

LEGENDE

DOCUMENTS DE REFERENCE			
TYPE DE PLAN	NOM DU PLAN	DATE	IND

EVOLUTION DU DOCUMENT				
INDICE	DATE	FAIT PAR	OBSERVATIONS	VERIFIE PAR
K				
J				
I				
H				
G				
F				
E				
D				
C				
B				
A	10-02-2017	L.De	Modifications suivant indice A.	
o	01-02-2017	L.De	PREMIERE DIFFUSION.	C.Le

MOE



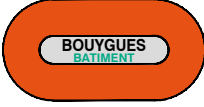
GBL Architectes
10, rue Marcel Dassault - BP 5013
59705 Marcq-en-Baroeul
Tél: 03.20.72.54.24

CLIENT



LINKCITY
1, avenue de l'horizon
59650 VILLENEUVE D'ASCQ
Tél: 03.5763.40.00

ENTREPRISE GENERALE



Bouygues bâtiment NORD - EST
Ere Park - 1 av de l'Horizon
59651 Villeneuve d'Ascq
Tél : 03.20.64.40.00

PRESENTATION DU CHANTIER

Construction de bureaux VALLOUREC
Avenue de l' Europe



LONGUEUR
/
HAUTEUR
/
TRACE LE
-
ECHELLE
Voir plan
PAGES
01 / 24

TITRE DU PLAN

**LONGRINES
ARMATURES**

EMETTEUR



Service structures

DATE	FAIT PAR	OBSERVATIONS						VERIFIE PAR	
10-02-17	L.De	Modifications suivant indice A.						C.Le	
N° PLAN	INDICE	INITIALES DU CHANTIER	TYPE DE PLAN	ZONE	BATIMENT	NIVEAU	PHASE	EMETTEUR	LOT
101	A	VALL	ARM	TZ	BUREAUX	FON	EXE	BBNE	GO

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BBNE - 1. avenue de l'horizon - BP 29 59651 Villeneuve d'Ascq

BETON	C25/30	SISMICITE	Zone 3
ENROBAGE	3cm MINI	CATEGORIE D'IMPORTANCE	III
ACIER HAUTE ADHERENCE	fe = 500 MPa	CLASSE DE SOL	C
ACIER DOUX	fe = 235 MPa	DUCTILITE LIMITEE	(DCL)
TREILLIS SOUDE	fe = 500 MPa		

LES ATTENTES AU DELA DU HA12 SERONT SYSTEMATIQUEMENT
EQUIPEES D'UN DISPOSITIF CONTRE L'EMPALEMENT

DIAMETRES INTERIEURS MINIMAUX DE CINTRAGE DES ARMATURES FACONNEES
suivant norme NF A35-027 de novembre 2009

DIAMETRES INTERIEURS DE CINTRAGE MINIMAUX POUR LES ACIERS A HAUTE ADHERENCE

DIAMETRE NOMINAL DE L'ARMATURE (mm)	5	6	7	8	9	10	12	14	16	20	25	32	40
CADRES ETRIERS EPINGLES OU ASSIMILES	20	25	30	30	40	40	50	70	100	150	200	SANS OBJET	
ANCRAGES	50	70	70	70	100	100	100	150	150	200	250	300	400
COUDES		100	100	100	150	150	200	200	250	300	400	500	500

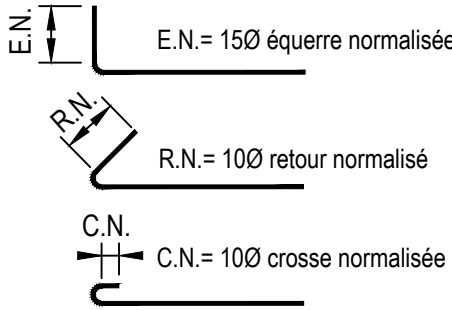
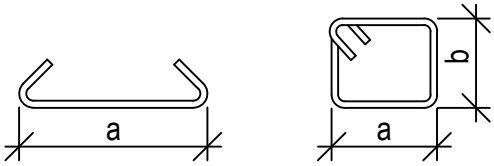
DIAMETRES INTERIEURS DE CINTRAGE MINIMAUX POUR LES RONDS LISSES DE NUANCE FeE235

DIAMETRE NOMINAL DE L'ARMATURE (mm)	5.5 & 6	8	10	12	14	16	20	25	32	40
CADRES ETRIERS EPINGLES OU ASSIMILES	20	30	30	40	50	50	70	100	SANS OBJET	
ANCRAGES ET COUDES	30	40	50	70	70	100	100	150	200	200

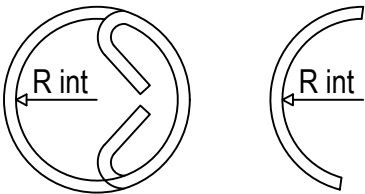
COTATION DES ACIERS :

- Les côtes données sont des dimensions exprimées en cm
- Les angles donnés sont des angles de cintrage exprimés en degrés

- Pour les aciers courants,
les côtes de façonnage correspondent
à l'extérieur des aciers façonnés



- Pour les cerces et les aciers courbés,
le rayon "R" donné correspond au rayon
intérieur de l'acier façonné



- Les aciers en attente seront munis d'un dispositif de protection contre l'empalement.

Lg 01

Poutre n09 Niveau n01
FONDATIONS

T 23.1

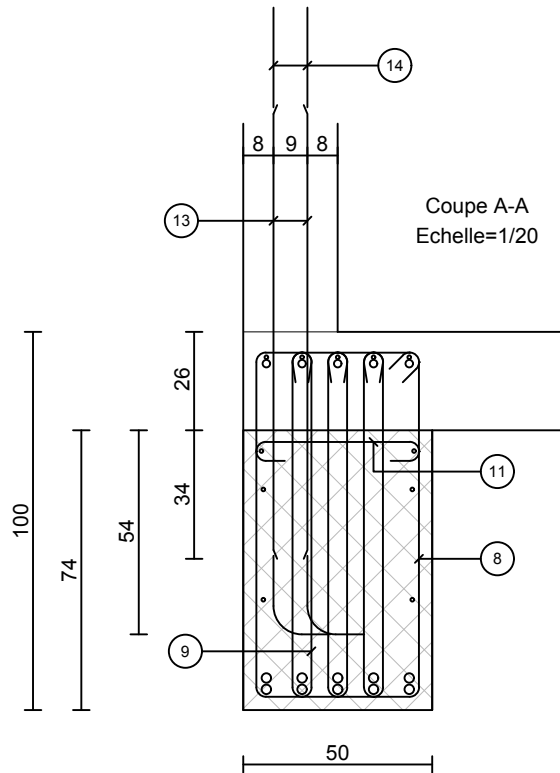
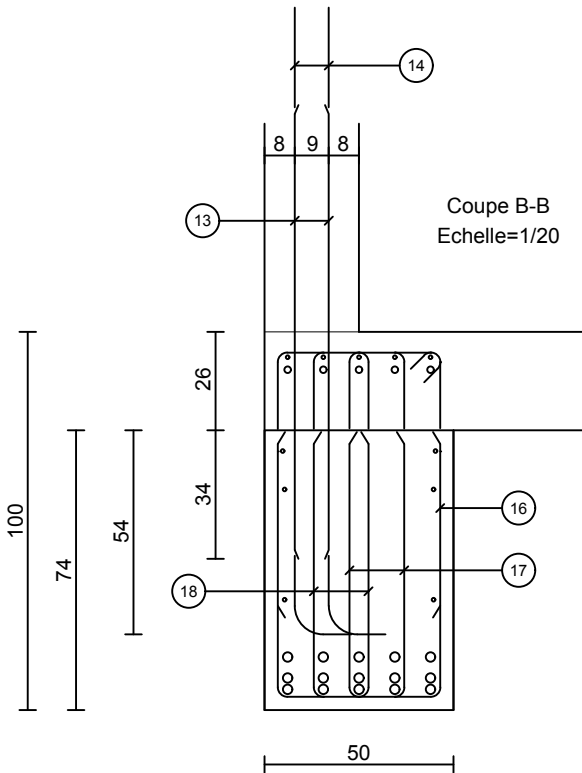
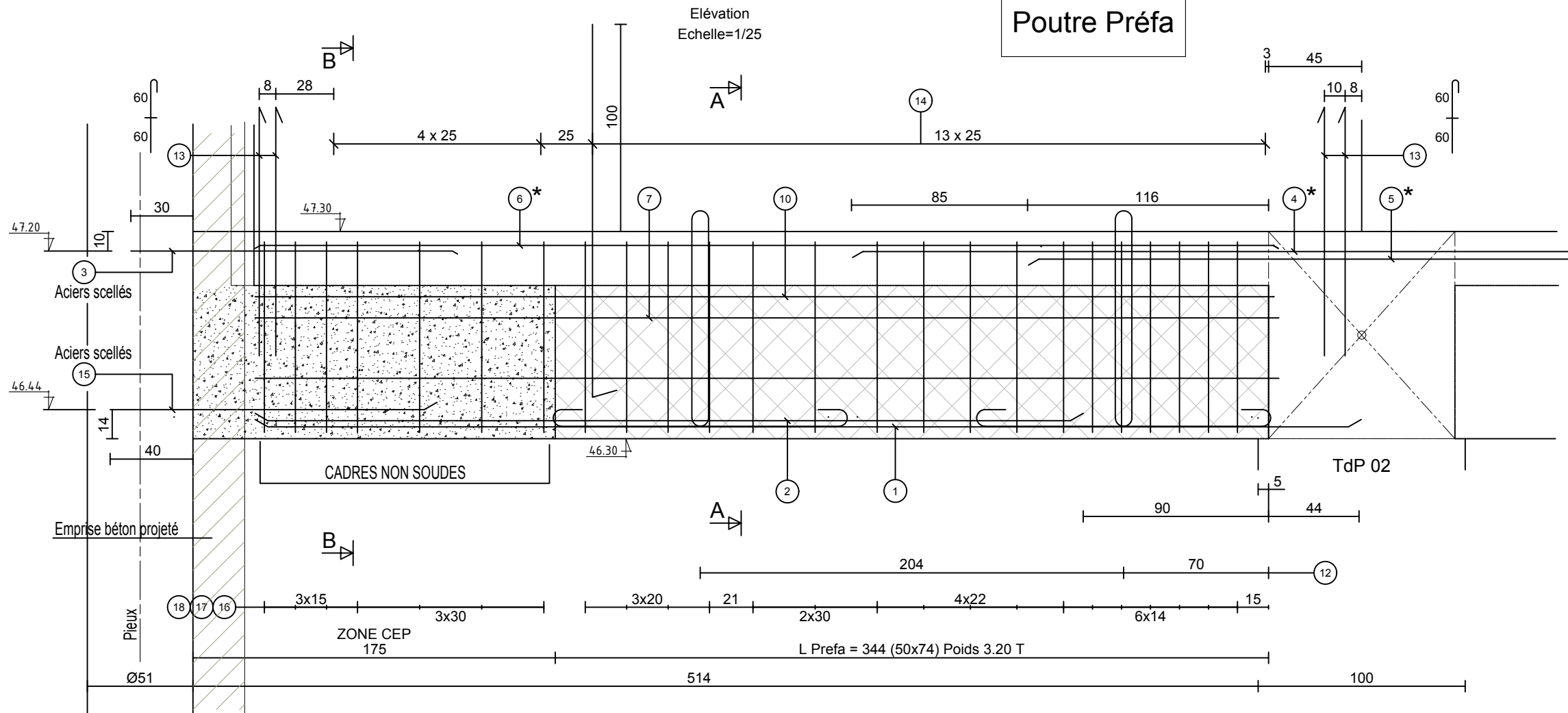
Béton=3.35 m3 (2.04 Préfa)
Acier=605.6 kg d=160.1 kg/m3
Fi=14.6 mm Cof=13.5 m²

Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

- Date 09/06/16 - 1 étages -

Section : 50 x 100ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2



Barre	Lg	Forme
1	5HA25	535
2	5HA25	400
3	5HA14	160
4	5HA20	478
5	5HA20	308
6	5HA10	495
7	4HA10	495
8	17HA10	282
9	51HA10	206
10	2HA10	495
11	9HA10	64
12	2Dx20	394
13	8HA12	132
14	38HA14	190
15	5HA25	150
16	2x7HA10	180
17	2x7HA10	155
18	2x7HA10	155
* ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD		
Barre		Lg/Poids
HA10		281.8/173.9
HA12		10.6/9.4
HA14		80.2/96.9
HA20		39.3/96.9
HA25		54.3/209.1
Dx20		7.9/19.4

Lg 02

Poutre n09 Niveau n01
FONDACTIONS

T 23.2

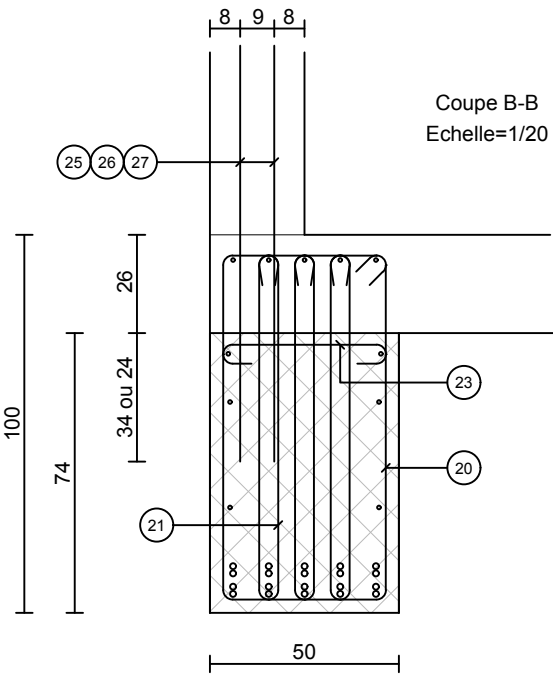
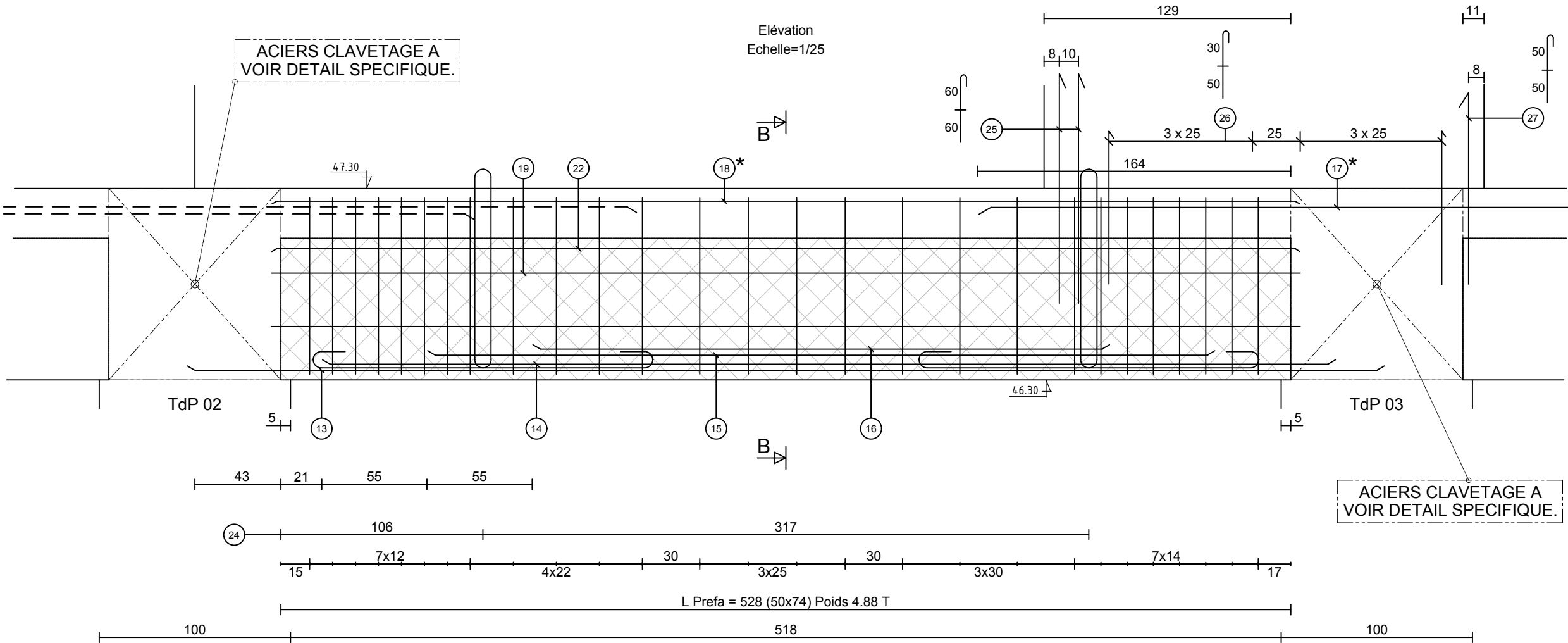
Béton=3.09 m3 (1.95 Préfa)
Acier=452.3 kg d=149.2 kg/m3
Fi=13.8 mm Cof=12.9 m²

Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

- Date 09/06/16 - 1 étages -

Section : 50 x 100ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2



Barre	Lg	Forme
13	5HA16	615
14	5HA16	530
15	5HA16	412
16	5HA16	302
17	5HA25	447
18	5HA10	538
19	4HA10	538
20	27HA10	282
21	81HA10	206
22	2HA10	538
23	11HA10	64
24	2Dx20	394
25	4HA12	132
26	16HA6	87
27	2HA10	110
* ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD		
Barre		Lg/Poids
HA6		13.9/3.1
HA10		311.5/192.2
HA12		5.3/4.7
HA16		93.0/146.7
HA25		22.4/86.2
Dx20		7.9/19.4

Lg 03

Poutre n09 Niveau n01
FONDATIONS

T 23.3

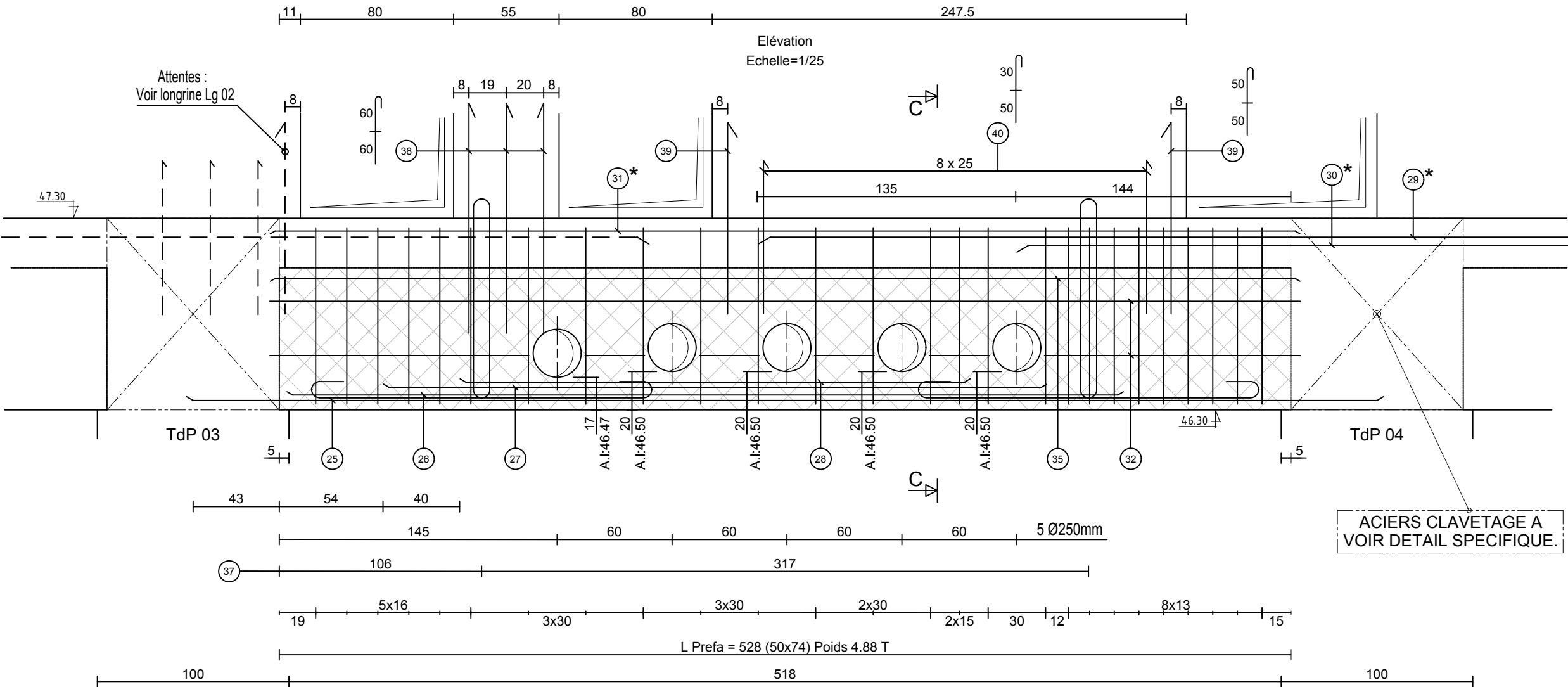
Béton=3.09 m3 (1.95 Préfa)
Acier=474.4 kg d=154.4 kg/m3
Fi=14.1 mm Cof=12.9 m²

Eb=3.0 cm
Eh=5.0 cm
EI=3.0 cm

- Date 09/06/16 - 1 étages -

Section : 50 x 100ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2



Barre	Lg	Forme
25	5HA14	615
26	5HA12	437
27	5HA12	347
28	5HA12	267
29	5HA25	567
30	5HA25	327
31	5HA10	538
32	4HA10	538
33	26HA10	282
34	78HA10	206
35	2HA10	538
36	11HA10	64
37	2Dx20	394
38	6HA12	132
39	4HA10	110
40	18HA6	87
* ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD		
Barre		Lg/Poids
HA6		15.7/3.5
HA10		304.6/188.0
HA12		60.5/54.0
HA14		30.8/37.2
HA25		44.7/172.3
Dx20		7.9/19.4

Lg 04

Poutre n09 Niveau n01
FONDACTIONS

T 23.4

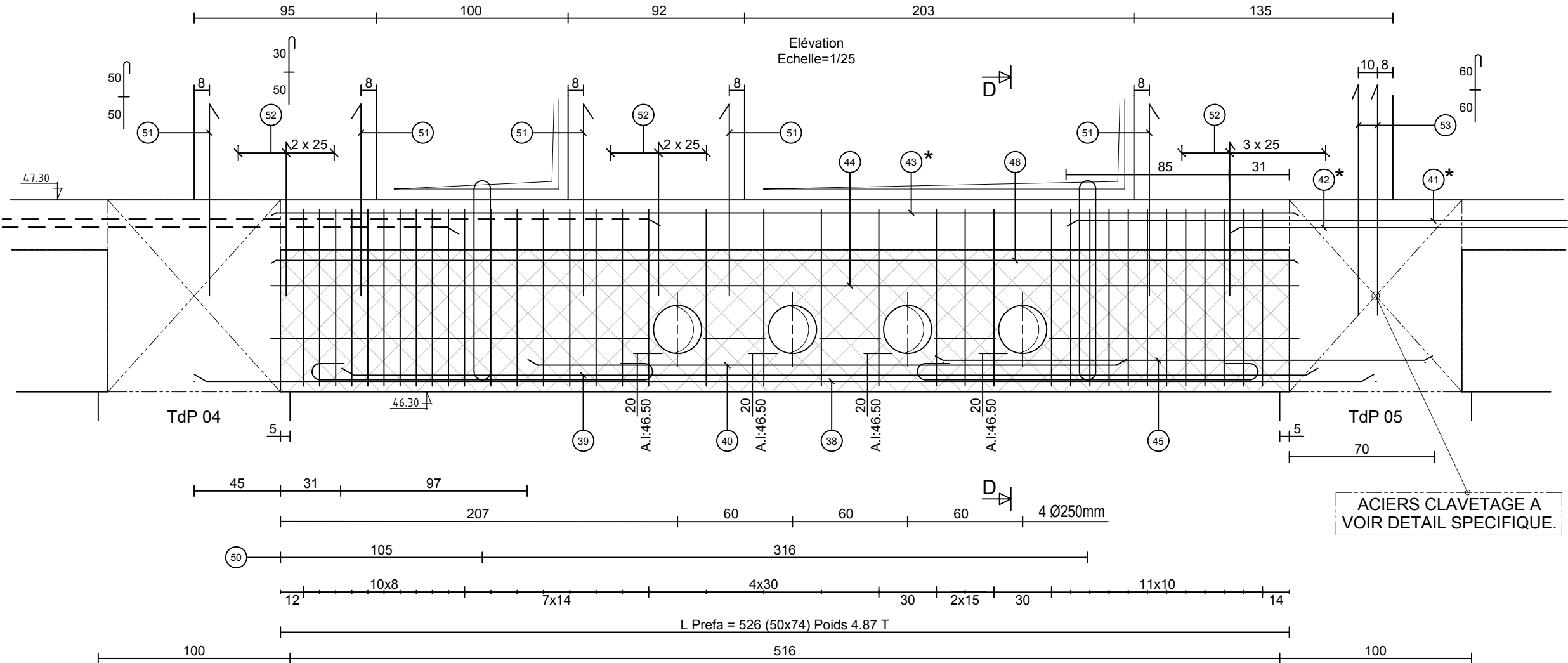
Béton=3.08 m3 (1.95 Préfa)
Acier=655.2 kg d=215.1 kg/m3
Fi=15.3 mm Cof=12.9 m²

Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

- Date 09/06/16 - 1 étages -

Section : 50 x 100ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2



Poutre Préfa

Barre	Lg	Forme
38	5HA25	615
39	5HA25	510
40	5HA20	313
41	5HA20	483
42	5HA20	313
43	5HA10	536
44	4HA10	536
45	5HA16	260
46	37HA10	282
47	111HA10	206
48	2HA10	536
49	11HA10	64
50	2Dx20	394
51	10HA10	110
52	20HA6	87
53	4HA12	132

* ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD		
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Barre	Lg/Poids
HA6	17.4/3.9
HA10	410.3/253.2
HA12	5.3/4.7
HA16	13.0/20.5
HA20	55.4/136.7
HA25	56.3/216.8
Dx20	7.9/19.4

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Lg 05

Poutre n09 Niveau n01
FONDATIONS

T 23.5

Béton=3.08 m3 (1.95 Préfa)
Acier=322.9 kg d=109.4 kg/m3
Fi=14.2 mm Cof=12.9 m²

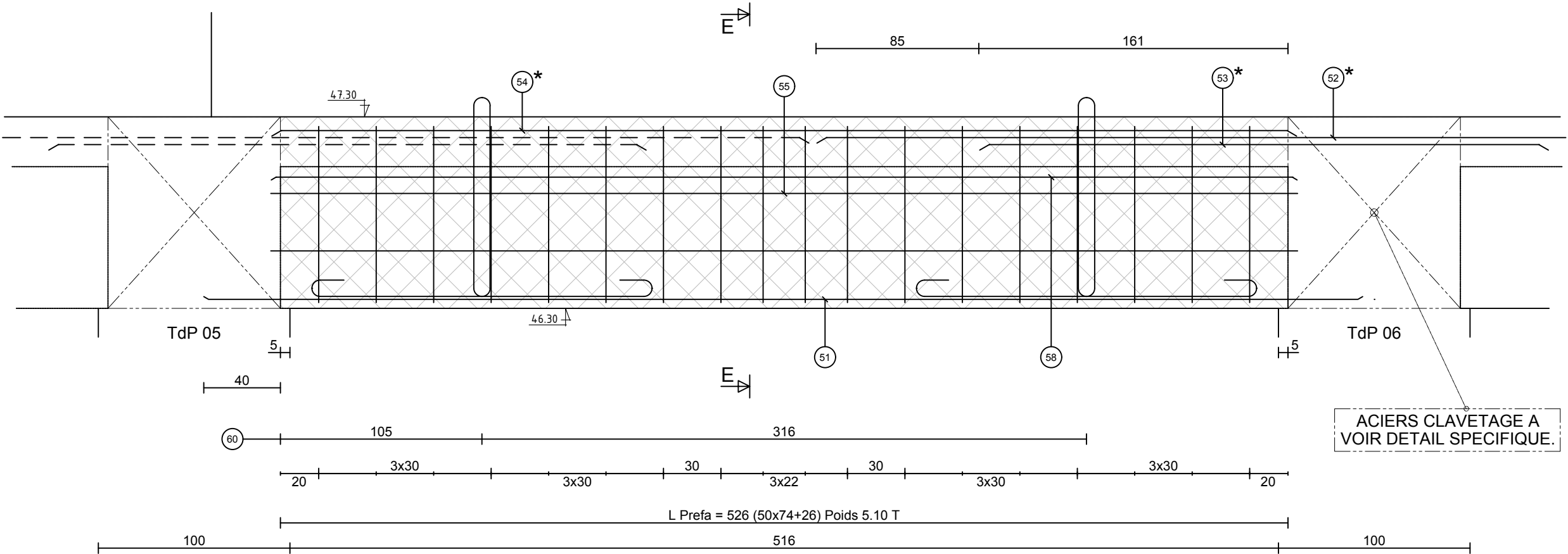
Eb=3.0 cm
Eh=5.0 cm
EI=3.0 cm

- Date 09/06/16 - 1 étages -

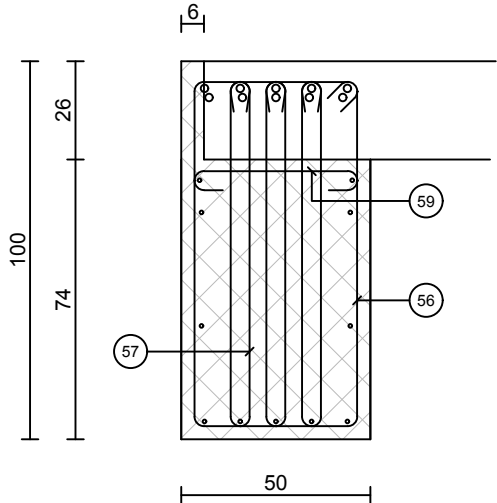
Section : 50 x 100ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2

Elévation
Echelle=1/25



Coupe E-E
Echelle=1/20



Poutre Préfa

	Barre	Lg	Forme
51	5HA10	605	605
52	5HA20	468	468
53	5HA20	298	298
54	5HA20	536	536
55	4HA10	536	536
56	18HA10	282	32 44
57	54HA10	206	92
58	2HA10	536	536
59	11HA10	64	44
60	2Dx20	394	105 144
* ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD			
Barre		Lg/Poids	
HA10		231.5/143.0	
HA20		65.1/160.5	
Dx20		7.9/19.4	

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Lg 06

Poutre n09 Niveau n01
FONDATIONS

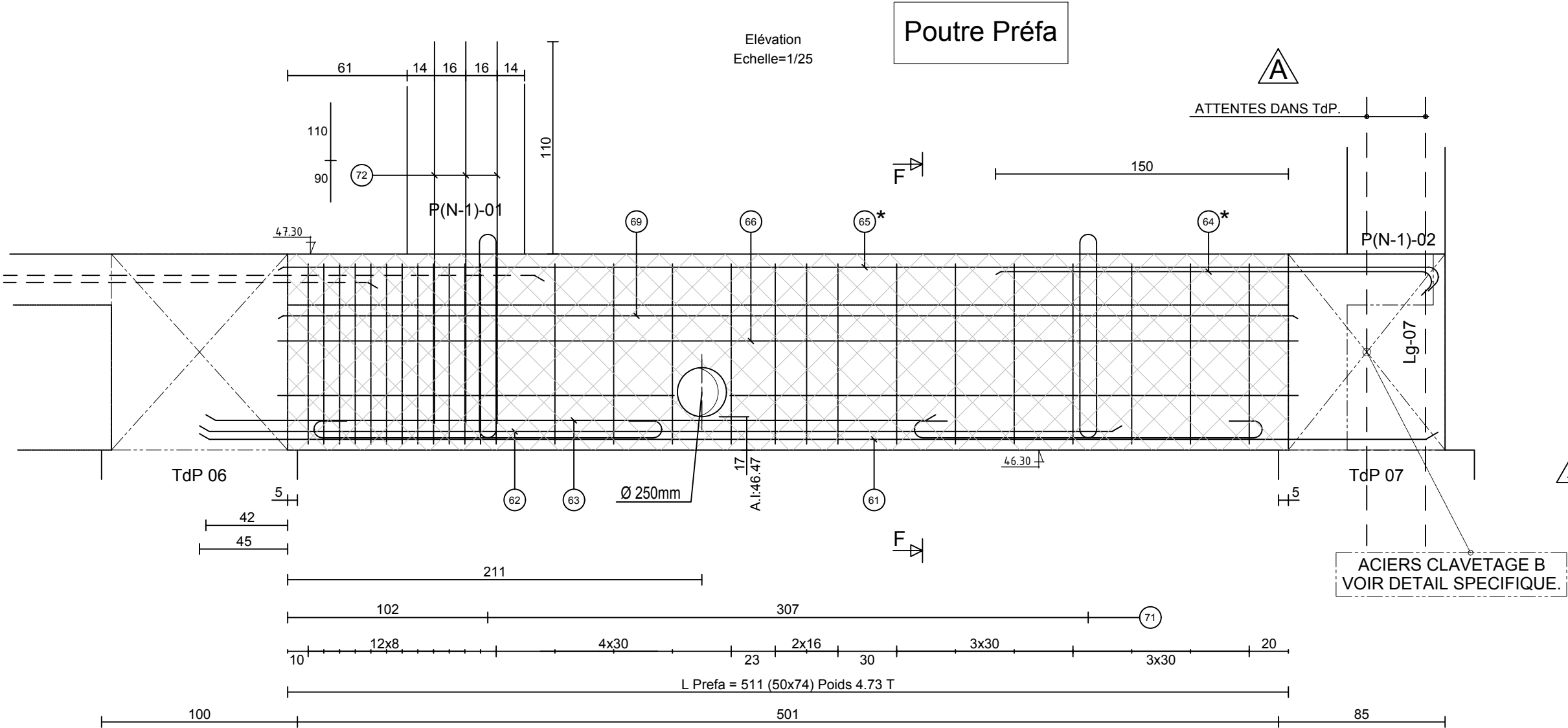
T 23.6

Béton=3.18 m3 (1.89 Préfa)
Acier=493.6 kg d=145.5 kg/m3
Fi=14.4 mm Cof=12.5 m²

Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

- Date 09/06/16 - 1 étages -
Section : 50 x 100ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2

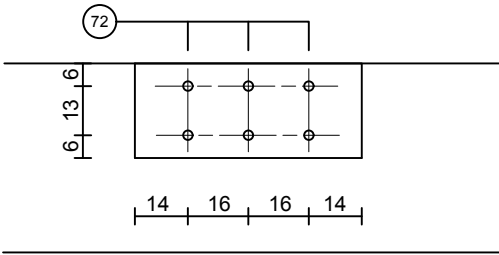


	Barre	Lg	Forme
61	5HA25	630	630
62	5HA20	485	485
63	5HA20	379	379
64	5HA10	234	135° 10 223
65	5HA10	604	135° 10 593
66	4HA10	521	521
67	27HA10	282	92 44
68	81HA10	206	92
69	2HA10	521	521
70	11HA10	64	44
71	2Dx20	394	105 144
72	6HA25	200	200

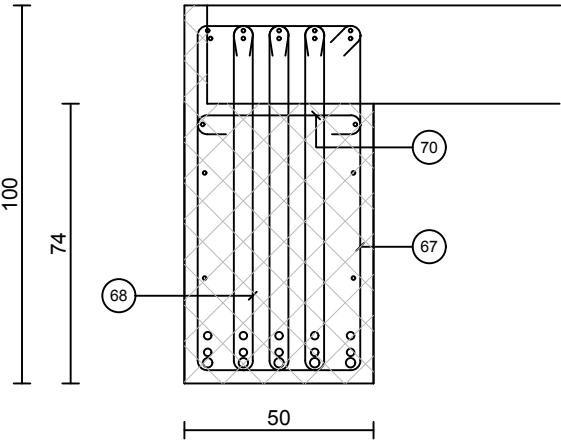
73 N'EXISTE PLUS

* ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD

DETAIL ATTENTES SUR POTEAU P(N-1)-01
Echelle=1/20



Coupe F-F
Echelle=1/20



Barre	Lg/Poids
HA10	323.2/199.4
HA20	43.2/107.0
HA25	43.5/167.7
Dx20	7.9/19.4

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Lg 07

Poutre n09 Niveau n01
FONDATIONS

T 24.1

Béton=3.15 m3 (1.91 Préfa)
Acier=416.0 kg d=123.8 kg/m3
Fi=14.3 mm Cof=12.6 m²

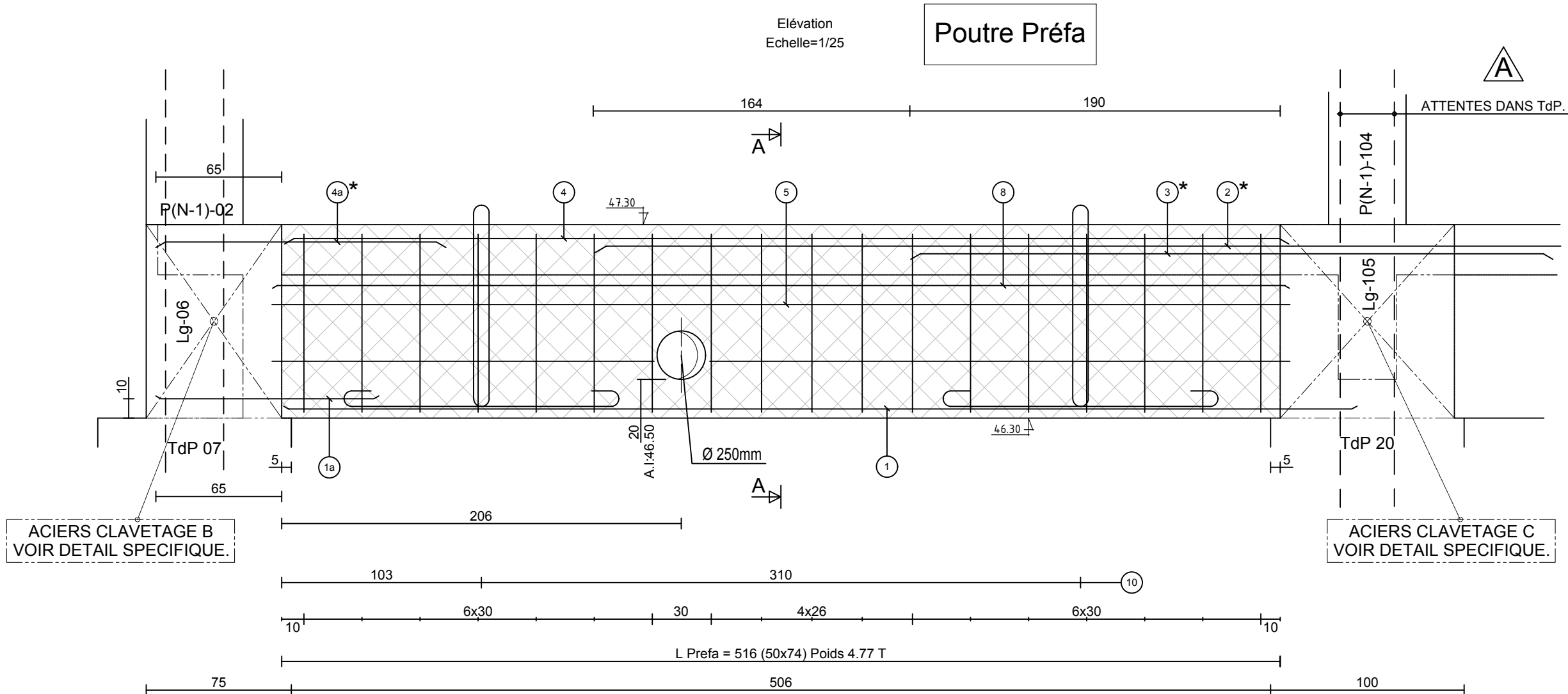
Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

- Date 02/11/16 - 10 étages -
Section : 50 x 100ht

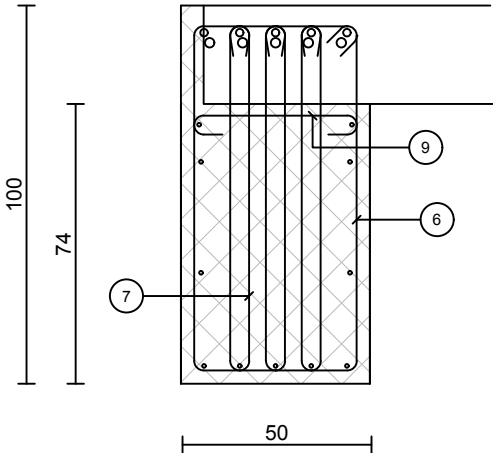
fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2













Elévation
Echelle=1/25

Poutre Préfa



Coupe A-A
Echelle=1/20



Barre		Lg	Forme
1	5HA10	550	
1a	5HA10	115	
2 ★	5HA25	624	
3 ★	5HA20	333	
4	5HA20	588	
4a ★	5HA20	150	
5	4HA10	526	
6	18HA10	282	
7	54HA10	206	
8	2HA10	526	
9	11HA10	64	
10	2Dx20	394	
11	N'EXISTE PLUS		
★	ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD		
Barre		Lg/Poids	
HA10		233.9/144.3	
HA20		53.6/132.1	
HA25		31.2/120.1	
Dx20		7.9/19.4	

Lg 08

Poutre n09 Niveau n01
FONDATIONS

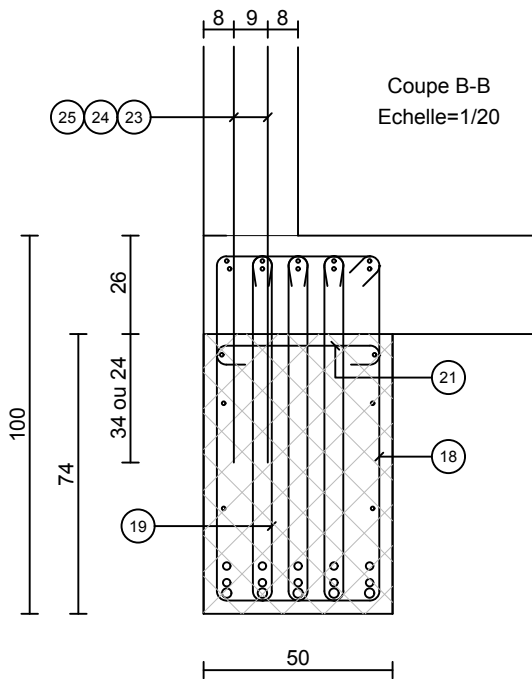
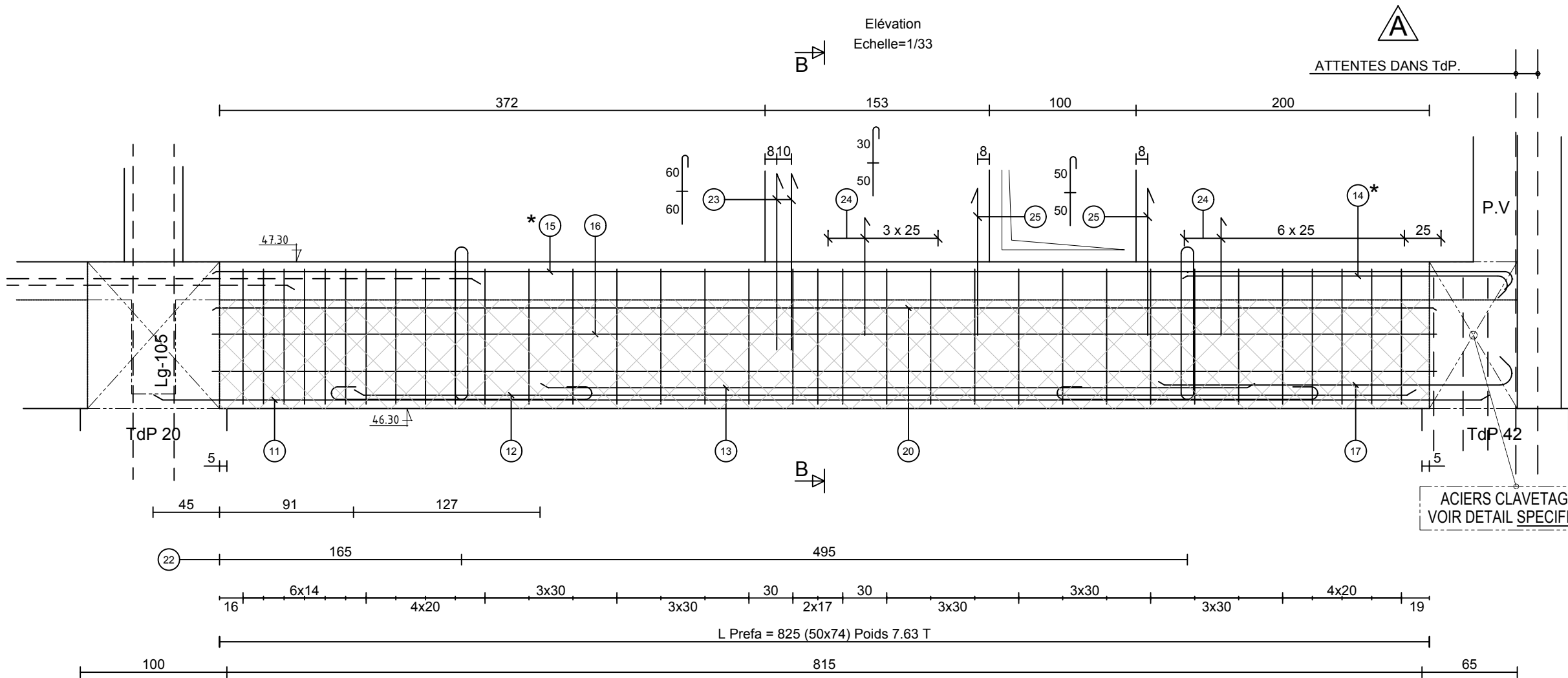
T 24.2

Béton=4.05 m3 (3.05 Préfa)
Acier=708.0 kg d=174.4 kg/m3
Fi=15.2 mm Cof=18.3 m²

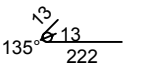
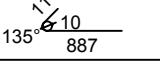
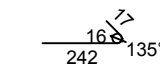
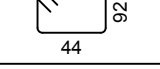
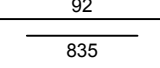
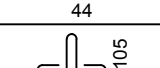
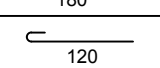
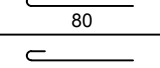

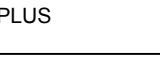
Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

- Date 02/11/16 - 10 étages -
Section : 50 x 100ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2



Poutre Préfa

Barre		Lg	Forme
11	5HA25	920	920
12	5HA25	725	725
13	5HA20	488	488
14	5HA12	236	
*			135° 13 222
15	5HA10	898	
*			135° 10 887
16	4HA10	835	835
17	5HA16	260	
			16 242 135°
18	34HA10	282	
			44 92
19	102HA10	206	
			92
20	2HA10	835	835
21	17HA10	64	
			44
22	2Dx25	435	
			105 180
23	4HA12	132	
			120
24	24HA6	87	
			80
25	4HA10	110	
			100
26	N'EXISTE PLUS		
27	N'EXISTE PLUS		
*	ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD		
Barre		Lg/Poids	
HA6		20.9/4.7	
HA10		416.3/256.8	
HA12		17.1/15.2	
HA16		13.0/20.5	
HA20		24.4/60.2	
HA25		82.3/317.0	
Dx25		8.7/33.5	

BBNE - 1. avenue de l'horizon - BP 29 59651 Villeneuve d'Ascq

Lg 100

Poutre n010 Niveau n01
FONDATIONS

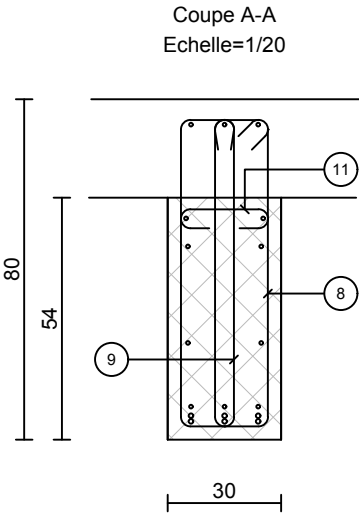
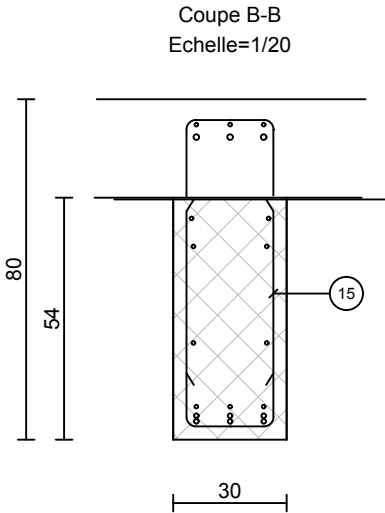
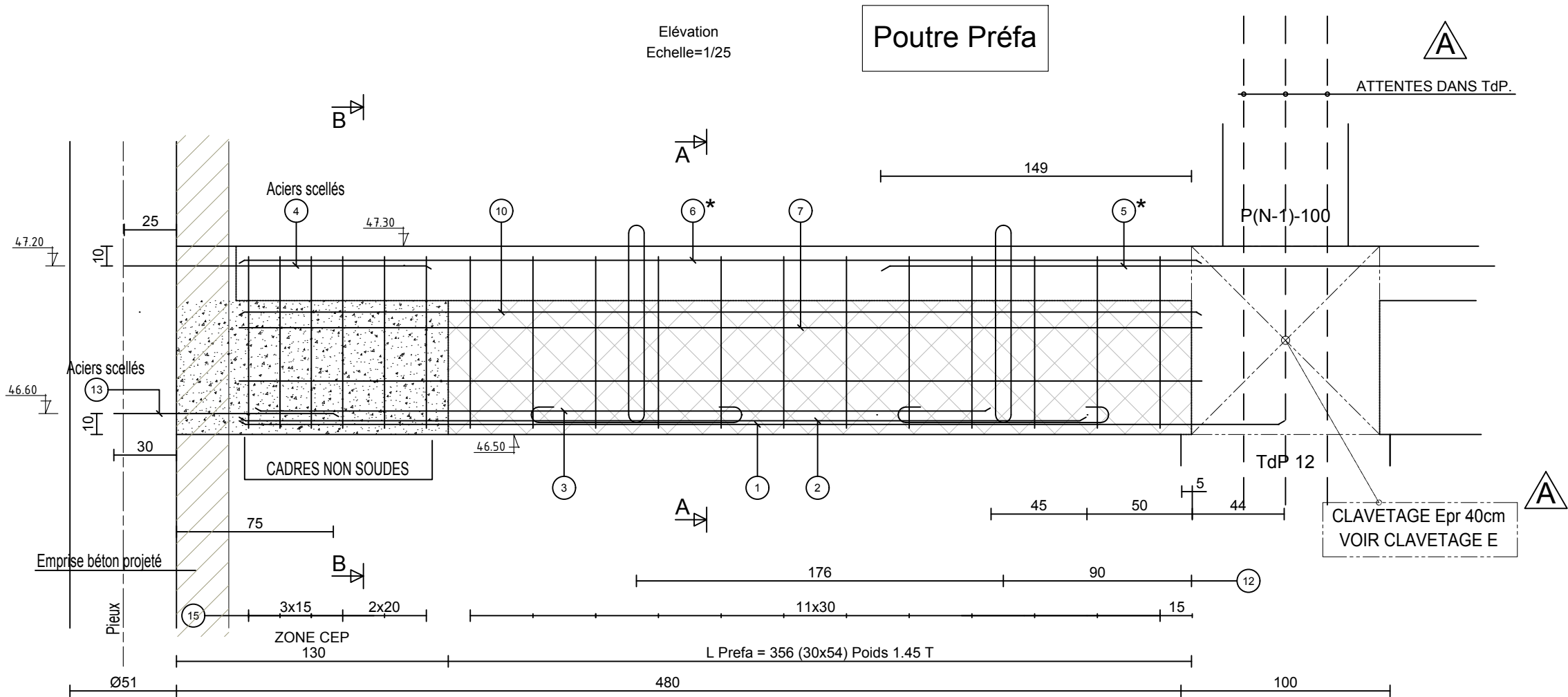
T 1.1

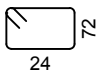
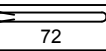
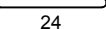
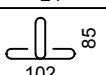

Béton=1.68 m3 (0.96 Préfa)
Acier=135.0 kg d=85.0 kg/m3
Fi=11.0 mm Cof=10.3 m²

Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

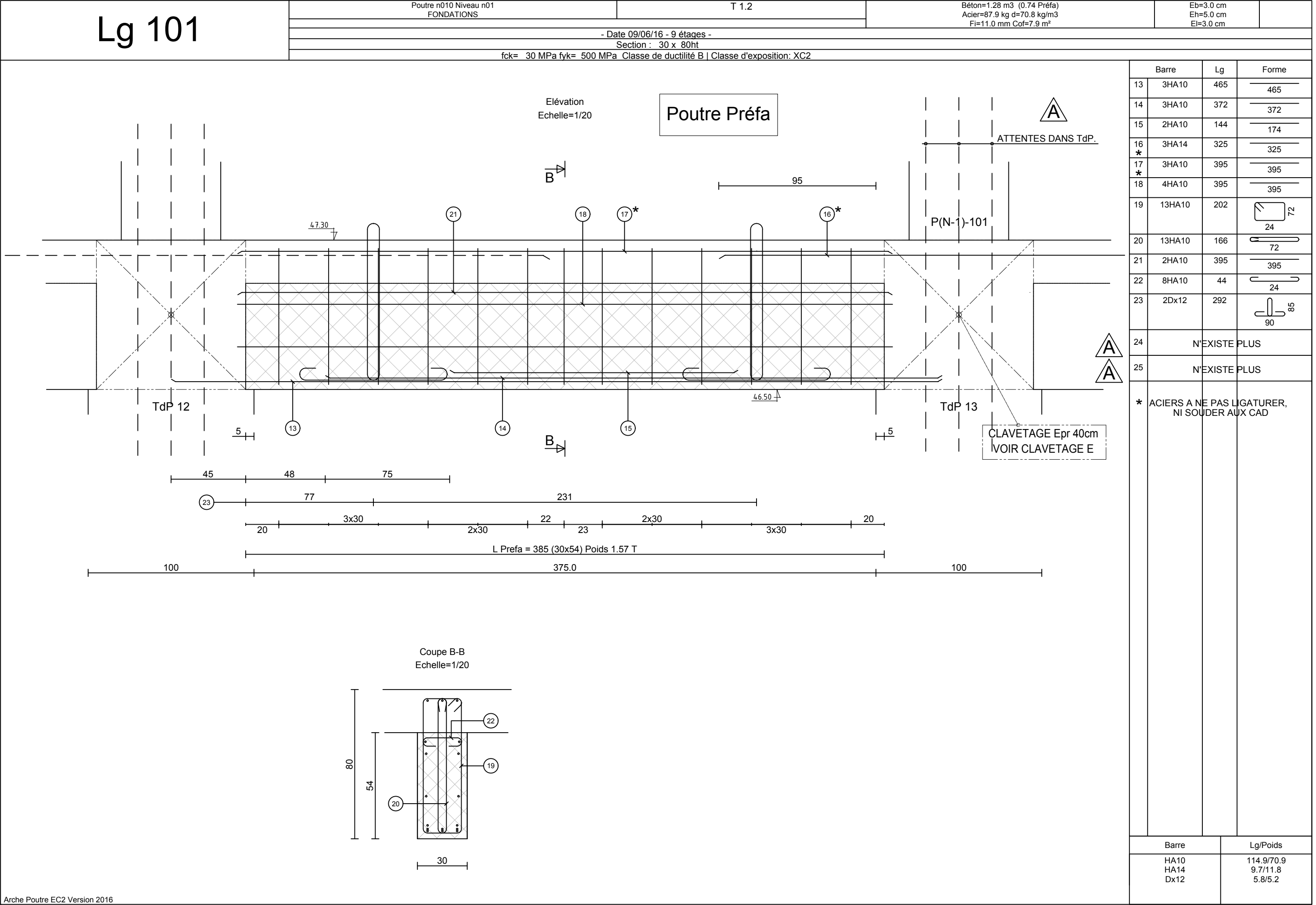
- Date 09/06/16 - 9 étages -
Section : 30 x 80ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2

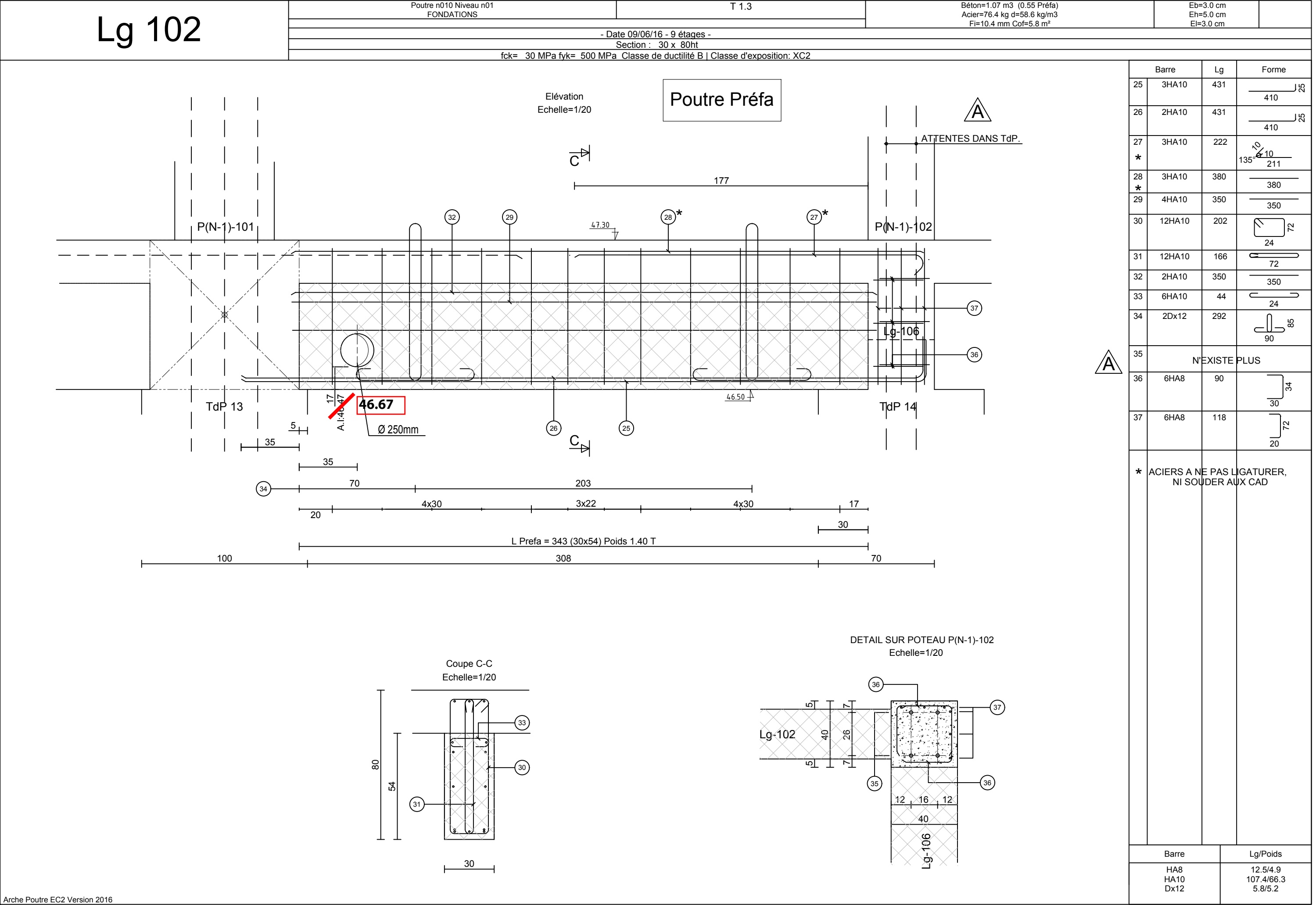


Barre		Lg	Forme
1	3HA12	500	500
2	3HA12	405	405
3	3HA12	352	352
4	3HA12	150	150
5	3HA16	422	422
6*	3HA10	460	460
7	4HA10	460	460
8	12HA10	202	
9	12HA10	166	
10	2HA10	460	460
11	7HA10	44	
12	2Dx14	306	
13	3HA16	105	105
14	N'EXISTE PLUS		
15*	2x6HA10	140	
* ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD			
Barre		Lg/Poids	
HA10		105.5/65.1	
HA12		42.2/37.5	
HA16		15.8/25.0	
Dx14		6.1/7.4	

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BBNE - 1, avenue de l'horizon - BP 29 59651 Villeneuve d'Ascq



Lg 106

Poutre n09 Niveau n01
FONDATIONS

T 3.2

Béton=1.00 m3 (0.37 Préfa)
Acier=99.4 kg d=62.2 kg/m3
Fi=10.6 mm Cof=4.2 m²

Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

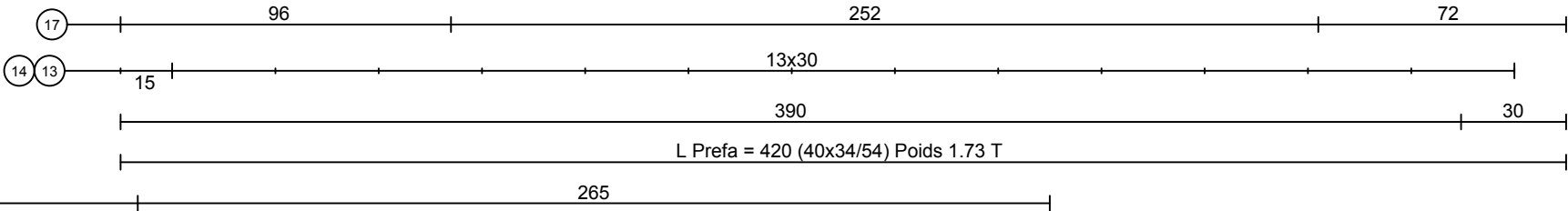
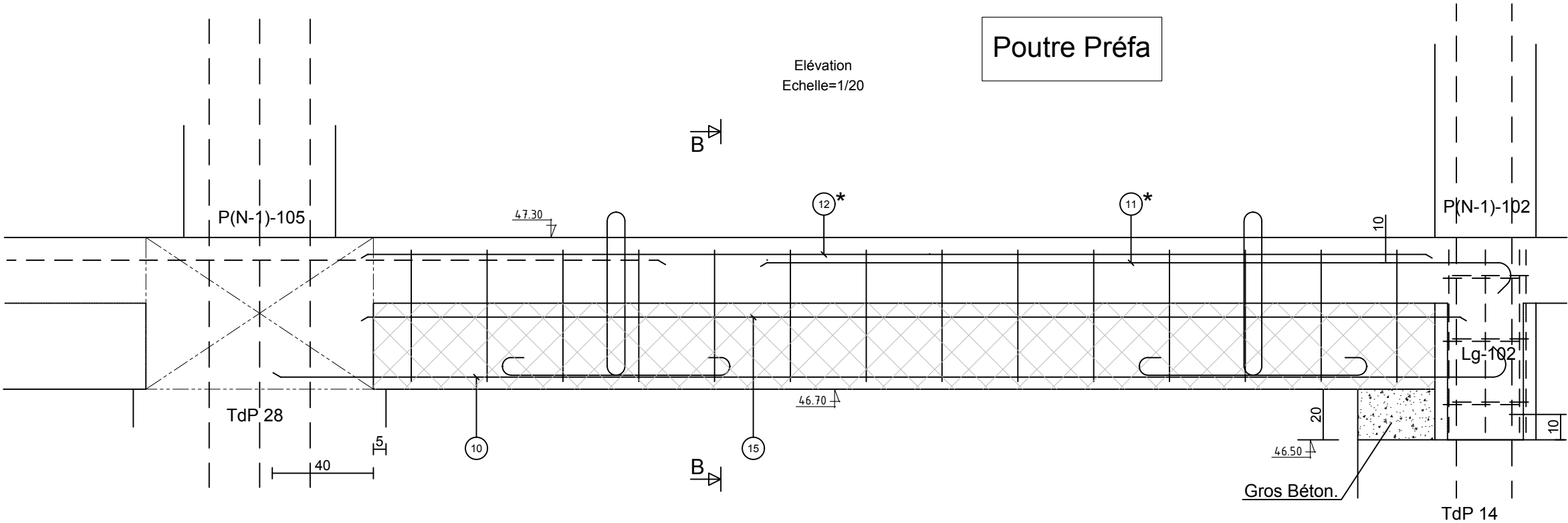
- Date 09/06/16 - 9 étages -

Section : 40 x 60ht

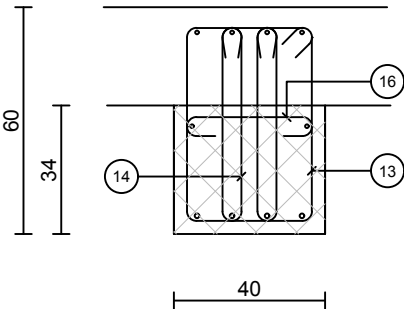
fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2

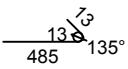
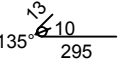
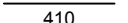
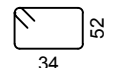
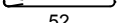
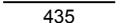
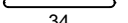
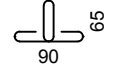
Poutre Préfa

Elévation
Echelle=1/20



Coupe B-B
Echelle=1/20



	Barre	Lg	Forme
10	4HA12	500	
11	4HA12	310	
12	4HA10	410	
13	14HA10	182	
14	28HA10	126	
15	2HA10	435	
16	14HA10	54	
17	2Dx12	252	

* ACIERS A NE PAS LIGATURER,
NI SOUDER AUX CAD

Barre	Lg/Poids
HA10	107.2/66.1
HA12	32.4/28.8
Dx12	5.0/4.5

Lg 107

Poutre n09 Niveau n01
FONDATIONS

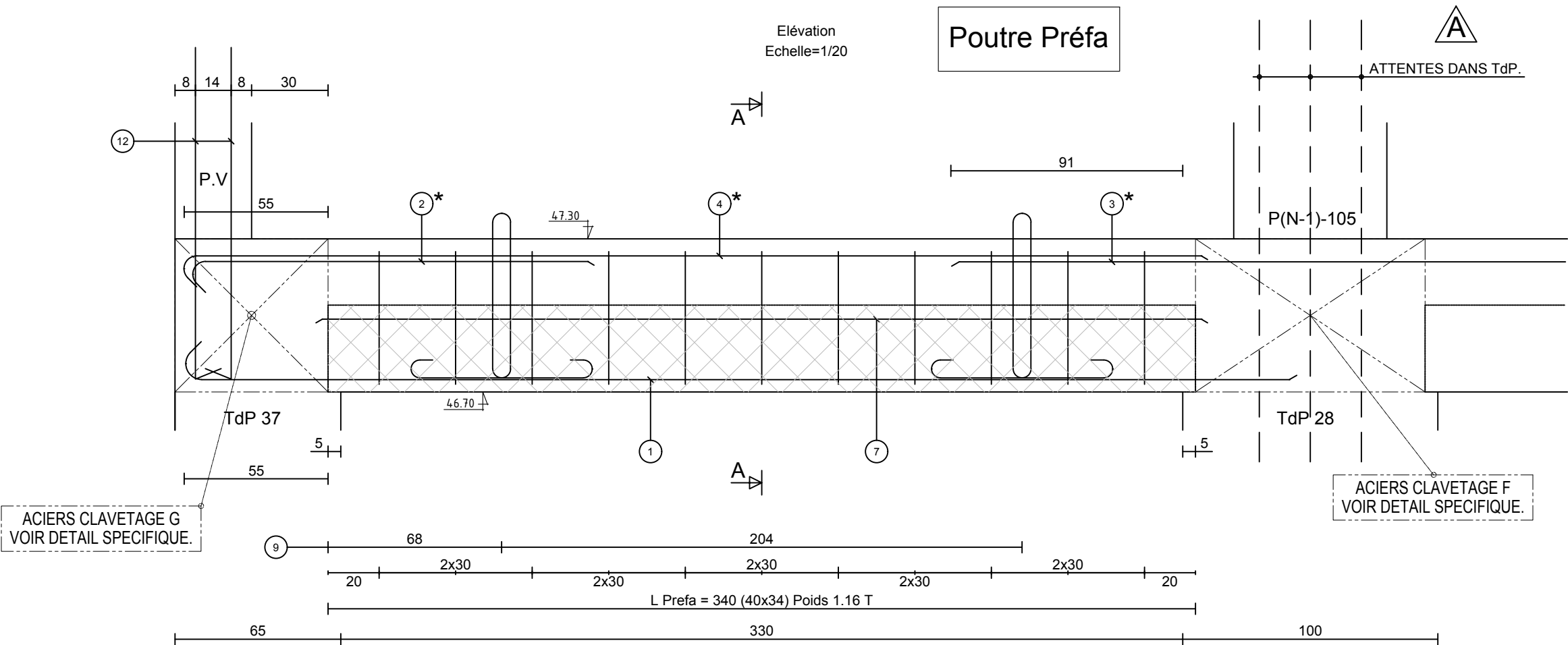
T 3.1

Béton=1.07 m3 (0.46 Préfa)
Acier=89.3 kg d=74.6 kg/m3
Fi=10.6 mm Cof=5.3 m²

Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

- Date 09/06/16 - 9 étages -
Section : 40 x 60ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2



	Barre	Lg	Forme
1	4HA12	450	
2	4HA10	169	
3	4HA12	302	
4	4HA10	413	
5	11HA10	182	
6	22HA10	126	
7	2HA10	350	
8	7HA10	54	
9	2Dx10	232	
10	N'EXISTE PLUS		
11	N'EXISTE PLUS		
12	4HA16	145	
*	ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD		
Barre		Lg/Poids	
HA10		81.8/50.5	
HA12		30.1/26.7	
HA16		5.8/9.2	
Dx10		4.6/2.9	

Lg 104

LG104-105	Poutre n014 Niveau n01 FONDATIONS	T 2.1	Béton=1.21 m3 (0.47 Préfa) Acier=77.5 kg d=60.5 kg/m3 Fi=11.4 mm Cof=6.7 m²	Eb=3.0 cm Eh=5.0 cm El=3.0 cm	
	- Date 09/06/16 - 9 étages -				
	Section : 30 x 80ht				
	fck= 30 MPa fyk= 500 MPa Classe de ductilité B Classe d'exposition: XC2				

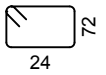
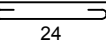
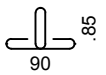
Elévation
Echelle=1/20

A

A

Coupe A-A
Echelle=1/20

Poutre Préfa

Barre		Lg	Forme
1	2HA14	450	450
2	2HA14	355	355
3	2HA12	272	272
4	2HA16	309	309
5	2HA10	545	545
6	4HA10	375	375
7	13HA10	202	 72 24
8	2HA10	375	375
9	6HA10	44	 24
10	2Dx12	292	 85 90

* ACIERS A NE PAS LIGATURER,
NI SOUDER AUX CAD

Barre		Lg/Poids
HA10		62.3/38.4
HA12		5.4/4.8
HA14		16.1/19.4
HA16		6.2/9.7
Dx12		5.8/5.2

Lg 103

Poutre n09 Niveau n01
PH R-1

T 17

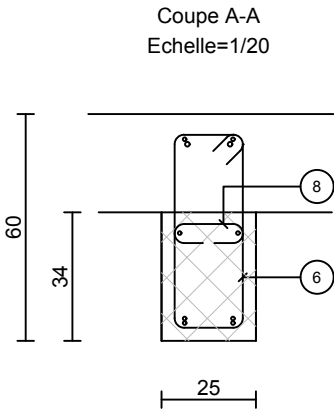
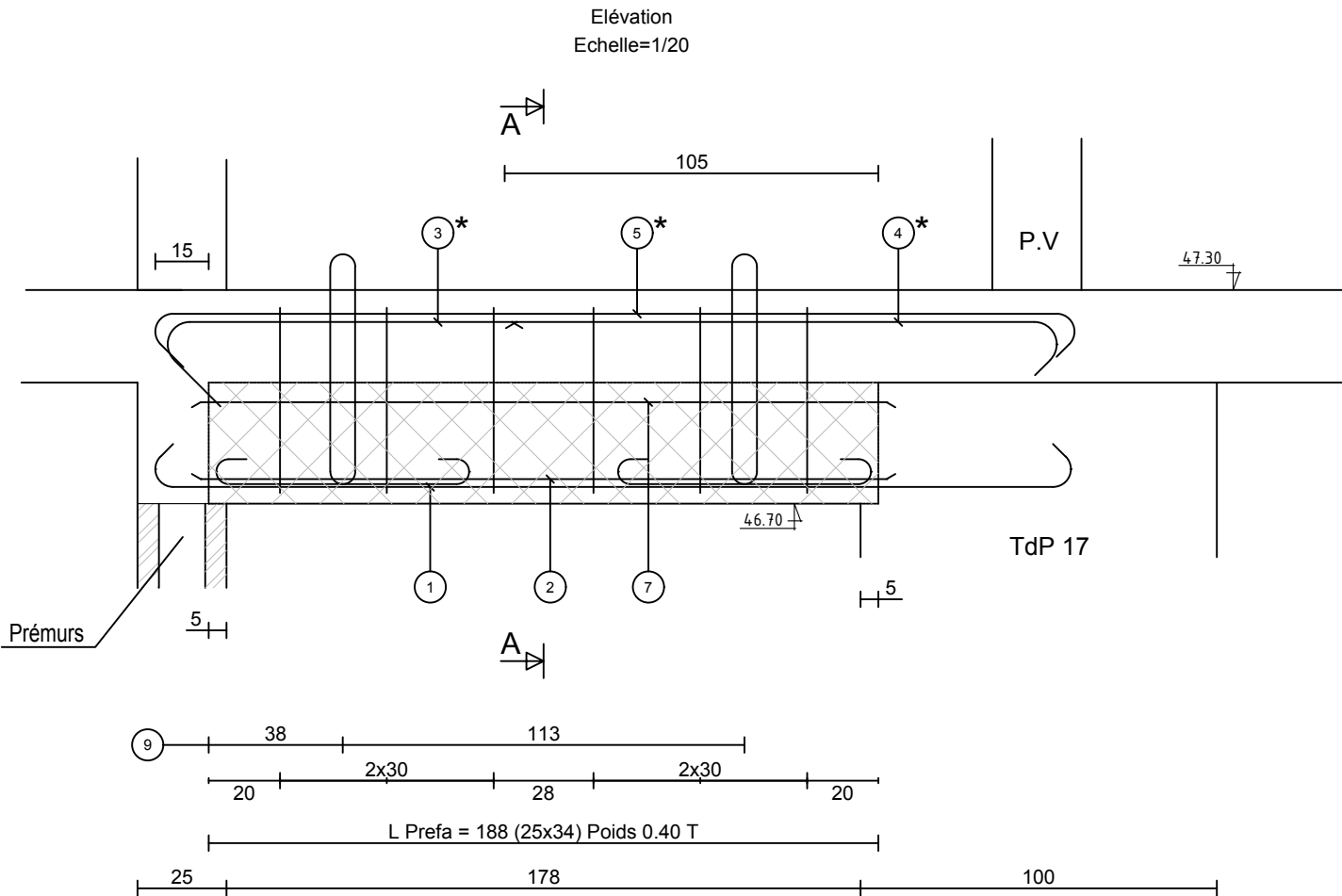
Béton=0.40 m3 (0.16 Préfa)
Acier=26.6 kg d=65.9 kg/m3
Fi=10.3 mm Cof=2.6 m²

Eb=3.0 cm
Eh=5.0 cm
El=3.0 cm

- Date 09/06/16 - 9 étages -

Section : 25 x 60ht

fck= 30 MPa fyk= 500 MPa Classe de ductilité B | Classe d'exposition: XC2



Poutre Préfa

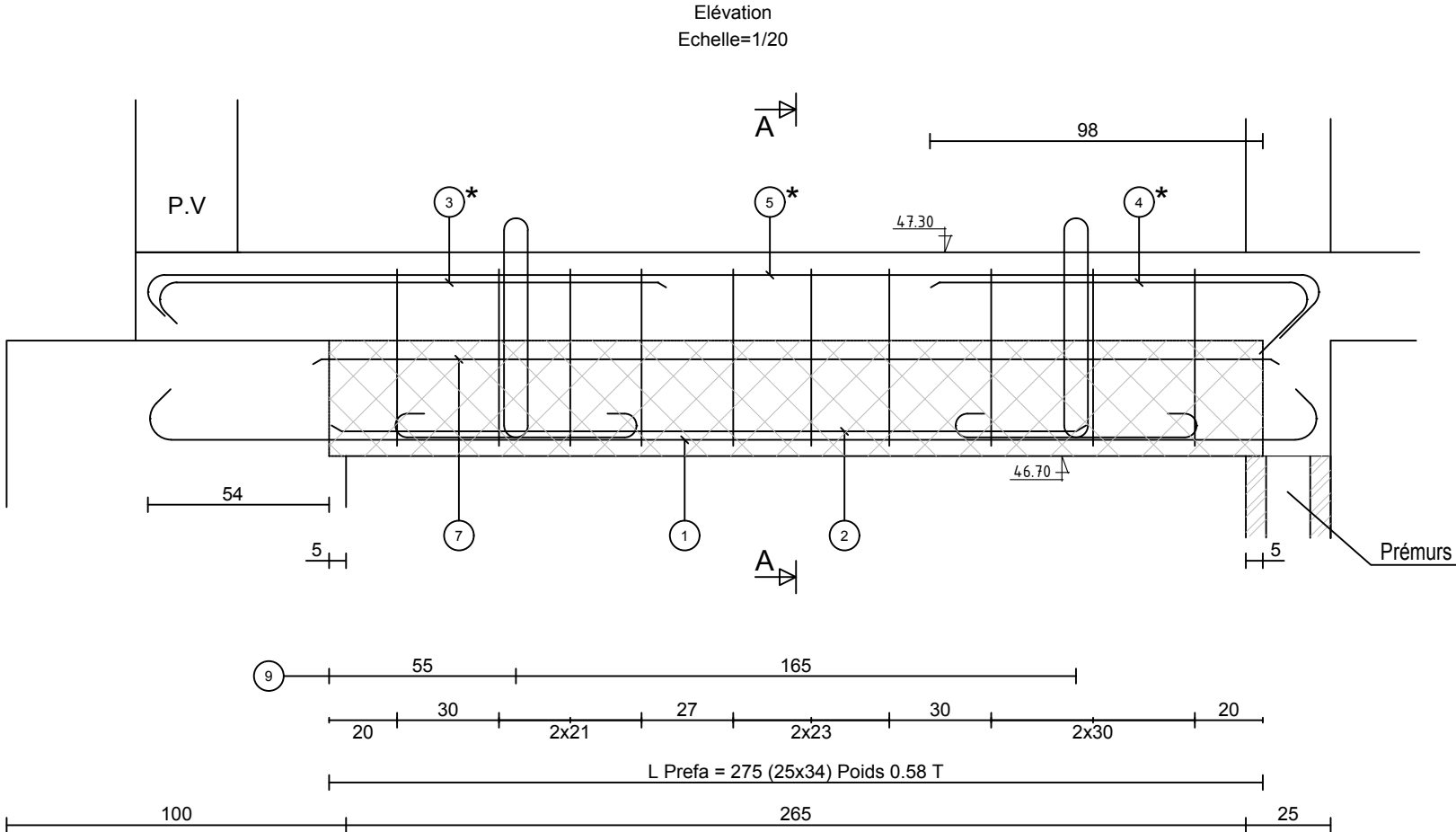
Barre		Lg	Forme
1	2HA10	281	
2	2HA10	198	
3	2HA12	128	
*			
4	2HA12	169	
*			
5	2HA10	286	
*			
6	6HA10	152	
7	2HA10	198	
8	4HA10	39	
9	2Dx10	232	
* ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD			
Barre		Lg/Poids	
HA10		29.9/18.4	
HA12		6.0/5.3	
Dx10		4.7/2.9	

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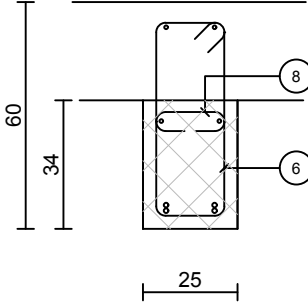
Lg 108

Lg 108	Poutre n09 Niveau n01 FONDATIONS		T 7		Béton=0.53 m3 (0.23 Préfa) Acier=36.1 kg d=67.5 kg/m3 Fi=10.5 mm Cof=3.8 m²		Eb=3.0 cm Eh=5.0 cm El=3.0 cm	
	- Date 09/06/16 - 9 étages -							
	Section : 25 x 60ht							
	fck= 25 MPa fyk= 500 MPa Classe de ductilité B Classe d'exposition: XC2							

Elévation
Echelle=1/20



Coupe A-A
Echelle=1/20



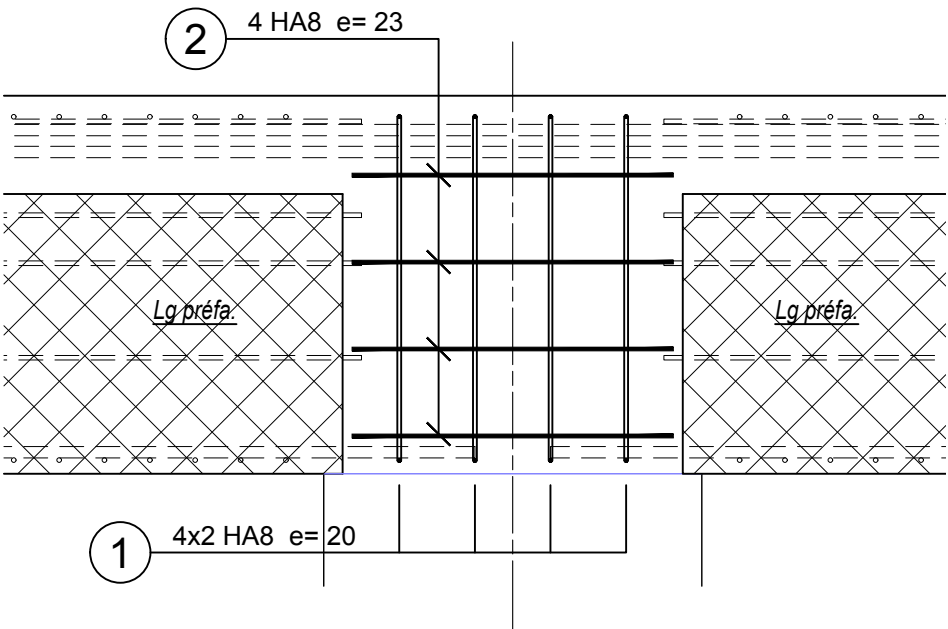
Poutre Préfa

	Barre	Lg	Forme
1	2HA12	373	
2	2HA12	223	
3	2HA10	161	
*			
4	2HA10	135	
*			
5	2HA10	378	
*			
6	10HA10	152	
7	2HA10	285	
8	6HA10	39	
9	2Dx10	232	
*	ACIERS A NE PAS LIGATURER, NI SOUDER AUX CAD		

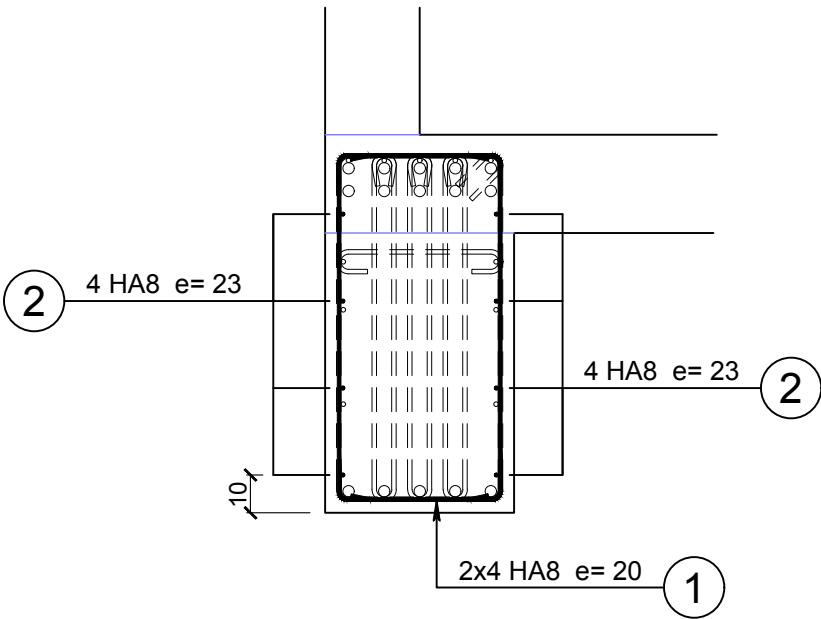
DETAIL CLAVETAGE A

Ech. 1/20

Pour TdP-02 à 06



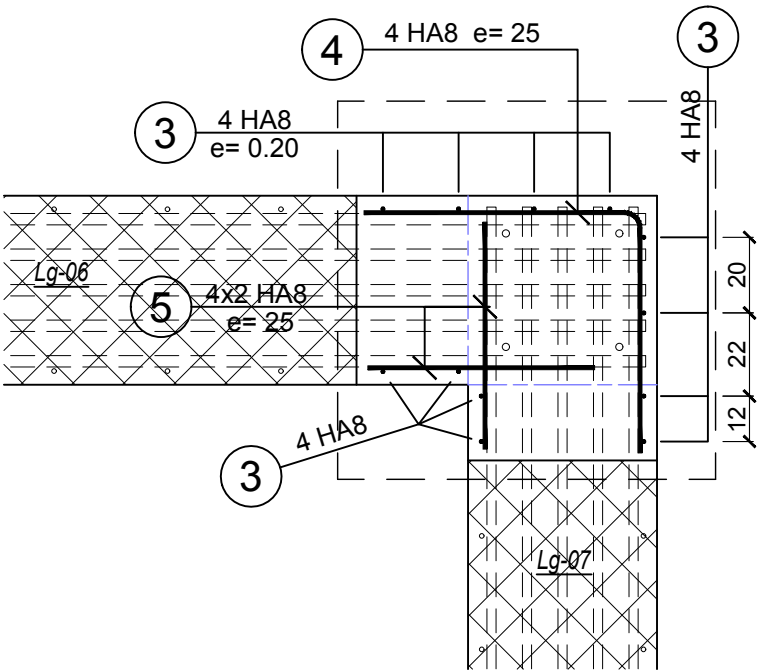
COUPE



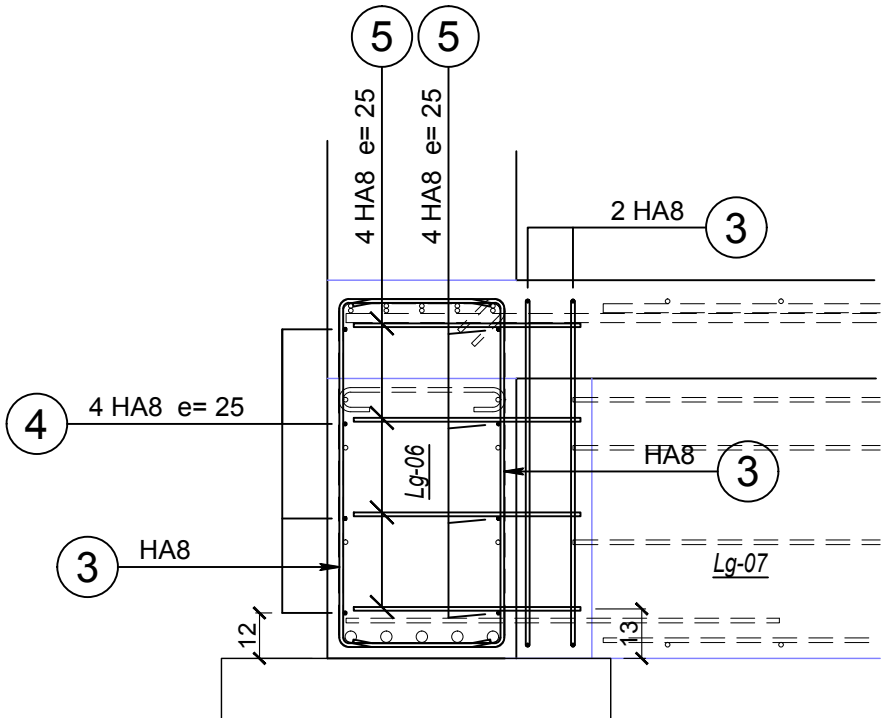
DETAIL CLAVETAGE B

Ech. 1/20

Pour TdP-07



COUPE

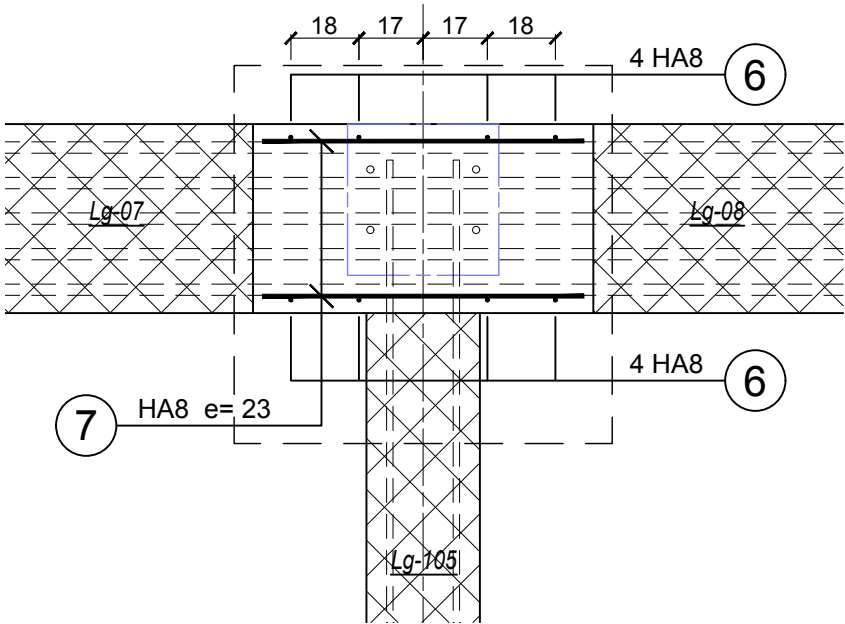


BBNE - 1, avenue de l'horizon - BP 29 59651 Villeneuve d'Ascq

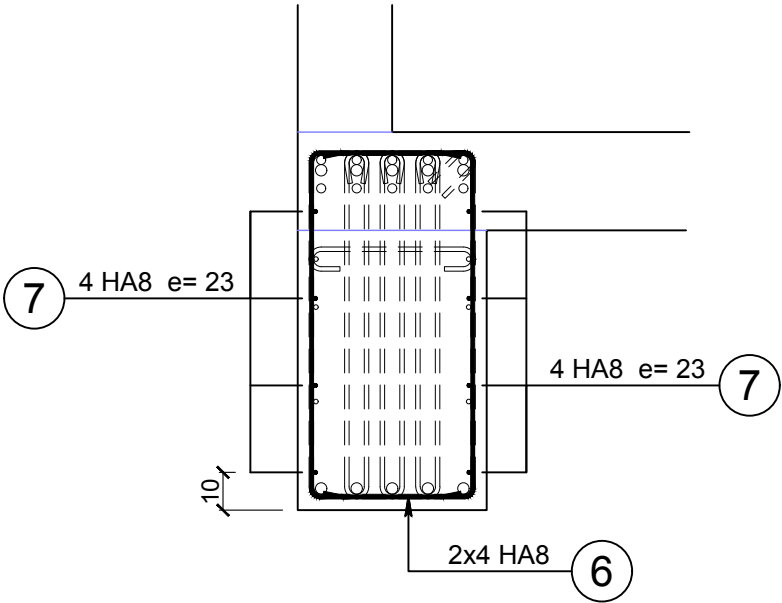
DETAIL CLAVETAGE C

Ech. 1/20

Pour TdP-20



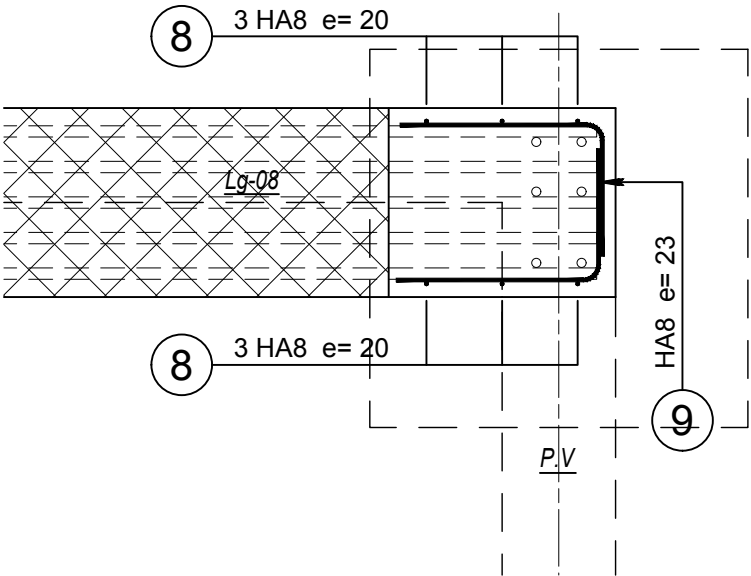
COUPE



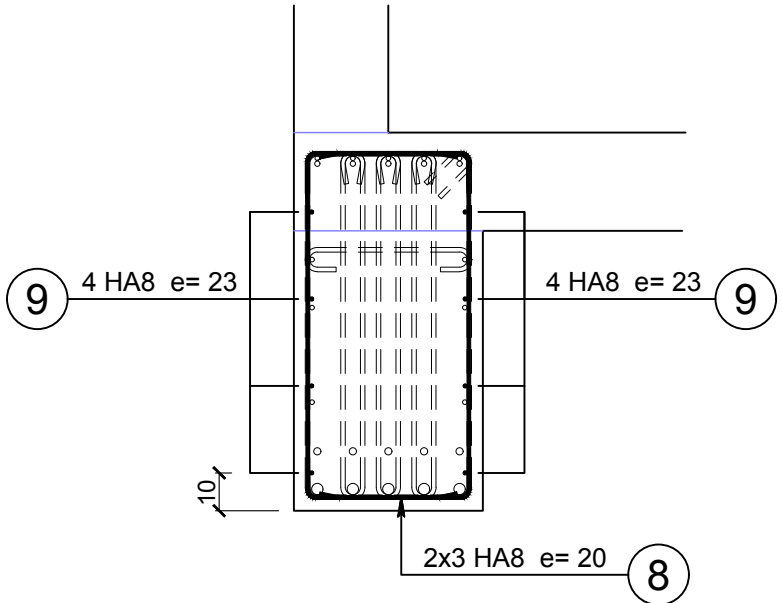
DETAIL CLAVETAGE D

Ech. 1/20

Pour TdP-42



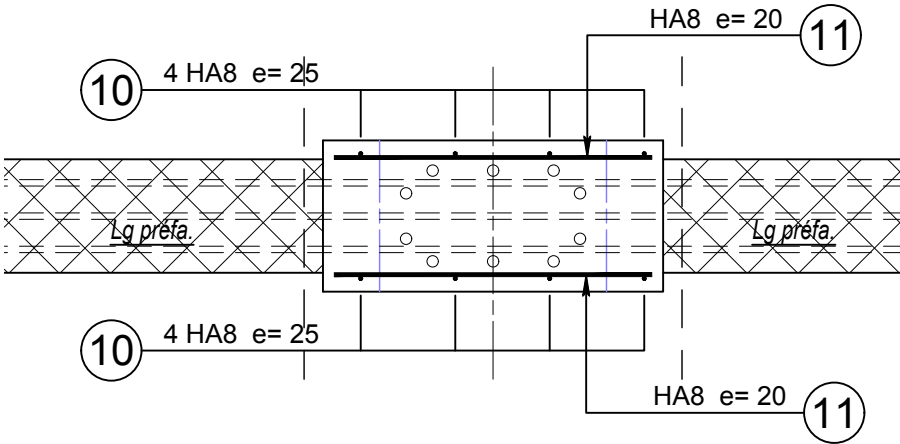
COUPE



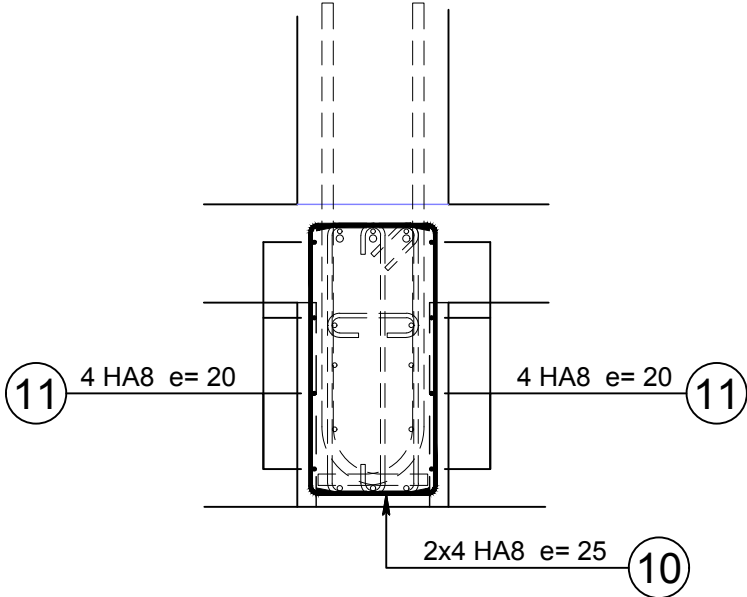
DETAIL CLAVETAGE E

Ech. 1/20

Pour TdP-12 & 13 & 19



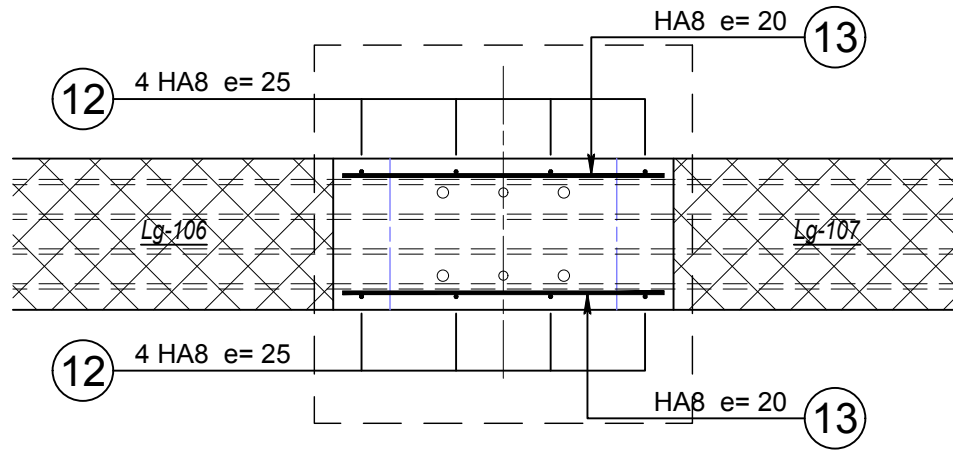
COUPE



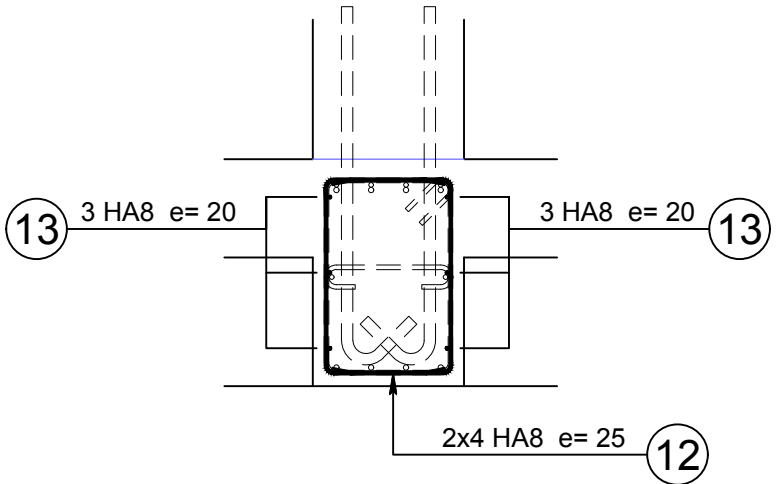
DETAIL CLAVETAGE F

Ech. 1/20

Pour TdP-28



COUPE

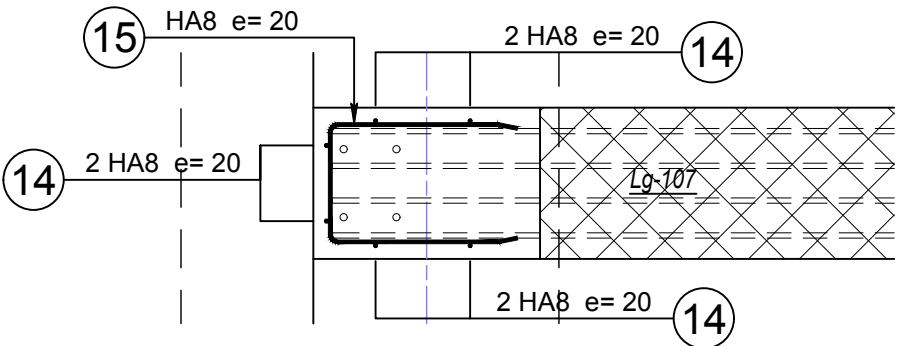


BBNE - 1, avenue de l'horizon - BP 29 59651 Villeneuve d'Ascq

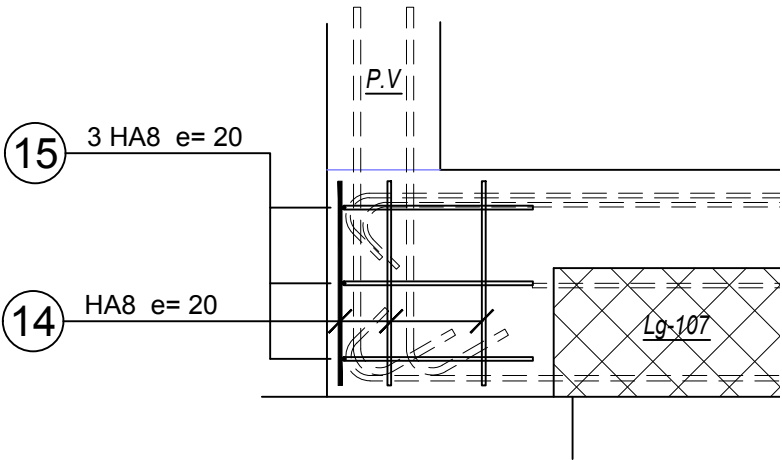
DETAIL CLAVETAGE G

Ech. 1/20

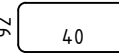
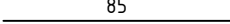
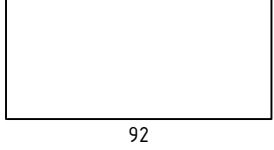
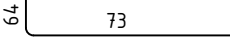
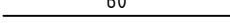
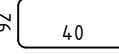
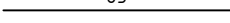
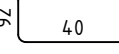
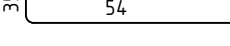

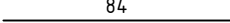
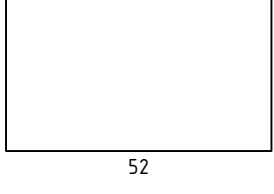
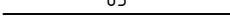
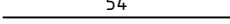
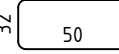
Pour TdP-37



ELEVATION



Nomenclature générale des aciers .

N°	TYPE	Ø	Nombre			Esp	Long. Unitaire	Façonnage	Mandrin (cm)	Long. TOTALE	Indice
			Par Elément	d'éléments	Total						
1	HA	8	8	5	40	20	168		3.0	6720	
2	HA	8	8	5	40	23	85			3400	
3	HA	8	12	1	12		168		3.0	2016	
4	HA	8	4	1	4	25	135		7.0	540	
5	HA	8	8	1	8	25	60			480	
6	HA	8	8	1	8		168		3.0	1344	
7	HA	8	8	1	8	23	85			680	
8	HA	8	6	1	6	20	168		3.0	1008	
9	HA	8	8	1	8	23	86		7.0	688	
10	HA	8	8	3	24	25	132		3.0	3168	
11	HA	8	8	3	24	20	84			2016	
12	HA	8	8	1	8	25	112		3.0	896	
13	HA	8	6	1	6	20	85			510	
14	HA	8	6	1	6	20	54			324	
15	HA	8	3	1	3	20	128		3.0	384	

★ : LONGUEUR MOYENNE

Diamètre moyen : 8.0

RECAPITULATIF DES ACIERS

DIAMETRE	HA6	HA8	HA10	HA12	HA14	HA16	HA20	HA25	HA32	HA40	HA-	D.MOY(mm)
MASSE (kg/ml)	0.222	0.395	0.617	0.888	1.208	1.578	2.466	3.854	6.313	9.864	-	8.00
LONG. (m)	-	241.7	-	-	-	-	-	-	-	-	-	TOTAL(kg)
MASSE (Kg)	-	95.5	-	-	-	-	-	-	-	-	-	95.5

Diamètre moyen : 8.0 mm

Masse totale : 95.5 kg