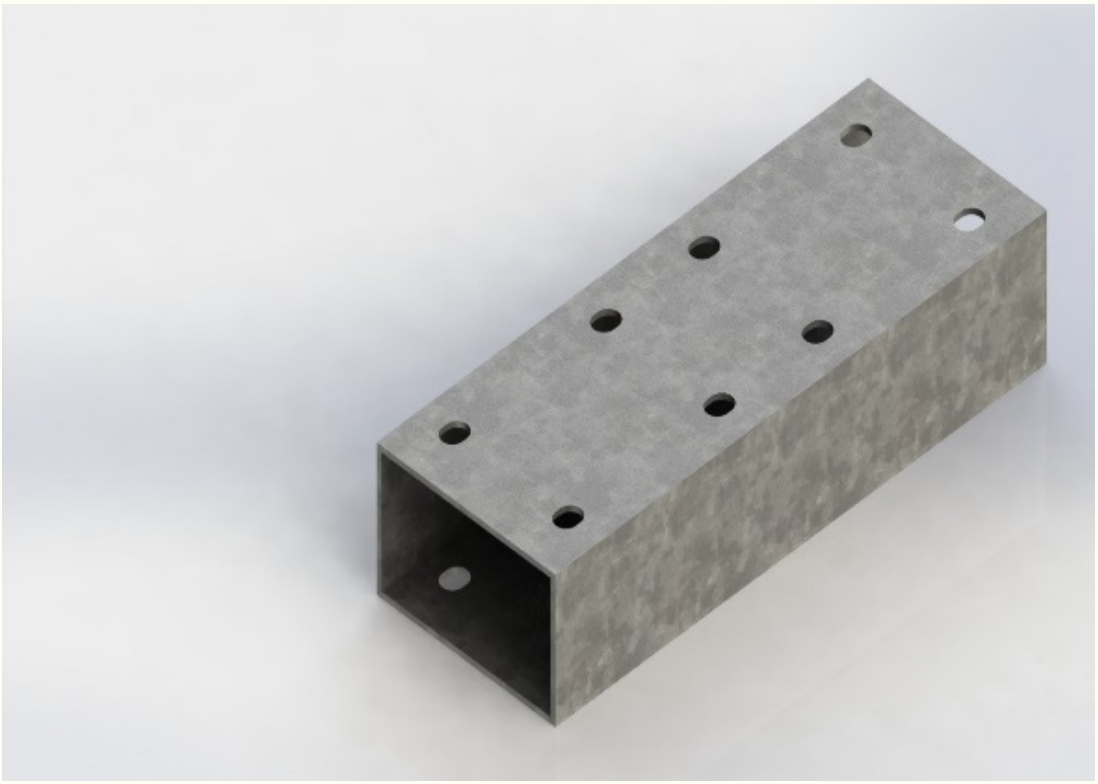
SNH4a Bottom Rail



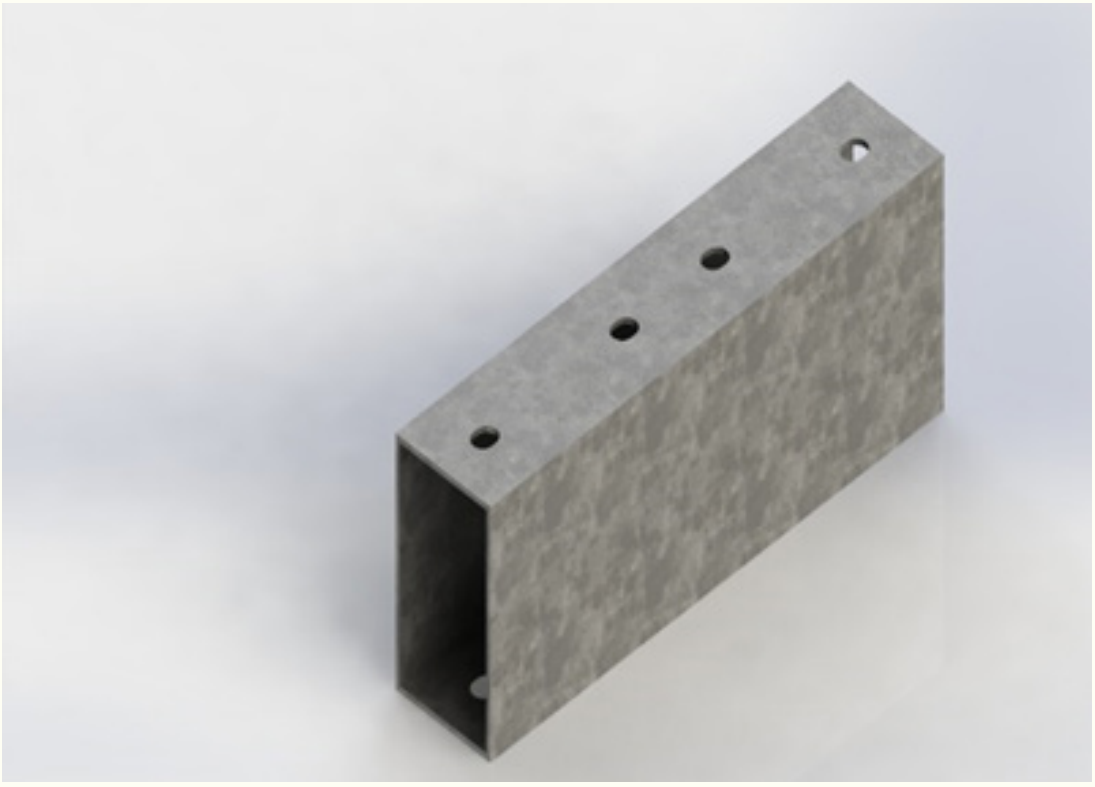
Note the difference in orientation between the top and middle Rails and the Bottom Rail

SNH4a Component Identification

SNH4a Top and Middle Rail Standard Joint



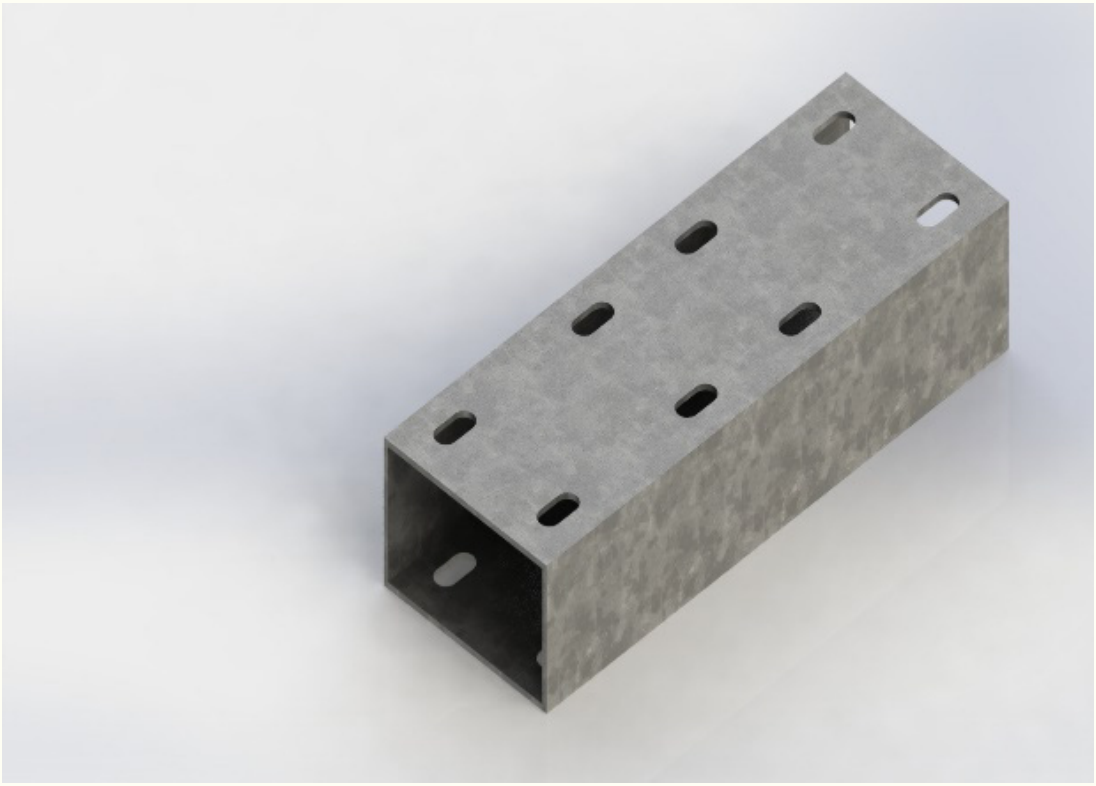
SNH4a Bottom Rail Standard Joint



Note the difference in orientation between the joints for the top and middle Rails and joint for the Bottom Rail

SNH4a Component Identification

SNH4a Top and Middle Rail Expansion Joint

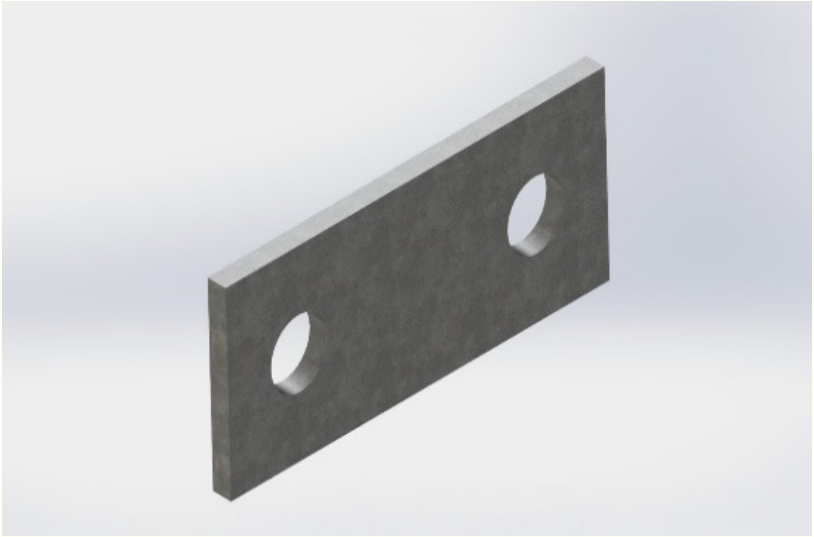


SNH4a Bottom Rail Expansion Joint

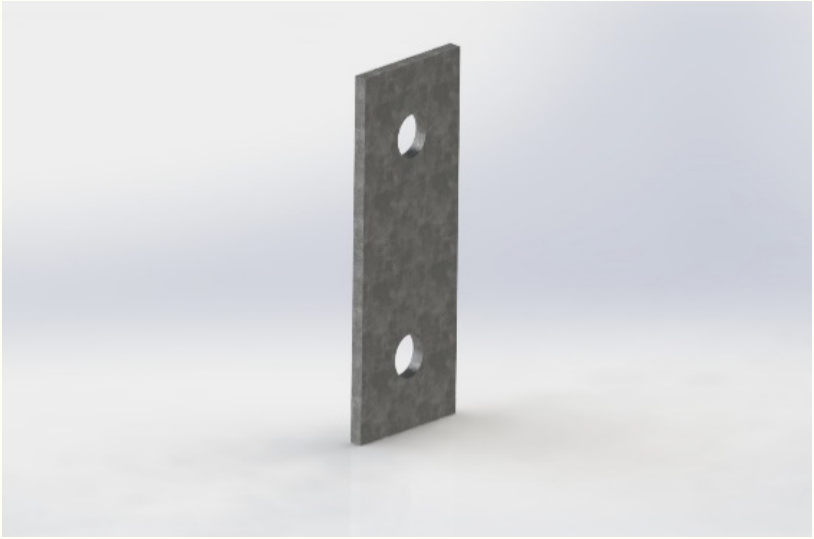
Note the difference in the bolt holes between the expansion joints and standard rail joints

SNH4a Component Identification

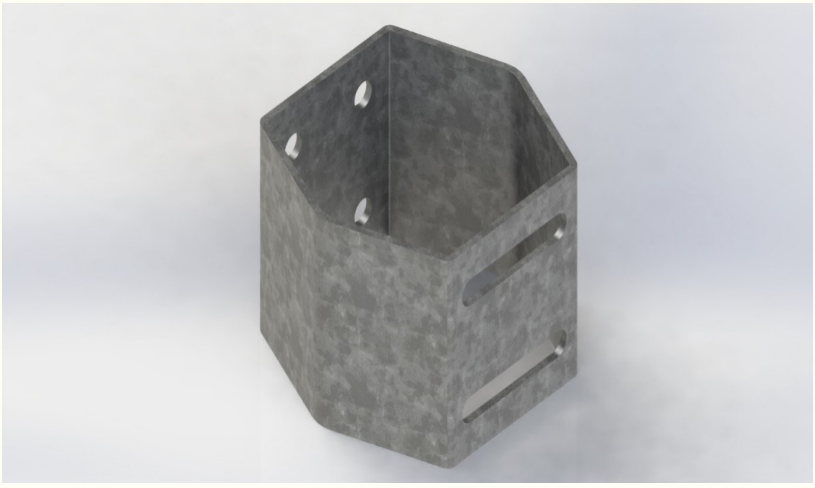
SNH4a Washer Plate Type “A”



SNH4a Washer Plate Type “B”

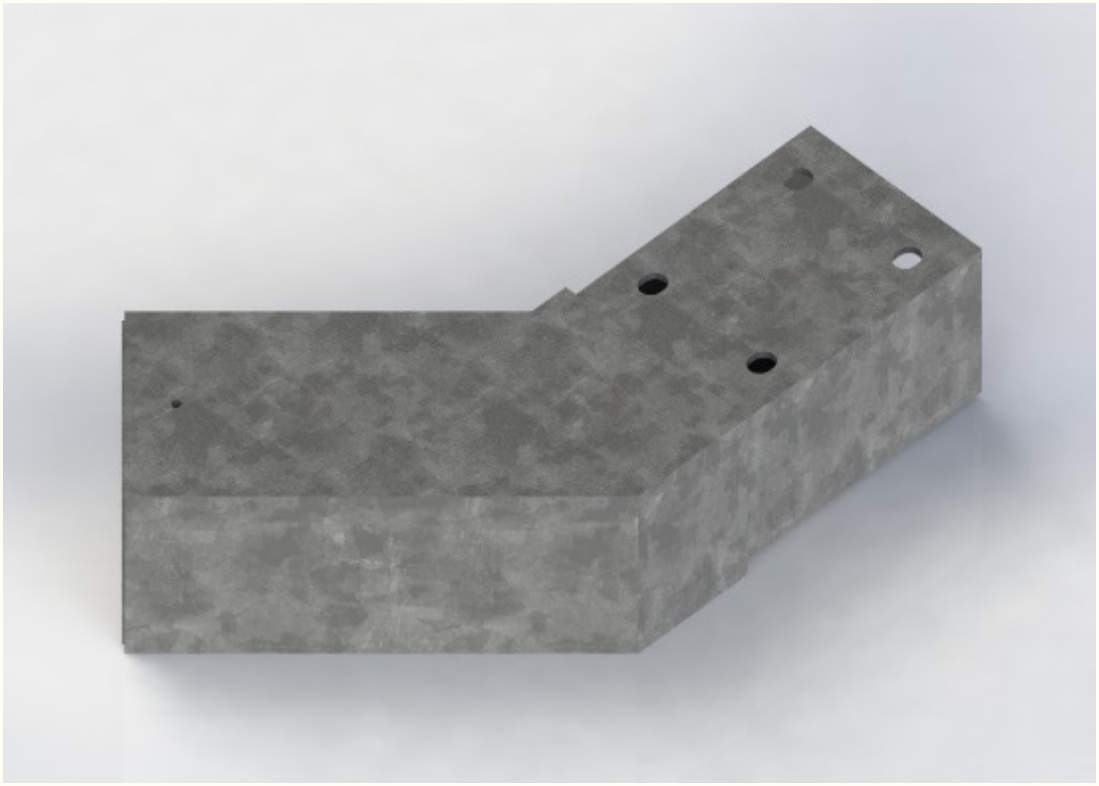


SNH4a Deformation Bracket

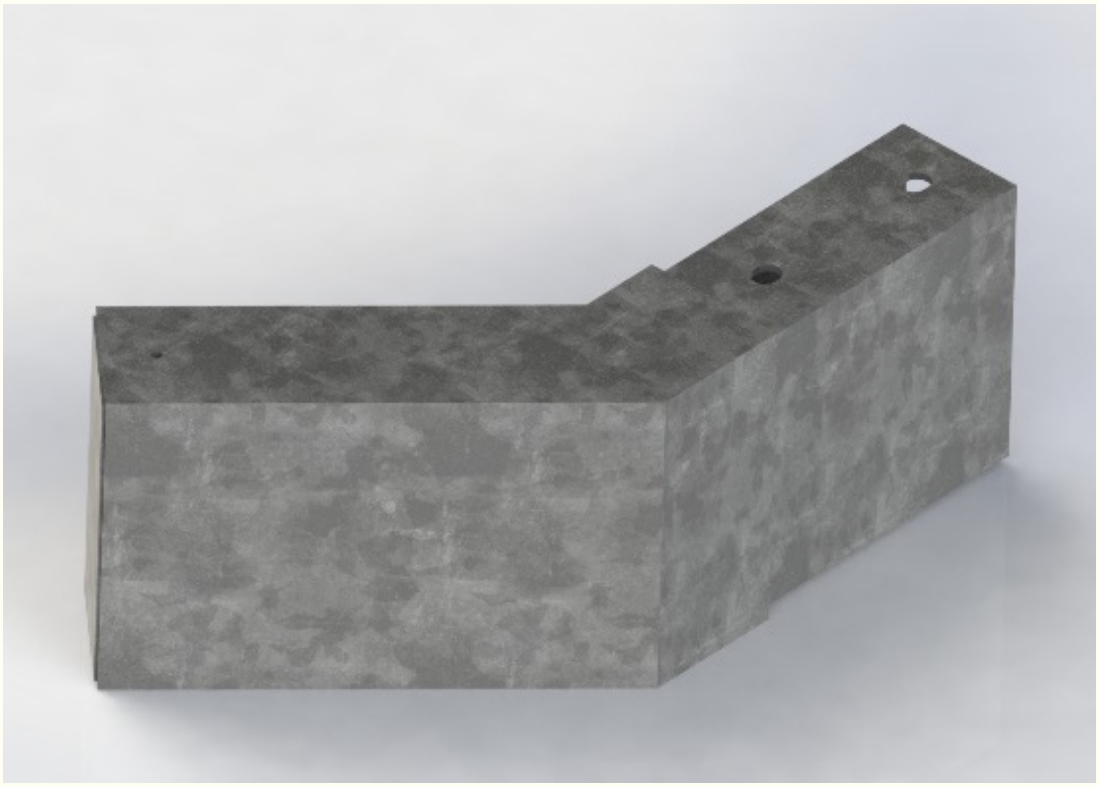


SNH4a Component Identification

SNH4a Top & Middle Rail Flareback End



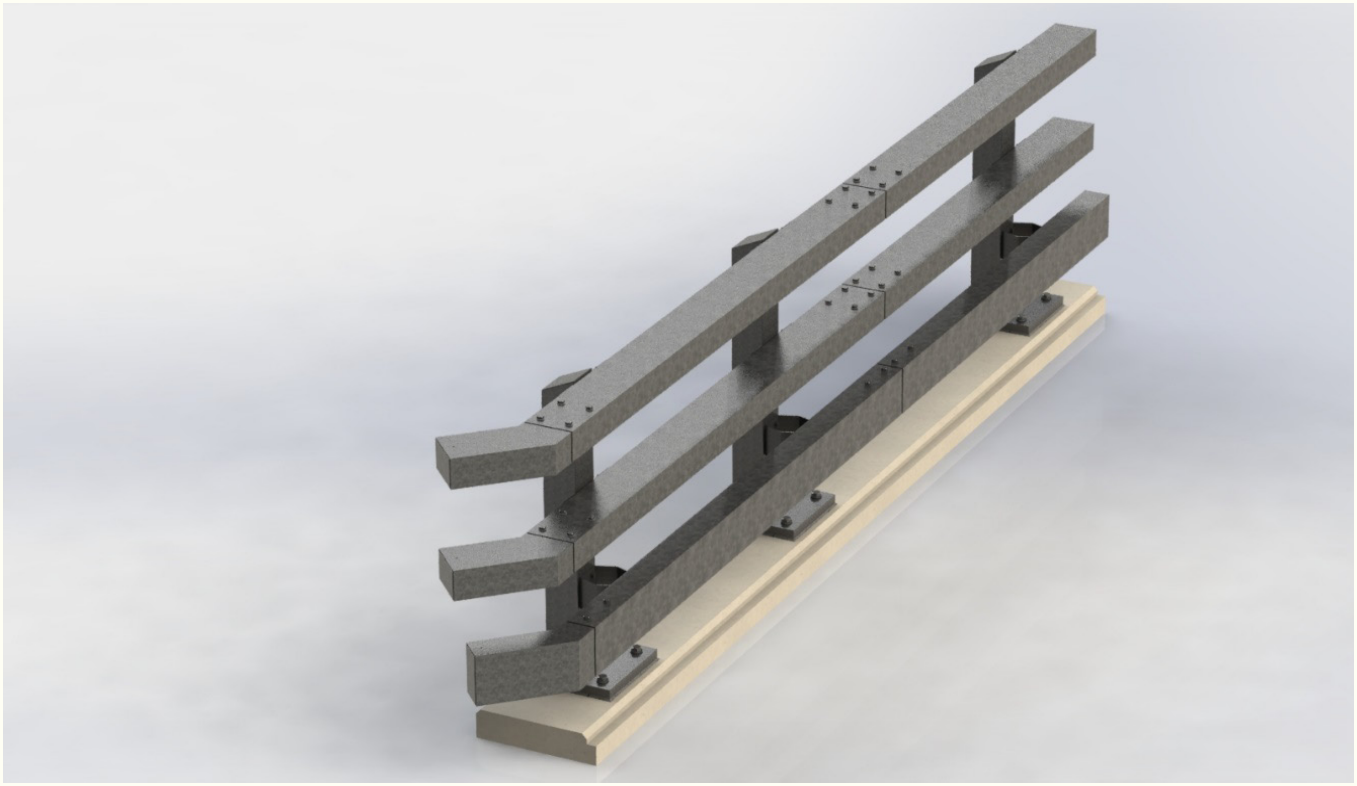
SNH4a Bottom Rail Flareback End



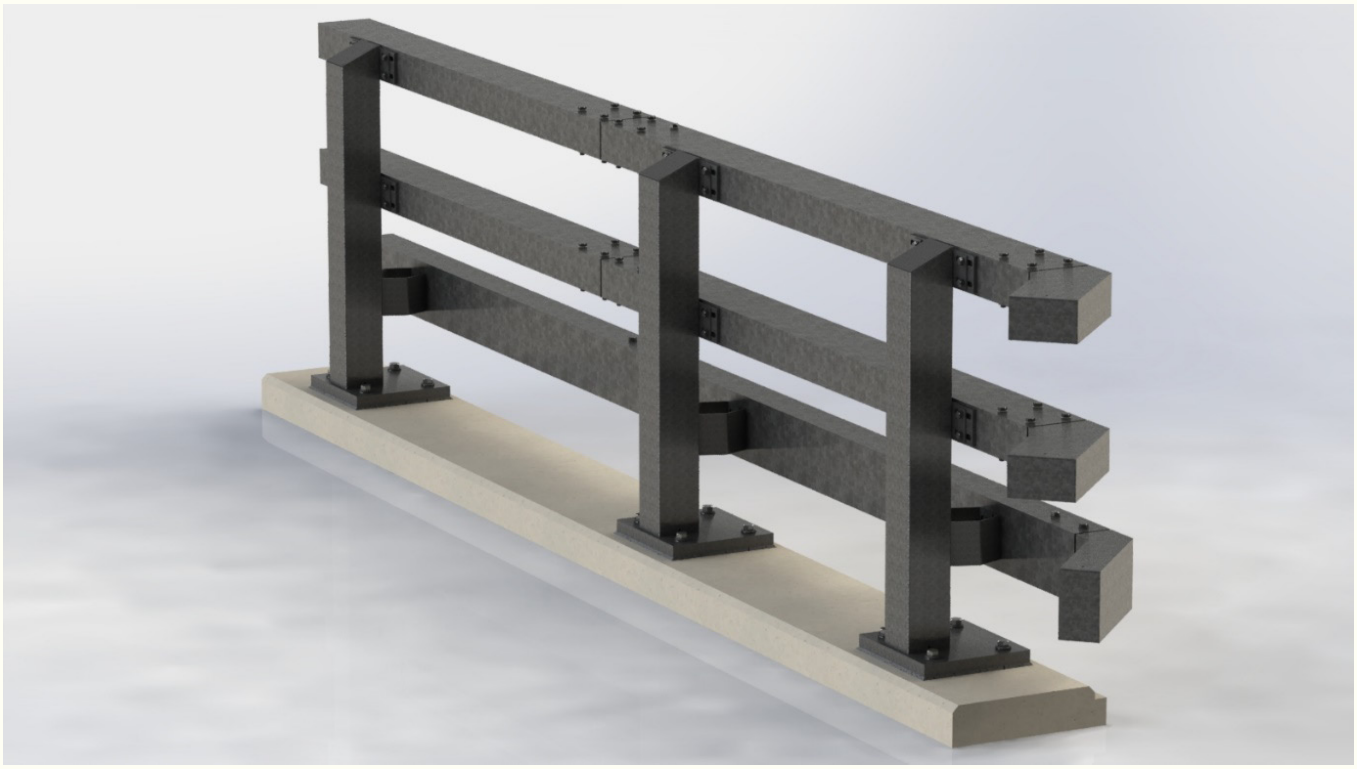
Note the difference in orientation between the flareback for the top and middle Rails and the flareback for the Bottom Rail

SNH4a Component Identification

Front view of SNH4a Parapet with bolt-in flarebacks fitted



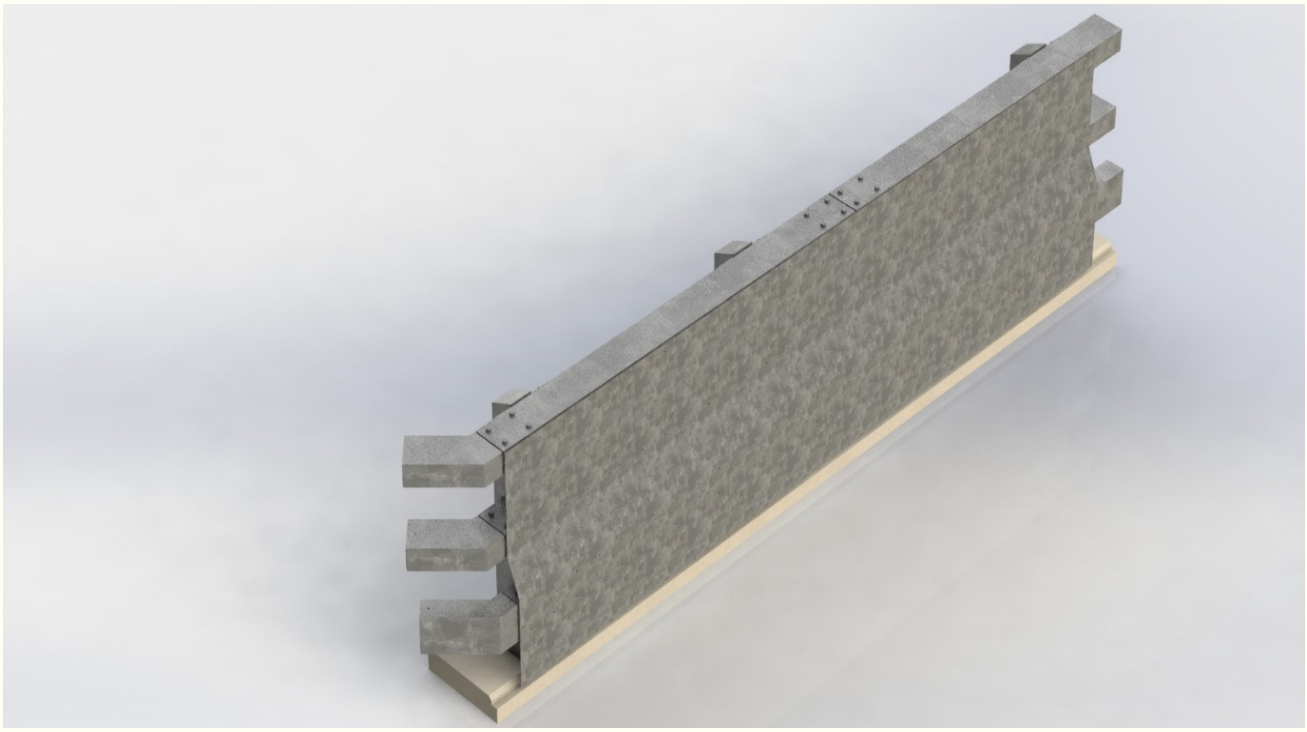
Rear view of SNH4a Parapet with bolt-in flarebacks fitted



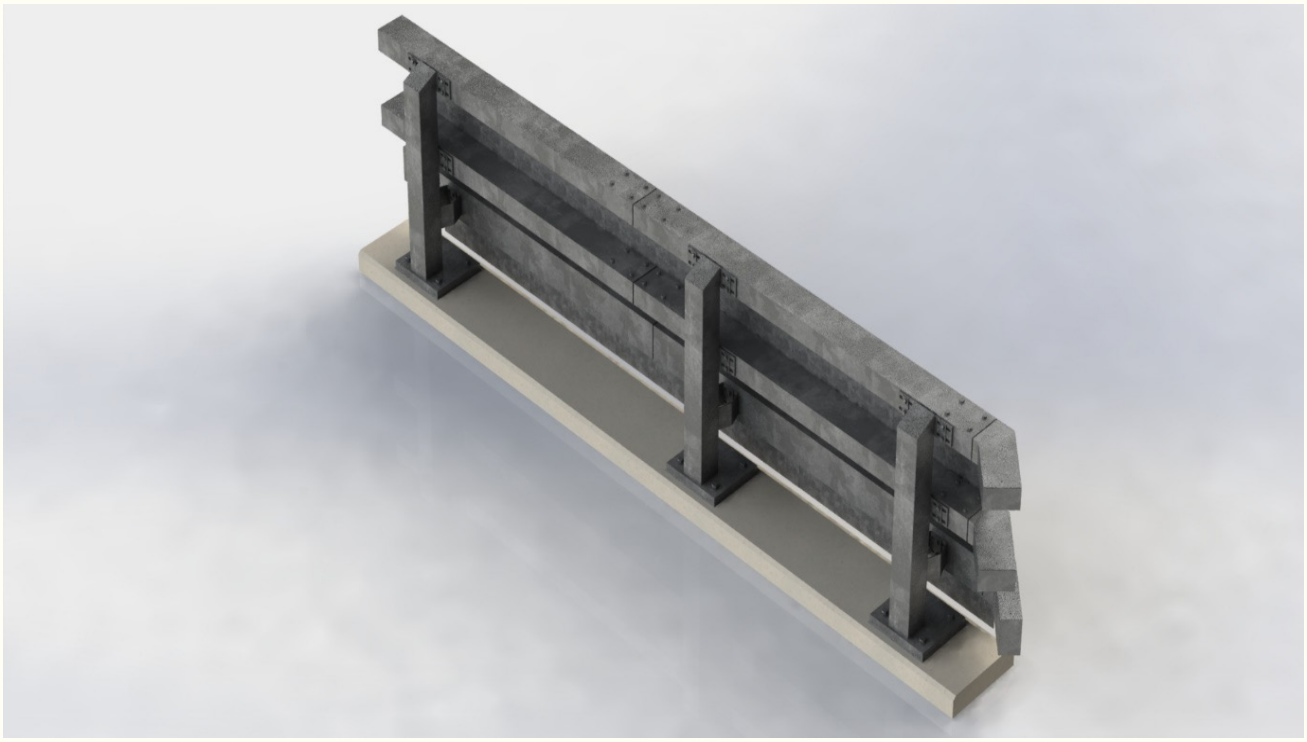
The images above are a 3D Model of what the SNH4a Parapet will look like with the rails and flarebacks installed

SNH4a Component Identification

Front view of SNH4a Parapet with cladding installed



Rear view of SNH4a Parapet with cladding installed



The images above are a 3D Model of what the SNH4a Parapet will look like with the rails, flarebacks and cladding installed

Installation Process for the SNH4a Parapet

Operation	Method	Tools Required	Fixings / Materials Required	Documents Required
CHECK ANCHOR POSITIONS	MEASURE DISTANCE BETWEEN ANCHOR POSITIONS TO CONFIRM AS BUILT DIMENSIONS.	TAPE MEASURE	NONE	LAYOUT DRAW-ING
PLACE POST ON ANCHORS	PLACE 20MM THICKNESS OF PACKERS IN CEN-TRE OF ANCHOR CLUSTER. PLACE 1 No S/S FLAT WASHER, 1 No FLAT WASHER & 1 No NYLON TOPHAT ONTO M27 FIXING. PLACE POST ONTO PACKERS & SCREW M27 FIXINGS INTO ANCHOR THROUGH BASEPLATE. PLUMB POST TO UPRIGHT POSITION TORQUE 70Nm (AFTER GROUTING) REPEAT AT ALL ANCHOR POSITIONS IF REQUESTED BY THE CLIENT, M27 SHEAR-HEAD BOLT TO BE IN REAR RIGHT ANCHORAGE POSITION.	WRENCH/SOCKET OR SPANNER TO SUIT M27 HEX SET. SPIRIT LEVEL	PARAPET POSTS FOR EACH PARAPET POST: 4 No M27 X 120 HEX-SETS 4 No M27 S/S FLAT WASHERS 4 No M27 FLAT WASHERS 4 No M27 NYLON TOPHAT WASHERS PACKERS	LAYOUT DRAW-ING PARTS LIST
LAYOUT RAILS	DISTRIBUTE & LAY RAILS IN FRONT OF PARAPET POSTS RELATIVE TO THEIR FINAL POSITION.	NONE	PARAPET RAILS	LAYOUT DRAW-ING PARTS LIST

Operation	Method	Tools Required	Fixings / Materials Required	Documents Required
FIX DEFORMATION BRACKETS ONTO POSTS	• INSERT 4No M16 X 40 HEX HEAD SET-SCREW WITH SPRING WASHER & FLAT WASHER THROUGH DEFORMATION BRACKET. • FIX DEFORMATION BRACKET ONTO POST (1 PER POST) • TORQUE: TORQUE IS ACHIEVED WHEN THE SPRING WASHER IS FLAT. • REPEAT FOR ALL DEFORMATION BRACKET POSITION.	WRENCH / SOCKET OR SPANNER TO SUIT M16 HEX SET.	• PARAPET POSTS DEFORMATION BRACKETS • 8 No M16 X 50 HEX HEAD SET-SCREWS • 4 No M16 X 40 HEX HEAD SET-SCREWS •12 No M16 SPRING WASHERS	LAYOUT DRAWING PARTS LIST
FIT RAILS TO POSTS	• LIFT LOWER IMPACT RAIL INTO POSITION IN FRONT OF PARAPET POSTS. • INSERT M16 FIXINGS WITH SPRING WASHER & FLAT WASHER THROUGH WASHER PLATE 'B' & DEFORMATION BRACKET INTO REAR OF BOTTOM RAIL. • REPEAT FOR ALL DEFORMATION TO BOTTOM RAIL CONNECTIONS. • **MIDDLE AND TOP RAILS** INSERT 2NO M16 X 50 SET SCREWS C/W M16 SPRING WASHER & M16 FLAT WASHER THROUGH WASHER PLATE 'A' THROUGH THE POST CLEAT AND INTO THE REAR OF THE RAIL AT EACH CONNECTION POINT	WRENCH / SOCKET OR SPANNER TO SUIT M16 HEX SET.	PARAPET POSTS WITH DEFORMATION BRACKETS PARAPET RAILS: **FOR EACH BOTTOM RAIL:** 2 No M16 X 40 HEX HEAD SETSCREWS 1 No WASHER PLATE "B", 2 No M16 SPRING WASHERS & FLAT WASHERS **FOR EACH TOP AND MIDDLE RAIL** 4NO M16 X 50 HEX HEAD SET-SCREWS C/W M16 FLAT & SPRING WASHERS AND 2NO WASHER PLATE 'A'	LAYOUT DRAWING PARTS LIST

Operation	Method	Tools Required	Fixings / Materials Required	Documents Required
PLACE & SECURE RAIL JOINT IN RAIL	INSERT RAIL JOINT INTO OPEN END OF RAIL. ALIGN HOLES IN RAIL JOINT WITH HOLES IN RAIL. PLACE M20 WASHER ON TO M20 X 180 (MID /TOP) OR M20 X 280 (BOTTOM) SET-SCREW. PLACE 1 No M20 X 180 (MID/TOP) OR M20 X 280 (BOTTOM) SET-SCREW THROUGH HOLE IN RAIL/RAIL JOINT (HEAD & WASHER ON TOP OF RAIL) PLACE WASHER & SPRING WASHER ON M20 X 180 (MID/TOP) OR M20 X 280 (BOTTOM) SET-SCREW ON THE UNDERSIDE OF RAIL. TIGHTEN M20 NUT ONTO M20 X 180 (MID/ TOP) OR M20 X 280 (BOTTOM) SET-SCREW ON THE UNDERSIDE OF RAIL. **TORQUE IS ACHIEVED WHEN THE SPRING WASHER IS FLAT.** REPEAT FOR ALL 3 No	WRENCH/SOCKET OR SPANNER TO SUIT M20 HEX SET.	PARAPET RAILS IMPACT RAIL JOINT FOR EACH BOTTOM RAIL JOINT: 4 No M20 X 280 HEX-HEAD SET-SCREWS 8 No M20 FLAT WASHERS 4 No M20 SPRING WASHERS 4 No M20 NUTS RAIL JOINT FOR EACH TOP OR MID RAIL JOINT: 8 No M20 X 180 HEX-HEAD SET-SCREWS 16 No M20 FLAT WASHERS 8 No M20 SPRING WASHERS 16 No M20 NUTS	LAYOUT DRAWING PARTS LIST

Operation	Method	Tools Required	Fixings / Materials Required	Documents Required
LINE & LEVEL PARAPET.	IDENTIFY POST LOCATIONS WHERE POSTS ARE TO BE RAISED OR LOWERED TO CORRECT PARAPET LEVEL. AT POST LOCATION, LOOSEN HOLDING DOWN FIXINGS & ADJUST PACKERS UNDER BASE PLATE TO CORRECT HEIGHT. TIGHTEN HOLDING DOWN FIXINGS, **TORQUE = 70Nm** (AFTER GROUTING) REPEAT AT THE REQUIRED POST LOCATIONS UNTIL THE PARAPET IS LEVEL. GROUT SHOULD BE MIXED AND POURED AS PER MANUFACTURERS INSTRUCTIONS. **GROUT TOLERANCE - 10MM MIN TO 30MM MAX**	SOCKET OR SPANNER TO SUIT M27 HEX SET. TORQUE WRENCH	PACKERS	
PLACE AND SECURE CLADDING PANELS.	LIFT PANEL INTO PLACE AND CLAMP TO PARAPET RAIL AS A TEMPORARY MEASURE. DRILL 6.9MM DIA HOLE AT EACH RIVET LOCATION. INSTALL RIVET, LAP NEXT PANEL BY 50MM AND REPEAT PROCEDURE UNTIL ALL CLADDING PANELS ARE FIXED TO THE PARAPET RAILS.	DRILL, CLAMP, RIVET GUN, STAINLESS STEEL MAGNALOK RIVETS AND 6.9MM DRILL BIT.	36 No RIVETS PER PANEL	LAYOUT DRAWING PARTS LIST

Inspection Of SNH4a Parapet

Operation	Method	Tools Required	Documents Required
INSPECT PARAPET	INSPECT TO ENSURE THE FOLLOWING: ALL FIXINGS LOCATED & TIGHTENED. (M27 HOLDING DOWN FIXINGS TIGHTENED TO 70Nm) POSTS INSTALLED AT CORRECT POSITIONS. RAILS INSTALLED AT CORRECT POSITIONS. ALL RAIL JOINTS INSERTED AT CORRECT POSITIONS. COMPLETE INSPECTION CHECK SHEET WITH CLIENT	TORQUE WRENCH SOCKETS TO SUIT M16, M20 & M27 FIXINGS.	LAYOUT DRAWING PARTS LIST ERECTION CHECK SHEET

Following an installation project for SNH4a Parapet whether this is a new install or a repair to a damaged Parapet, an inspection must be completed by a trained and competent person to ensure that the SNH4a Parapet has been installed in line with the manufacturer's specifications and NHSS 10B.

When completing this inspection, it is recommended that a representative of the client is present to witness the inspection. Inspection record forms such as the example shown on the next page can be used to keep a clear record of the inspection and can be signed by the installer and the client / main contractor who witnesses the inspection

SAFEROAD	Final Inspection of Parapet	GQF16-3
		Issue 2 July 24

Date:		Visit		of		Install Completed	Y	N
Client:								
Contract:								
Location:								
Parapet System:								

	Within Specification			
CHECKS	**Yes**	**No**	**N/A**	**COMMENTS**
Anchors		d		
Posts				
Rails and Joints				
System Height				
Fasteners				
Line and Level				
Grout pad thickness				
Holding down Bolts Torque				
Parapet Mesh Infill				
Parapet Solid Infill				
Parapet Cladding				
Parapet Copings				
Anti Access Panels				
Visual Inspection of galvanised/Painted finish				

I confirm that I have inspected the Parapet in the above location and confirm that the inspected work has been completed in accordance with specifications.

Saferoad Lead Installer or Supervisor	Main Contractor	Client
Name (Print):	Name (Print):	Name (Print):
Signature:	Signature:	Signature:
Date:	Date:	Date:

Saferoad UK Ltd and its subsidiary Saferoad VRS Ltd.
Concord House, Bessemer Way, Scunthorpe.
DN15 8XE
Tel: 01724 289119

Conformity, Maintenance & Repair of SNH4a Parapets

General Information

Where maintenance or repairs are required to be carried out, the procedure for installation in the following paragraphs shall be followed unless otherwise stated:

• If not subjected to impact damage, special corrosion conditions such as a chemical spillage, vandalism, or theft of components, the SNH4a Parapet requires very little maintenance.

• It is encouraged that the information contained in the following slides is regarded as the minimum level of attention that will be afforded the SNH4a system.

Conformity

New works will be initially inspected to ensure the system has been installed to the correct specification and will be ‘signed off’ by the installer in accordance with National Highways Sector Scheme Document 10B.

The inspection will include the following:-

- All fasteners are tightened to the specified torque and random checks of torques have been made with a calibrated torque wrench.
- System heights, with an accepted tolerance of ± 30mm (+30 -0 for railways) are to be confirmed with the relevant drawings.
- Post spacing tolerances must not, however, become cumulative.
- Remove any old/unused fittings from fencing installations.

Repairing damaged galvanised coatings

- Damaged areas of galvanised protective coatings can be repaired by removing any rust from the steel and application of a 150-micron coat of zinc-enriched spray paint.

- This procedure complies with EN ISO 1461 2022 clause 6.3 and does not apply to components that are damaged or thinned in such a way as to affect their integrity should an impact occur. Damaged components should be replaced.

Routine Inspection

The SNH4a parapet will be subject to routine inspection in line with the maintaining or adopting bodies' schedules.
Should damage to the parapet be encountered – either caused by an errant vehicle or vandalism, Saferoad should be contacted to arrange a survey and recommend the correct repair procedure.

Repair

- The straightening of damaged components is not allowed, and such components will be required to be replaced. All fasteners in the area of the impact shall be replaced with new fasteners irrespective of their apparent condition.

- A check/inspection of the system, on either side of the area of impact will be conducted to ascertain if further damage has resulted. If damage is seen, or suspected, then the area of repair should be extended to encompass this.

- Posts in this area should be inspected with the inclusion of the anchorage. If the anchor has failed or is suspected of having failed, a test must be conducted in accordance with the Anchor Testing Method & recorded to ascertain if anchor replacement is required.

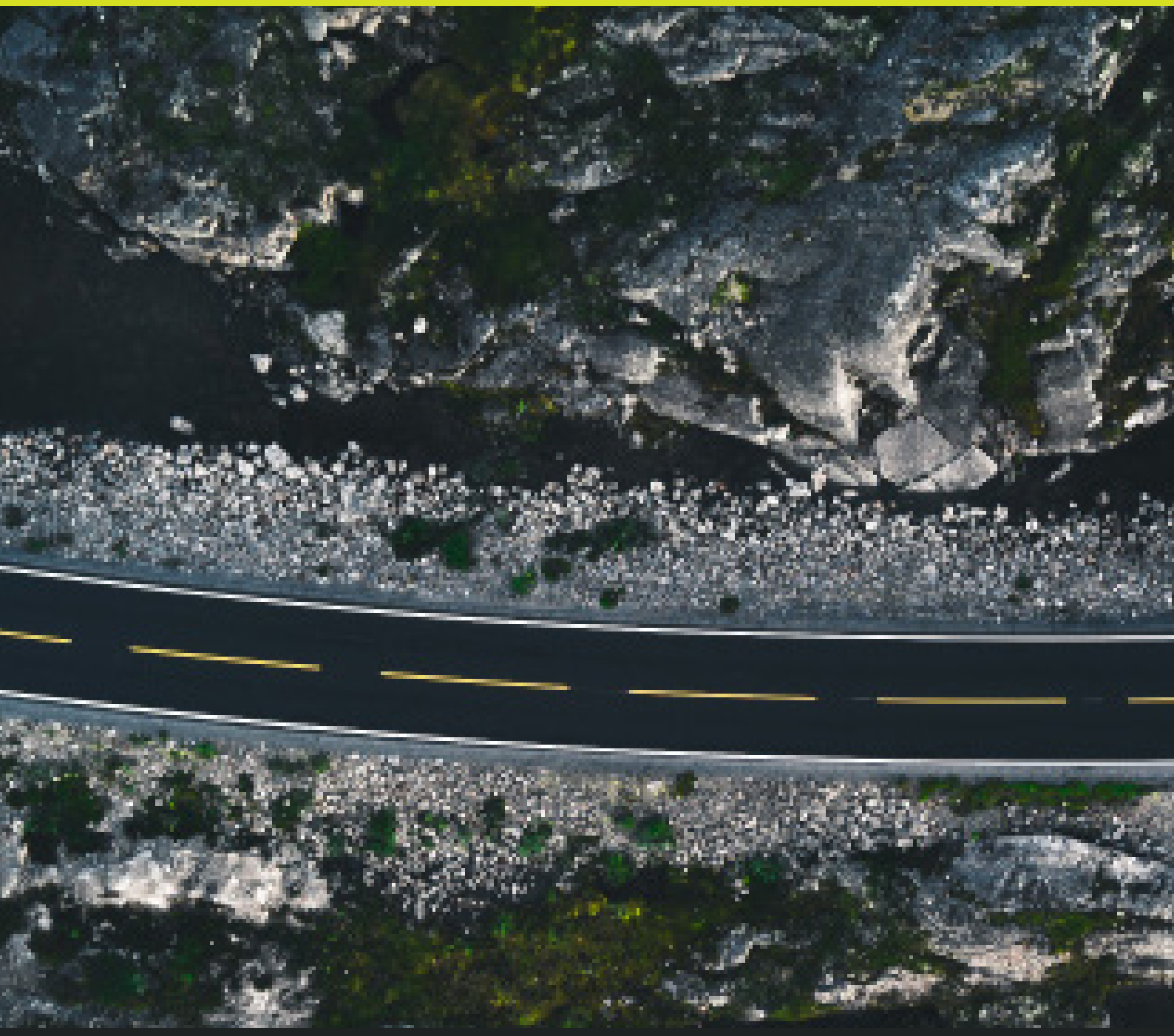
General Arrangment Drawings

Saferoad UK Ltd are a leading supplier of Vehicle Restraint Systems, for information on our range of products or services please visit www.saferoad-rs.com/uk for more information or scan the QR codes below

Our Services

Training

Our Products



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