Single Steel Guardrail "BMS1L-H2"

INSTALLATION MANUAL

May 2022

Road Steel Engineering

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SINGLE STEEL GUARDRAIL "BMS1L-H2": INSTALLATION WORKS

The Single Steel Guardrail "BMS1L-H2" 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 "BMS1L-H2" 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.

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 1,33 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:

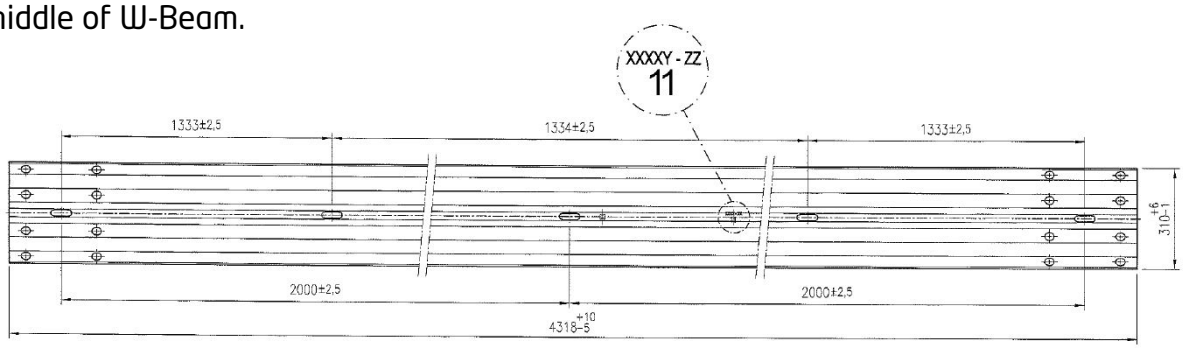
- *In hard soils*, a cylindrical hole of 200mm diameter and aprox. 900mm deep shall be bored with appropriate equipment (crown-boring machine), the C-120 steel post shall be positioned partially embedded in the hole using timber wedges in order to fasten it. Then, the hole shall be totally filled with 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. 900mm 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.

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 "11", just under traceability code, located in the sine of their profile, by the middle of W-Beam.



W-Beam

The W-Beam is set up in place and attached directly to the posts through bolts CRF-10.5 M16x40(+10), rectangular washer 100x40x5mm M16, squared washer 35x35x5mm M16 and nut M16. Rectangular flat washers are located below head bolt and above the W-Beam. Squared washers are located below 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-10.5 M16x40(+10) 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 fastening the W-Beam to Post shall be tightened with a torque from 30 N.m to 50 N.m.

All remaining joints shall be tightened with a torque from 60 N.m to 80 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. **Assembly and Tightening of W-Beams**

D. **Vertical alignment and definitive tightening**

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Annex 1: Installation Drawings

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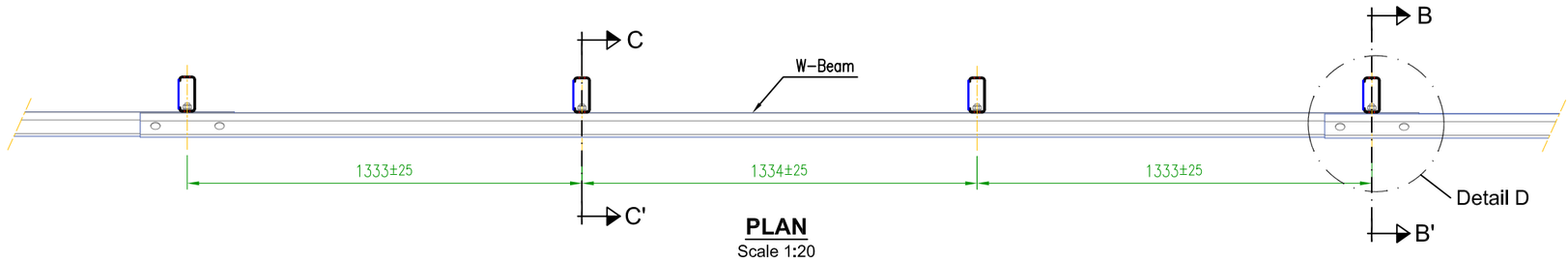
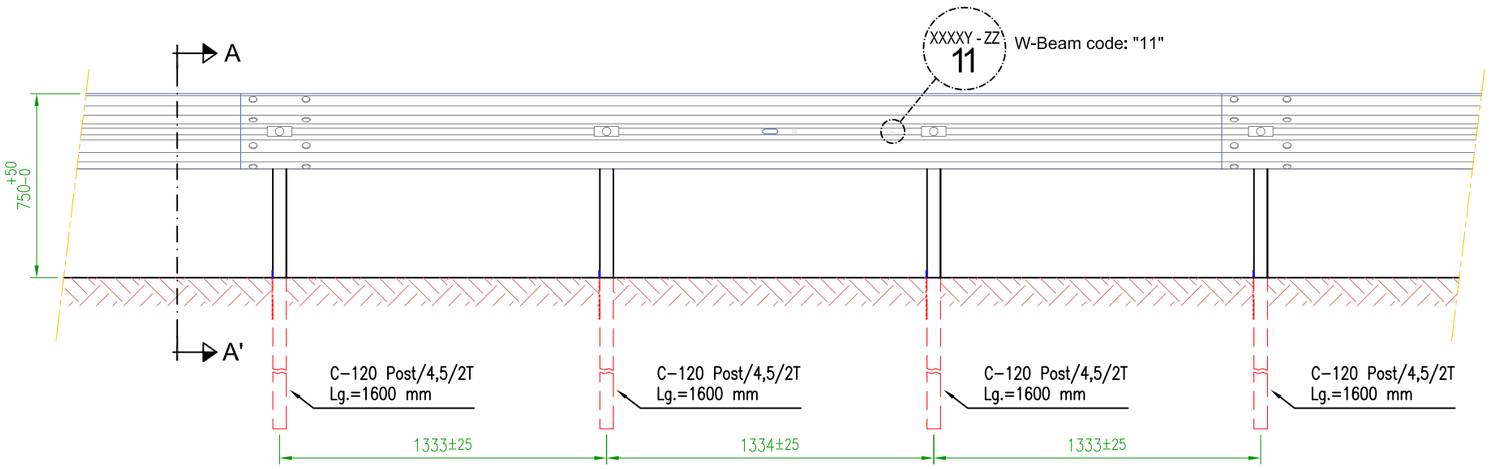
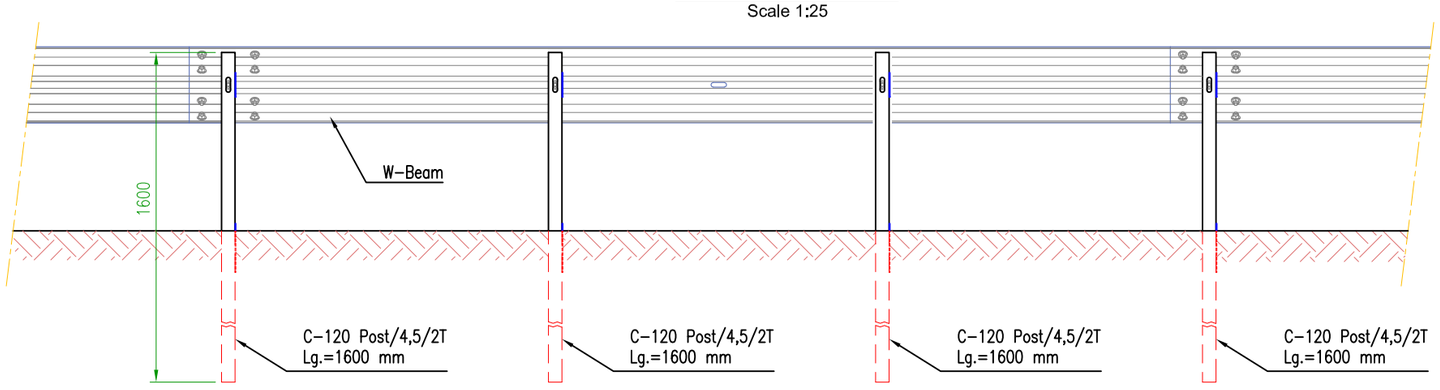


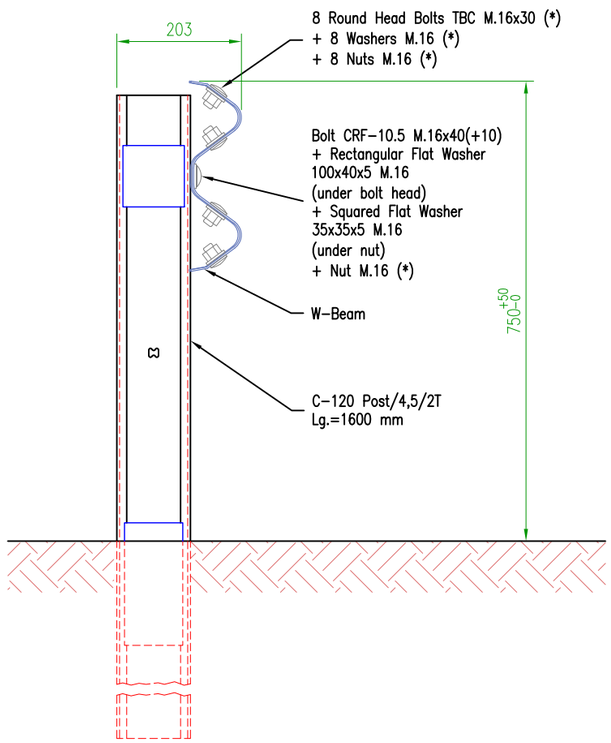
PLAN
Scale 1:20



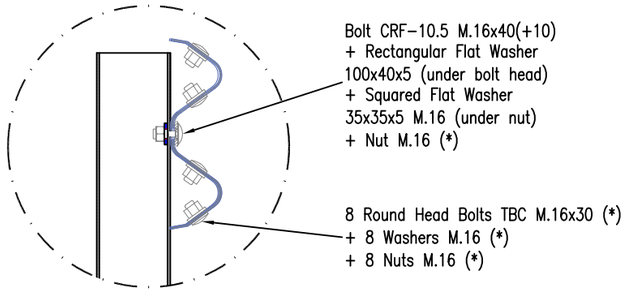
ELEVATION FRONT
Scale 1:25



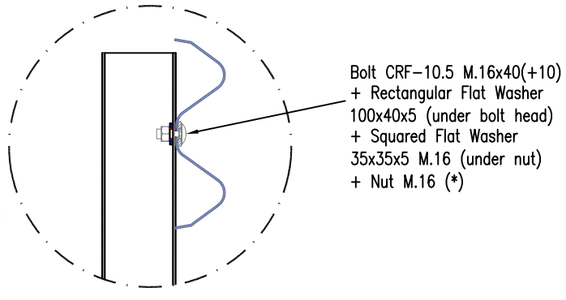
ELEVATION REAR
Scale 1:25



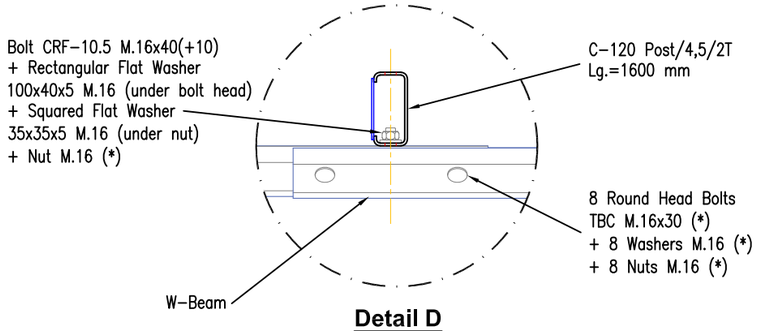
SECTION A-A'
Scale 1:10



SECTION B-B'
Scale 1:10



SECTION C-C'
Scale 1:10



Detail D

NOTE:
W-Beams of this system are identified with the reference code number "11", just under traceability code, located in the central-sine of their profile, by the middle of W-Beam.

Note (informative):	Material complying the Spanish Standard UNE 135122	Note (informative):	Material complying the Spanish Standard UNE 135122 (UNE-EN ISO 4034)
Round Head Bolt TBC M.16x30 Round Head Bolt TBC M.16x40 Washer M.16 (*)		Nut M.16 (*)	

Dimensions in mm

	DATE	NAME	SIGNATURES
Draw	25-11-16	Patricia Iglesias M.	
Review	25-11-16	Gerardo Agudín M.	
Accept	25-11-16	Antonio Amengual P.	

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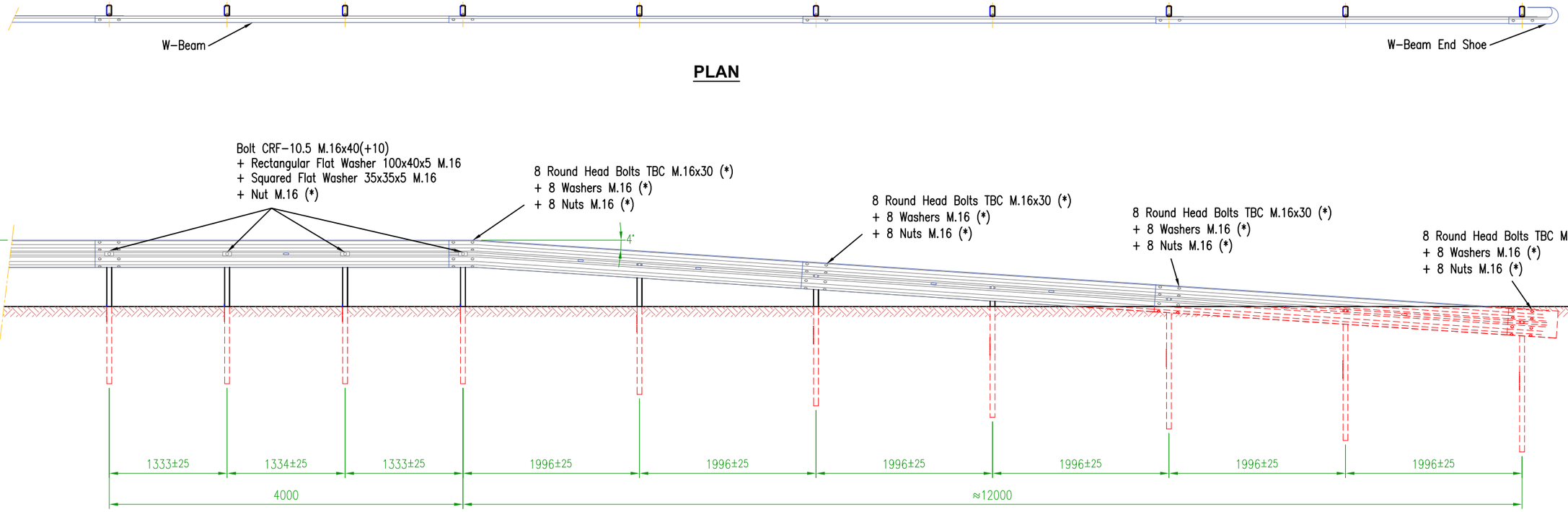
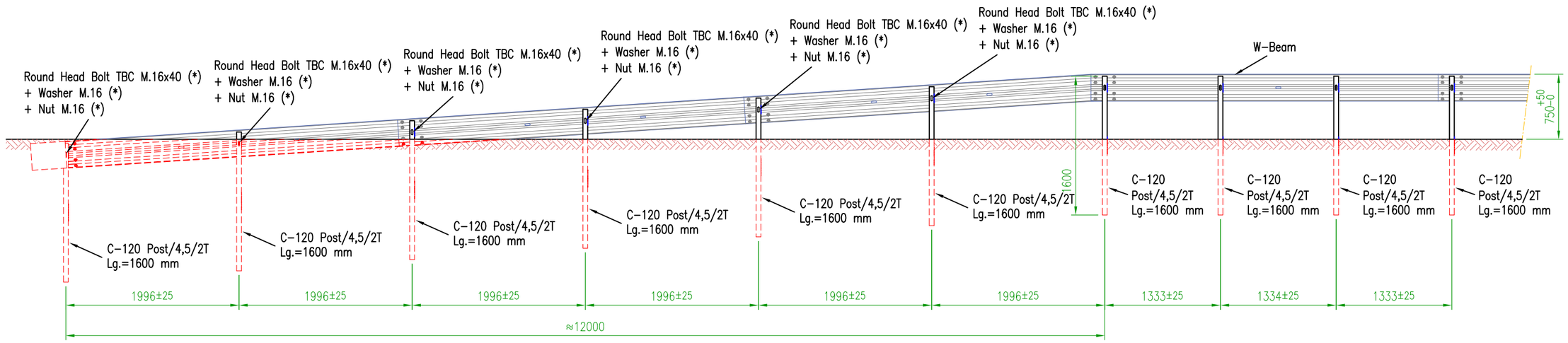
SCALE	BMS1L-H2 SINGLE STEEL GUARDRAIL	Drawing Nº: BMS1L-H2-MAN-251116-001b
1:10 1:20 1:25	GENERAL DRAWING	Replace to: BMS1L-H2-MAN-251116-001a Replaced for:



PLAN

ELEVATION FRONT



ELEVATION REAR

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 1:50

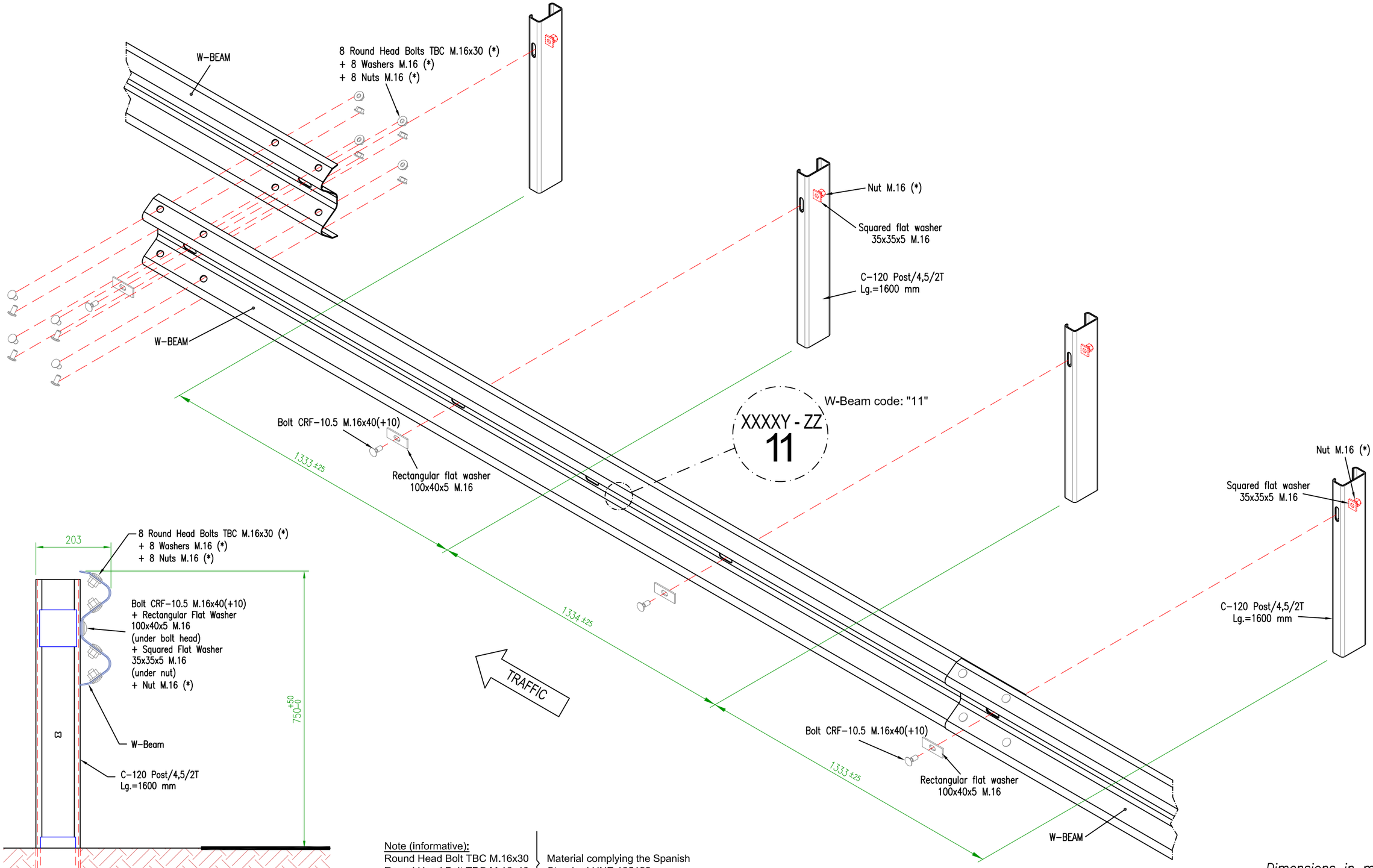
BMS1L-H2 SINGLE STEEL GUARDRAIL

DRAWING OF END RAMPING DOWN SECTION

Drawing Nº: BMS1L-H2-MAN-251116-002b

Replace to: BMS1L-H2-MAN-251116-002a

Replaced for:



CROSS SECTION AT POST

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)

NOTE:
W-Beams of this system are identified with the reference code number "11", 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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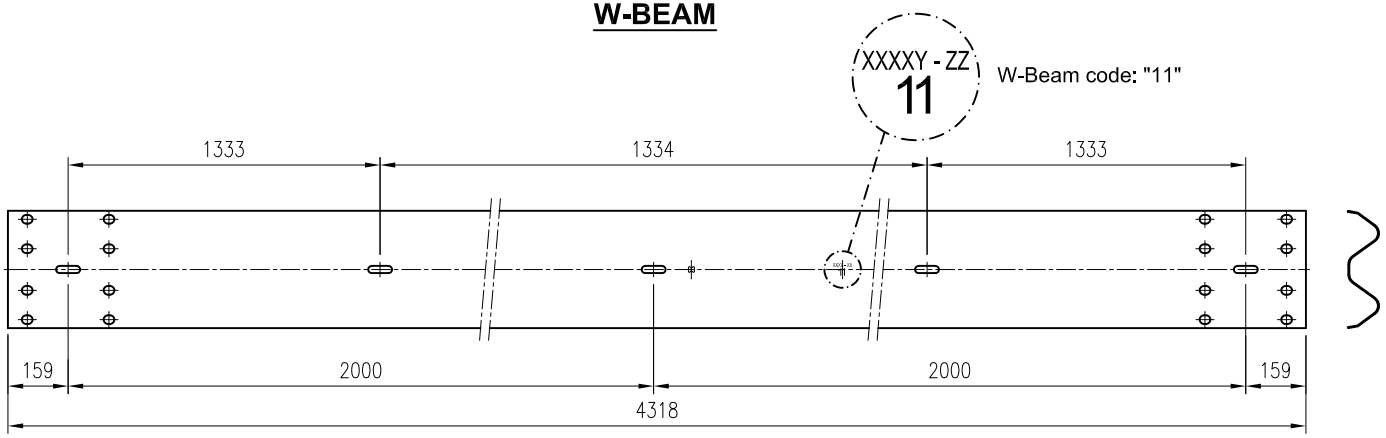
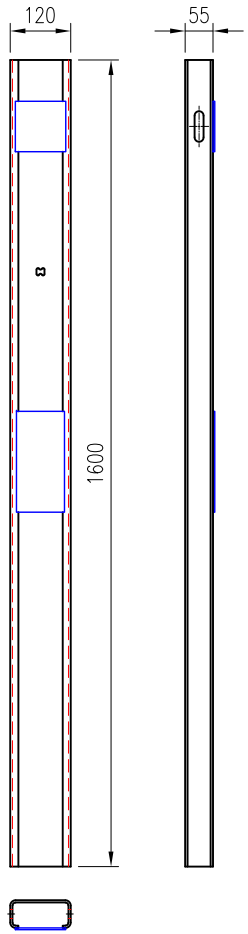
SCALE	BMS1L-H2 SINGLE STEEL GUARDRAIL	Drawing Nº: BMS1L-H2-MAN-251116-003b
-	INSTALLATION	Replace to: BMS1L-H2-MAN-251116-003a
		Replaced for:

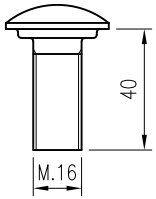
W-BEAM



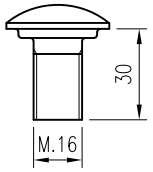
C-120 POST (Lg 1600 mm)



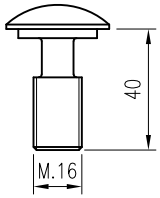
BOLT TBC M.16x40



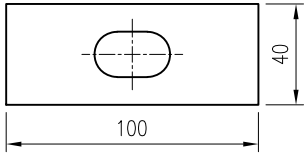
BOLT TBC M.16x30



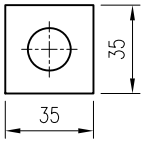
BOLT CRF-10.5 M.16x40(+10)



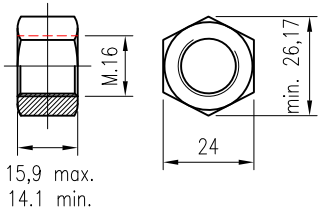
RECTANGULAR FLAT WASHER 100x40



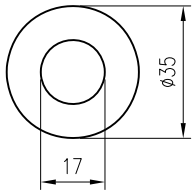
RECTANGULAR WASHER 35x35



NUT M.16



WASHER M.16



Dimensions in mm

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SCALE: -

BMS1L-H2 SINGLE STEEL GUARDRAIL

COMPONENTS

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Drawing Nº: BMS1L-H2-MAN-251116-004b

Replace to: BMS1L-H2-MAN-251116-004a

Replaced for:

Single Steel Guardrail "BMS1L-H2"

Annex 2: Installation Steps

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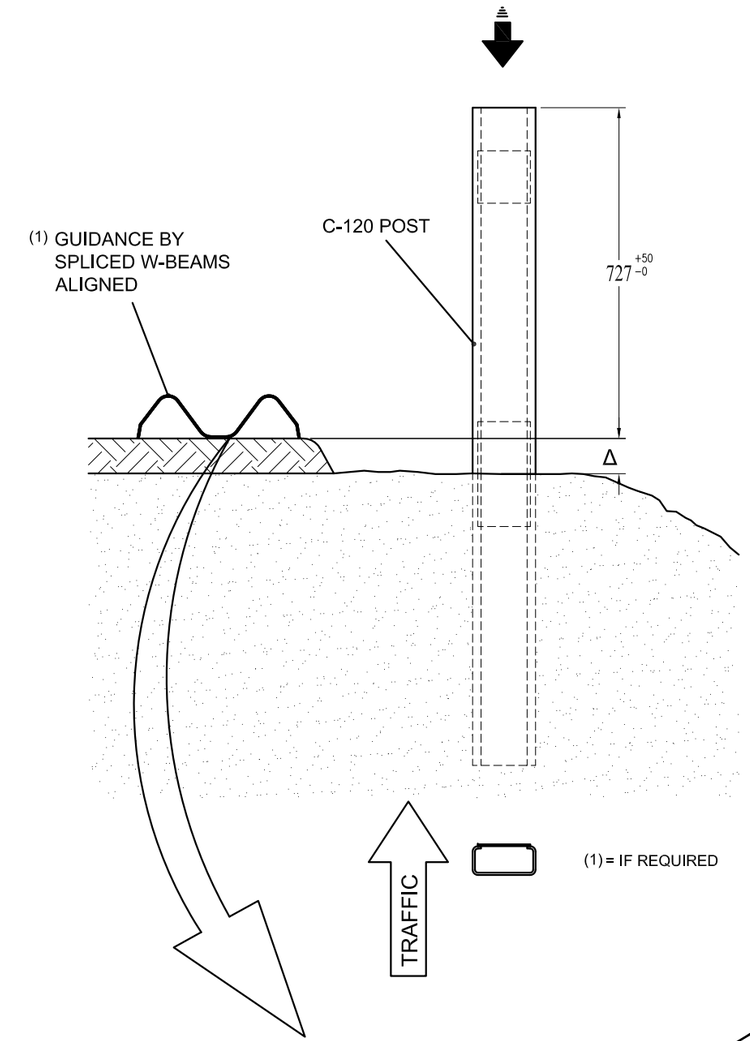
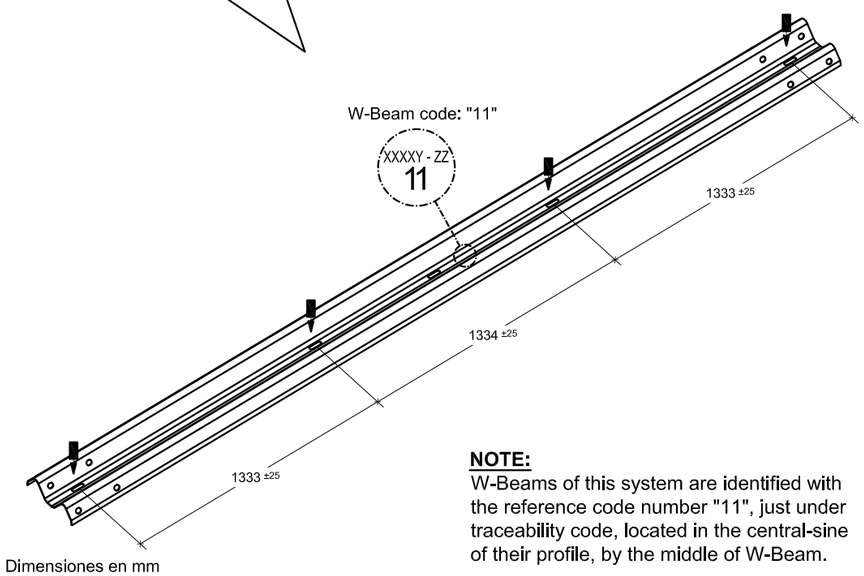
(A) POST INSERTION

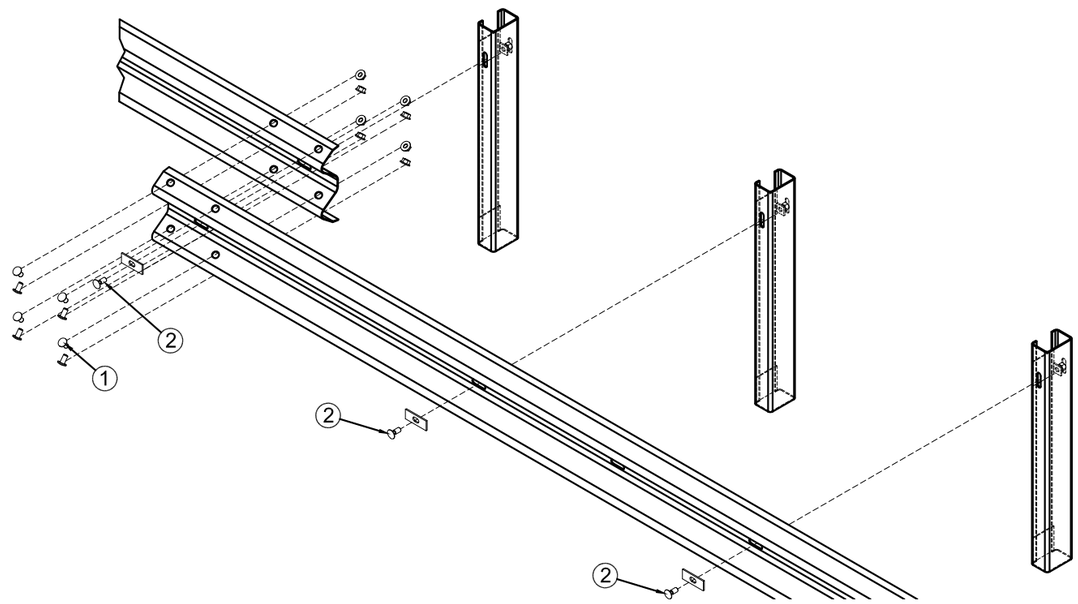




Dimensiones en mm

NOTE:
W-Beams of this system are identified with the reference code number "11", just under traceability code, located in the central-sine of their profile, by the middle of W-Beam.

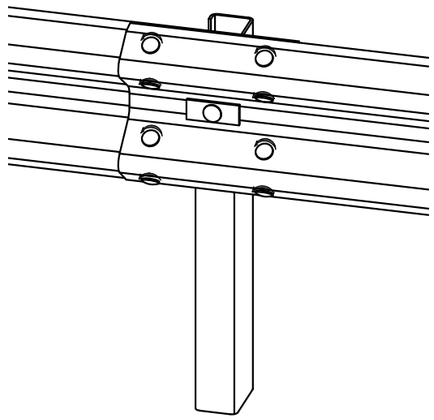
(B) FASTENING OF THE W-BEAM TO INSERTED POST



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

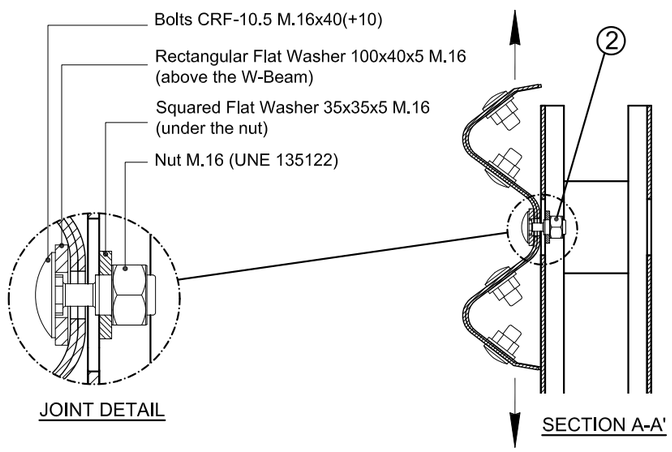
② Bolts CRF-10.5 M.16x40(+10)
+ Rectangular Flat Washer 100x40x5 M.16 (above the W-Beam)
+ Squared Flat Washer 35x35x5 M.16 (under the nut)
+ Nut M.16 (UNE 135122)

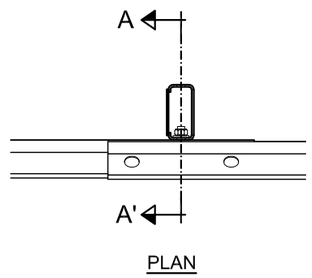
(C) ASSEMBLY AND TIGHTENING OF W-BEAMS



Note: Definitive tightening of bolts ① with a torque of 60-80 N·m

(D) VERTICAL ALIGNMENT AND DEFINITIVE TIGHTENING





PLAN

Note: Definitive tightening of bolts ② with a torque of 30-50 N·m

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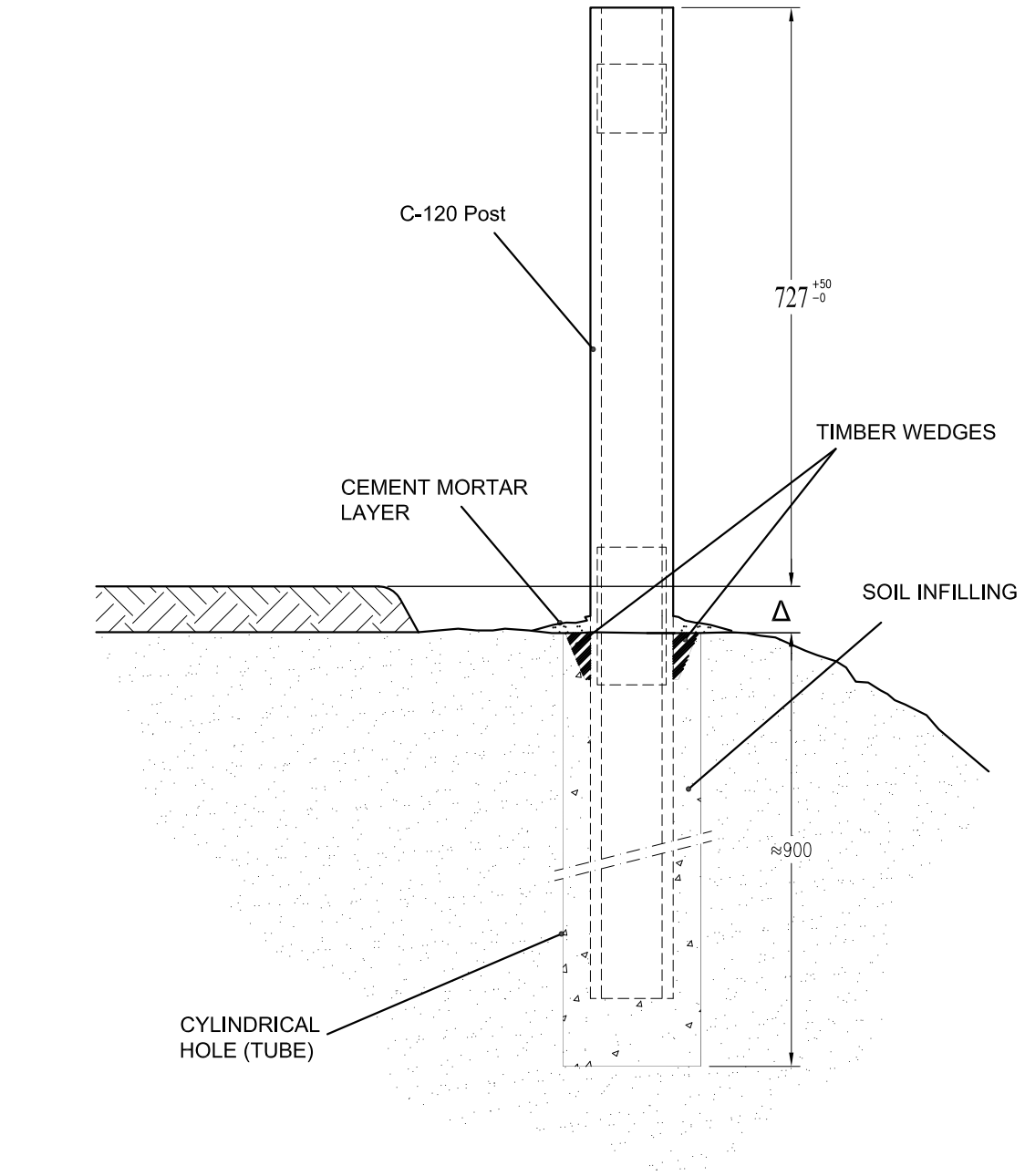
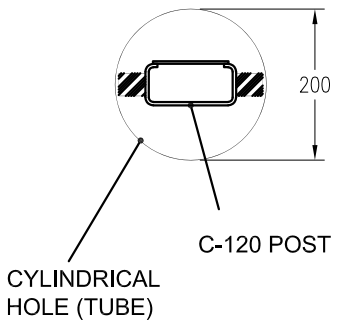
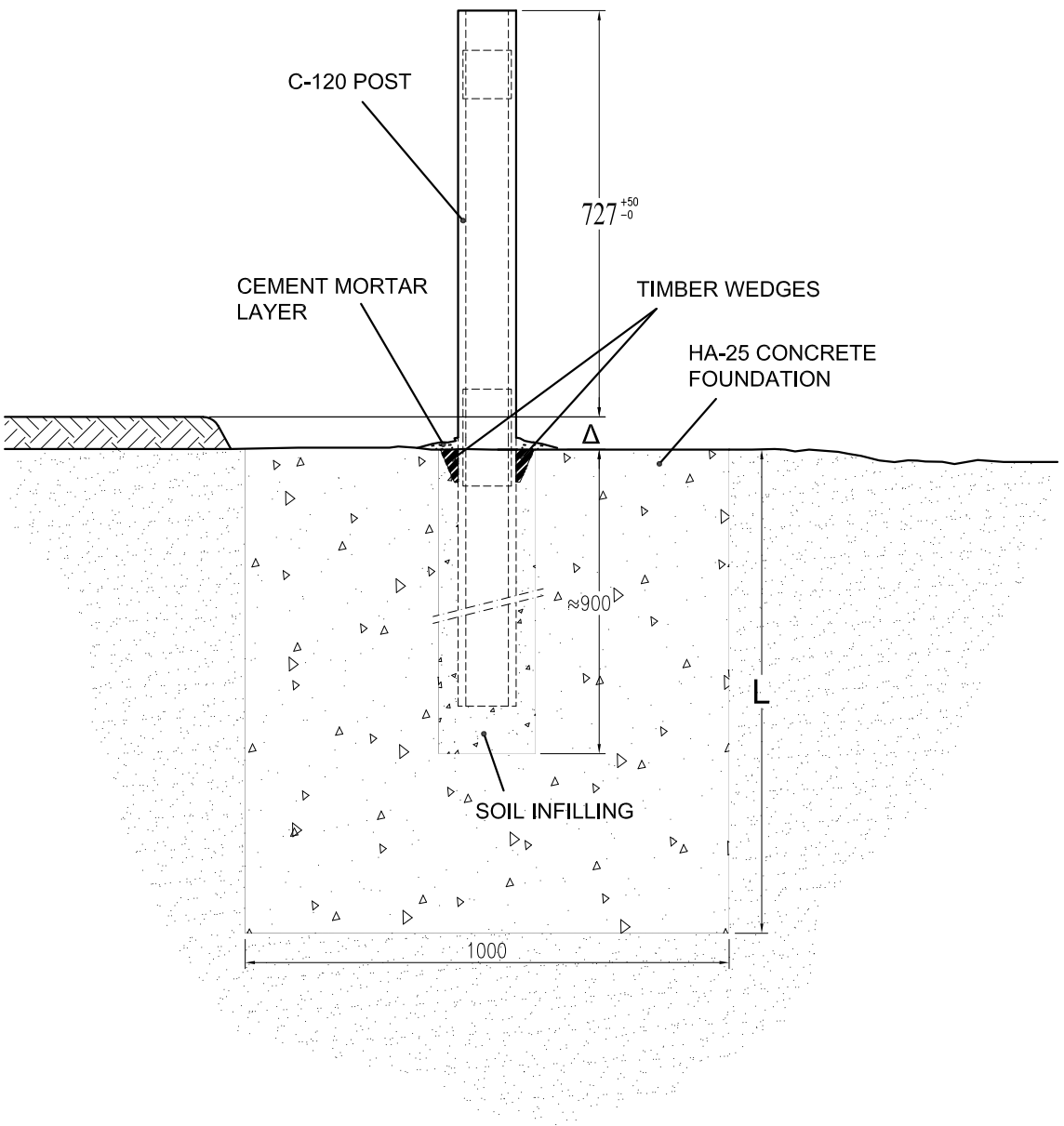
BMS1L-H2
INSTALLATION STEPS (I)

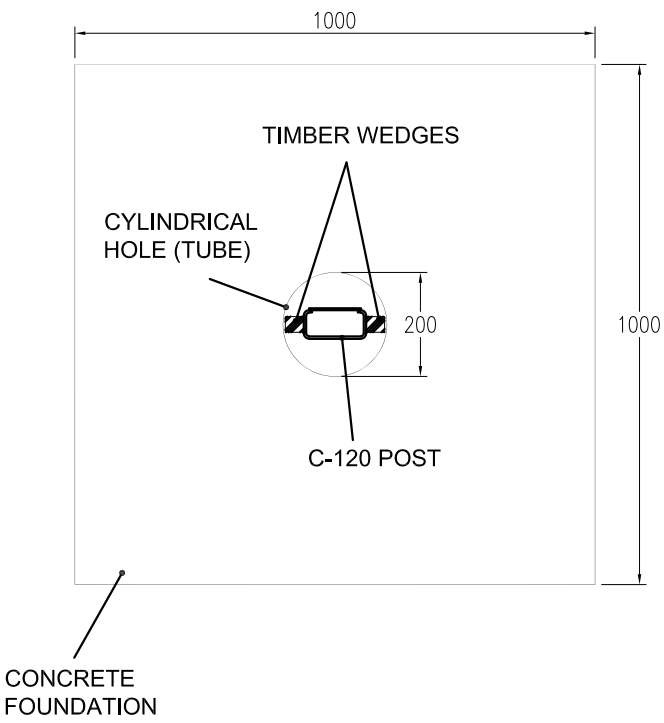
(A') POST INSERTION IN HARD SOILS





(A'') POST INSERTION IN WEAK SOILS





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BMS1L-H2
INSTALLATION STEPS (II)