

<i>Stalprodukt S.A.</i>	Kind of document : Assembly manual	Reference No: IM/MD-85/21	
Title : ASSEMBLY MANUAL OF BRIDGE SAFETY BARRIER Viking One according to EN 1317-5:2007+A2:2012		Page:	1
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		Pages:	4
			22.09.2021

Documentation of the producer

According to EN 1317:5 standard point 5.2 Product description

Equipment and employees

The Contractor should produce evidence that he has the possibility to use special equipment to assemble and transport barriers, which is safe to use. The team performing road works should be under continuous supervision, executed by a properly qualified employee. The Contractor shall equip employees with means of individual protection. Vehicle marking and protection of the working place should be compliant with current legal regulations binding in the place where works are performed.

Materials

Materials should be compliant with requirements stated in Documentation of the Manufacturer.

Individual barrier elements are packed in bundles with size depending on the weight of elements and the size of the commission. Small barrier elements are delivered in containers or cases.

Each bundle or case shall have a tag including at least the following information:

- name and address of the producer,
- name of the product, together with the name and marking of the element,
- date of production,
- weight of the bundle, container or case,
- number of items in one delivery.

Barrier elements should be stored in places and conditions, in which they shall not be exposed to mechanical defects or intensive corrosion.

Stages of assembly works

Assembly works include the following stages:

- 1) **Preparatory works and measurements** (indication of barrier road with verification of the course of underground installations, determination of posts location, indication of possible passage routes, crossings as well as final and initial barrier sections).
- 2) **Placing posts of the protective barriers system** – placing posts within the distance from the edge of the road stated in Project Documentation. During this stage of works it is essential to verify settlement, height and distance between posts.

Installation instructions on new constructions:

During construction of the concrete beams preassembled groups of treaded rods with anchor plate should be placed in correct distance and with correct height before pouring the concrete.

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The groups of treaded rods should be secured so they won't move during the pouring of the concrete.

Installation instructions on existing constructions (maintenance work):

Please note that when doing maintenance work on bridges the requirements for anchors, tolerances etc. should be in accordance with current regulations and according to Project Documentation.

When using the chemical anchor HILTI HIT-HY 200-A the following procedure should be followed:

- drill hole to the required diameter and depth for stud size being used,
- clean the hole with brush and hand pump at least four times each,
- insert foil pack into pack holder and put holder into the dispenser,
- discard initial resin,
- inject the resin starting at the back of the hole, fill holes approximately 2/3 full,
- setting anchor in hole,
- leave the anchor undisturbed until the curing time elapses,
- attach fixture and tighten the nut to the required torque.

Before use, please see instruction provided by manufacturer of anchors.

3) **Assembly of protective barriers system** – Assembly of protective barrier elements should be made according to Documentation of the Producer and Project Documentation.

Assembly of protective road barriers includes:

- a) assembly of distancing elements within the protective barriers system with the use of appropriate joining elements,
- b) assembly of guides for distancing elements with the use of appropriate joining elements. During this stage of works adjoining segments of guides need to be connected according to the direction of vehicle movement, in a way, which in case of accident will enable the vehicle to slide along protective barriers system without touching edges of the guides,
- c) assembly of initial and final segments of protective barriers system,
- d) regulation of joining element's tightening moment,
- e) checking the continuity of galvanized surface and repair of possible damages.

4) **Quality control of the works** should include:

- a) verifying the compliance between the assembly of protective barriers system with Project Documentation and Documentation of the Producer, with consideration of possible size deviations,
- b) test of galvanized layer thickness and its appearance

5) **Site arrangement**

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Technical specification for bridge restraint system Viking One

Steel quality: S235JR in accordance with EN 10025-2

Steel quality: S355J2 in accordance with EN 10025-2

Steel quality: S355MC in accordance with EN 10149-2

Hot-dip zinc coating:

- in accordance with EN ISO 1461
- continuous method in accordance with EN 10346

Bolts:

Bolts in accordance with EN ISO 898-1

- M 16 x 25 according to drawing DBO-1930; property class 8.8
- M 16 x 30 according to drawing DBO-1933; property class 4.6
- M 16 x 40 according to EN ISO 4017; DBO-1902; property class 5.8
- M 16 x 40 according to EN ISO 4017; DBO-1904; property class 8.8
- M 16 x 120 according to EN ISO 4017; DBO-1960; property class 8.8

Nuts according to EN ISO 4032

Nuts with flange according to ISO 4161; property class 8 – as option

Washers according to EN ISO 7089 and EN ISO 7091

Tightening torque of the bolts:

- M 16 - T = 70 ± 10 [Nm]

Anchors/Anchorage

- HILTI HIT-HY 200-A + HIT-C-F (8.8) M24x280, minimum driving depth 210[mm],
- When assembling the barrier on new constructions preassembled groups of M24x430 A4-80 treaded rods should be used. The rods should be assembled to a 5[mm] thick steel plate (drawing n° MD/18/2021) or 10[mm] thick steel plate (drawing n° MD/15/2021) which secures the rods in the concrete. Minimum driving depth 310[mm],
- When assembling the barrier on existing constructions the requirements for anchors should be in accordance with current regulations and according to Project Documentation.

Tightening torque of the anchors:

- HILTI HIT-HY 200-A + HIT-C-F (8.8) M24x280

$$T_{inst,max} = 200 \text{ [Nm]}$$

The usage of groups of M24x430 A4-80 treaded rods is allowed on the base of the report number 0101\ME\HRB\21.

The usage of Guardrail type A(W) and Guardrail type B is allowed on the base of the report number 0096\ME\HRB\21.

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List of elements Viking One

ID	Part name	N° of drawing	Material/ property class	Theoretical mass [kg]
1	Bridge Post STP-14M	DBO-1637	S355J2, S235JR	33.0
2	Guardrail 120x80 L=3998[mm]	DBO-0903	S355J2H	46.2
3	Single outrigger STP	DBO-1602	S355J2	4.0
4	Guardrail type B or A(W)	DBO-1315/ DBO-0669	S355MC	43.0/47.4
5	Handle	DBO-1641	S355J2	4.0
6	Washer M16	DBO-0513	S235JR	0.16
7	Connector	DBO-0904	S355J2	4.3
8	Bolt M16x25-set	DBO-1930	8.8	-
9	Bolt M16x30-set	DBO-1933	4.6	-
10	Bolt M16x40-set	DBO-1902	5.8	-
11	Bolt M16x40-set	DBO-1904	8.8	-
12	Bolt M16x120-set	DBO-1960	8.8	-
13	Anchor HILTI HIT-HY 200-A + HIT-C-F (8.8) M24x280 or M24x430 A4-80 with 5[mm] or 10[mm] anchor plate	-	8.8/ A4-80	-

Sequence of assembly in accordance with attached drawings:

IM/MD-85/I - Assembly drawing bridge safety barrier Viking One

IM/MD-85/II - Single section Viking One

IM/MD-85/III - Bridge safety barrier Viking One

IM/MD-85/IV - Assembly of bolt M16x40 (Outrigger-Post) for system Viking One

IM/MD-85/V - Assembly of bolt M16x40 (Guardrail-Outrigger) for system Viking One

IM/MD-85/VI - Assembly of bolt M16x25 for system Viking One

IM/MD-85/VII - Assembly of bolt M16x40 (Post-Handle) for system Viking One

IM/MD-85/VIII - Assembly of bolt M16x120 (Guardrail-Handle) for system Viking One

IM/MD-85/IX - Assembly of bolt M16x30 (Guardrail-Connector) for system Viking One

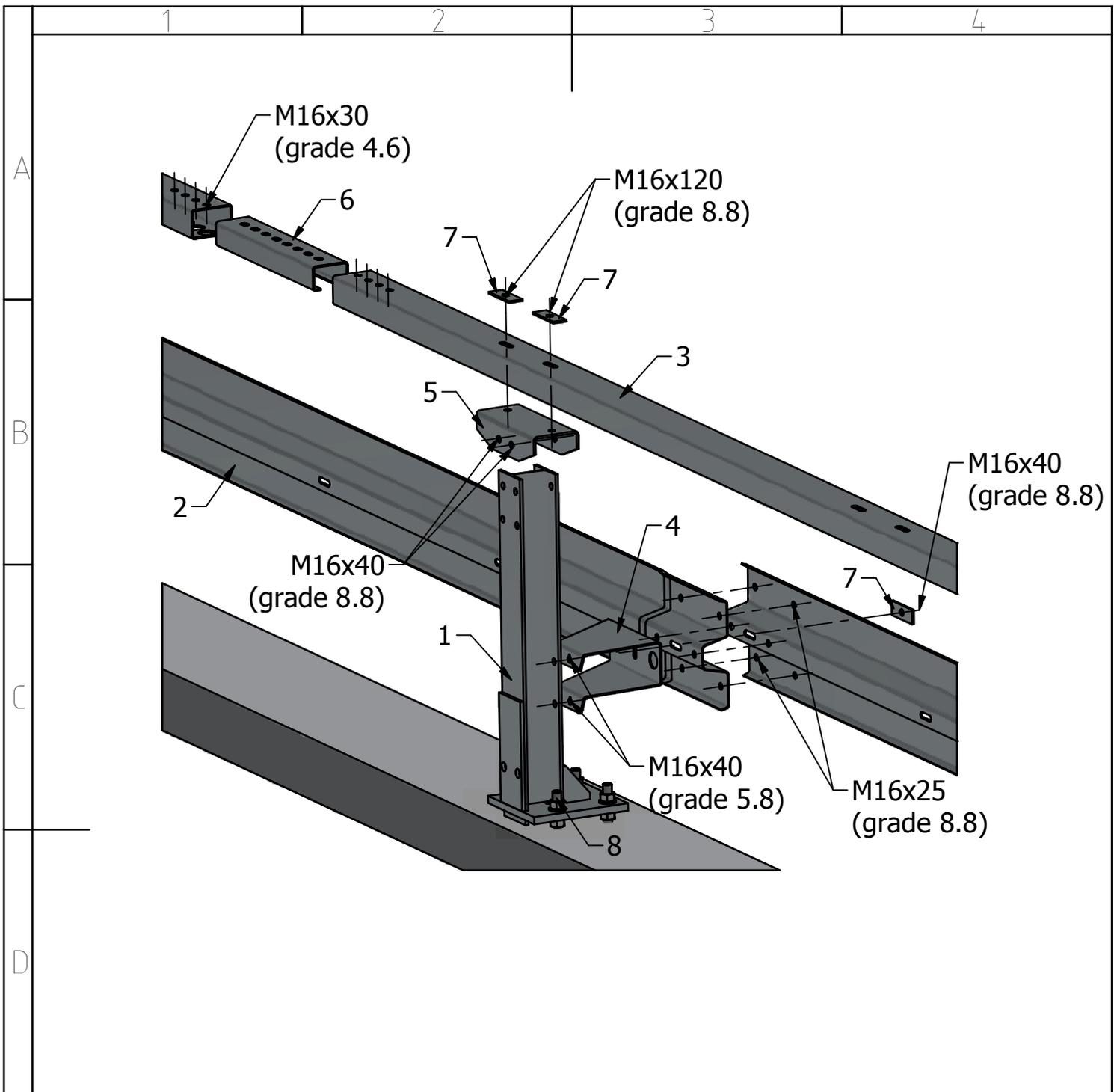
Tested length of system is 60 m (without terminals).

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Stalprodukt S.A.
Dyrektor Sprzedaży
Wyrobow Segmentu Profili
mgr Jarosław Cholewiński

Stalprodukt S.A.
Dział Sprzedaży Barier Drogowych
Marcin Piechnik

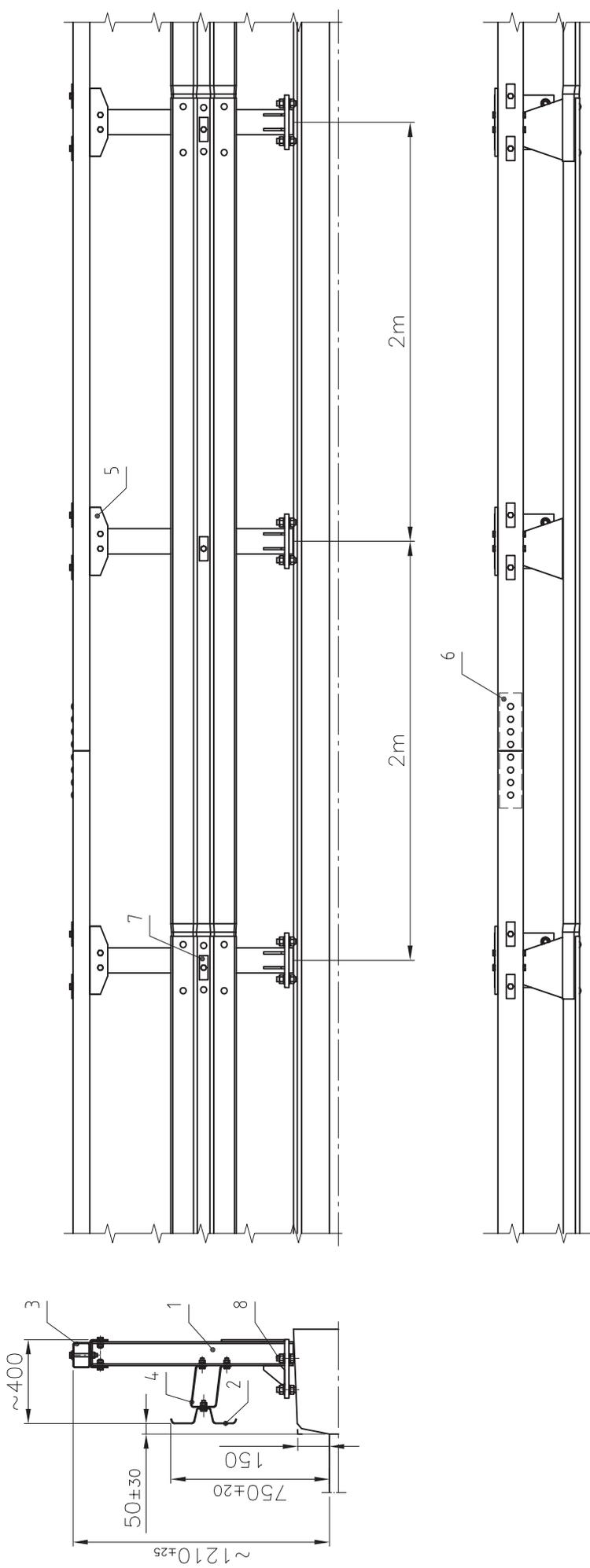
Stalprodukt S.A.
Dział Sprzedaży Barier Drogowych
Dawid Pałkowski



List of elements:

1. Bridge Post STP-14M (DBO-1637)
2. Guardrail type B (DBO-1315)
3. Guardrail 120x80 L=3998[mm] (DBO-0903)
4. Single outrigger STP (DBO-1602)
5. Handle (DBO-1641)
6. Connector (DBO-0904)
7. Washer M16 (DBO-0513)
8. Anchor M24 cl. 8.8

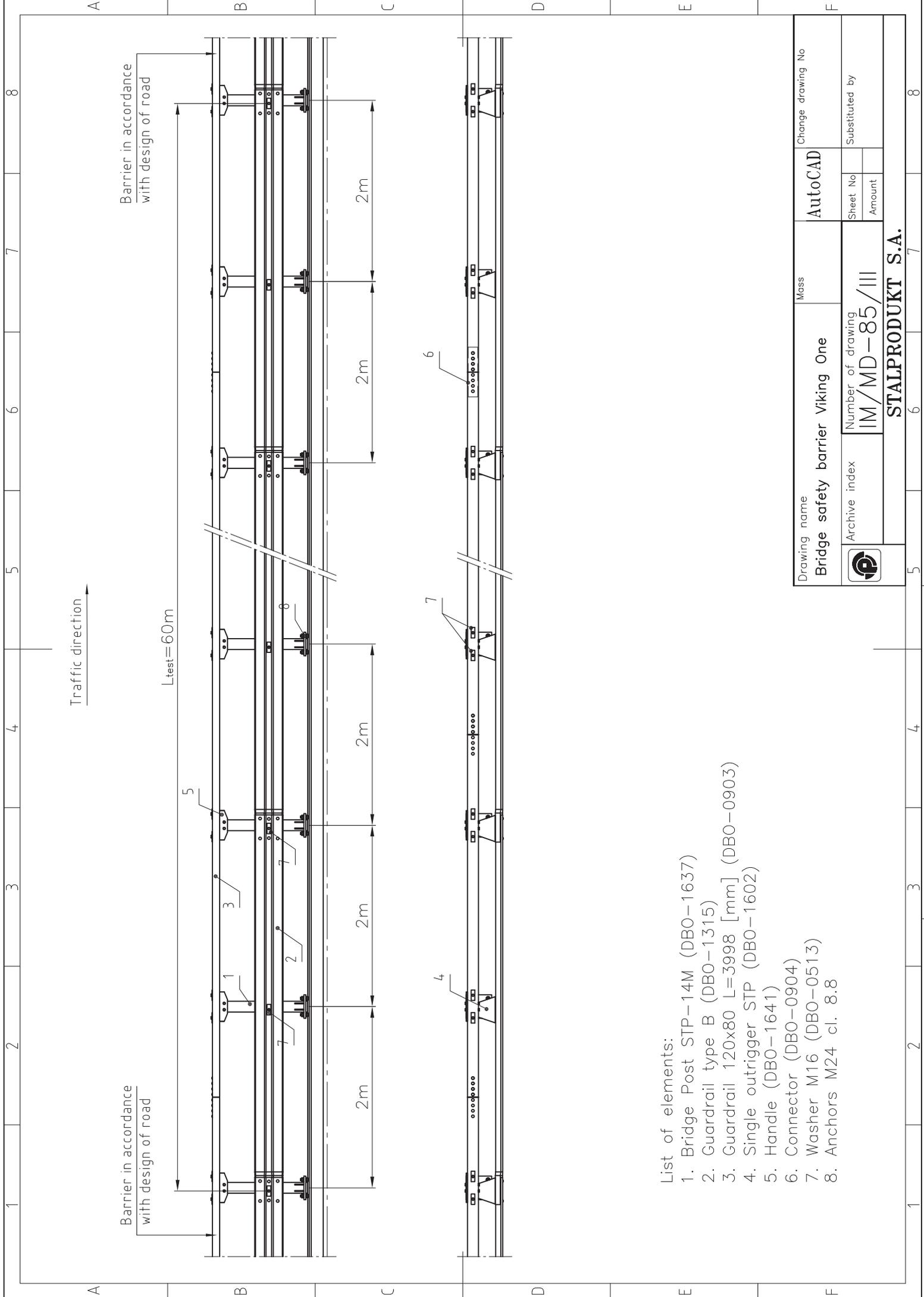
Drawing name Assembly drawing bridge safety barrier Viking One		Mass -	INVENTOR	Change drawing No
	Archive index	Number of drawing IM/MD-85/I	Sheet No 1	Substituted by
			Amount 1	
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List of elements:

1. Bridge Post STP-14M (DBO-1637)
2. Guardrail type B (DBO-1315)
3. Guardrail 120x80 L=3998 [mm] (DBO-0903)
4. Single outrigger STP (DBO-1602)
5. Handle (DBO-1641)
6. Connector (DBO-0904)
7. Washer M16 (DBO-0513)
8. Anchors M24 cl. 8.8

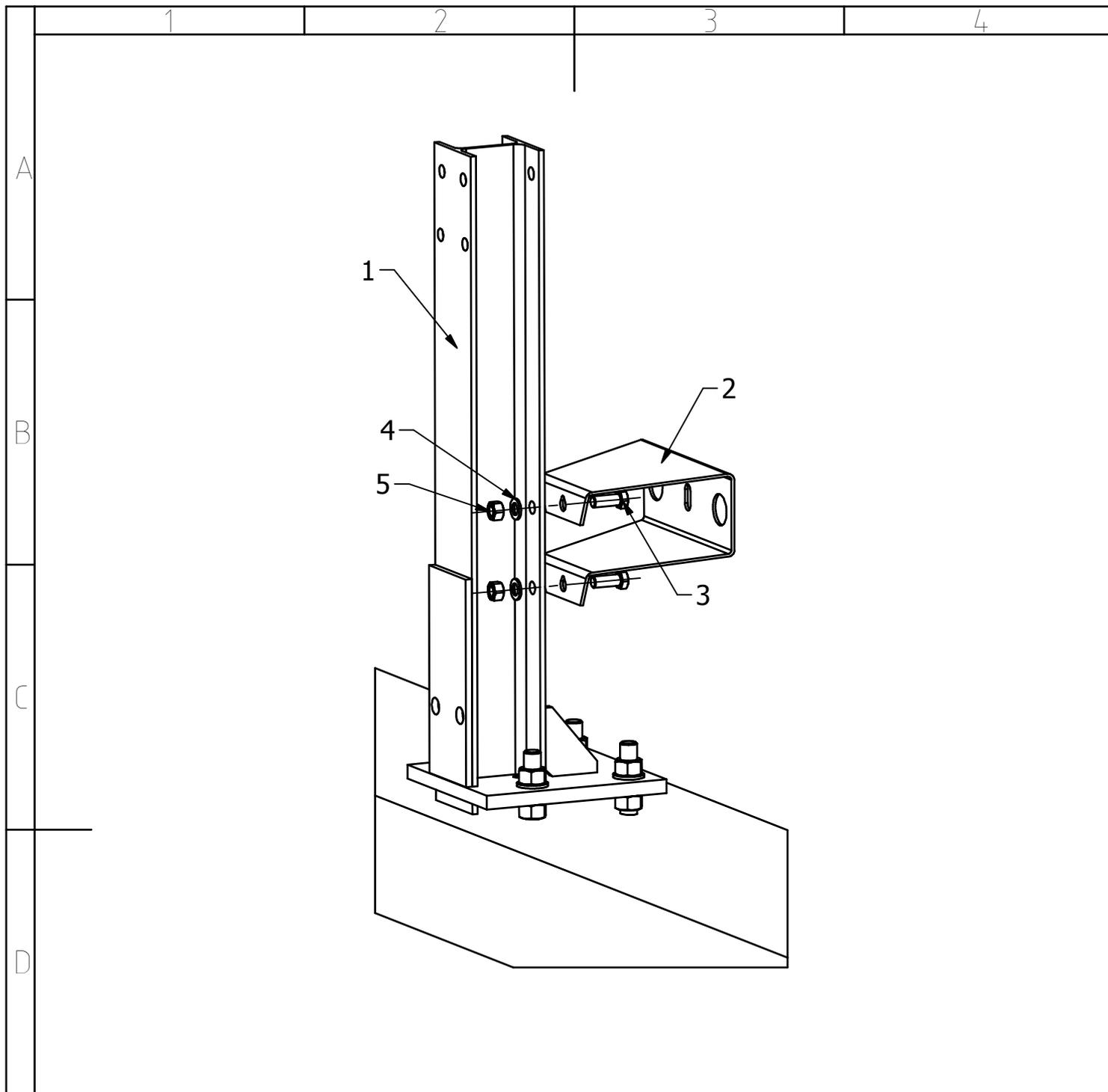
Drawing name		Mass		Change drawing No	
Single section Viking One				AutoCAD	
Archive index		Number of drawing		Substituted by	
IM/MD-85/II		IM/MD-85/II		Sheet No	
				Amount	
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List of elements:

1. Bridge Post STP-14M (DBO-1637)
2. Guardrail type B (DBO-1315)
3. Guardrail 120x80 L=3998 [mm] (DBO-0903)
4. Single outrigger STP (DBO-1602)
5. Handle (DBO-1641)
6. Connector (DBO-0904)
7. Washer M16 (DBO-0513)
8. Anchors M24 cl. 8.8

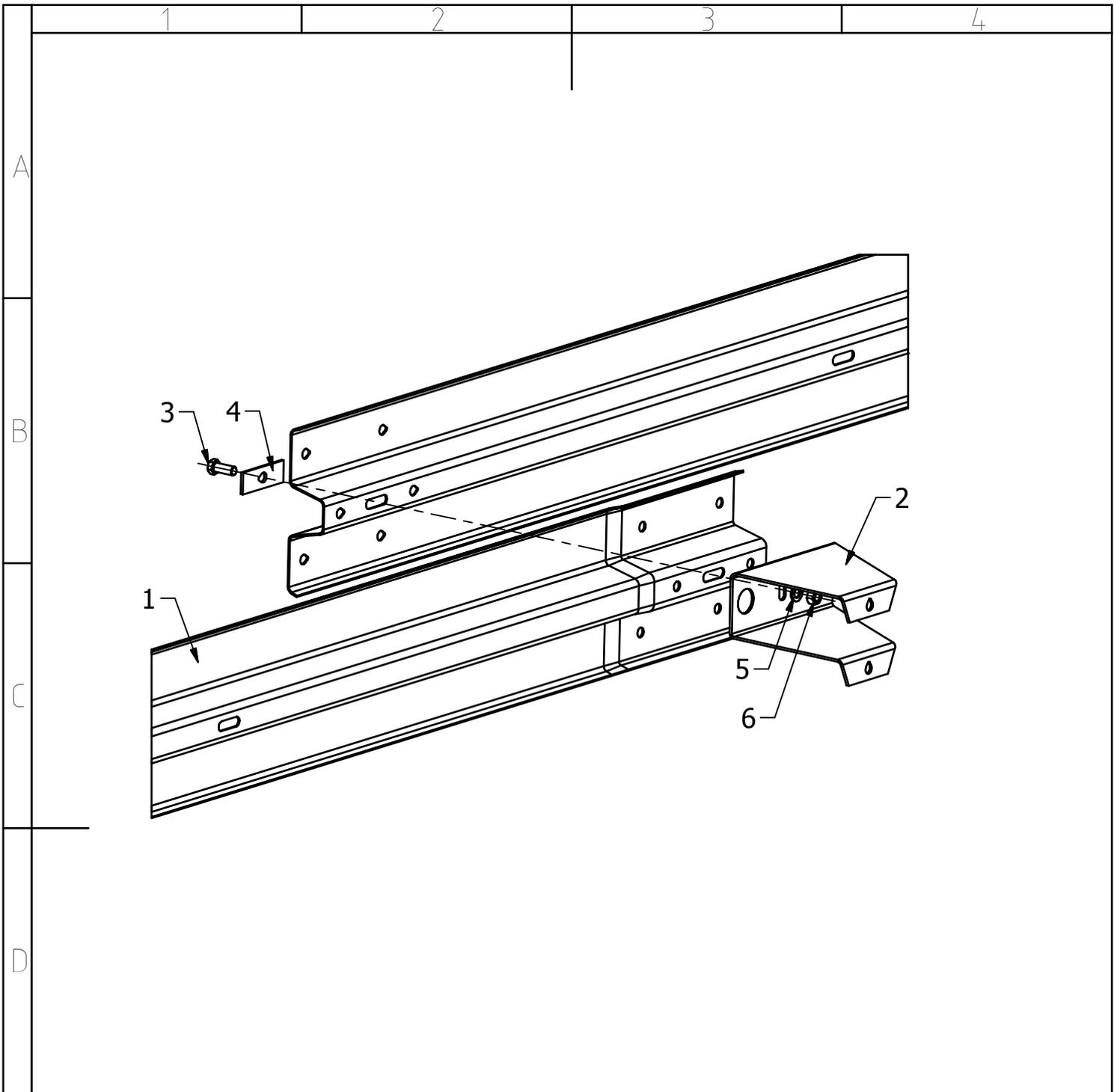
Drawing name		Mass		Change drawing No	
Bridge safety barrier Viking One		AutoCAD			
Archive index	Number of drawing		Sheet No	Substituted by	
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5	6	7	8	7	8



List of elements:

1. Bridge Post STP-14M (DBO-1637)
2. Single outrigger STP (DBO-1602)
3. Bolt M16x40; grade 5.8 (DBO-1902)
4. Round washer (DBO-1902)
5. Nut M16 (DBO-1902)

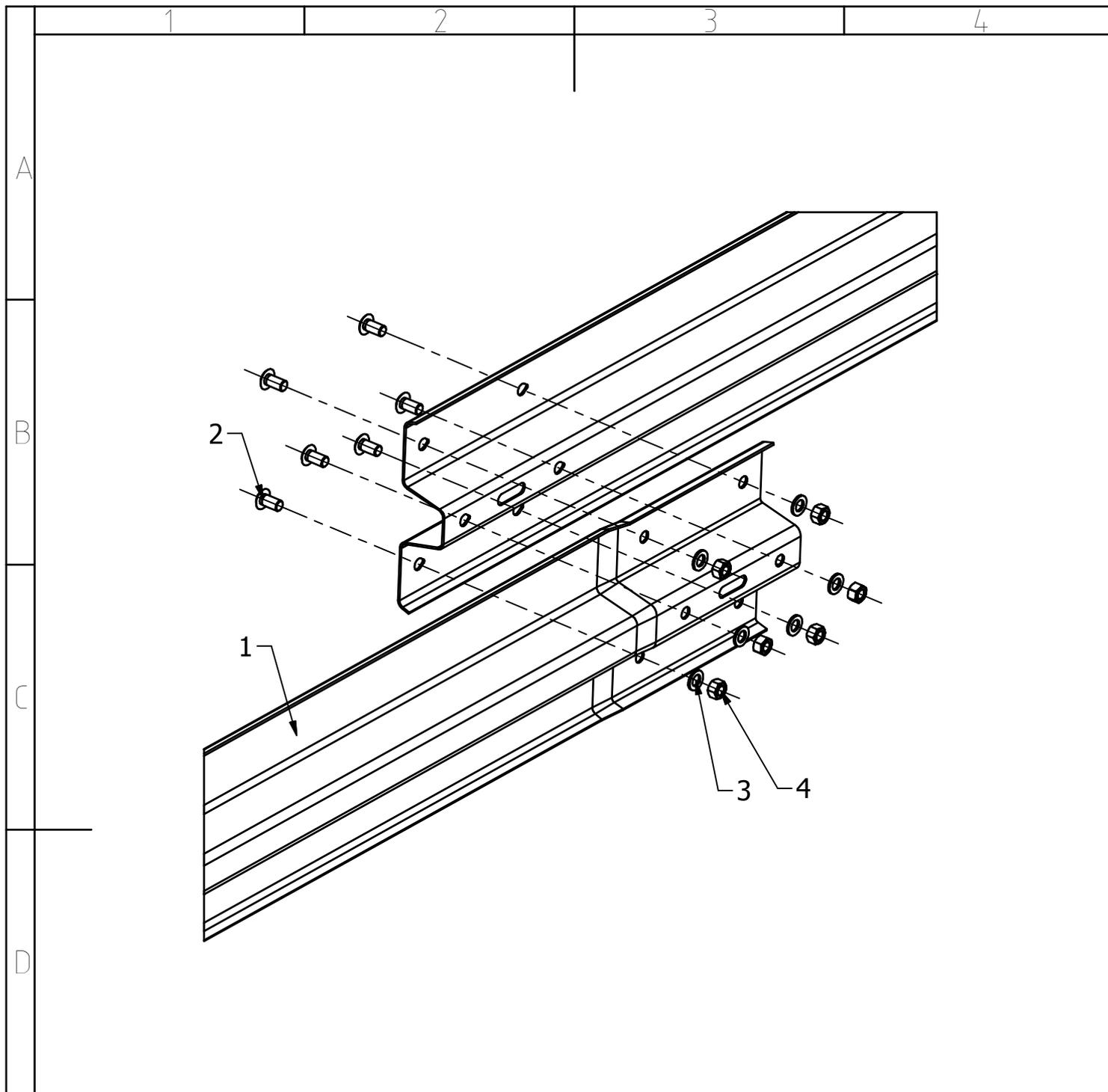
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	Archive index	Number of drawing IM/MD-85/IV		Sheet No	1
				Amount	1
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List of elements:

1. Guardrail type B (DBO-1315)
2. Single outrigger STP (DBO-1602)
3. Bolt M16x40; grade 8.8 (DBO-1904)
4. Washer M16 (DBO-0513)
5. Round Washer (DBO-1904)
6. Nut M16 (DBO-1904)

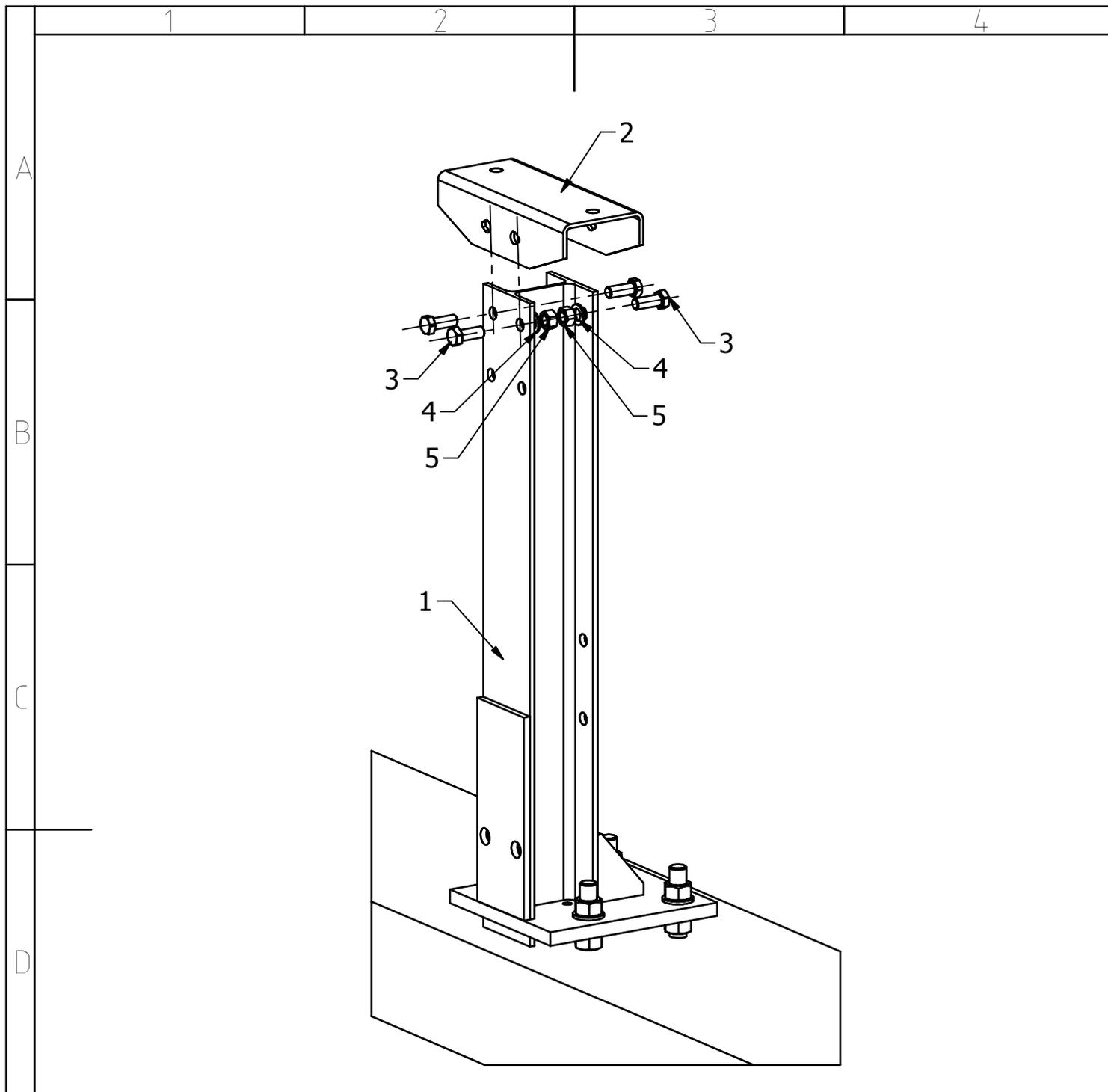
Drawing name Assembly of bolt M16x40(Guardrail-Outrigger) for system Viking One		Mass -	INVENTOR	Change drawing No
	Archive index	Number of drawing IM/MD-85/V	Sheet No 1	Substituted by
			Amount 1	
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List of elements:

1. Guardrail type B (DBO-1315)
2. Bolt M16x25; grade 8.8 (DBO-1930)
3. Round washer (DBO-1930)
4. Nut M16 (DBO-1930)

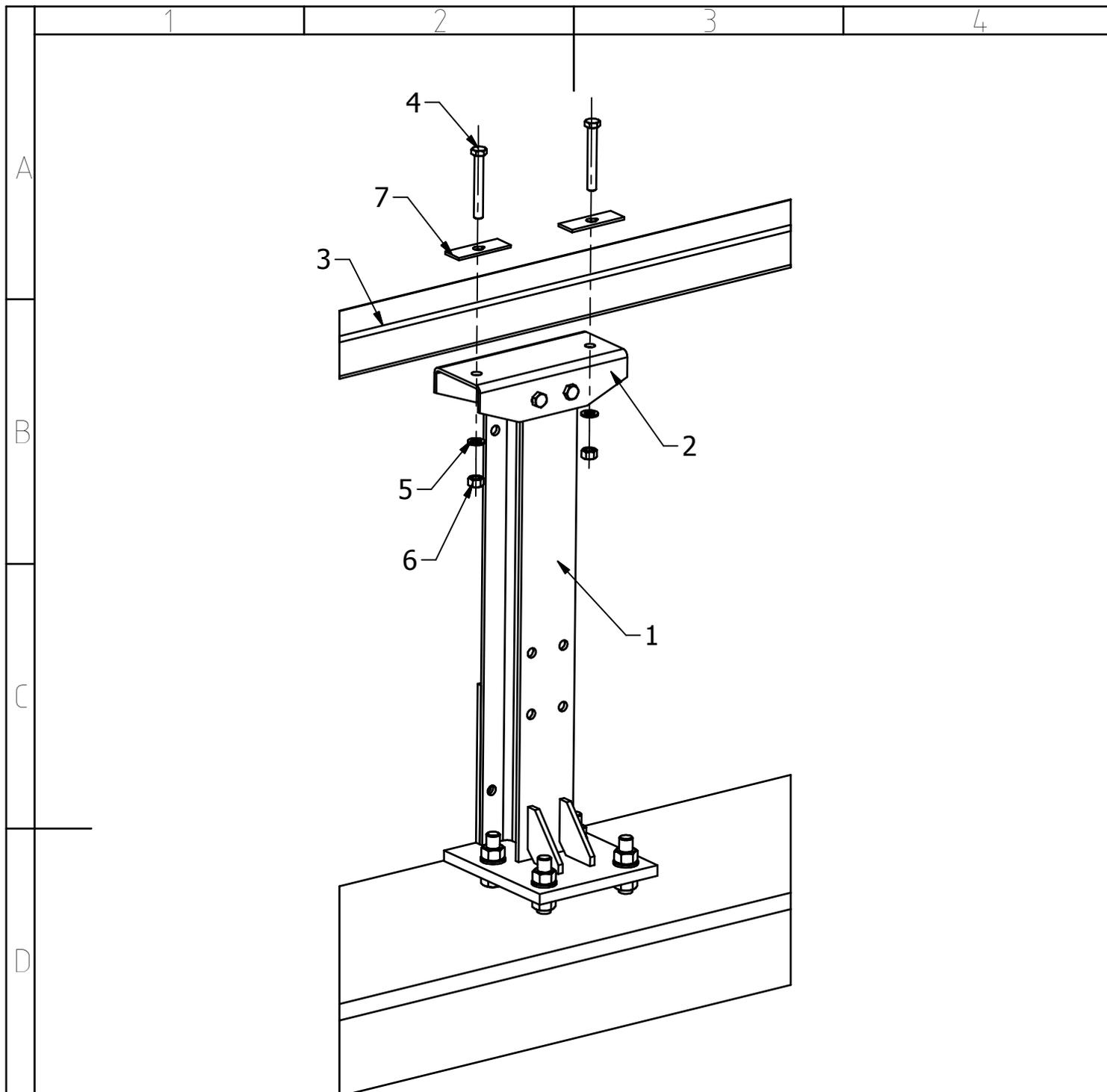
Drawing name Assembly of bolt M16x25 for system Viking One		Mass -	INVENTOR	Change drawing No
	Archive index	Number of drawing IM/MD-85/VI		Substituted by
		Sheet No	1	
		Amount	1	
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List of elements:

1. Bridge Post STP-14M (DBO-1637)
2. Handle (DBO-1641)
3. Bolt M16x40; grade 8.8 (DBO-1904)
4. Round washer (DBO-1904)
5. Nut M16 (DBO-1904)

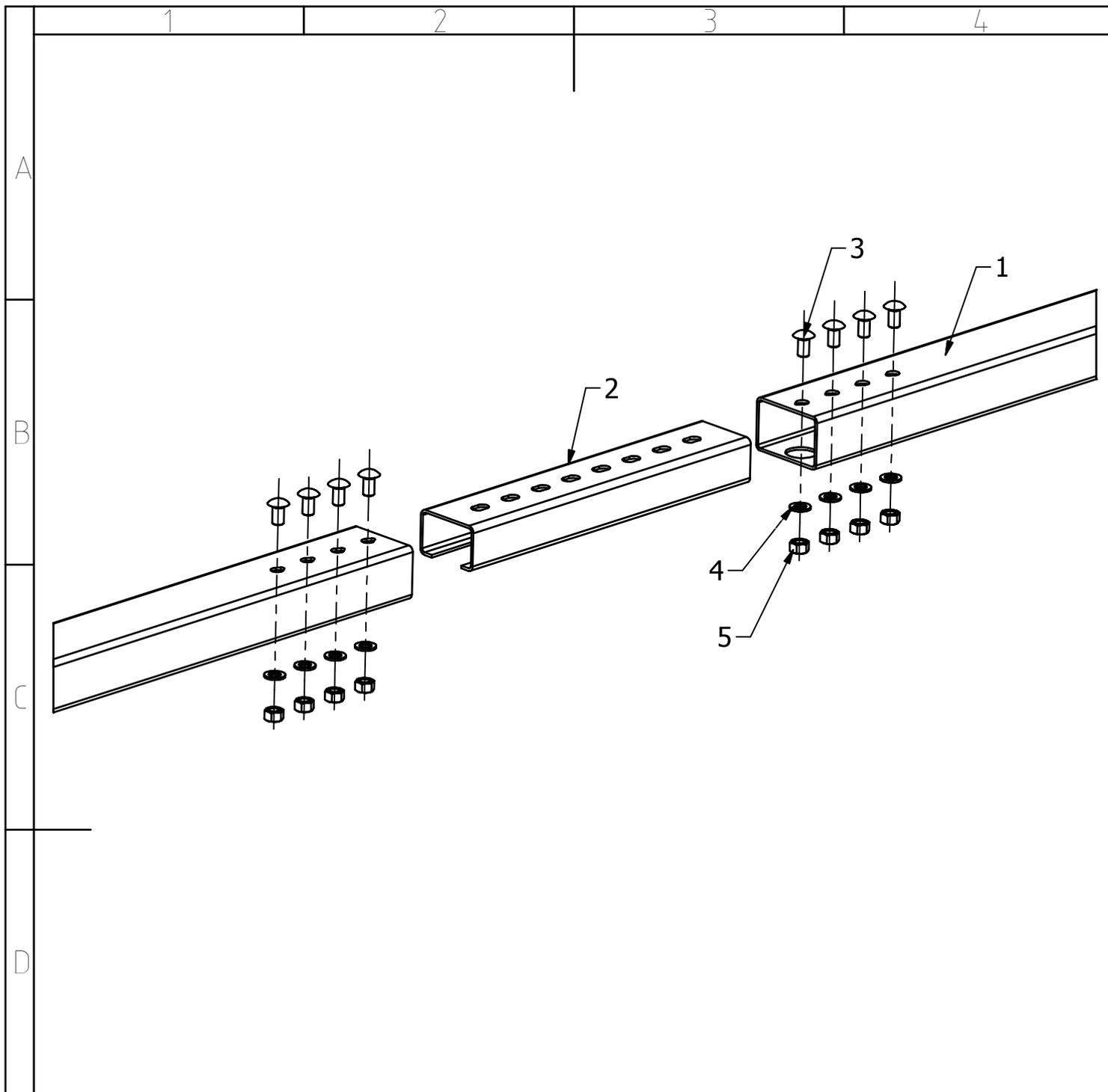
Drawing name Assembly of bolt M16x40 (Post-Handle) for system Viking One		Mass -	INVENTOR	Change drawing No
	Archive index	Number of drawing IM/MD-85/VII	Sheet No 1	Substituted by
			Amount 1	
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List of elements:

1. Bridge Post STP-14M (DBO-1637)
2. Handle (DBO-1641)
3. Guardrail 120x80 L=3998[mm] (DBO-0903)
4. Bolt M16x120; grade 8.8 (DBO-1960)
5. Round washer (DBO-1960)
6. Nut M16 (DBO-1960)
7. Washer M16 (DBO-0513)

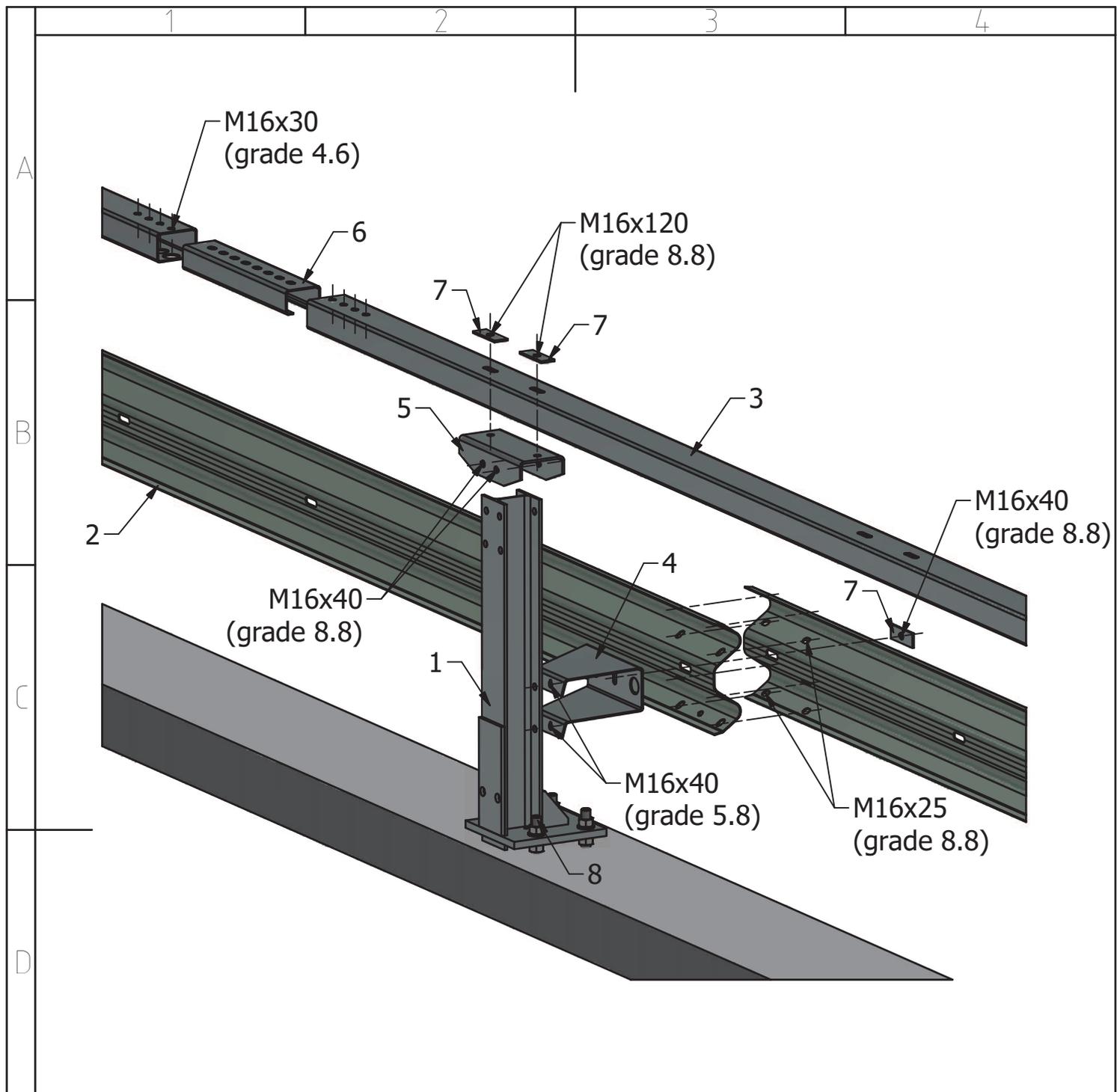
Drawing name Assembly of bolt M16x120 (Guardrail-Handle) for system Viking One		Mass -	INVENTOR	Change drawing No
	Archive index	Number of drawing IM/MD-85/VIII	Sheet No 1	Substituted by
			Amount 1	
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List of elements:

1. Guardrail 120x80 L=3998[mm] (DBO-0903)
2. Connector (DBO-0904)
3. Bolt M16x30; grade 4.6 (DBO-1933)
4. Round washer (DBO-1933)
5. Nut M16 (DBO-1933)

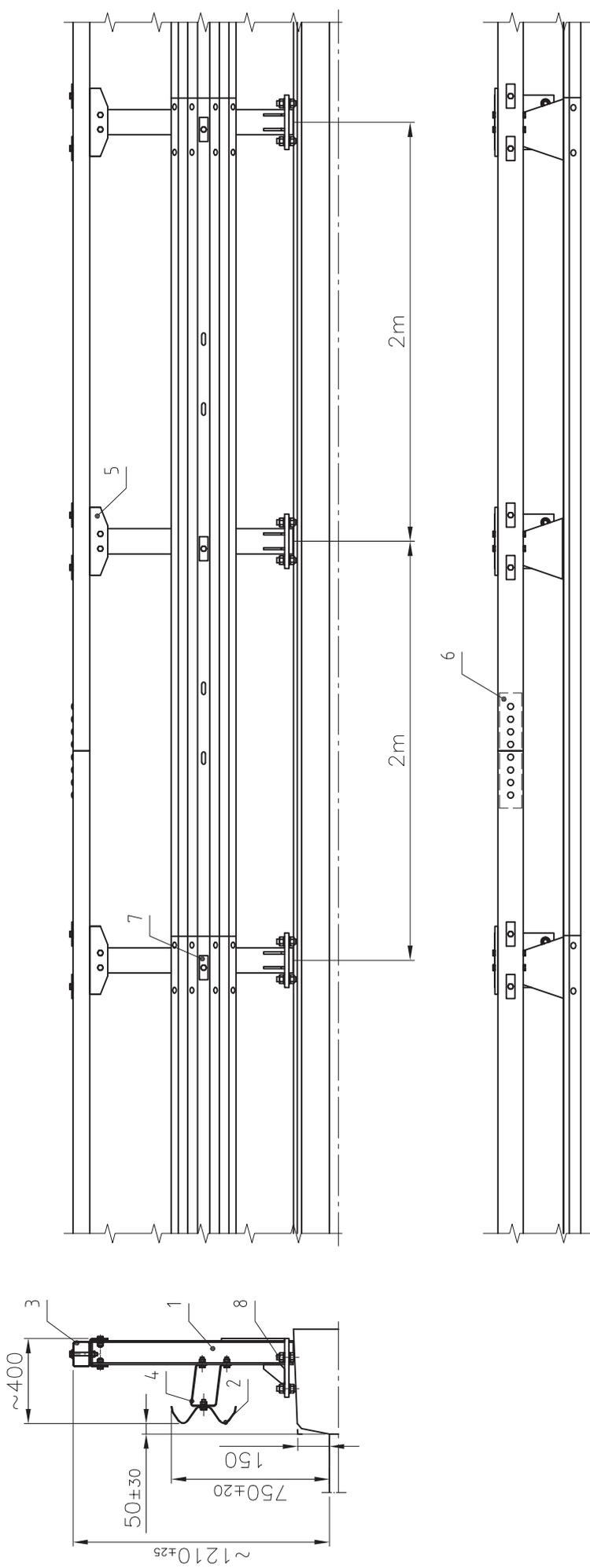
Drawing name Assembly of bolt M16x30 (Guardrail-Connector) for system Viking One		Mass -	INVENTOR	Change drawing No
	Archive index	Number of drawing IM/MD-85/IX		Substituted by
		Sheet No	1	
		Amount	1	
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List of elements:

1. Bridge Post STP-14M (DBO-1637)
2. Guardrail type A(W) (DBO-0669)
3. Guardrail 120x80 L=3998[mm] (DBO-0903)
4. Single outrigger STP (DBO-1602)
5. Handle (DBO-1641)
6. Connector (DBO-0904)
7. Washer M16 (DBO-0513)
8. Anchor M24 cl. 8.8

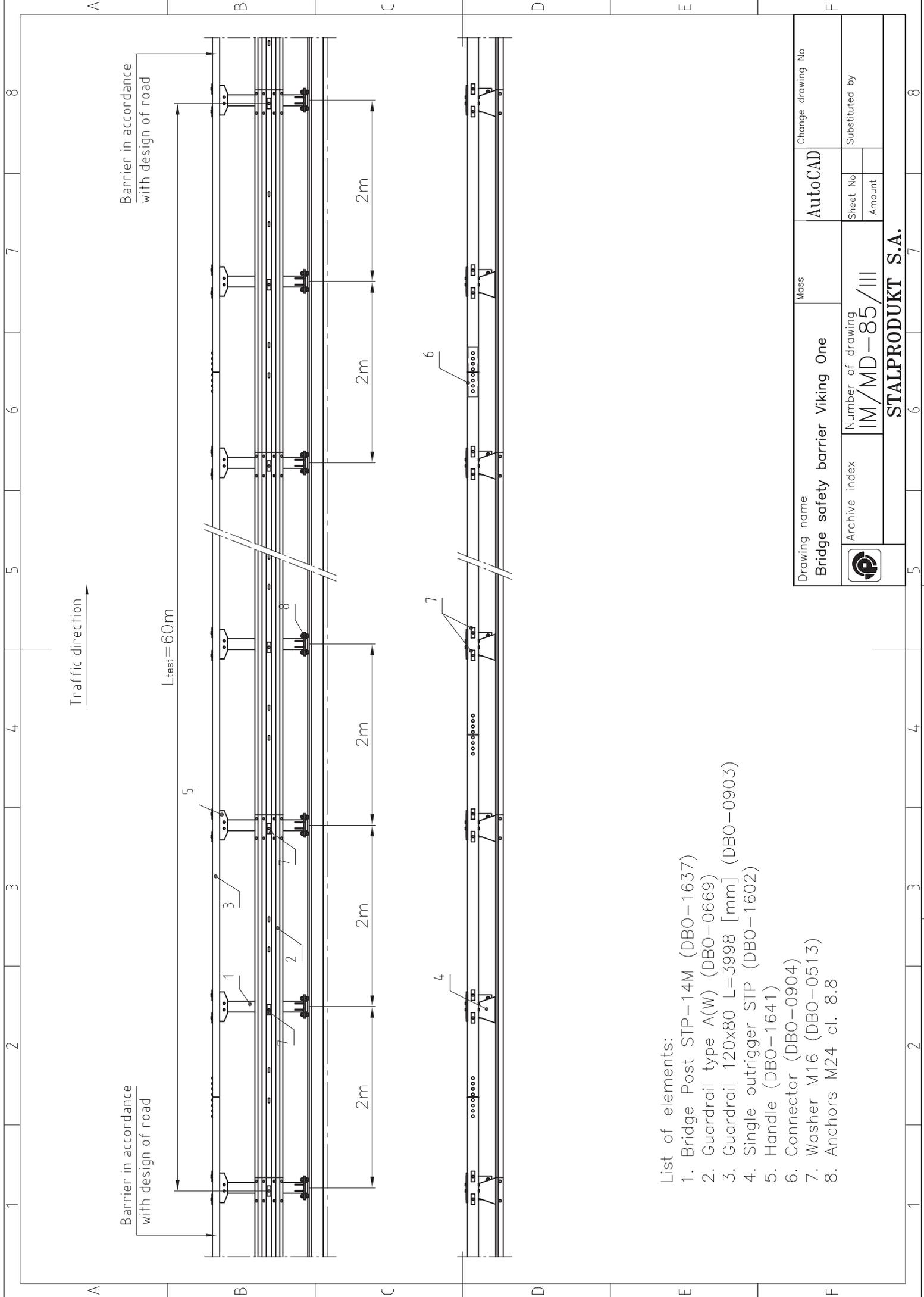
Drawing name Assembly drawing bridge safety barrier Viking One		Mass -	INVENTOR	Change drawing No
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			Amount 1	
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List of elements:

1. Bridge Post STP-14M (DBO-1637)
2. Guardrail type A(W) (DBO-0669)
3. Guardrail 120x80 L=3998 [mm] (DBO-0903)
4. Single outrigger STP (DBO-1602)
5. Handle (DBO-1641)
6. Connector (DBO-0904)
7. Washer M16 (DBO-0513)
8. Anchors M24 cl. 8.8

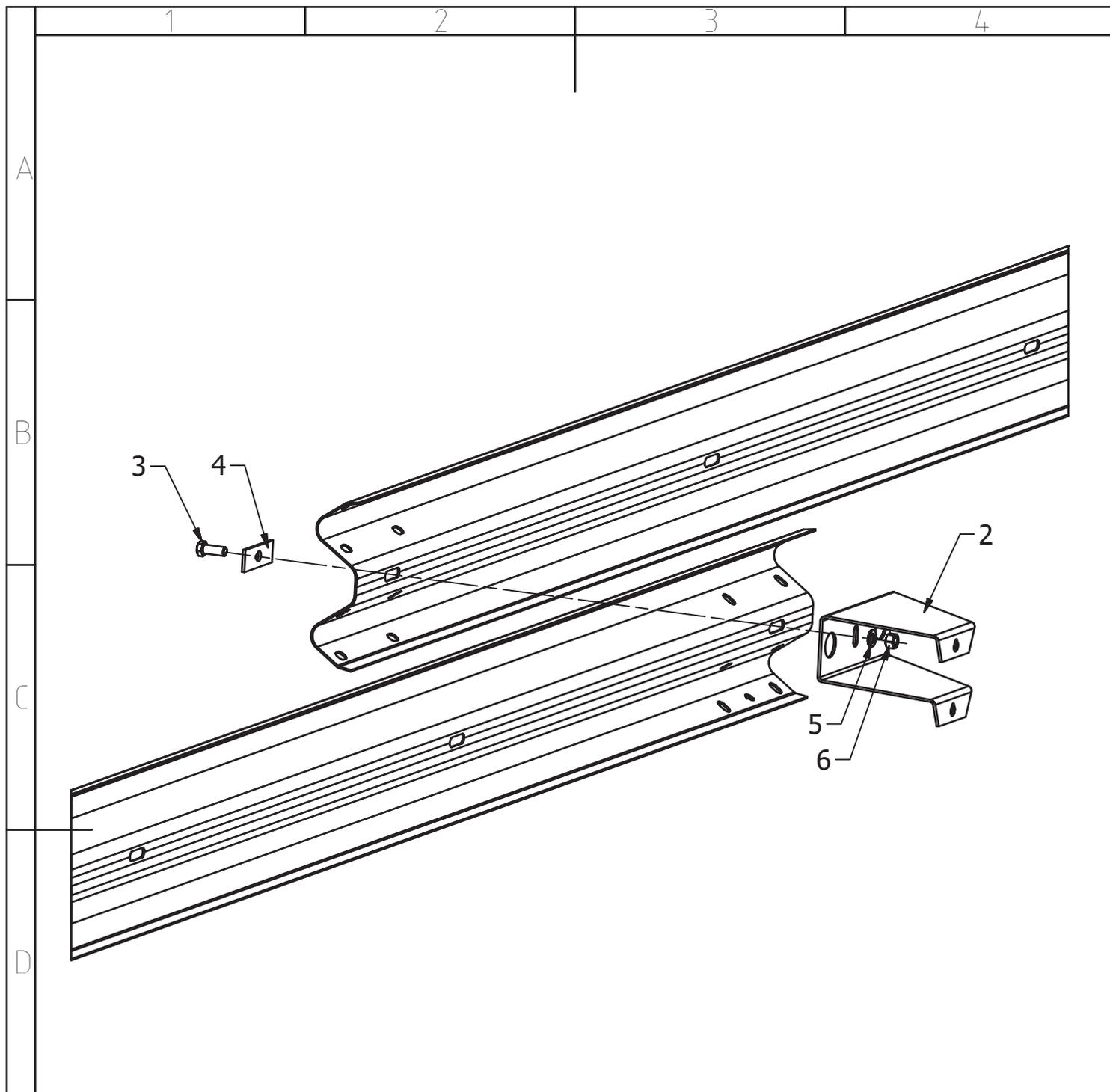
Drawing name		Mass		Change drawing No	
Single section Viking One				AutoCAD	
Archive index		Number of drawing		Substituted by	
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List of elements:

1. Bridge Post STP-14M (DBO-1637)
2. Guardrail type A(W) (DBO-0669)
3. Guardrail 120x80 L=3998 [mm] (DBO-0903)
4. Single outrigger STP (DBO-1602)
5. Handle (DBO-1641)
6. Connector (DBO-0904)
7. Washer M16 (DBO-0513)
8. Anchors M24 cl. 8.8

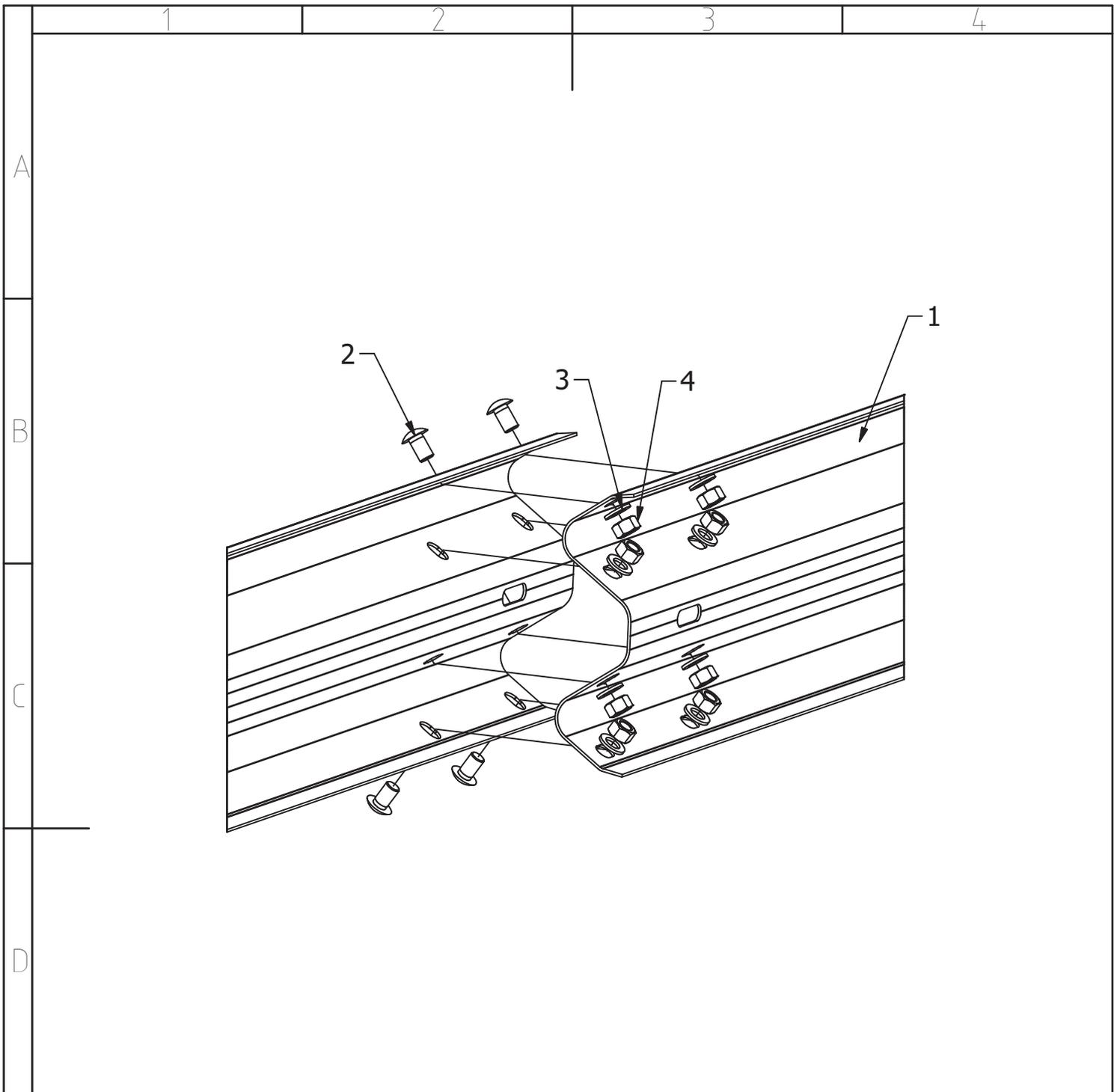
Drawing name		Mass		Change drawing No	
Bridge safety barrier Viking One		AutoCAD			
Archive index	Number of drawing		Sheet No	Substituted by	
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List of elements:

1. Guardrail type A(W) (DBO-0669)
2. Single outrigger STP (DBO-1602)
3. Bolt M16x40; grade 8.8 (DBO-1904)
4. Washer M16 (DBO-0513)
5. Round washer (DBO-1904)
6. Nut M16 (DBO-1904)

Drawing name Assembly of bolt M16x40(Guardrail-Outrigger) for system Viking One		Mass -	INVENTOR		Change drawing No
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List of elements:

1. Guardrail type A(W) (DBO-0669)
2. Bolt M16x25; grade 8.8 (DBO-1930)
3. Round washer M16 (DBO-1930)
4. Nut M16 (DBO-1930)

Drawing name Assembly of bolt M16x25 for system Viking One		Mass -	INVENTOR		Change drawing No
	Archive index	Number of drawing IM/MD-85/VI		Sheet No	Substituted by
				Amount	
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