Single Steel Guardrail "BMS4BR-L1"

INSTALLATION MANUAL

March 2023

Road Steel Engineering

Paseo de Belén, 11 - Edificio UVainnova - Campus Miguel Delibes
47011 - Valladolid, ESPAÑA (SPAIN) Tel: +(34) 983 990468
e-mail: info@roadsteel.com - http://www.roadsteel.com

ROAD STEEL ENGINEERING
Paseo de Belén, 11 - Edificio UVainnova - Campus Miguel Delibes
47011 - Valladolid, ESPAÑA (SPAIN) Tel: +(34) 983 990468
e-mail: info@roadsteel.com - http://www.roadsteel.com

SINGLE STEEL GUARDRAIL "BMS4BR-L1": INSTALLATION WORKS

The Single Steel Guardrail "BMS4BR-L1" is a longitudinal safety barrier made entirely of galvanized steel and specifically designed to be installed so much in lateral margins as median of any type of road.

The Single Steel Guardrail "BMS4BR-L1" is composed by a continuous horizontal W-Beam exposed to traffic with both peak waves oriented to it, and regularly supported by C-shaped vertical posts that can have different lengths (1650 mm, 1850 mm or 1900 mm) depending on the installation conditions.

All the components are assembled one to each other by threaded joints by means of "Bolt – Washer – Nut" assemblies. Continuity of the horizontal (W-beam) is obtained through partial overlapping of consecutive elements through threaded joints with bolts, nuts and washers.

Installation works.

1.- Post Insertion.

Posts are to be embedded in soil. Posts shall be driven in soil using a hydraulic or pneumatic hammering machine or any other system equivalent to mechanical post-driving. Posts shall be driven with 4 meters spacing and at the proper depth to meet the barrier height.

The machine can be guided setting the motorized wheel inside the sine of the W-Beam, this would be used as guide and the torn holes of the W-Beam would be taken as reference for embedding the posts.

In those particular cases where the soil conditions do not allow an adequate post-driving, an equivalent insertion system is to be executed:

- *In hard soils*, a cylindrical hole of 200mm diameter and aprox. 1000 mm deep shall be bored with appropriate equipment (crown-boring machine), the C-120 steel post shall be positioned partially embedded in the hole using timber wedges in order to fasten it. Then, the hole shall be totally filled with soil, well compacted and the upper surface totally covered by an impermeable layer of cement mortar.

- *In weak soils*, a cubic foundation made of concrete shall be executed leaving a cylindrical hole of 200mm diameter and aprox. 1000 mm deep just in the centre (a tube can be used), the C-120 post shall be positioned partially embedded in the hole using timber wedges in order to fasten it. Then, the hole shall be totally filled with soil, well compacted and the upper surface totally covered by an impermeable layer of cement mortar.

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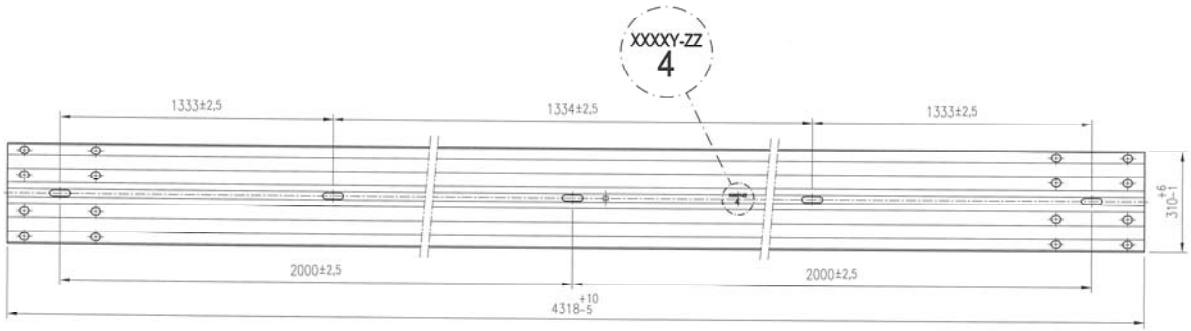
2.- Assembly.

The "in-site" assembly of all the barrier components, once the posts are driven in soil, shall be made only by tightening bolts (screw, nuts and washers) meeting both the configuration, dimensions and tolerances defined in attached drawings.

Important: W-Beams of this system are identified with the reference code number "4" just under traceability code, located in the sine of their profile, by the middle of the W-Beam.



W-Beam

The W-Beam is set up in place and attached directly to the posts through bolts CRF-11.75 M16x50, washer C-70 (140x70x4,5mm) M16, squared flat washer 35x35x5mm and nut M16. Washers C-70 (140x70x4,5mm) M16 are located under head bolt and above the W-Beam. Squared washers are located under the nut, inside the post.

The splice between the consecutive W-Beams is carried out and definitively tightened by TBC M16x30 bolts. The vertical alignment of the W-Beam and posts is then properly adjusted in order to, finally, proceed to the definitive tightening of the bolts CRF-11.75 M16x50 attaching W-Beam to posts.

For ramping down end sections at both the beginning and end of the extension of barrier, the assembly sequence is similar to that described for the straight section of the barrier described above.

3.- Tightening of Bolts.

The bolts CRF-11.75 M16x50 fastening the W-Beam to Post shall be tightened with a torque from 40 N.m.

Bolts TBC M16x30 fastening consecutive W-Beams shall be tightened with a torque from 100 N.m.

Bolts TBC M16x40 fastening the w-beam to post shall be tightened with a torque from 70 N.m.

Attached to this specification, the ANNEX 1 includes all installation drawings needed (general drawings of standard barrier section and end terminals) an ANNEX 2 shows the installation steps:

A. **Post insertion**

B. **Fastening of the W-Beam to inserted post**

C. **W-Beams assembly**

D. **Vertical alignment and definitive tightening**

Single Steel Guardrail "BMS4BR-L1"

Annex 1: Installation Drawings

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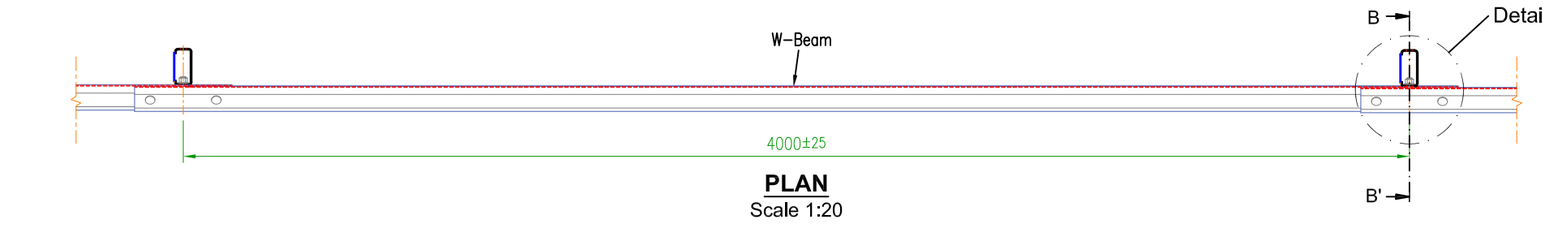
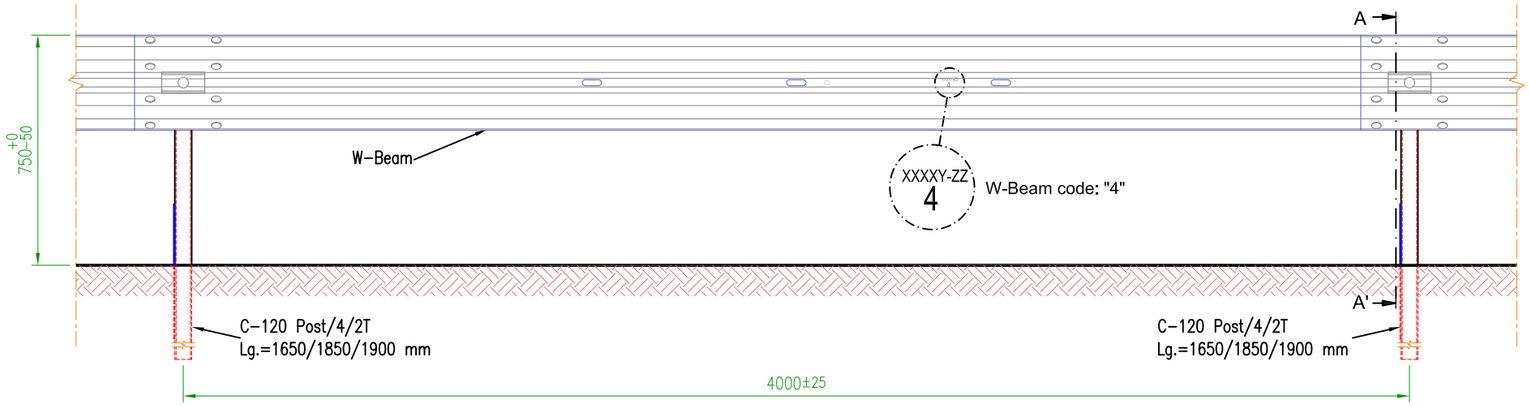
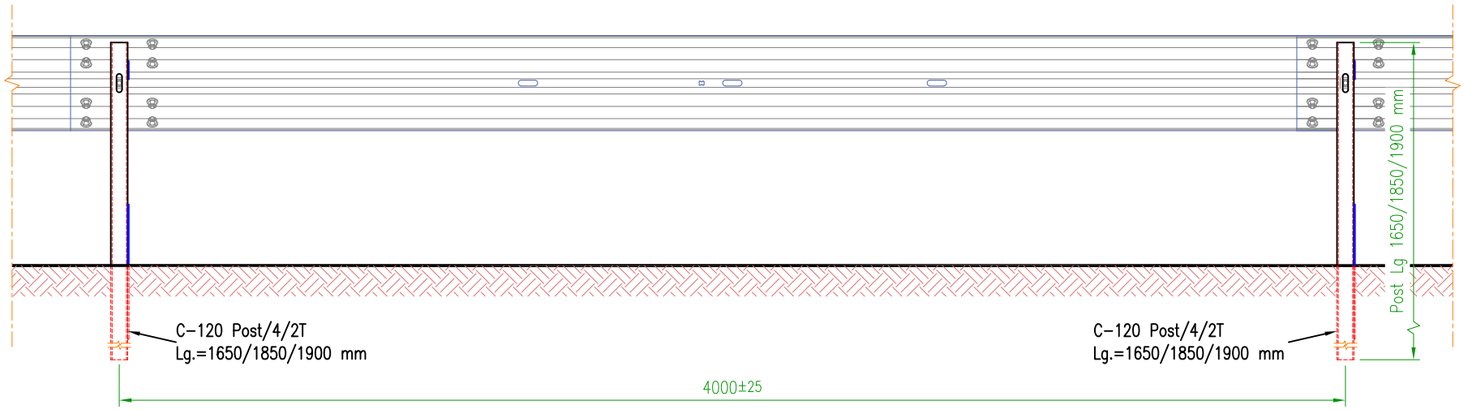


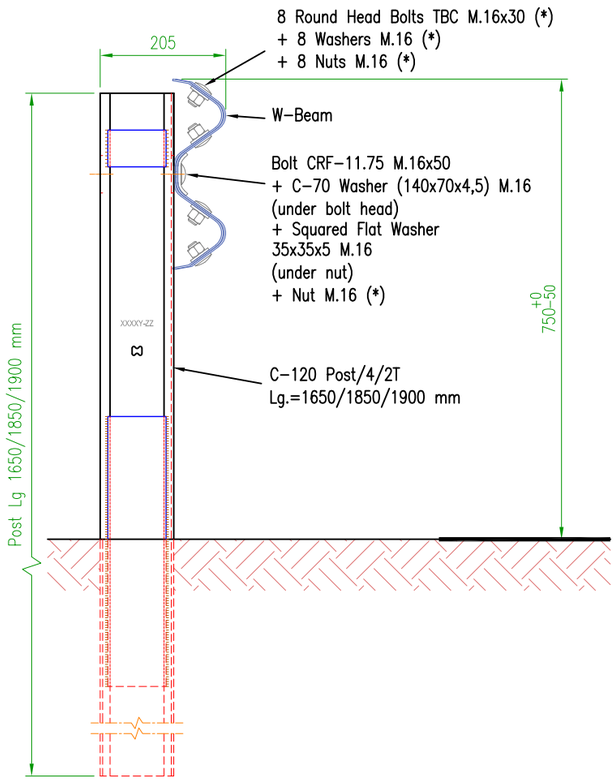
PLAN
Scale 1:20



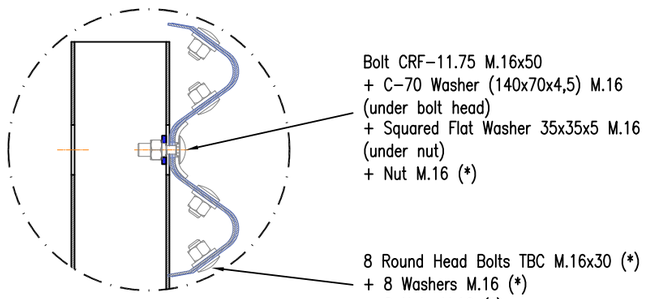
FRONT ELEVATION
Scale 1:20



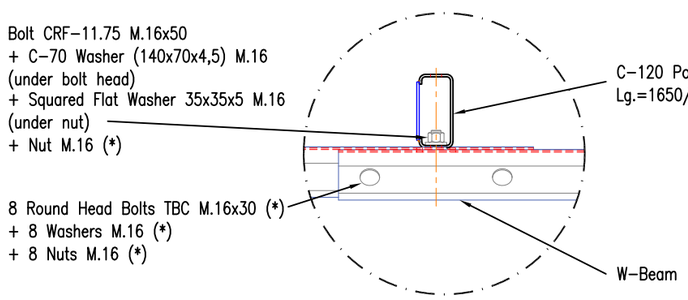
REAR ELEVATION
Scale 1:20



SECTION A-A'
Scale 1:10



SECTION B-B'
Scale 1:7,5



Detail C

NOTE:
W-Beams of this system are identified with the reference code number "4", just under traceability code, located in the central sine of their profile, by the middle of W-Beam.

Note (informative):
Round Head Bolt TBC M.16x30 (*)
Washer M.16 (*)
Material complying the Spanish Standard UNE 135122

Note (informative):
Nut M.16 (*)
Material complying the Spanish Standard UNE 135122 (UNE-EN ISO 4034)

Dimensions in mm

	DATE	NAME	SIGNATURES
Draw	28-03-2023	Noelia Marqués G.	
Review	28-03-2023	Luis Hernando D.	
Accept	28-03-2023	Antonio Amengual P.	

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Tel:+(34) 985 128200 +(34) 985 990468
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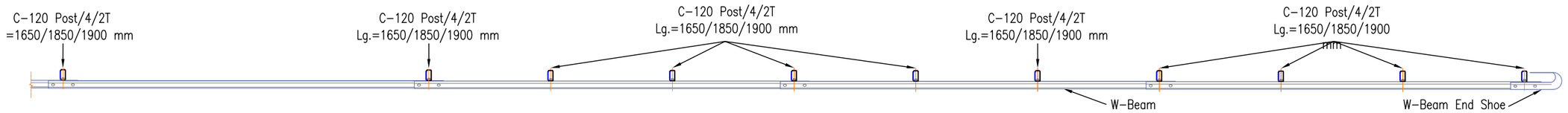
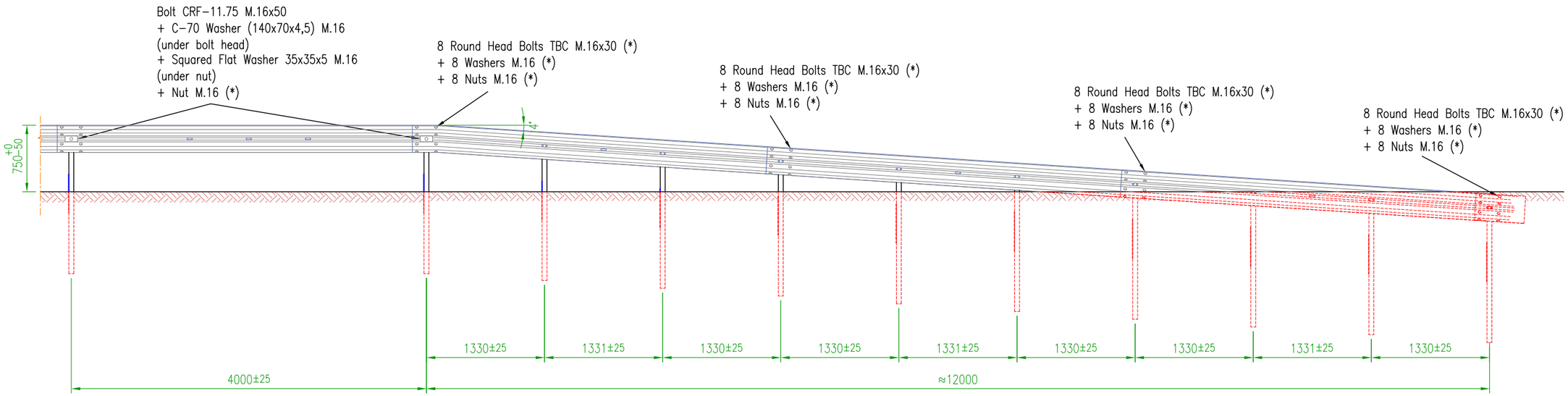
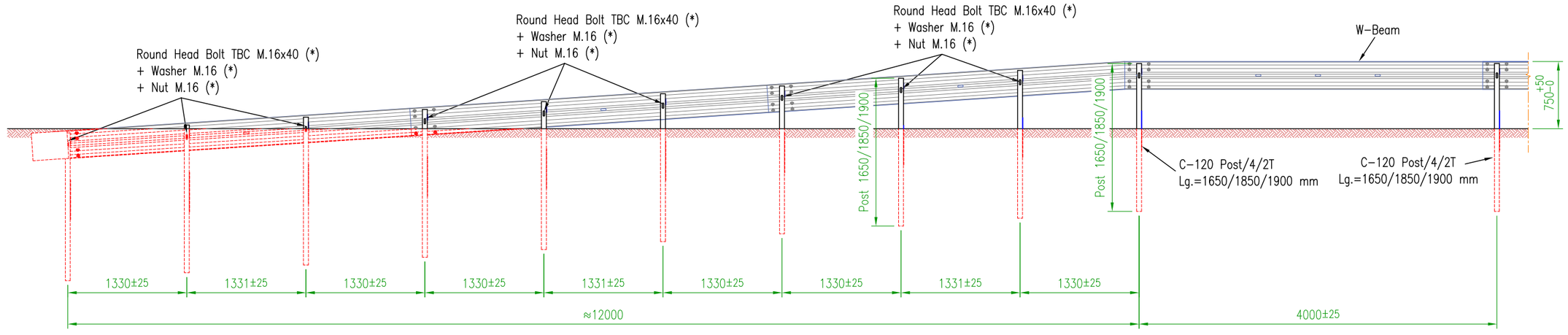
SCALE	"BMS4BR-L1" SINGLE STEEL GUARDRAIL	Drawing Nº: BMS4BR-L1-280323-MAN-001
1:7,5 1:10 1:20	GENERAL DRAWING	Replace to: Replaced for:



PLAN



FRONT ELEVATION



REAR ELEVATION

Dimensions in mm

Note (informative):
Round Head Bolt TBC M.16x30 (*)
Round Head Bolt TBC M.16x40 (*)
Washer M.16 (*)
} Material complying the Spanish Standard UNE 135122

Note (informative):
Nut M.16 (*)
} Material complying the Spanish Standard UNE 135122 (UNE-EN ISO 4034)

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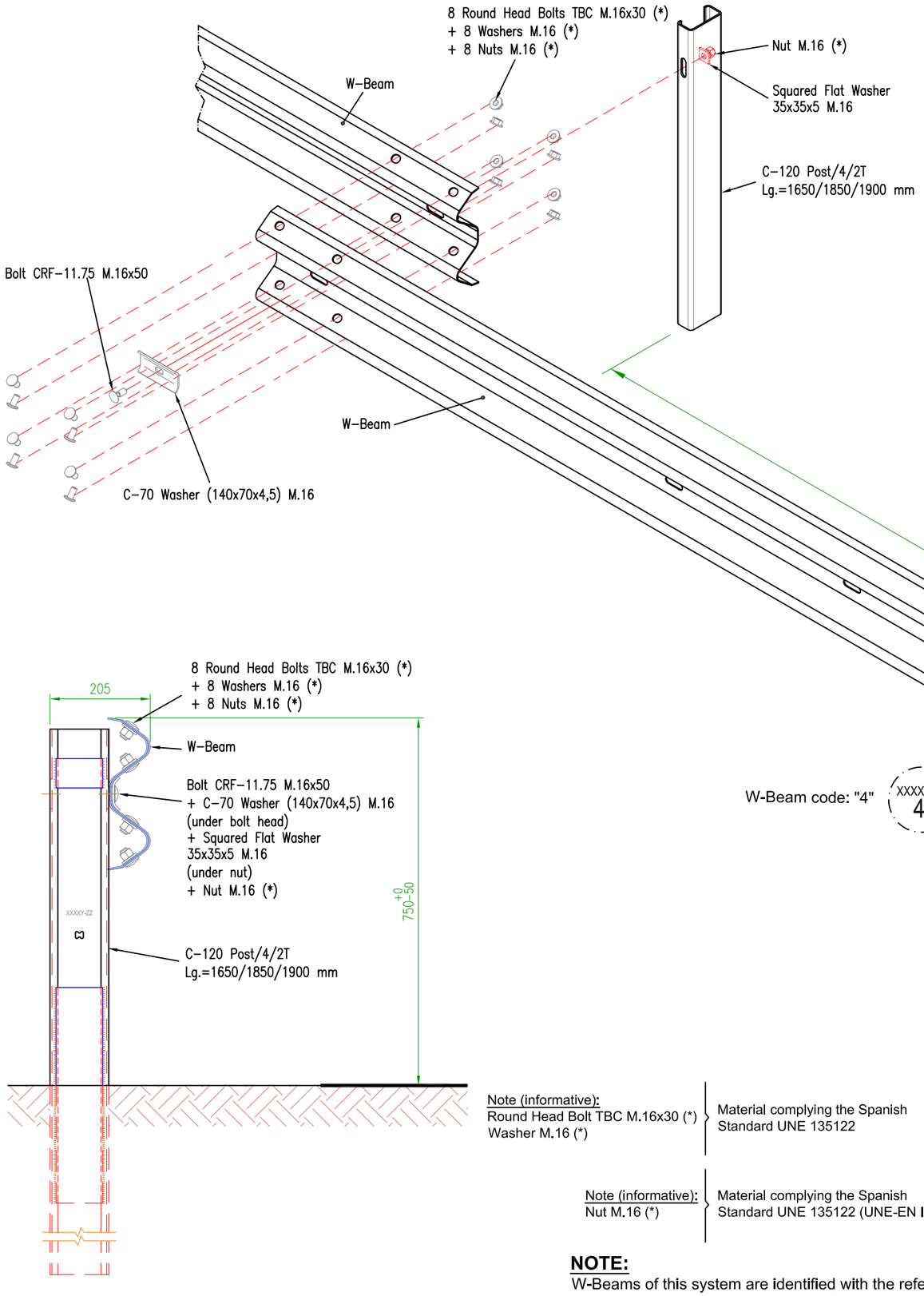
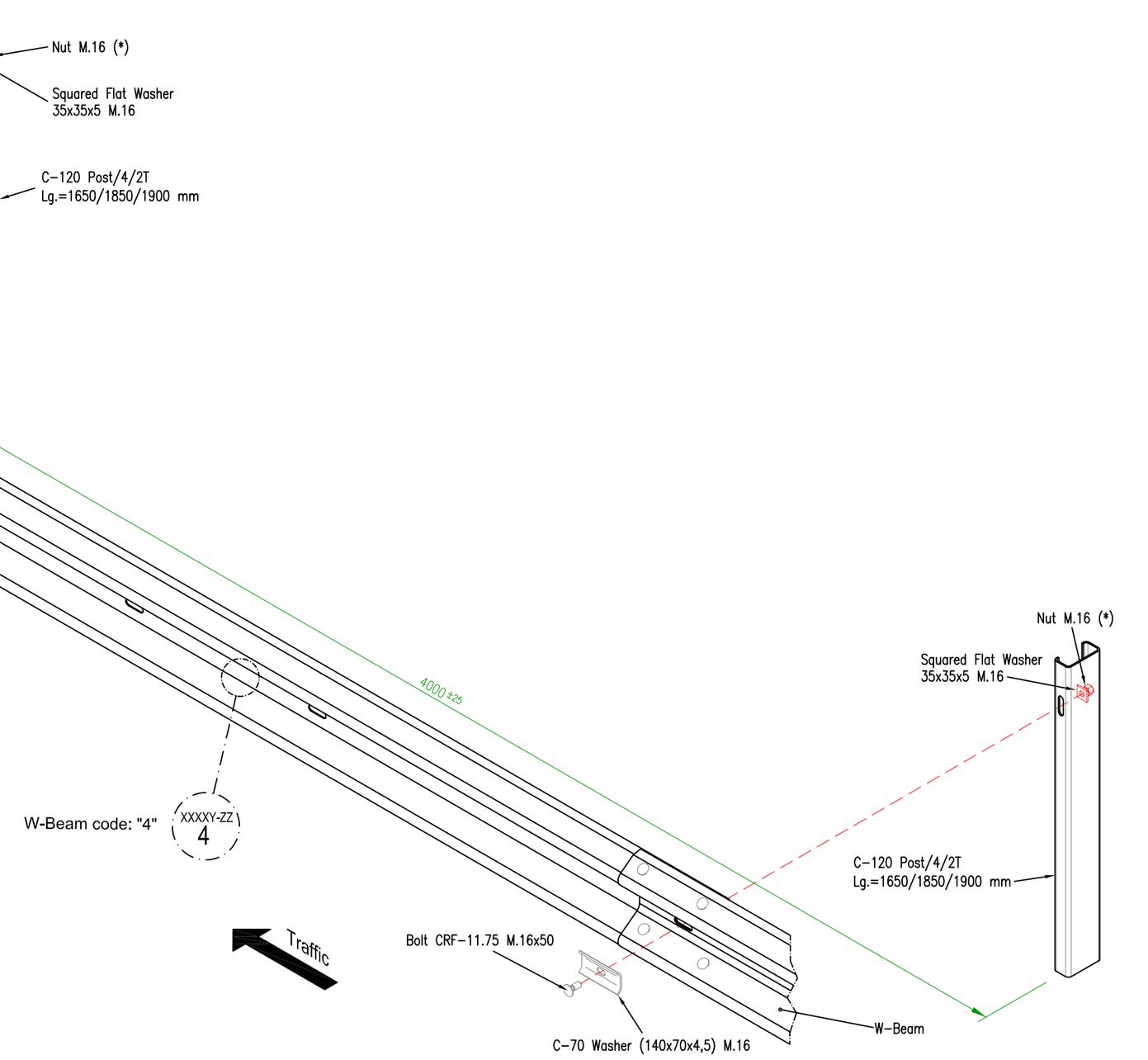
SCALE	"BMS4BR-L1" SINGLE STEEL GUARDRAIL	Drawing Nº: BMS4BR-L1-280323-MAN-002
1:50	DRAWING OF END RAMPING DOWN SECTION	Replace to:
		Replaced for:



CROSS SECTION AT POST



Note (informative):
Round Head Bolt TBC M.16x30 (*)
Washer M.16 (*)
} Material complying the Spanish Standard UNE 135122

Note (informative):
Nut M.16 (*)
} Material complying the Spanish Standard UNE 135122 (UNE-EN ISO 4034)

NOTE:
W-Beams of this system are identified with the reference code number "4", just under traceability code, located in the central sine of their profile, by the middle of W-Beam.

Dimensions in mm

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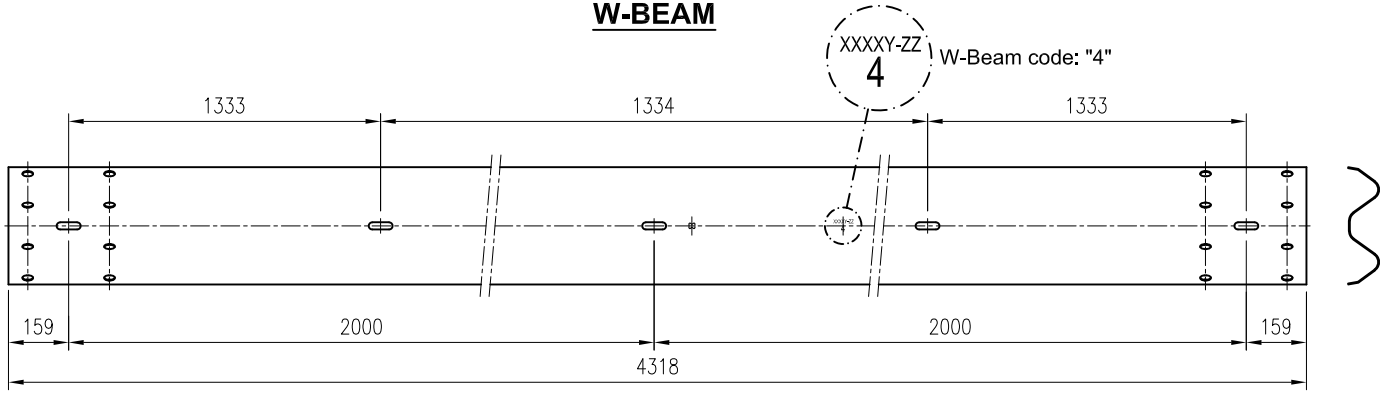
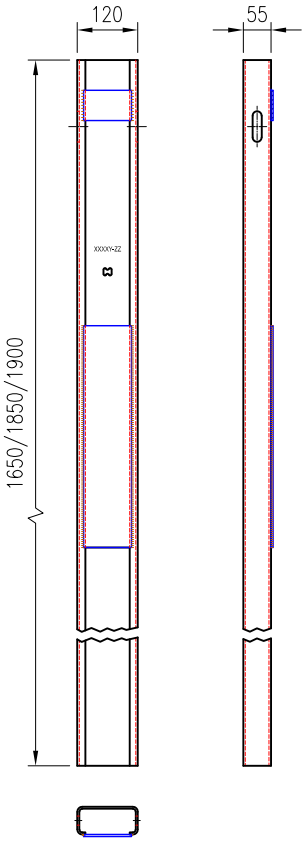
SCALE	"BMS4BR-L1" SINGLE STEEL GUARDRAIL	Drawing Nº: BMS4BR-L1-280323-MAN-003
–	INSTALLATION	Replace to:
		Replaced for:

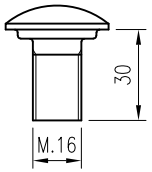
W-BEAM



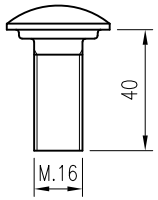
C-120 POST (Lg 1650/1850/1900 mm)



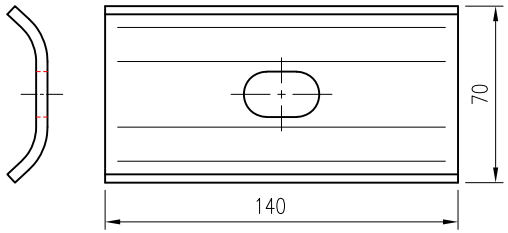
BOLT TBC M.16x30



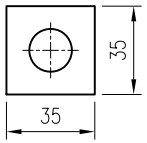
BOLT TBC M.16x40



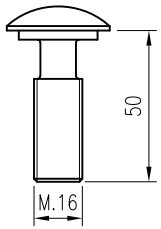
C-70 WASHER (140x70)



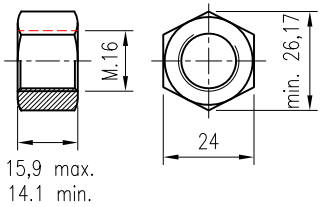
SQUARED FLAT WASHER 35x35



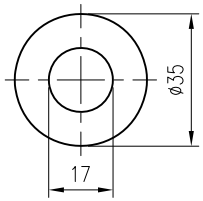
BOLT CRF-11.75 M.16x50



NUT M.16



WASHER M.16



Dimensions in mm

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SCALE: –

"BMS4BR-L1" SINGLE STEEL GUARDRAIL

COMPONENTS

Drawing Nº: BMS4BR-L1-280323-MAN-004

Replace to:

Replaced for:

Single Steel Guardrail "BMS4BR-L1"

Annex 2: Installation Steps

March 2023

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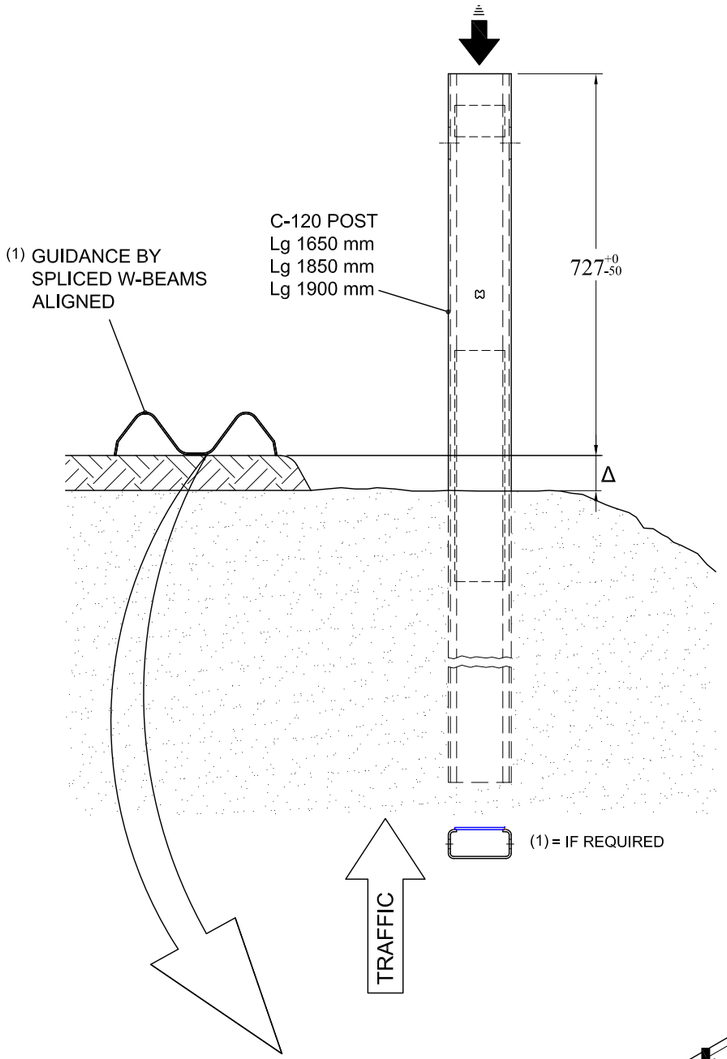
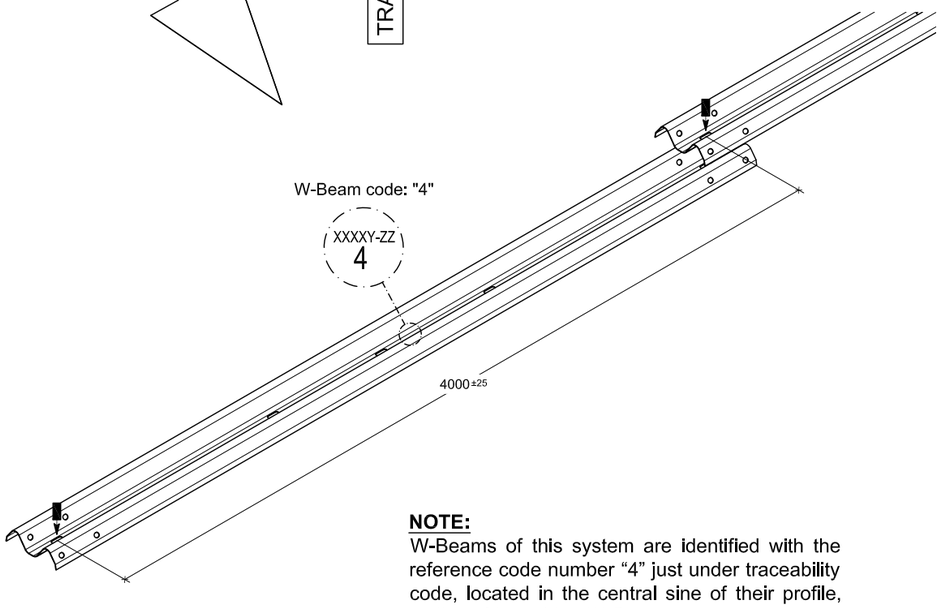
(A) POST INSERTION

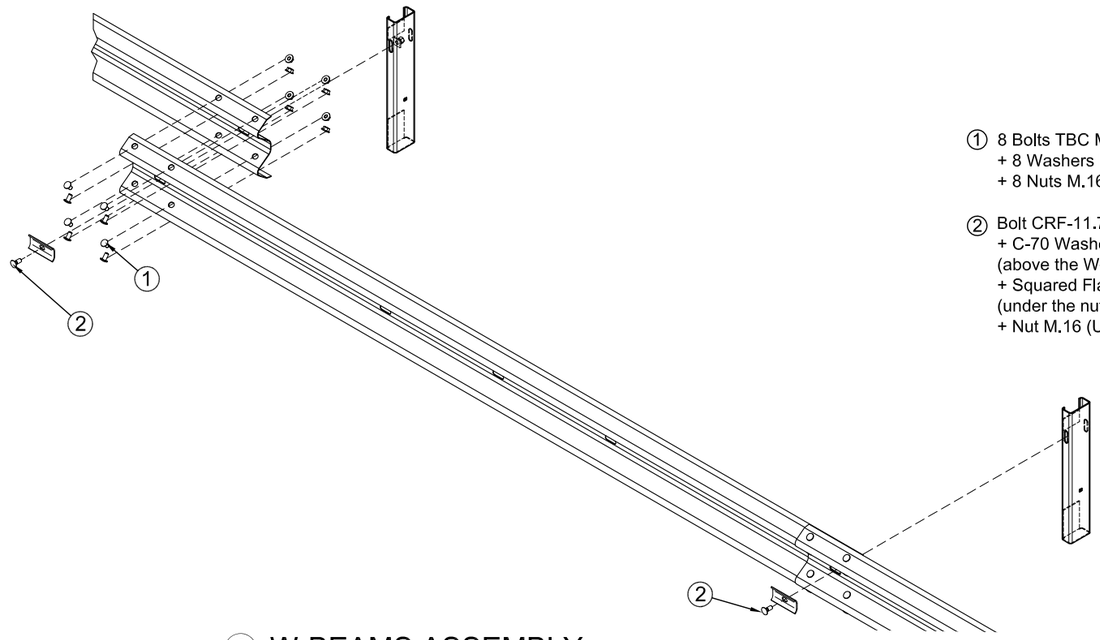




NOTE:
W-Beams of this system are identified with the reference code number “4” just under traceability code, located in the central sine of their profile, by the middle of the W-Beam.

Dimensions in mm

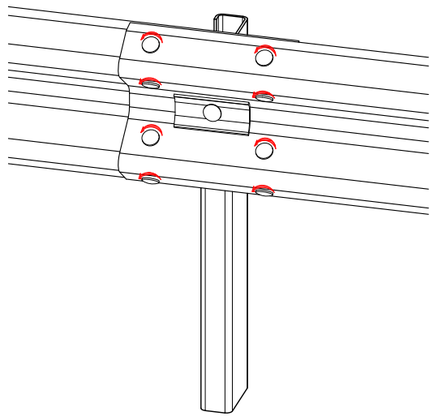
(B) FASTENING OF THE W-BEAM TO INSERTED POST



① 8 Bolts TBC M.16x30 (UNE 135122)
+ 8 Washers M.16 (UNE 135122)
+ 8 Nuts M.16 (UNE 135122)

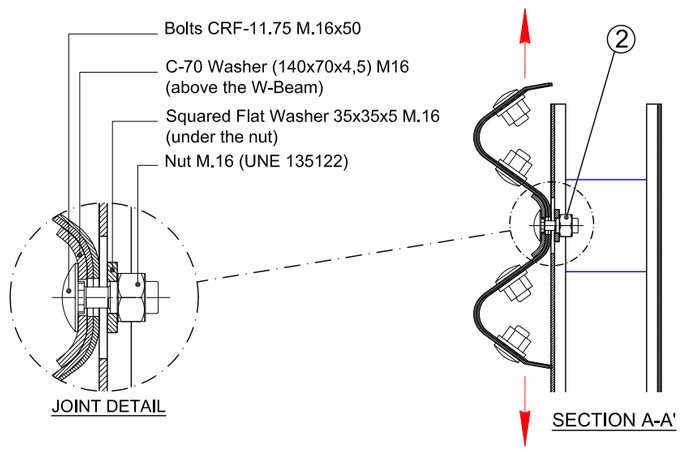
② Bolt CRF-11.75 M.16x50
+ C-70 Washer (140x70x4,5) M16 (above the W-Beam)
+ Squared Flat Washer 35x35x5 M.16 (under the nut)
+ Nut M.16 (UNE 135122)

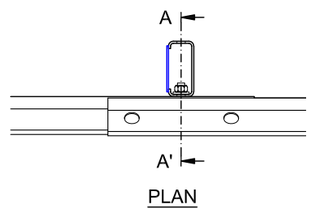
(C) W-BEAMS ASSEMBLY



Note: Definitive tightening of bolts ① with a torque of 100 N·m.

(D) VERTICAL ALIGNMENT AND DEFINITIVE TIGHTENING





Note: Definitive tightening of bolts ② with a torque of 40 N·m.

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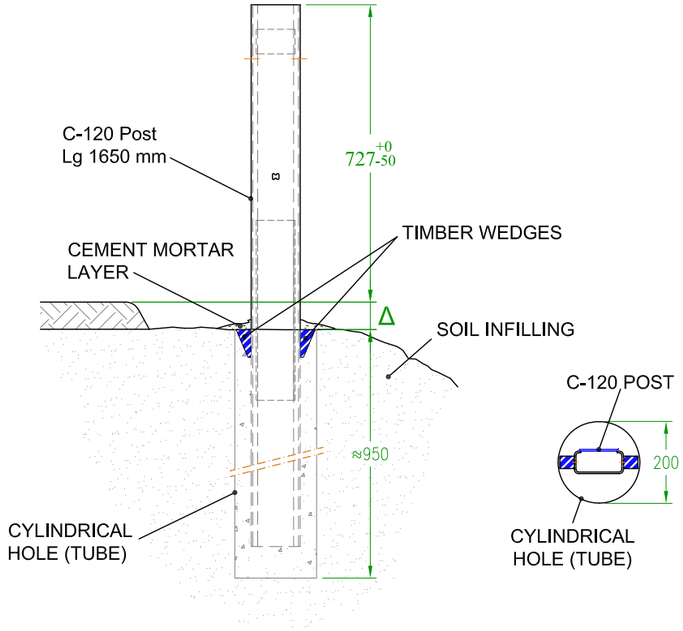
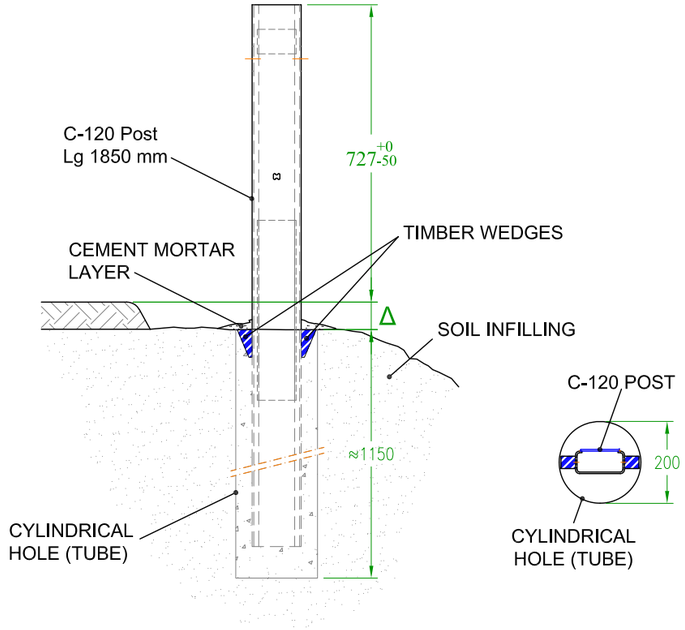
BMS4BR-L1
INSTALLATION STEPS (I)

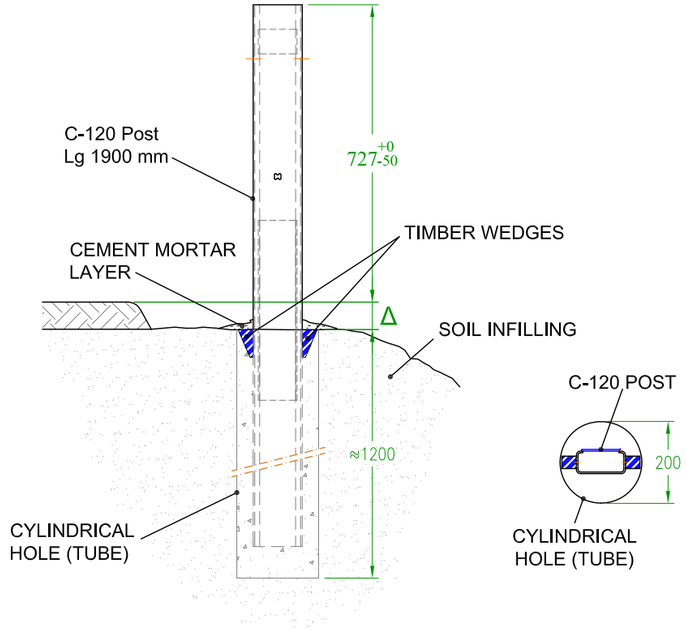
(A') POST INSERTION IN HARD SOILS



C-120 Post Lg 1650 mm

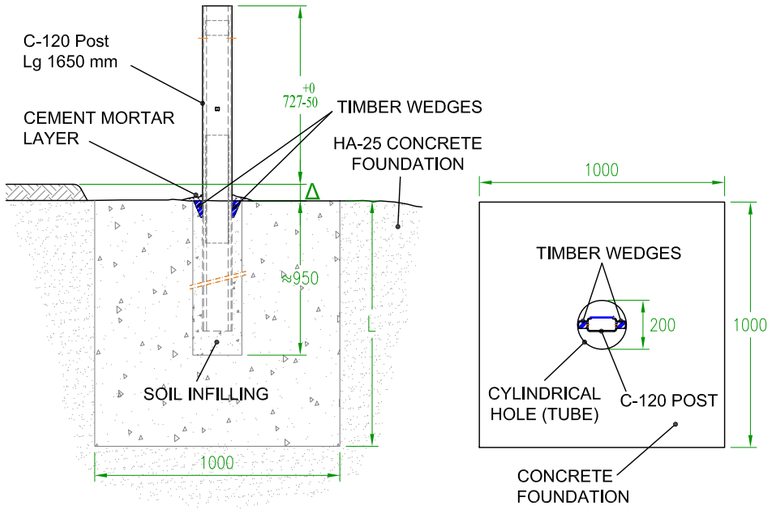


C-120 Post Lg 1850 mm

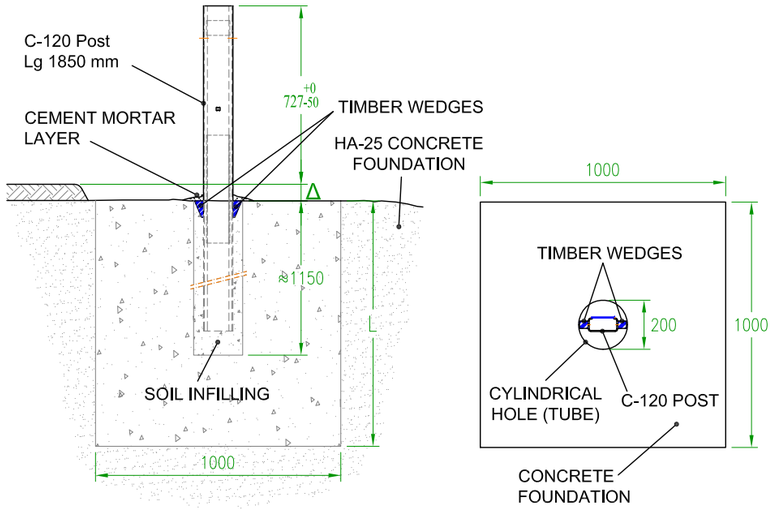


C-120 Post Lg 1900 mm

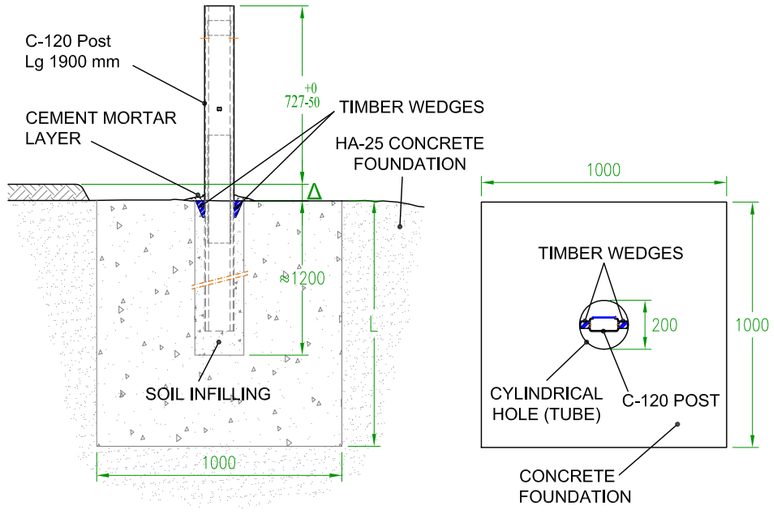
(A'') POST INSERTION IN WEAK SOILS



C-120 Post Lg 1650 mm



C-120 Post Lg 1850 mm



C-120 Post Lg 1900 mm

Road Steel Engineering

BMS4BR-L1
INSTALLATION STEPS (II)