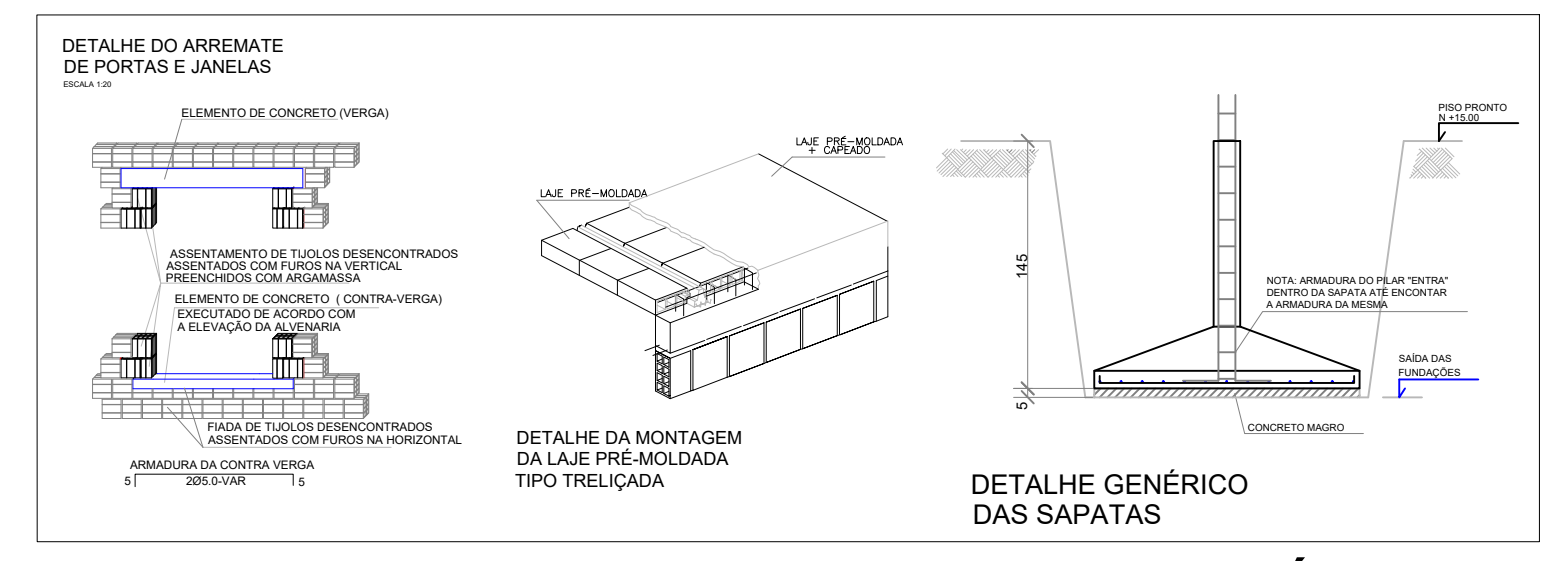
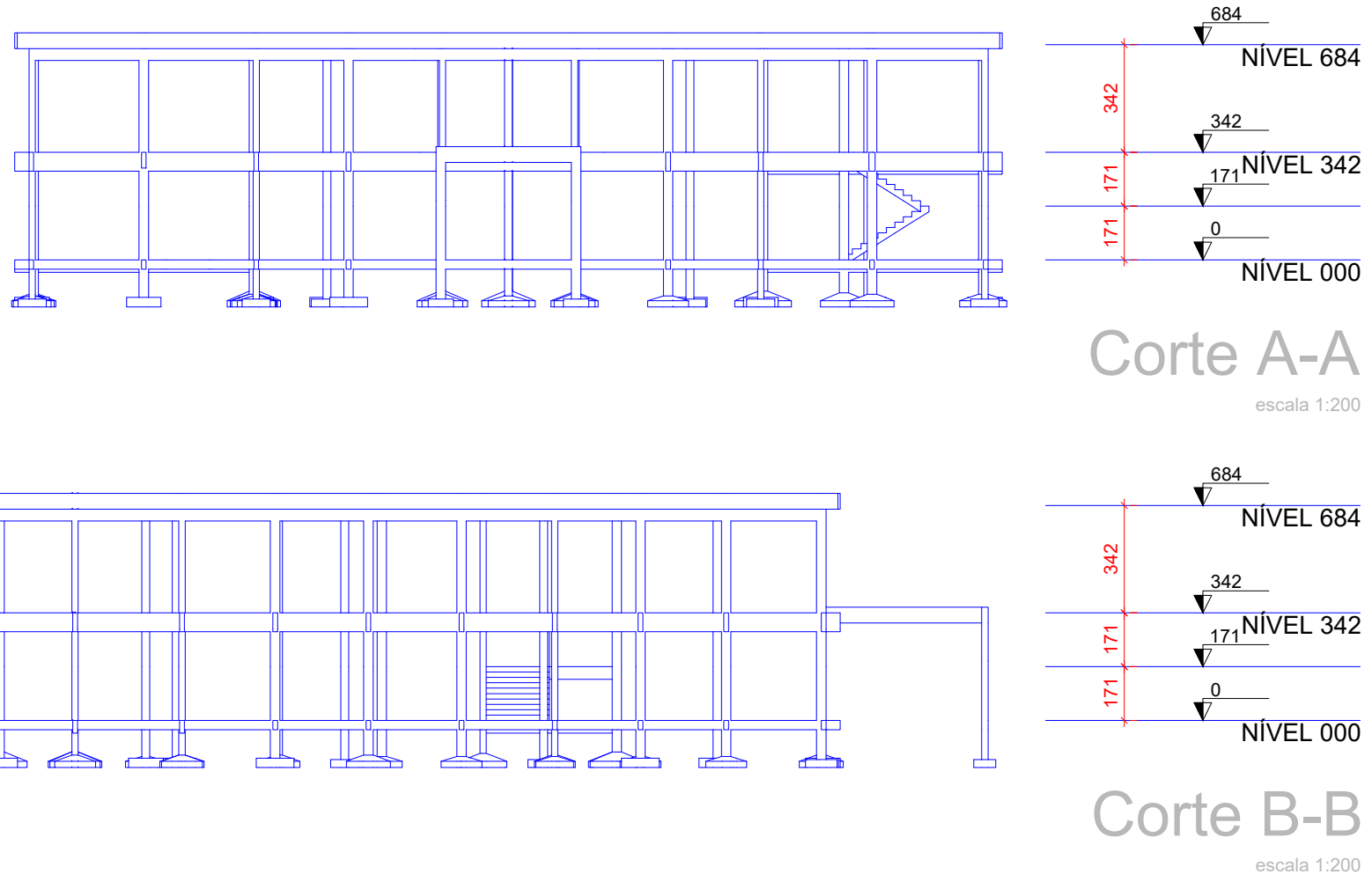


Nome	Seção (cm)	X (cm)	Y (cm)	Pilar	Posição	Carga Máx. (tf)	Carga Mín. (tf)
P1	20x30	55.00	3130.00	A-1	A-1	15.1	13.8
P2	20x30	767.50	3130.00	A-3	A-3	24.0	21.8
P3	25x25	992.50	3132.50	A-4	A-4	14.7	12.8
P4	25x25	1569.70	3132.50	A-6	A-6	24.9	22.2
P5	25x25	2146.50	3132.50	A-8	A-8	17.9	15.7
P6	20x30	2371.50	3130.00	A-9	A-9	14.5	13.5
P7	20x30	2714.00	3135.00	A-10	A-10	15.7	14.4
P8	20x30	3084.00	3130.00	A-11	A-11	9.4	8.4
P9	20x30	2371.50	2854.45	B-9	B-9	16.0	13.4
P10	20x30	3084.00	2854.45	B-11	B-11	25.4	23.1
P11	20x30	55.00	2785.00	B-1	B-1	24.5	21.5
P12	20x30	760.00	2785.00	B-3	B-3	16.8	13.2
P13	25x25	992.50	2670.00	C-4	C-4	14.9	10.8
P14	25x25	1569.65	2670.00	C-6	C-6	46.4	39.5
P15	25x25	2146.50	2670.00	C-8	C-8	14.8	10.7
P16	20x30	60.00	2432.50	D-1	D-1	25.6	23.0
P17	20x30	760.00	2432.50	D-3	D-3	39.8	36.0
P18	20x30	2379.00	2432.40	D-9	D-9	45.2	40.6
P19	20x30	3079.00	2432.40	D-11	D-11	28.6	26.3
P20	25x25	992.50	2207.50	E-4	E-4	17.9	15.6
P21	25x25	1569.50	2207.50	E-6	E-6	17.9	15.3
P22	25x25	2146.50	2207.50	E-8	E-8	17.7	15.5
P23	20x30	60.00	2092.50	F-1	F-1	26.3	23.3
P24	20x30	760.00	2092.50	F-3	F-3	25.4	21.8
P25	20x30	2371.50	2108.70	F-9	F-9	15.2	12.7
P26	20x30	3084.00	2108.70	F-11	F-11	15.0	14.3
P27	20x30	55.00	1796.25	G-1	G-1	16.7	14.9
P28	20x30	767.50	1796.25	G-3	G-3	18.2	15.8
P29	20x30	2379.00	1783.00	G-9	G-9	28.5	24.7
P30	20x30	3079.00	1783.00	G-11	G-11	26.7	23.8
P31	25x25	992.50	1575.00	H-1	H-1	10.6	8.9
P32	25x25	2146.50	1575.00	H-8	H-8	10.5	8.9
P33	20x30	55.00	1500.00	I-1	I-1	21.8	19.2
P34	20x30	767.50	1500.00	I-3	I-3	22.7	19.4
P35	20x30	2371.50	1457.50	I-9	I-9	20.5	17.3
P36	20x30	3084.00	1457.50	I-11	I-11	20.1	17.6
P37	20x30	55.00	1203.70	J-1	J-1	17.5	15.4
P38	20x30	767.50	1203.70	J-3	J-3	18.5	15.8
P39	20x30	2379.00	1135.00	J-9	J-9	17.1	15.0
P40	15x30	2636.00	1132.50	J-10	J-10	27.0	23.3
P41	20x30	3079.00	1135.00	J-11	J-11	18.2	17.0
P42	20x30	60.00	907.50	K-1	K-1	23.5	20.9
P43	20x30	760.00	907.50	K-3	K-3	27.8	24.0
P44	25x25	992.50	942.50	K-4	K-4	12.3	10.3
P45	25x25	1357.00	942.50	K-5	K-5	4.4	3.8
P46	25x25	1782.00	942.50	K-7	K-7	3.9	3.4
P47	25x25	2146.50	942.50	K-8	K-8	13.3	11.1
P48	20x30	1359.50	710.00	L-5	L-5	41.9	35.9
P49	20x30	1779.50	710.00	L-7	L-7	39.7	34.0
P50	20x30	2379.00	715.00	L-9	L-9	28.0	24.3
P51	15x30	2636.00	717.50	L-10	L-10	29.2	24.7
P52	20x30	3079.00	715.00	L-11	L-11	20.1	18.6
P53	20x30	55.00	635.00	L-1	L-1	15.9	14.0
P54	20x30	767.50	635.00	L-3	L-3	22.3	19.2
P55	20x30	55.00	382.50	M-1	M-1	21.3	18.8
P56	20x30	767.50	382.50	M-3	M-3	21.8	18.6
P57	20x30	2371.50	388.75	M-9	M-9	16.9	14.8
P58	20x30	3084.00	388.75	M-11	M-11	12.5	11.3
P59	20x30	55.00	60.00	N-1	N-1	10.5	9.8
P60	20x30	410.00	55.00	N-2	N-2	15.6	14.4
P61	20x30	767.50	60.00	N-3	N-3	14.0	12.9
P62	20x30	1061.00	55.00	N-4	N-4	17.3	15.1
P63	20x30	1359.50	60.00	N-5	N-5	27.3	24.3
P64	20x30	1779.50	60.00	N-7	N-7	27.3	24.4
P65	20x30	2077.00	55.00	N-8	N-8	16.9	14.8
P66	20x30	2371.50	60.00	N-9	N-9	13.8	12.7
P67	20x30	2725.25	55.00	N-10	N-10	22.8	20.2
P68	20x30	3084.00	60.00	N-11	N-11	11.3	10.5
P69	20x30	1354.50	-460.00	O-5	O-5	4.1	3.8
P70	20x30	1784.50	-460.00	O-7	O-7	4.1	3.8

Coordenadas (cm)		Nome	
55.00	P11, P27, P33, P37, P53, P55, P59	3135.00	P7
60.00	P16, P23, P42	3132.50	P3, P4, P5
410.00	P60	3130.00	P1, P2, P6, P8
760.00	P12, P17, P24, P43	2854.45	P9, P10
767.50	P2, P26, P34, P38, P54, P56, P61	2785.00	P11, P12
992.50	P3, P13, P20, P31, P44	2670.00	P13, P14, P15
1061.00	P82	2432.50	P16, P17
1354.50	P69	2432.40	P18, P19
1357.00	P45	2207.50	P20, P21, P22
1359.50	P48, P63	2108.70	P25, P26
1569.50	P70	2092.50	P23, P24
1569.65	P14	1796.25	P27, P28
1569.70	P4	1783.00	P29, P30
1779.50	P49, P64	1575.00	P31, P32
1782.00	P46	1500.00	P33, P34
1784.50	P70	1457.50	P35, P36
2077.00	P65	1203.70	P37, P38
2146.50	P5, P15, P22, P32, P47	1135.00	P39, P41
2371.50	P6, P9, P25, P35, P57, P66	1132.50	P40
2379.00	P18, P29, P39, P50	942.50	P45, P46, P47
2636.00	P40, P51	907.50	P42, P43
2714.00	P7	717.50	P51
2725.25	P67	715.00	P50, P52
3079.00	P19, P30, P41, P52	710.00	P48, P49
3084.00	P8, P10, P26, P36, P58, P68	635.00	P53, P54
		388.75	P57, P58
		382.50	P55, P56
		60.00	P59, P61, P63, P64, P66, P68
		55.00	P60, P62, P65, P67
		-460.00	P69, P70



### DETALHES GÊNÉRICOS



PROPRIETÁRIO: \_\_\_\_\_

CALCULO: \_\_\_\_\_

CONSTRUÇÃO: \_\_\_\_\_

CREA: \_\_\_\_\_

APROVO PM - \_\_\_\_\_

Nº	DATA	REVISÃO	DESENHO	APROVAÇÃO
02				
01				

PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO

CLIENTE: MUNICÍPIO DE MARCO

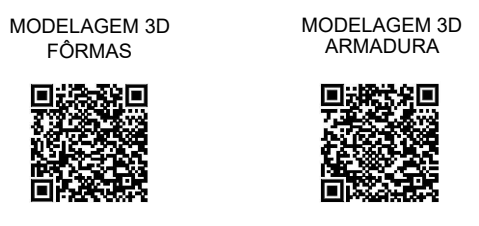
LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO:

- Planta de Locação
- Detalhamento das Sapatas

ESCALA: \_\_\_\_\_ DESENHO: SEINFRA PRANCHA: \_\_\_\_\_

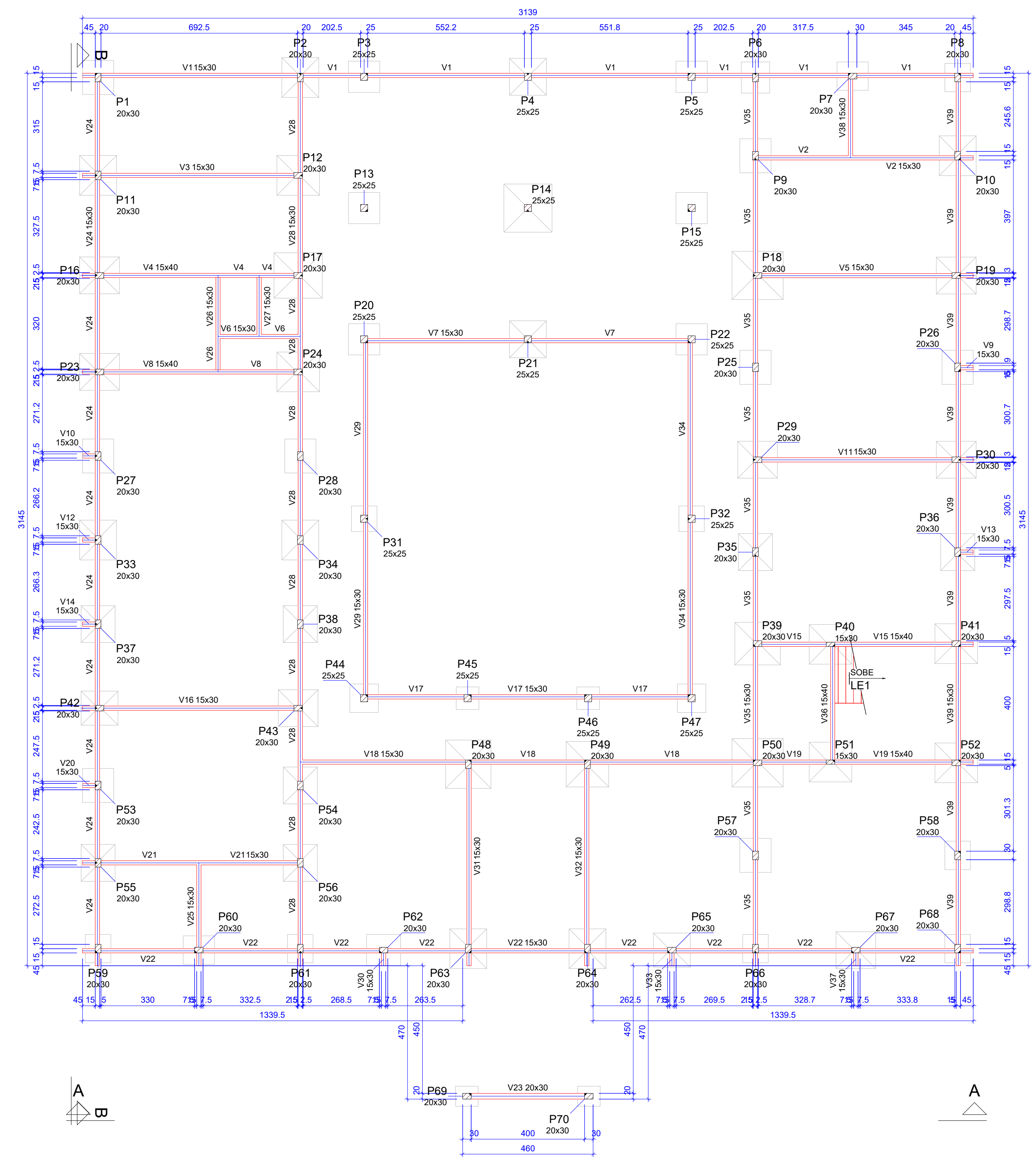
INDICADA: \_\_\_\_\_ DATA: 01/15 AGOSTO/2023



### Planta de locação

escala 1:75





Vigas			
Nome	Seção (cm)	Elevação (cm)	Nível (cm)
V1	15x30	0	0
V2	15x30	0	0
V3	15x30	0	0
V4	15x40	0	0
V5	15x30	0	0
V6	15x30	0	0
V7	15x30	0	0
V8	15x40	0	0
V9	15x30	0	0
V10	15x30	0	0
V11	15x30	0	0
V12	15x30	0	0
V13	15x30	0	0
V14	15x30	0	0
V15	15x40	0	0
V16	15x30	0	0
V17	15x30	0	0
V18	15x30	0	0
V19	15x40	0	0
V20	15x30	0	0
V21	15x30	0	0
V22	15x30	0	0
V23	20x30	0	0
V24	15x30	0	0
V25	15x30	0	0
V26	15x30	0	0
V27	15x30	0	0
V28	15x30	0	0
V29	15x30	0	0
V30	15x30	0	0
V31	15x30	0	0
V32	15x30	0	0
V33	15x30	0	0
V34	15x30	0	0
V35	15x30	0	0
V36	15x40	0	0
V37	15x30	0	0
V38	15x30	0	0
V39	15x30	0	0

Pilares			
Nome	Seção (cm)	Elevação (cm)	Nível (cm)
P1	20x30	0	0
P2	20x30	0	0
P3	25x25	0	0
P4	25x25	0	0
P5	25x25	0	0
P6	20x30	0	0
P7	20x30	0	0
P8	20x30	0	0
P9	20x30	0	0
P10	20x30	0	0
P11	20x30	0	0
P12	20x30	0	0
P13	25x25	0	0
P14	25x25	0	0
P15	25x25	0	0
P16	20x30	0	0
P17	20x30	0	0
P18	20x30	0	0
P19	20x30	0	0
P20	25x25	0	0
P21	15x30	0	0
P22	25x25	0	0
P23	20x30	0	0
P24	20x30	0	0
P25	20x30	0	0
P26	20x30	0	0
P27	20x30	0	0
P28	20x30	0	0
P29	20x30	0	0
P30	20x30	0	0
P31	25x25	0	0
P32	25x25	0	0
P33	20x30	0	0
P34	20x30	0	0
P35	20x30	0	0
P36	20x30	0	0
P37	20x30	0	0
P38	20x30	0	0
P39	20x30	0	0
P40	15x30	0	0
P41	20x30	0	0
P42	20x30	0	0
P43	20x30	0	0
P44	25x25	0	0
P45	25x25	0	0
P46	25x25	0	0
P47	25x25	0	0
P48	20x30	0	0
P49	20x30	0	0
P50	20x30	0	0
P51	15x30	0	0
P52	20x30	0	0
P53	20x30	0	0
P54	20x30	0	0
P55	20x30	0	0
P56	20x30	0	0
P57	20x30	0	0
P58	20x30	0	0
P59	20x30	0	0
P60	20x30	0	0
P61	20x30	0	0
P62	20x30	0	0
P63	20x30	0	0
P64	20x30	0	0
P65	20x30	0	0
P66	20x30	0	0
P67	20x30	0	0
P68	20x30	0	0
P69	20x30	0	0
P70	20x30	0	0

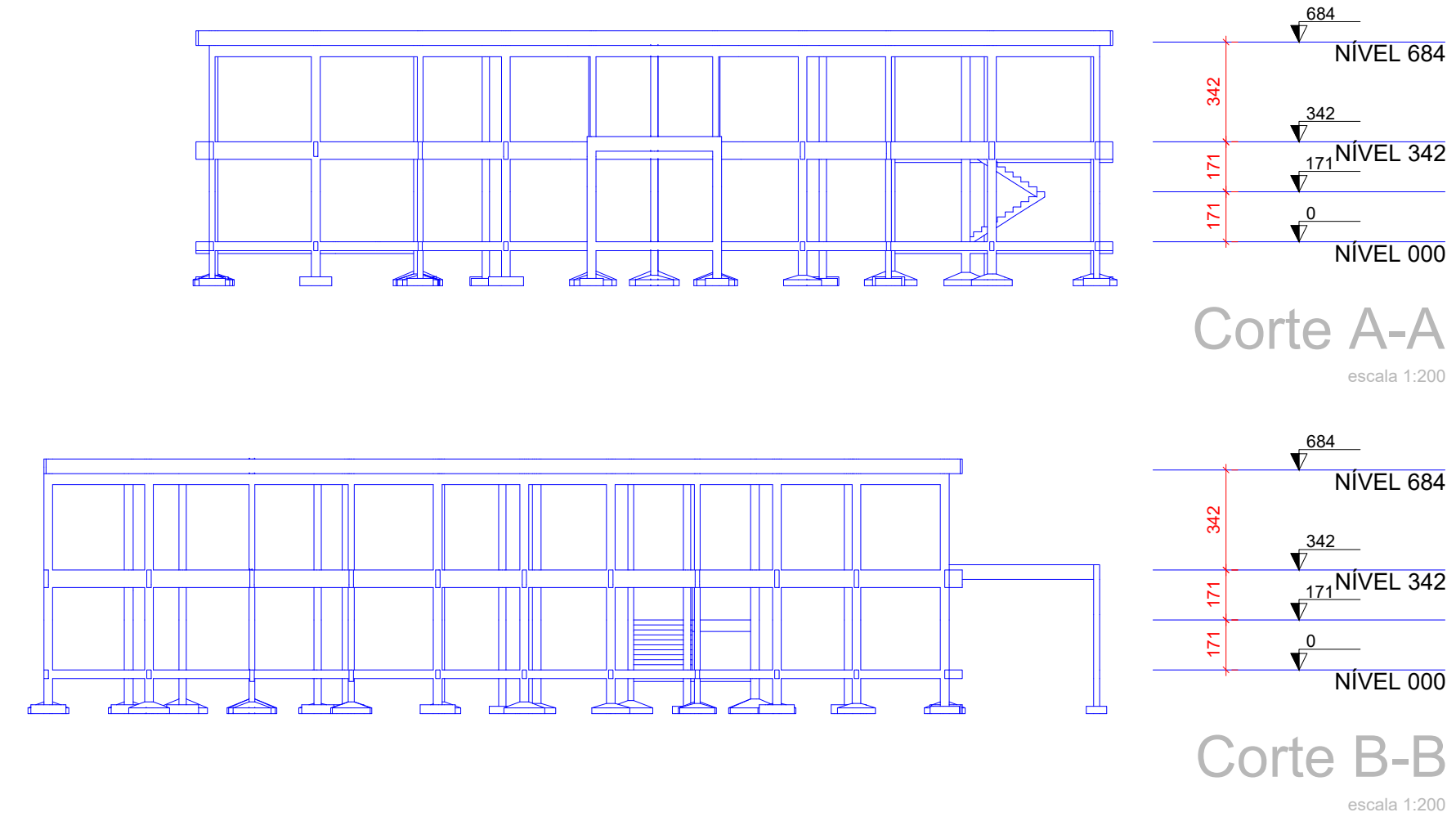
Características dos materiais  
fck (kgf/cm²)  
300

**Legenda dos pilares**

Pilar que passa

**Legenda das vigas e paredes**


Viga



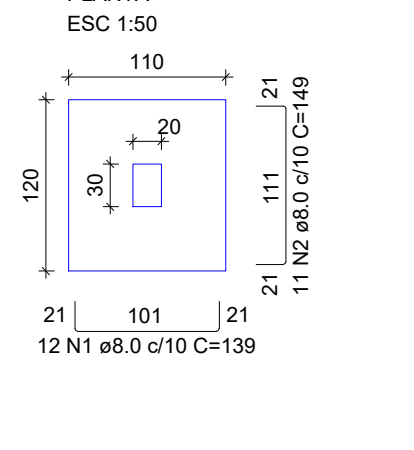
**Forma do pavimento NÍVEL 000 (Nível 0)**  
escala 1:100

COR	ESP. PENNA
01	0.70
02	0.50
03	0.30
04	0.40
05	0.70
06	0.20
07	0.20
08	0.08
09	0.10
10	1.00
11	1.00
12	1.00
13	1.00



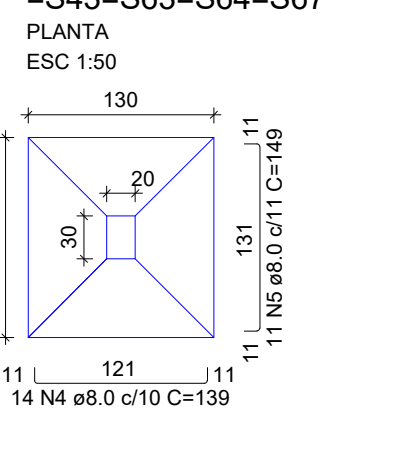
PROPRIETÁRIO	
CALCULO	CREA
CONSTRUÇÃO	
APROVO PM -	
02	
01	
Nº	DATA
REVISÃO	
DESENHO	
APROVAÇÃO	
PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO	
CLIENTE: MUNICÍPIO DE MARCO	
LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE	
CONTEÚDO: 1 Forma do pavimento Nível 000	
 AV. PREFEITO GUIDO OSTENHO, S/N CENTRO - MARCO - CE - 82500-000 FONE: 3661-1210 / 3634-1415 WWW.MARCO.CE.GOV.BR CNPJ: 07.546.318/0001-47	
ESCALA:	DESENHO: SEINFRA
INDICADA:	DATA: 02/15
	AGOSTO/2023

S1=S9=S25=S26=S27  
=S28=S53=S57=S62



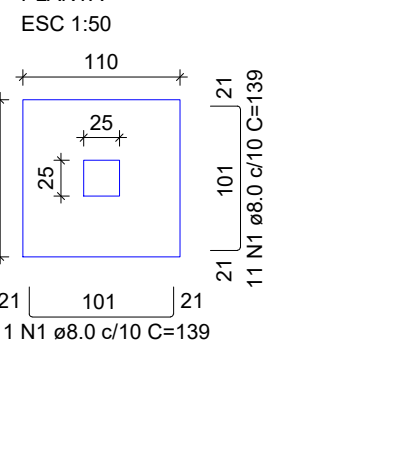
CORTE ESC 1:50

S2=S10=S11=S16=S19  
=S23=S29=S30=S33=S34  
=S43=S63=S64=S67



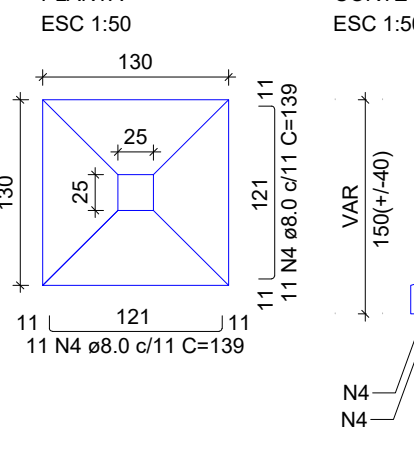
CORTE ESC 1:50

S3=S5=S13=S15=S20=S22



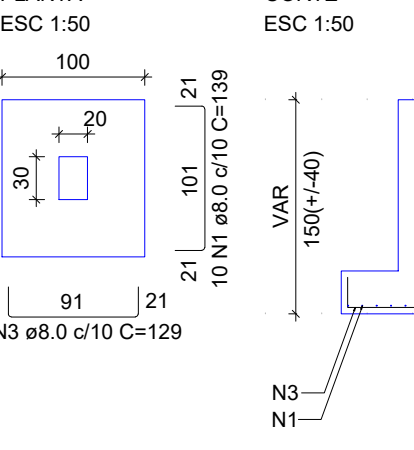
CORTE ESC 1:50

S4=S21



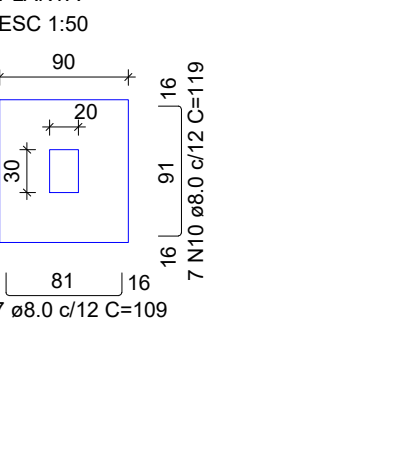
CORTE ESC 1:50

S6=S7=S60



CORTE ESC 1:50

S8=S58=S59=S61=S66=S68

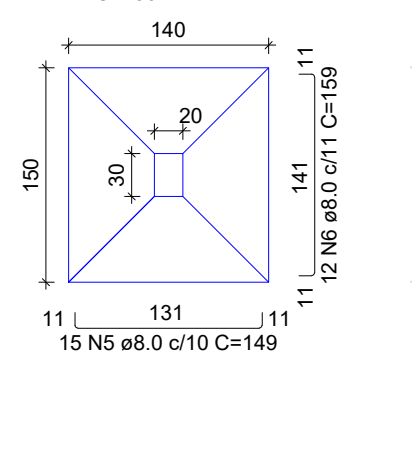


CORTE ESC 1:50

RELAÇÃO DO AÇO

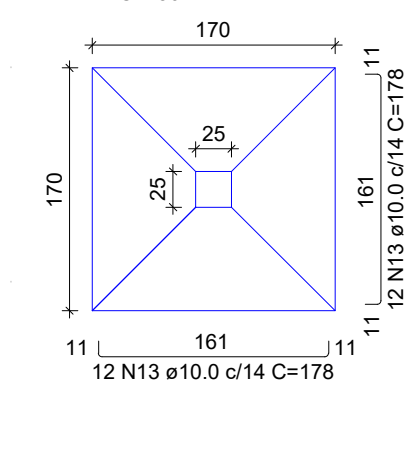
CAÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA50	1	8.0	270	139	37530
	2	8.0	99	149	14751
	3	8.0	33	129	4257
	4	8.0	339	139	47121
	5	8.0	214	149	31886
	6	8.0	76	159	12084
	7	8.0	76	109	8294
	8	8.0	99	129	12771
	9	8.0	30	169	5070
	10	8.0	74	119	8806
	11	8.0	36	99	3564
	12	8.0	12	89	1068
	13	10.0	72	178	12816
	14	10.0	24	168	4032
	15	10.0	24	188	4512
	16	10.0	22	158	3476
	17	10.0	20	148	2960

S12=S24=S41=S52



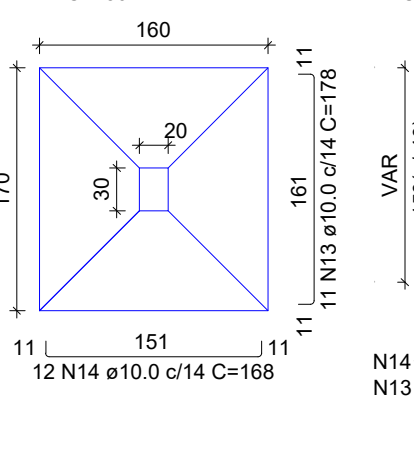
CORTE ESC 1:50

S14



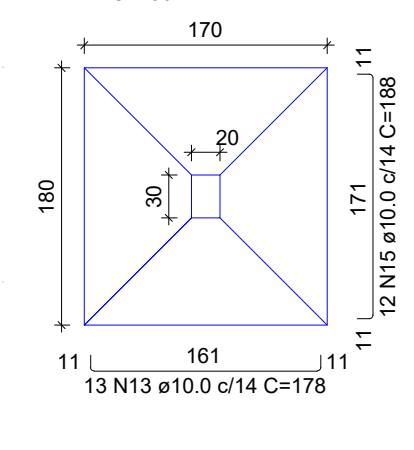
CORTE ESC 1:50

S17=S48



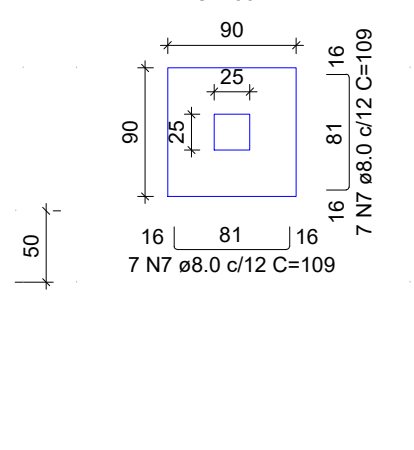
CORTE ESC 1:50

S18=S50



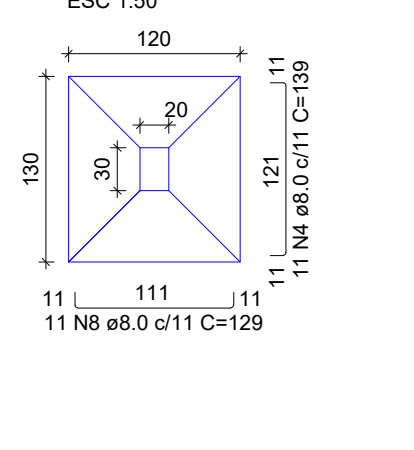
CORTE ESC 1:50

S31=S32



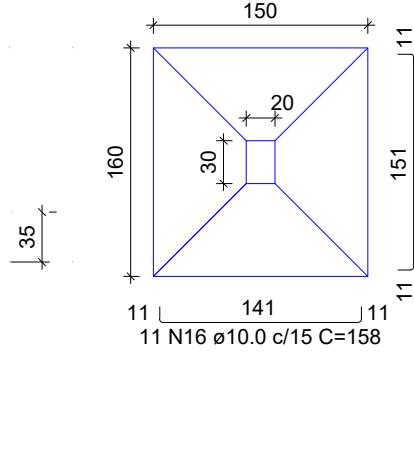
CORTE ESC 1:50

S35=S36=S37=S38=S42  
=S54=S55=S56=S65



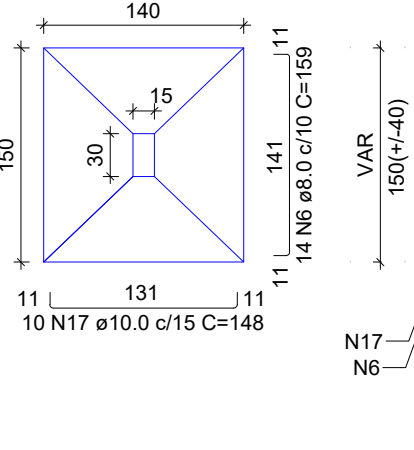
CORTE ESC 1:50

S39=S49



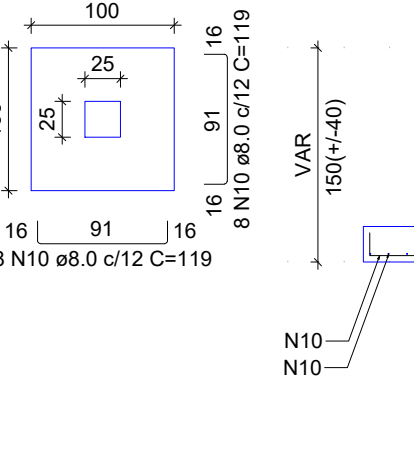
CORTE ESC 1:50

S40=S51



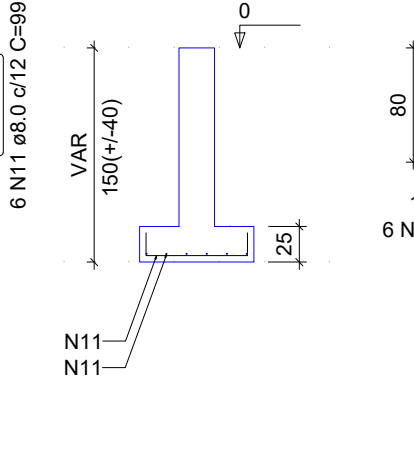
CORTE ESC 1:50

S44=S47



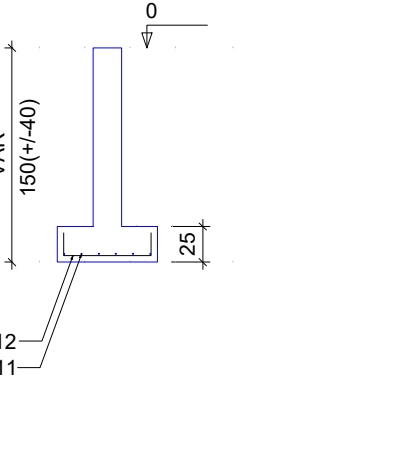
CORTE ESC 1:50

S45=S46



CORTE ESC 1:50

S69=S70



CORTE ESC 1:50

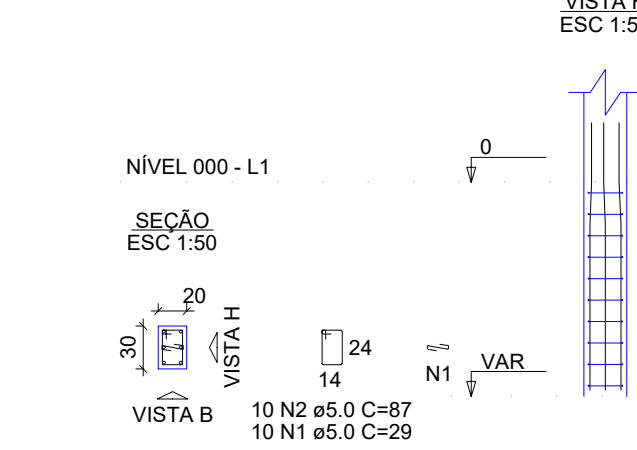
RESUMO DO AÇO

CAÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	8.0	1871.9	812.5
	10.0	278	188.5

PESO TOTAL (kg)  
CA50 1001

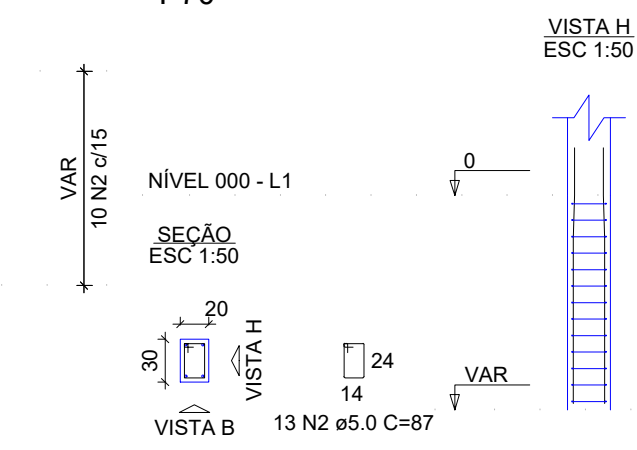
Volume de concreto (C-30) = 30.91 m³  
Área de forma = 79.16 m²

P1=P25=P26=P27=P28=P35=P37=  
=P38=P53=P54=P62=P65



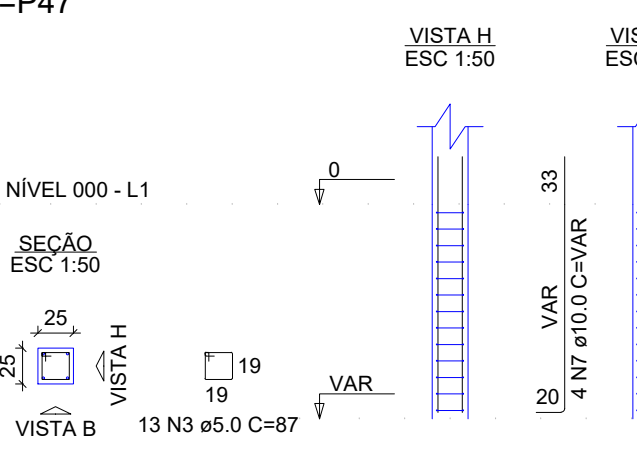
VISTA H ESC 1:50

P2=P6=P7=P8=P10=P11=P12=  
=P17=P18=P19=P23=P24=P29=  
=P30=P39=P41=P48=P49=P50=  
=P52=P57=P58=P59=P60=P61=  
=P63=P64=P66=P67=P68=P69=  
=P70



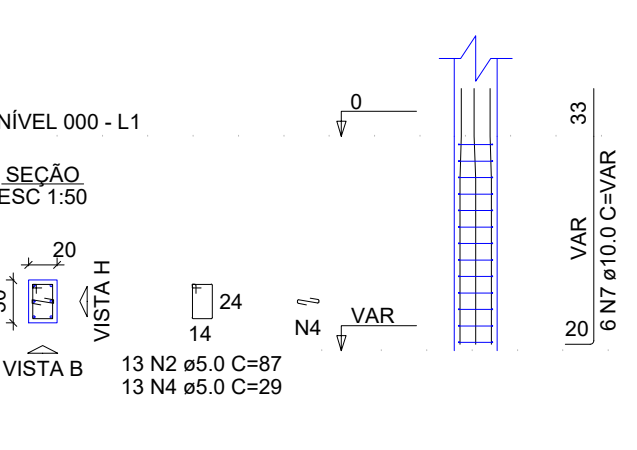
VISTA B ESC 1:50

P3=P4=P5=P13=P14=P15=P20=  
=P22=P31=P32=P44=P45=P46=  
=P47



VISTA H ESC 1:50

P9=P42=P43



VISTA B ESC 1:50

RELAÇÃO DO AÇO

CAÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA60	1	5.0	120	29	3480
	2	5.0	635	87	55245
	3	5.0	192	87	16704
	4	5.0	39	39	1151
	5	5.0	13	24	312
	6	5.0	23	77	1771
	7	10.0	208	VAR	VAR
	8	12.5	128	VAR	VAR
	9	12.5	2	83	166

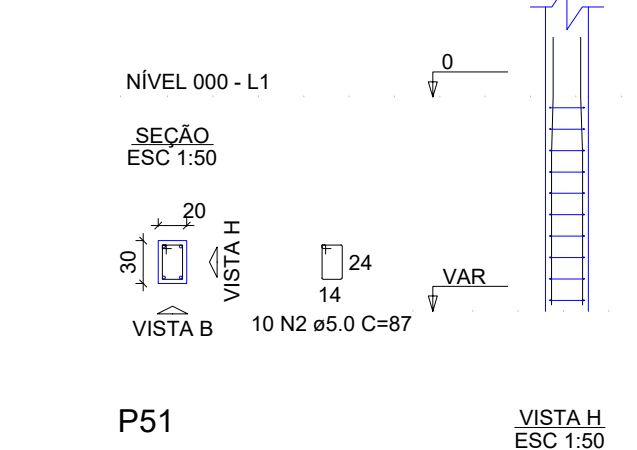
RESUMO DO AÇO

CAÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	10.0	409.8	277.9
CA60	12.5	264.1	279.8
CA60	5.0	786.4	133.3

PESO TOTAL (kg)  
CA50 557.7  
CA60 133.3

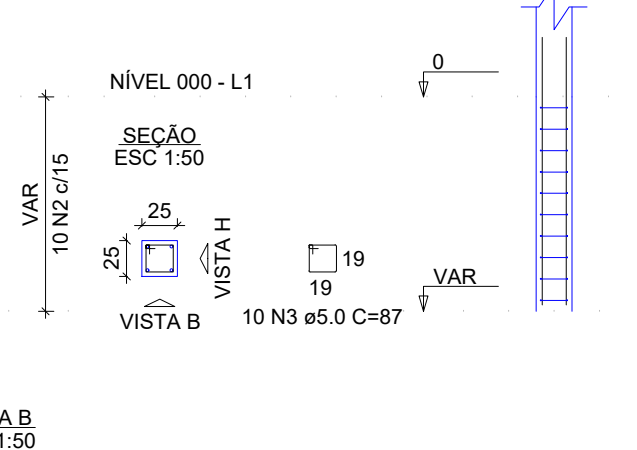
Volume de concreto (C-30) = 4.80 m³  
Área de forma = 79.64 m²

P16



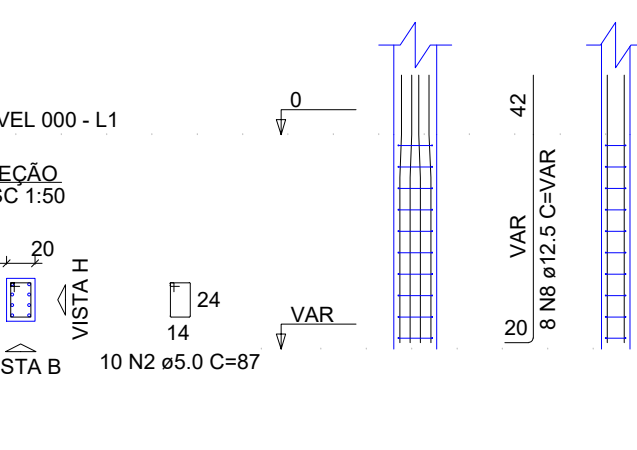
VISTA H ESC 1:50

P21



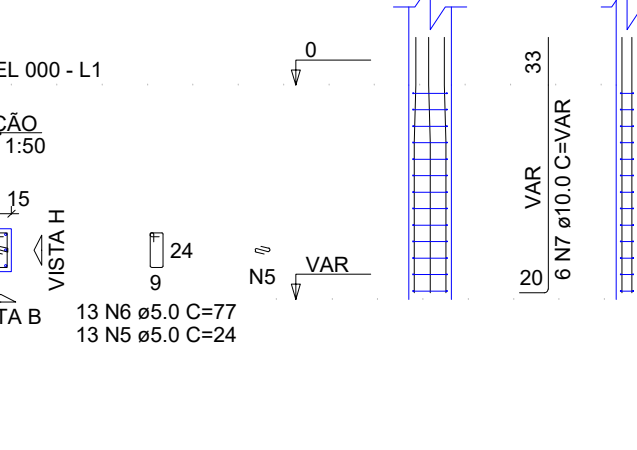
VISTA B ESC 1:50

P33=P34=P36=P55=P56



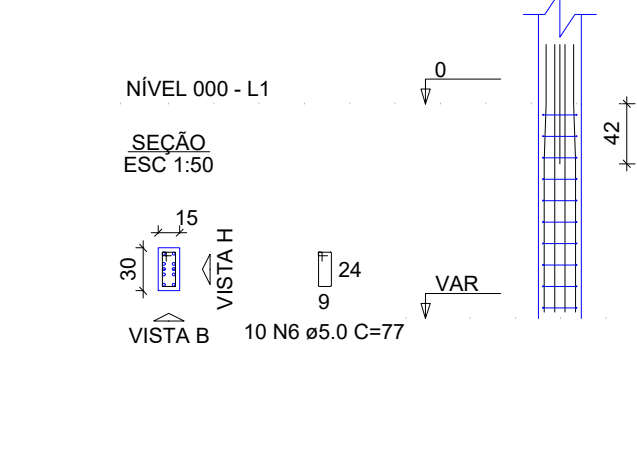
VISTA H ESC 1:50

P40



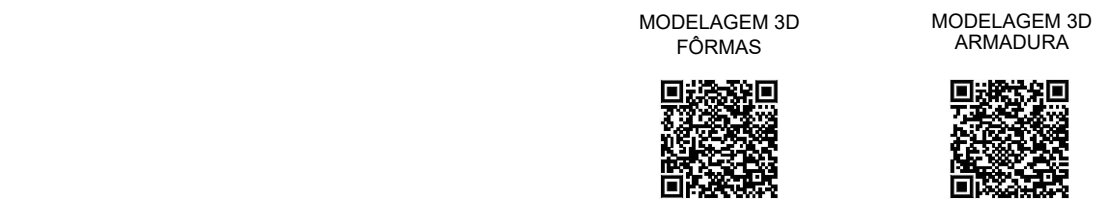
VISTA B ESC 1:50

P51



VISTA H ESC 1:50

VISTA B ESC 1:50



PROPRIETÁRIO \_\_\_\_\_

CALCULO \_\_\_\_\_

CONSTRUÇÃO \_\_\_\_\_

CREA \_\_\_\_\_

APROVO PM - \_\_\_\_\_

02 \_\_\_\_\_

01 \_\_\_\_\_

Nº DATA \_\_\_\_\_

REVISÃO \_\_\_\_\_

DESENHO \_\_\_\_\_

APROVAÇÃO \_\_\_\_\_

PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO

CLIENTE: MUNICÍPIO DE MARCO

LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO:

1 Detalhamento das Sapatas

2 Detalhamento dos Pilares Nível 000

AV. PREFEITO GUIDO OSTERHO, S/N  
CENTRO - MARCO - CE - 85500-000  
FONE: 3661-1210 / 3634-1415  
WWW.MARCO.CE.GOV.BR  
CNPJ: 07.546.318/0001-47

ESCALA: \_\_\_\_\_

DESENHO: SEINFRA

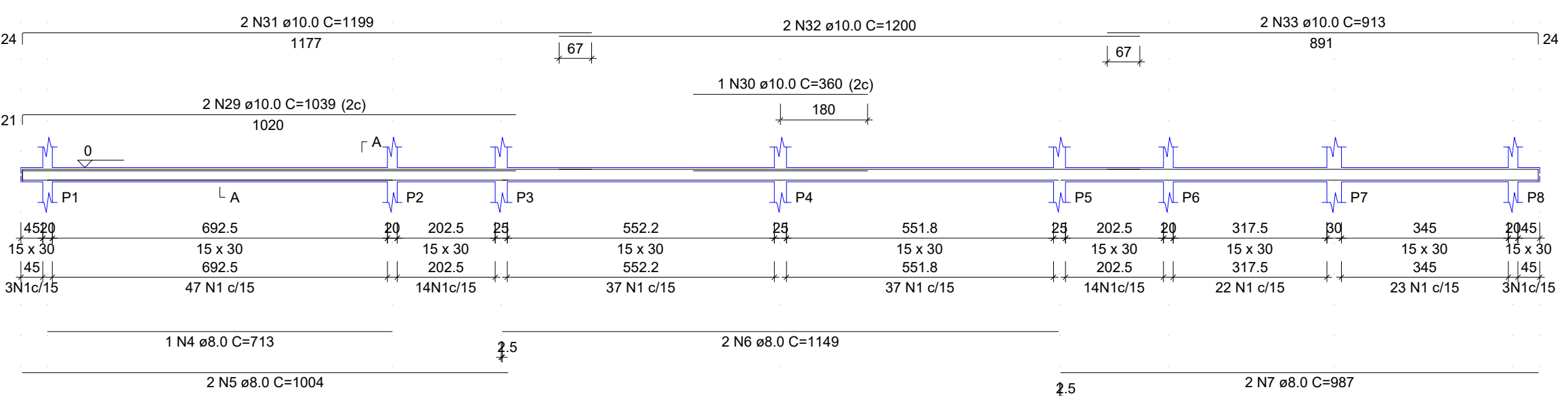
PRANCHA: 03/15

INDICADA \_\_\_\_\_

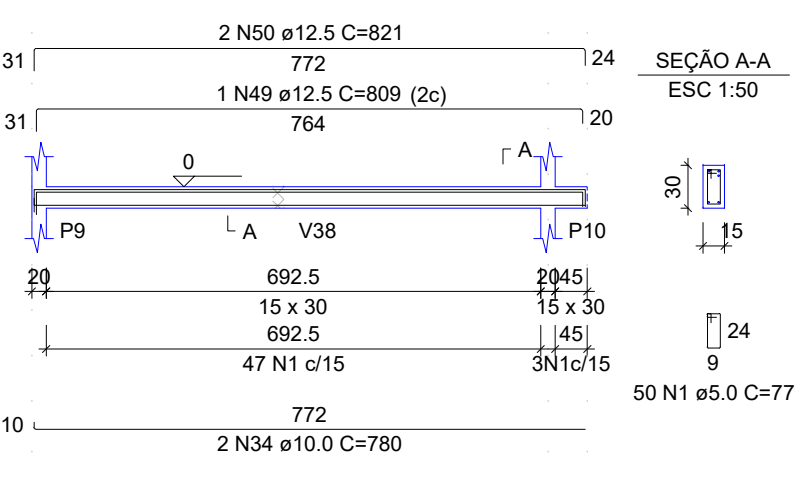
DATA: AGOSTO/2023



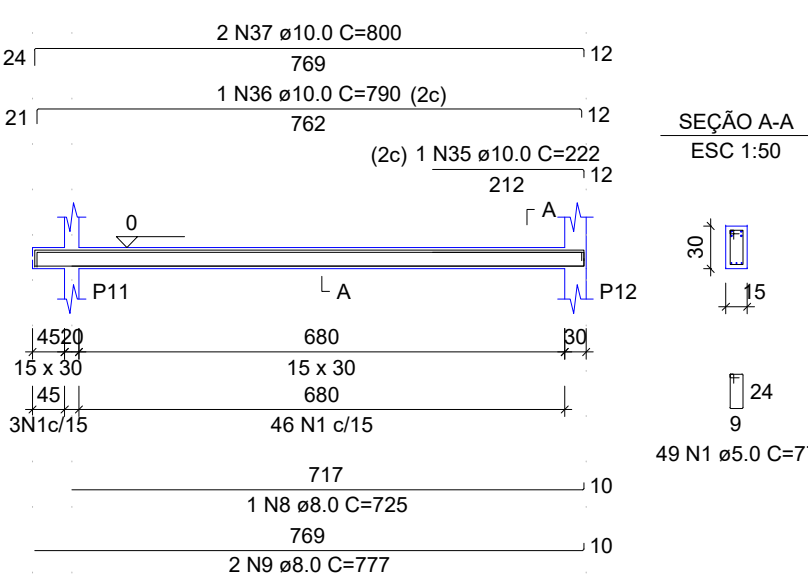
V1  
ESC 1:100



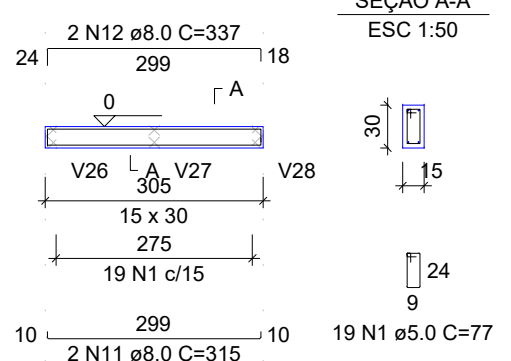
V2  
ESC 1:100



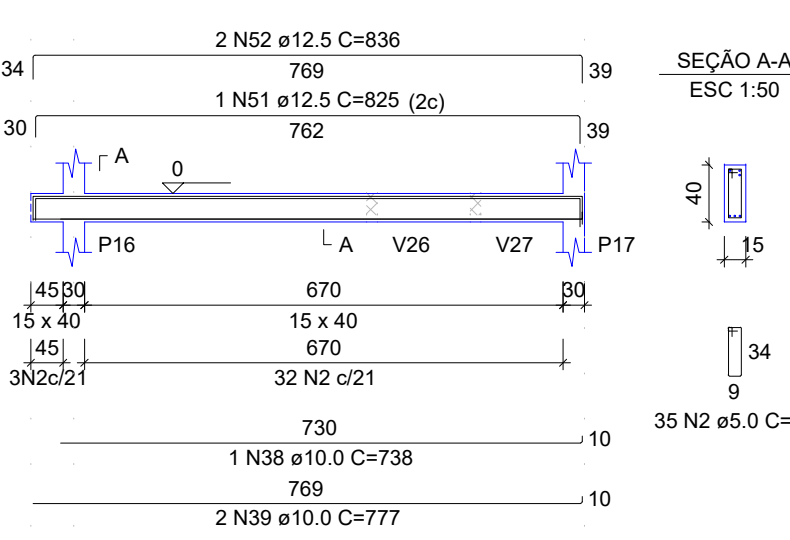
V3  
ESC 1:100



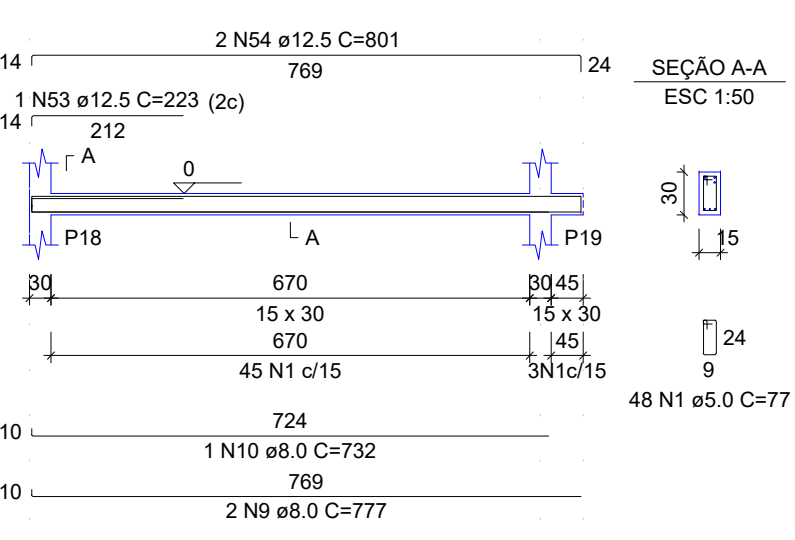
V6  
ESC 1:100



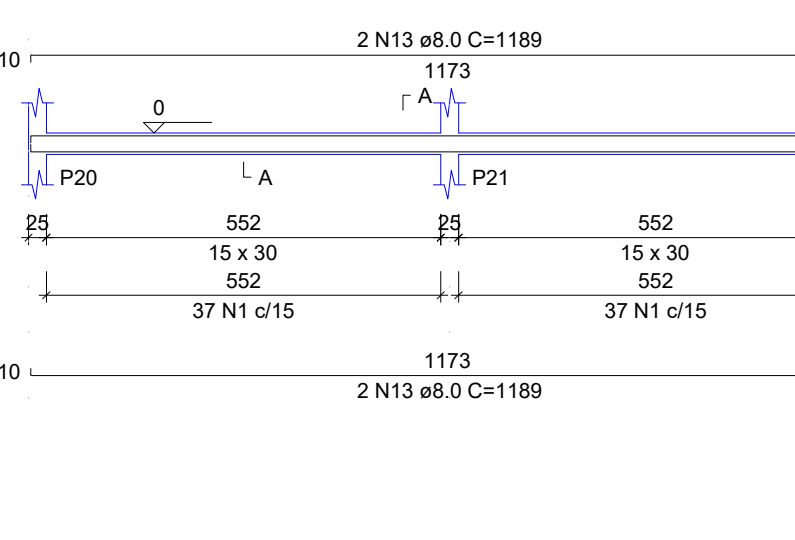
V4  
ESC 1:100



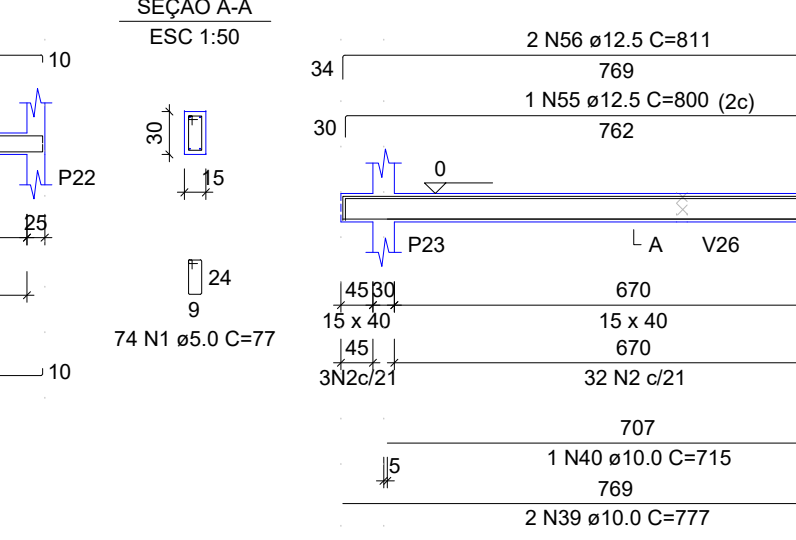
V5  
ESC 1:100



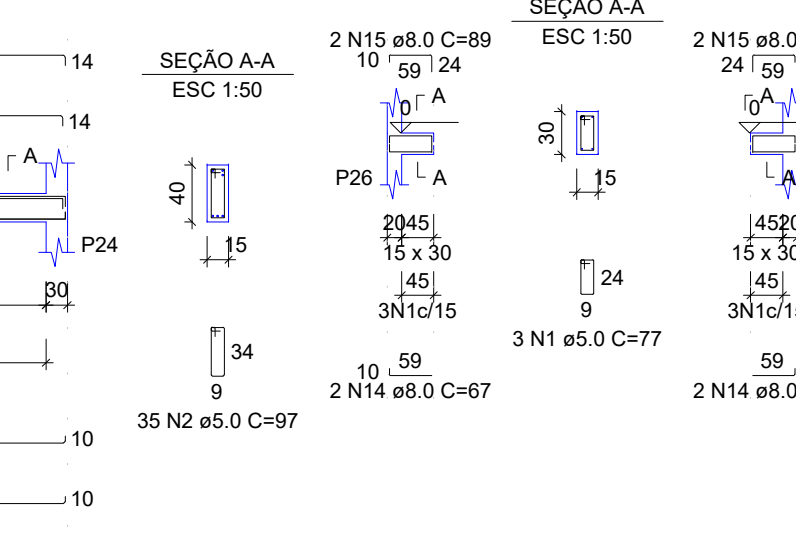
V7  
ESC 1:100



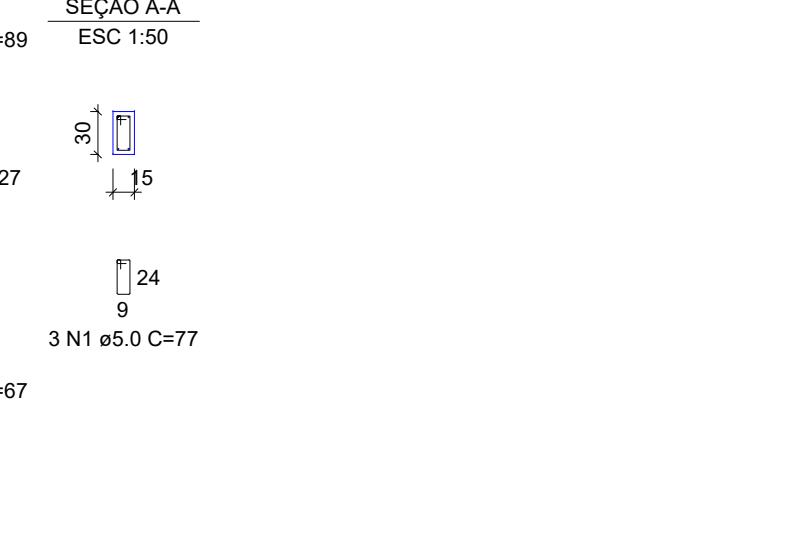
V8  
ESC 1:100



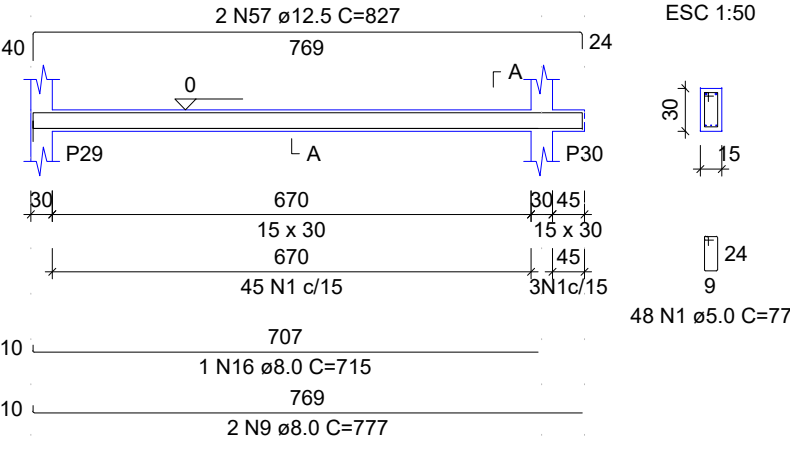
V9  
ESC 1:100



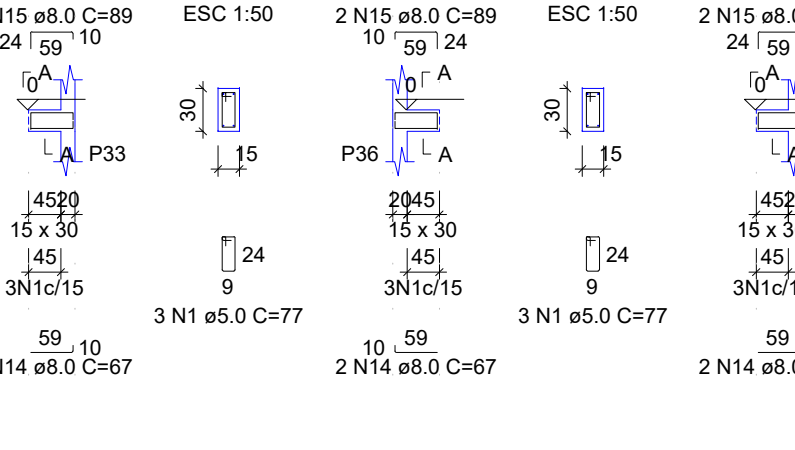
V10  
ESC 1:100



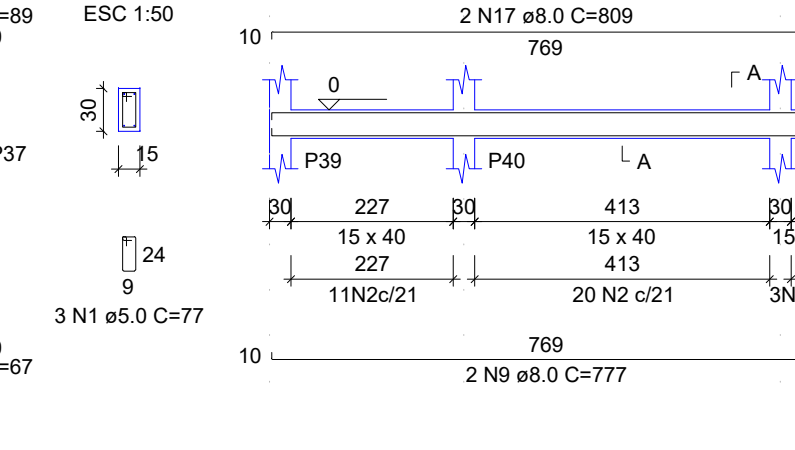
V11  
ESC 1:100



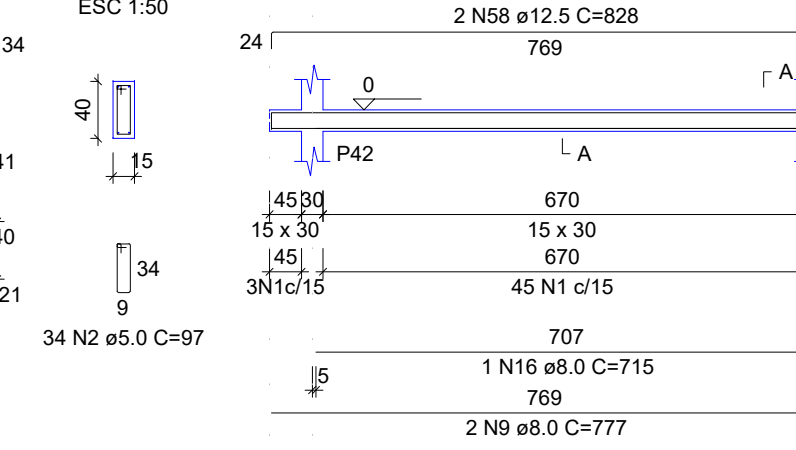
V12  
ESC 1:100



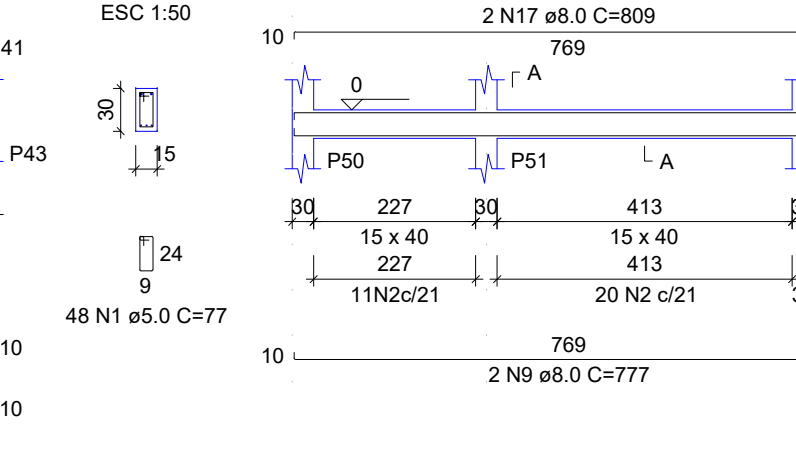
V13  
ESC 1:100



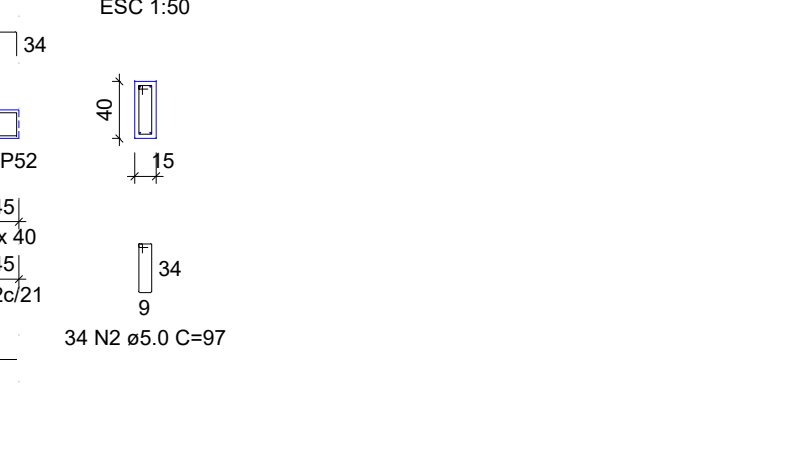
V14  
ESC 1:100



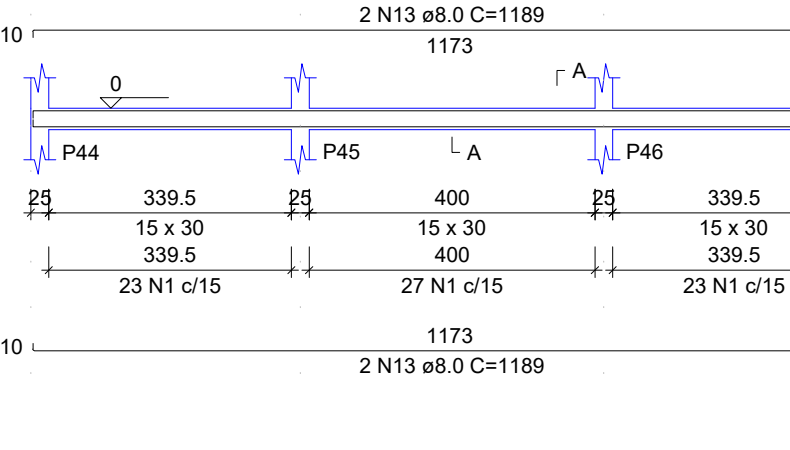
V15  
ESC 1:100



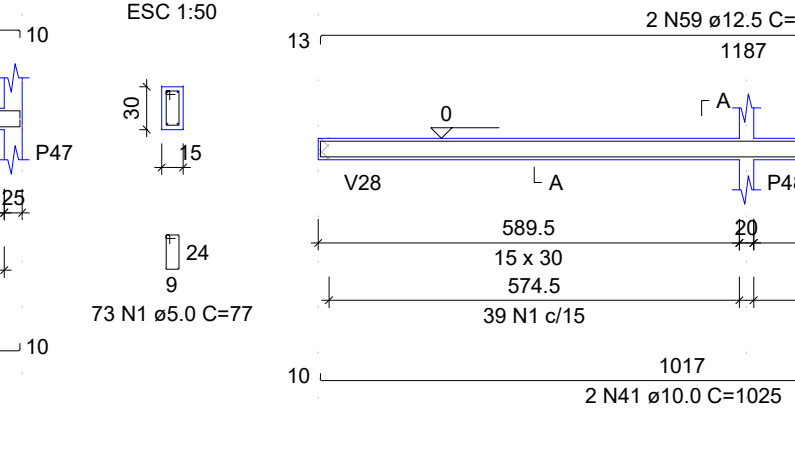
V16  
ESC 1:100



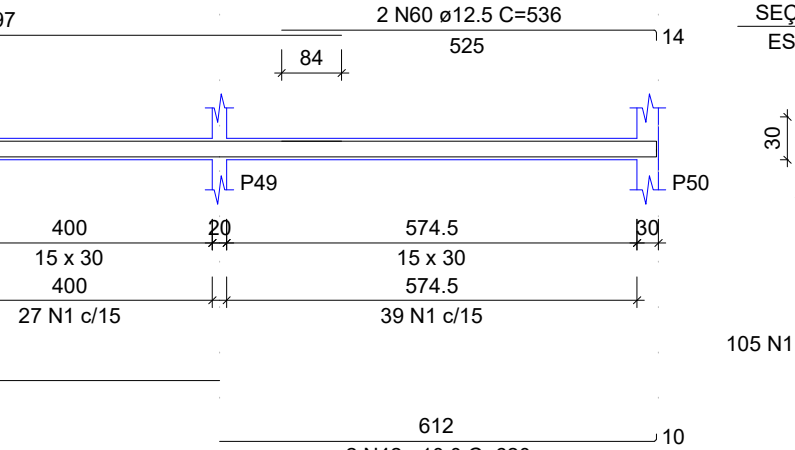
V17  
ESC 1:100



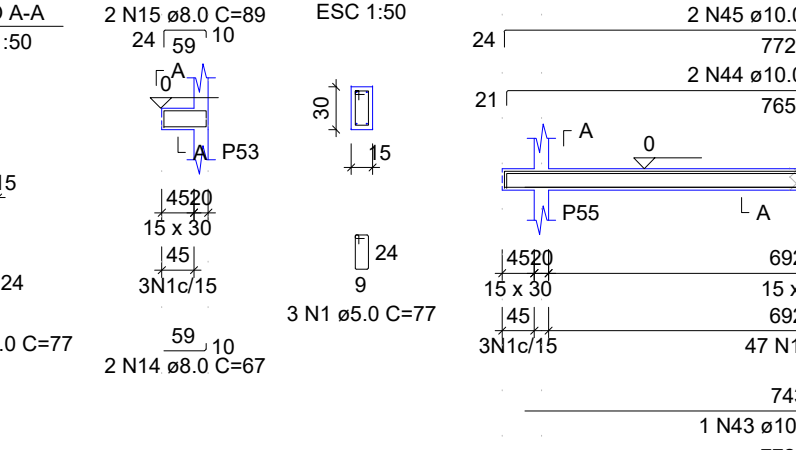
V18  
ESC 1:100



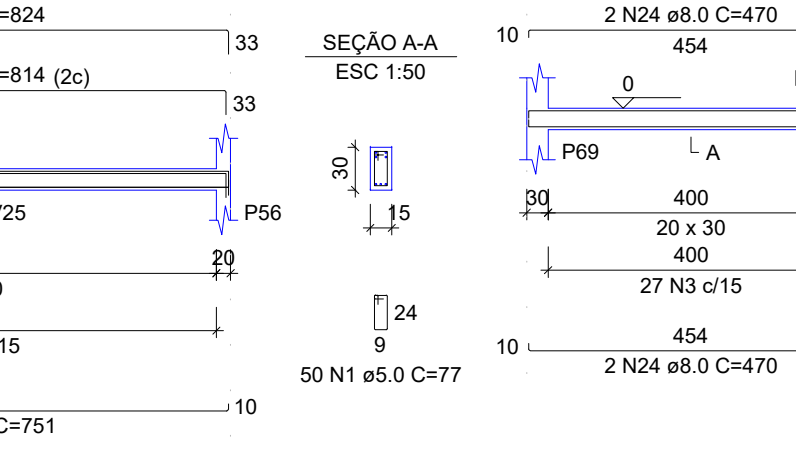
V20  
ESC 1:100



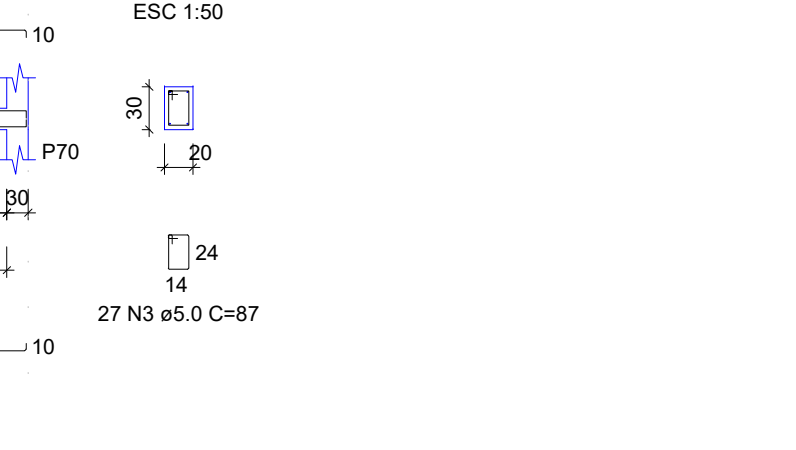
V21  
ESC 1:100



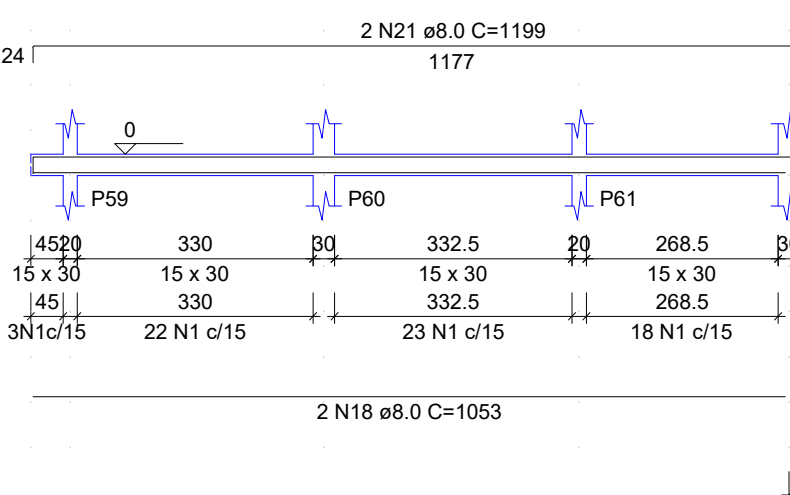
V22  
ESC 1:100



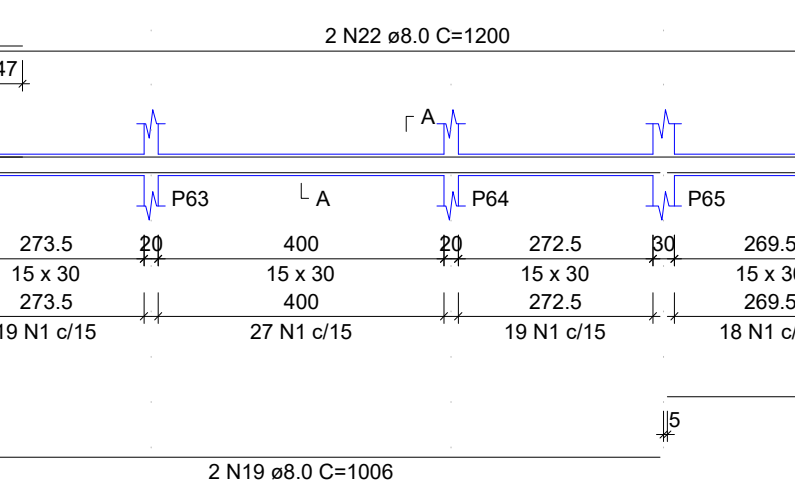
V23  
ESC 1:100



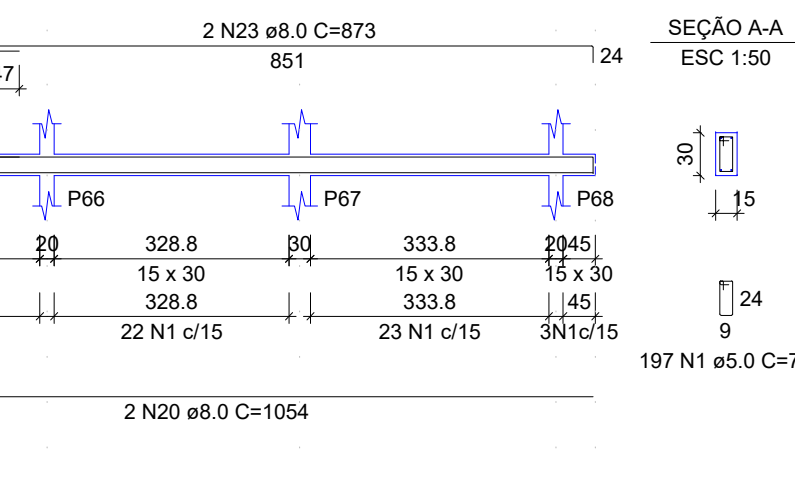
V22  
ESC 1:100



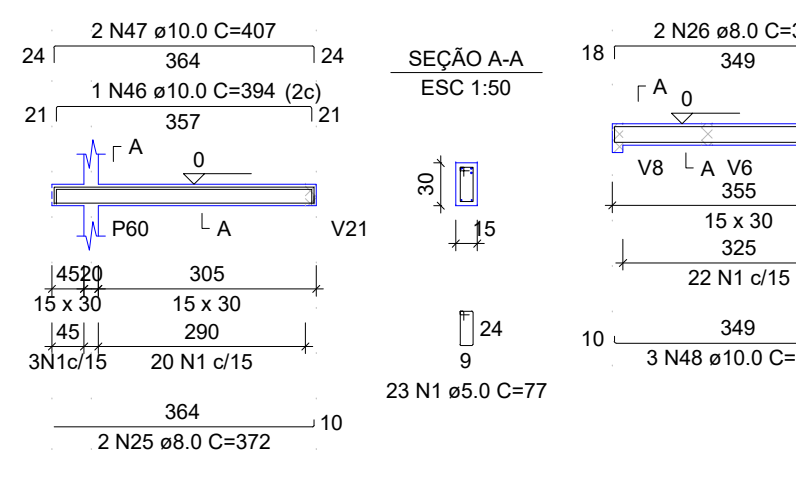
V25  
ESC 1:100



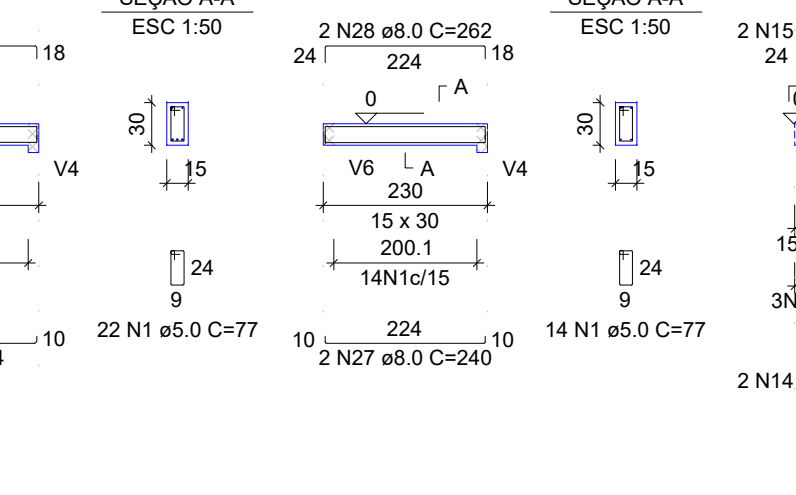
V26  
ESC 1:100



V27  
ESC 1:100



V30  
ESC 1:100



RELAÇÃO DO AÇO

AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL
CA60	1	5.0	1041	77	80157
CA60	2	5.0	138	97	13386
CA60	3	5.0	27	87	2349
CA60	4	8.0	21	713	713
CA60	5	8.0	2	1004	2008
CA60	6	8.0	2	1149	2298
CA60	7	8.0	2	987	1974
CA60	8	8.0	1	725	725
CA60	9	8.0	12	777	9324
CA60	10	8.0	1	732	732
CA60	11	8.0	2	315	630
CA60	12	8.0	2	337	674
CA60	13	8.0	8	1189	9512
CA60	14	8.0	14	67	938
CA60	15	8.0	14	89	1246
CA60	16	8.0	2	715	1430
CA60	17	8.0	4	809	3236
CA60	18	8.0	2	1053	2106
CA60	19	8.0	2	1006	2012
CA60	20	8.0	2	1054	2108
CA60	21	8.0	2	1169	2338
CA60	22	8.0	2	1200	2400
CA60	23	8.0	2	873	1746
CA60	24	8.0	2	470	940
CA60	25	8.0	2	372	744
CA60	26	8.0	2	381	762
CA60	27	8.0	2	360	720
CA60	28	8.0	2	262	524
CA60	29	10.0	2	1039	2078
CA60	30	10.0	2	913	1826
CA60	31	10.0	2	1199	2398
CA60	32	10.0	2	1200	2400
CA60	33	10.0	2	913	1826
CA60	34	10.0	4	780	3120
CA60	35	10.0	1	222	222
CA60	36	10.0	1	790	790
CA60	37	10.0	2	800	1600
CA60	38	10.0	1	738	738
CA60	39	10.0	4	777	3108
CA60	40	10.0	1	715	715
CA60	41	10.0	2	1025	2050
CA60	42	10.0	2	620	1240
CA60	43	10.0	1	751	751
CA60	44	10.0	2	814	1628
CA60	45	10.0	2	824	1648
CA60	46	10.0	1	394	394
CA60	47	10.0	2	407	814
CA60	48	10.0	3	364	1092
CA60	49	12.5	1	809	809
CA60	50	12.5	2	821	1642
CA60	51	12.5	1	825	825
CA60	52	12.5	2	836	1672
CA60	53	12.5	1	223	223
CA60	54	12.5	2	801	1602
CA60	55	12.5	1	800	800
CA60	56	12.5	2	811	1622
CA60	57	12.5	2	827	1654
CA60	58	12.5	2	828	1656
CA60	59	12.5	2	1197	2394
CA60	60	12.5	2	536	1072

RESUMO DO AÇO

AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	8.0	526	228.3
CA50	10.0	289.7	196.5
CA60	12.5	159.7	169.2
CA60	5.0	958.9	162.6
<b>PESO TOTAL (kg)</b>			<b>594</b>
CA50			162.6
CA60			162.6

Volume de concreto (C-30) = 8.86 m³  
Área de forma = 145.49 m²

MODELAGEM 3D FORMAS



MODELAGEM 3D ARMADURA



PROPRIETÁRIO \_\_\_\_\_

CALCULO \_\_\_\_\_

CONSTRUÇÃO \_\_\_\_\_

APROVO PM \_\_\_\_\_

REVISÃO	DESENHO	APROVAÇÃO
02		
01		
Nº	DATA	

PROJETO: PROJETO ESTRUTURAL EFF JOSÉ HELVÉCIO

CLIENTE: MUNICÍPIO DE MARCO

LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO: 1 Detalhamento das Vigas Nível 000

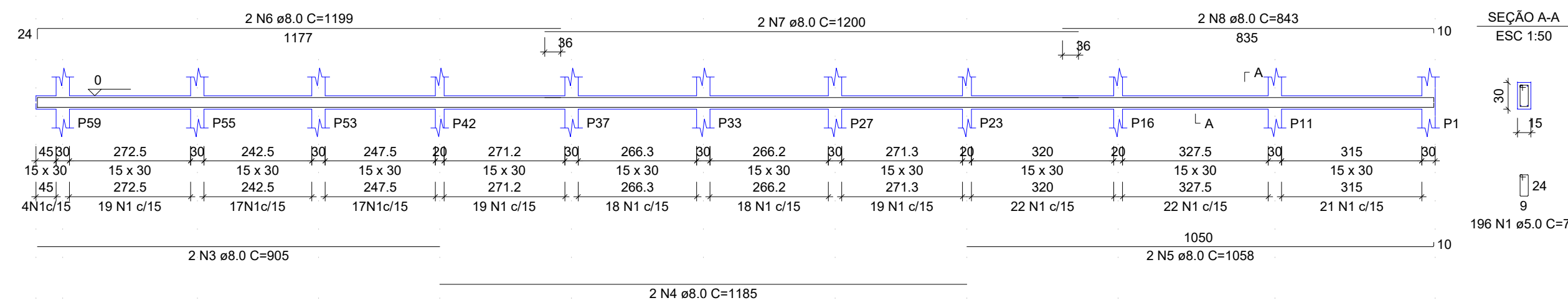
ESCALA: INDICADA DESENHO: SEINFRA PRANCHIA: 04/15

DATA: AGOSTO/2023

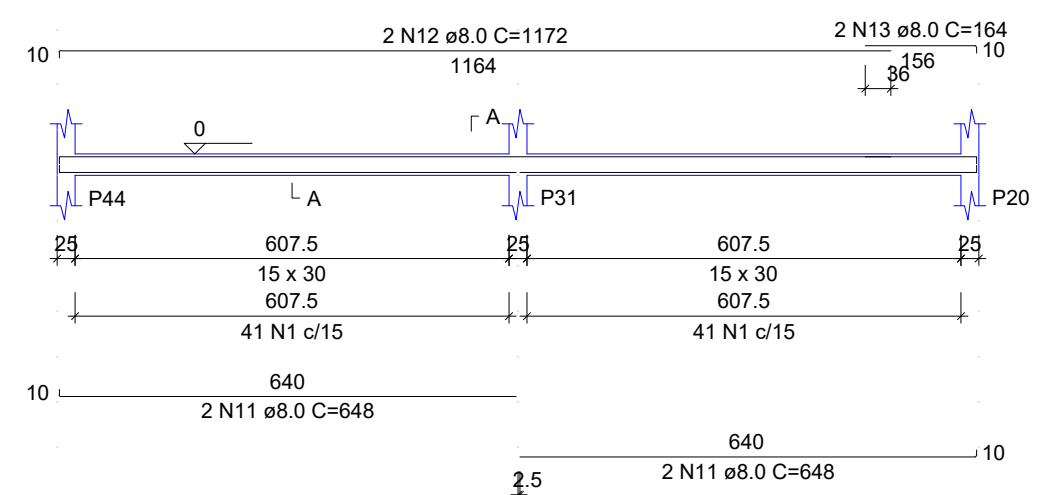


AV. PREFEITO GUIDO OSTERHO, S/N  
CENTRO - MARCO - CE - 83500-000  
FONE: (85) 3364-3115  
WWW.MARCO.CE.GOV.BR  
CNPJ: 07.546.316/0001-47

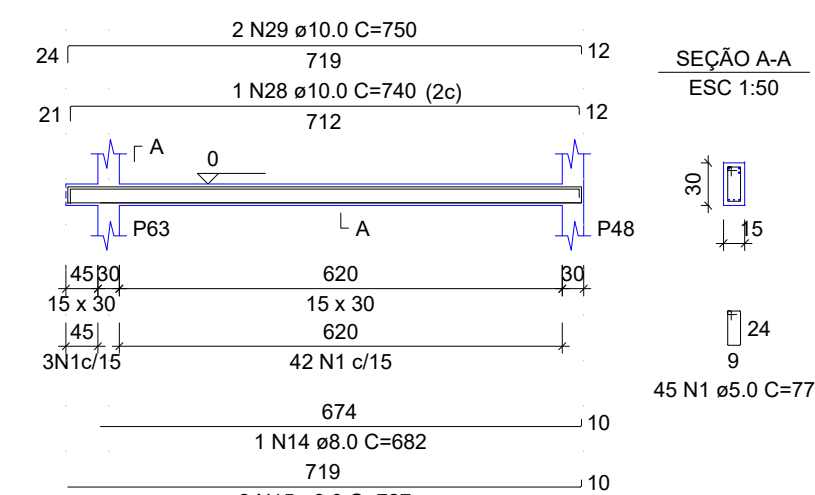
**V24**  
ESC 1:100



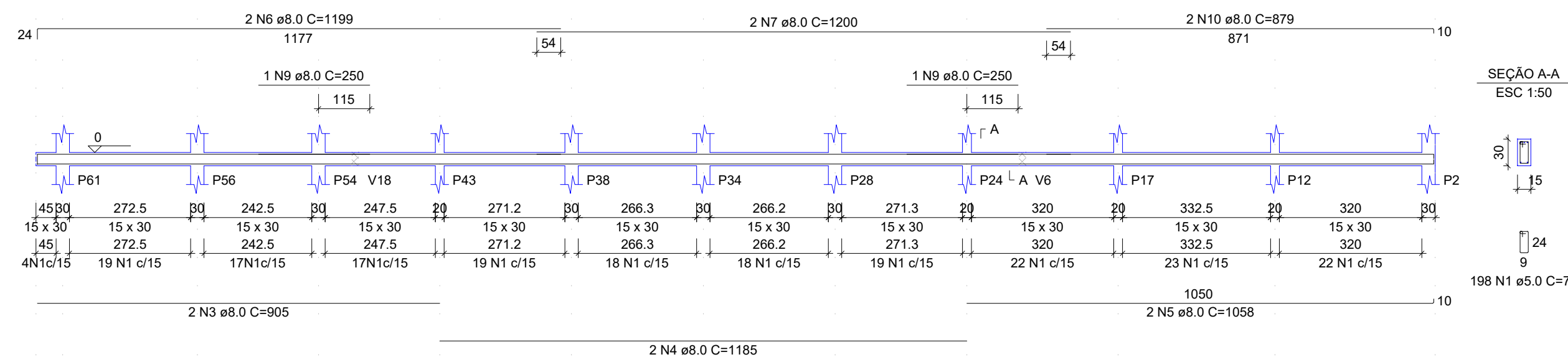
**V29**  
ESC 1:100



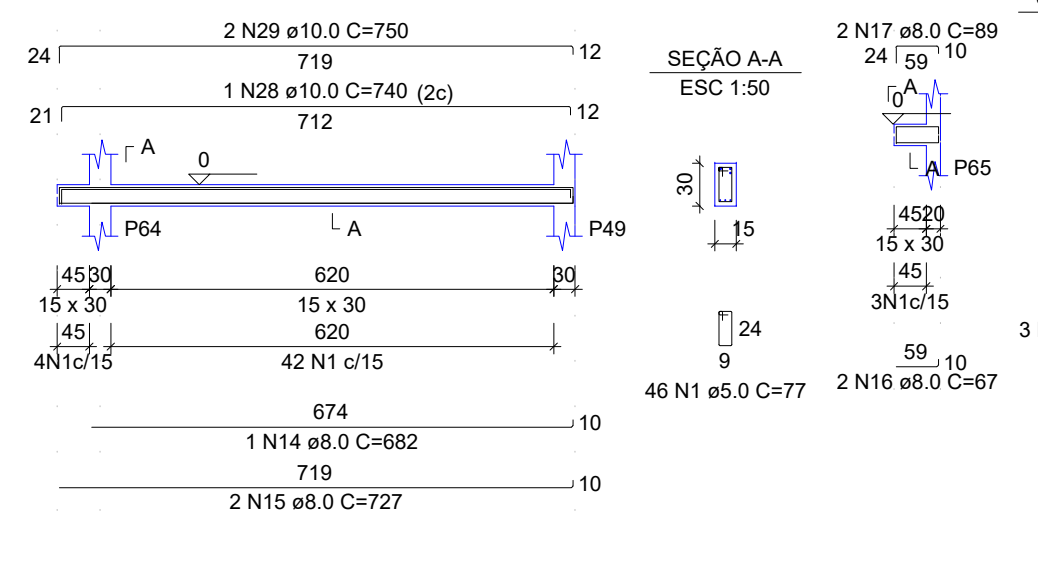
**V31**  
ESC 1:100



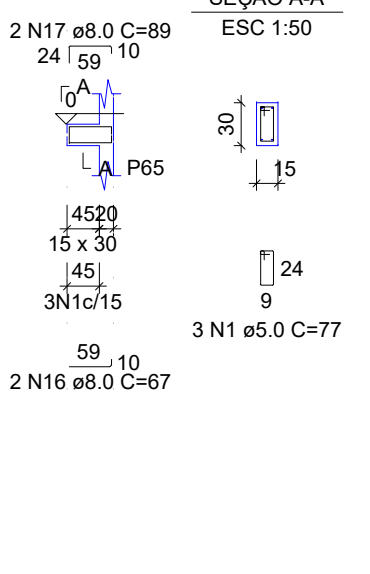
**V28**  
ESC 1:100



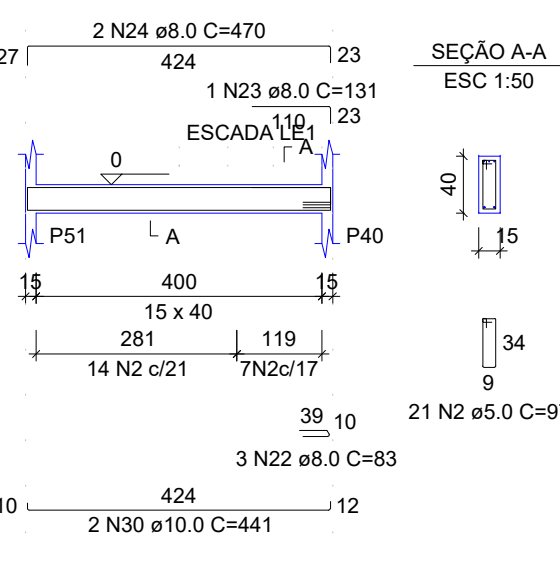
**V32**  
ESC 1:100



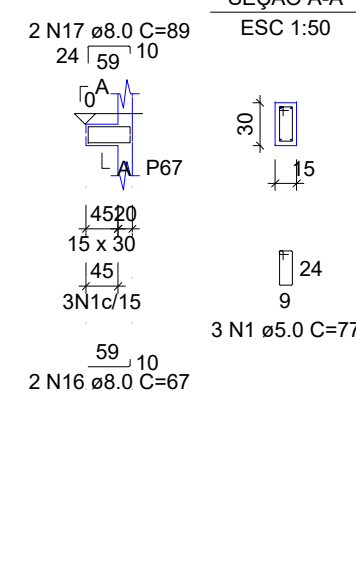
**V33**  
ESC 1:100



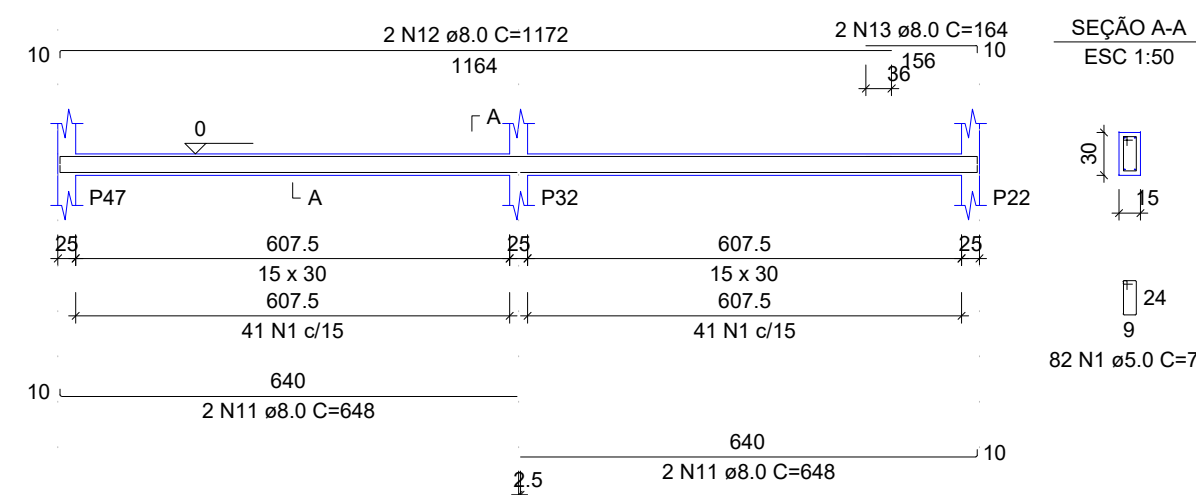
**V36**  
ESC 1:100



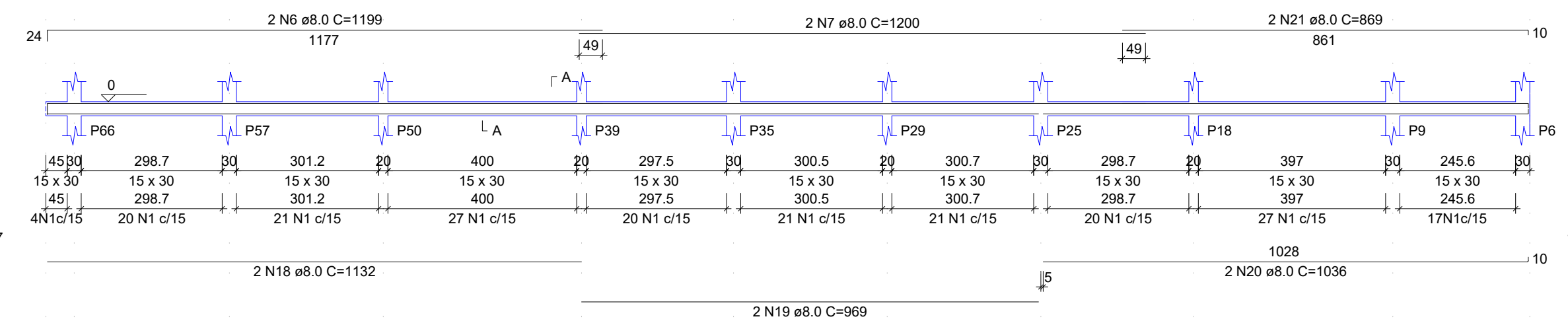
**V37**  
ESC 1:100



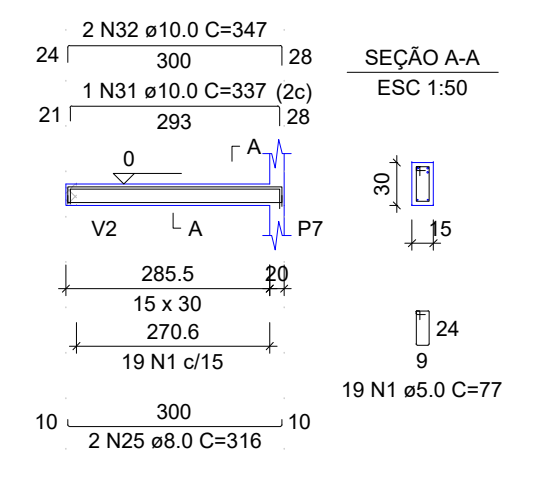
**V34**  
ESC 1:100



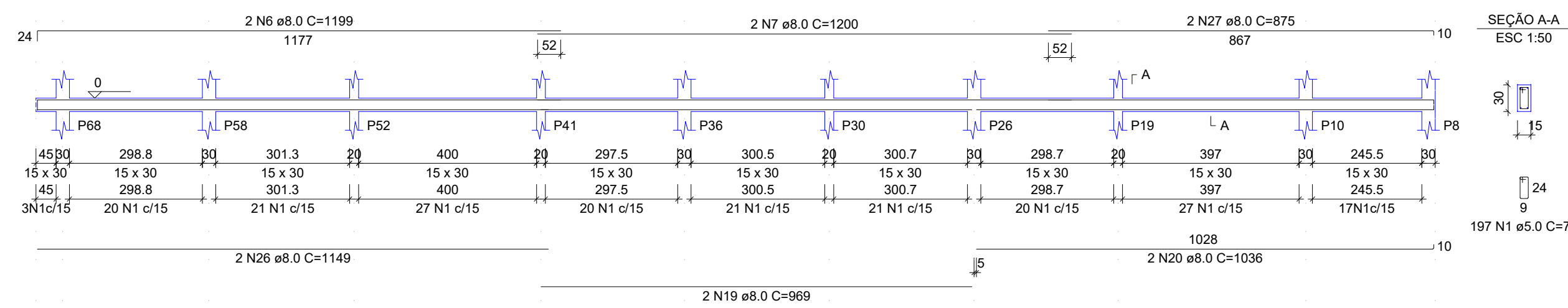
**V35**  
ESC 1:100



**V38**  
ESC 1:100



**V39**  
ESC 1:100



RELAÇÃO DO AÇO

AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA50	1	5.0	1069	77	82313
	2	5.0	21	97	2037
	3	8.0	4	905	3620
	4	8.0	4	1185	4740
	5	8.0	4	1058	4232
	6	8.0	8	1169	9352
	7	8.0	8	1200	9600
	8	8.0	2	843	1686
	9	8.0	2	250	500
	10	8.0	2	879	1758
	11	8.0	8	648	5184
	12	8.0	4	1172	4688
	13	8.0	4	164	656
	14	8.0	2	682	1364
	15	8.0	4	727	2908
	16	8.0	4	67	268
	17	8.0	4	89	356
	18	8.0	2	1132	2264
	19	8.0	4	969	3876
	20	8.0	4	1036	4144
	21	8.0	2	869	1738
	22	8.0	3	83	249
	23	8.0	1	131	131
	24	8.0	2	470	940
	25	8.0	2	316	632
	26	8.0	2	1149	2298
	27	8.0	2	975	1950
	28	10.0	2	740	1480
	29	10.0	4	750	3000
	30	10.0	2	441	882
	31	10.0	1	337	337
	32	10.0	2	347	694

RESUMO DO AÇO

AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	8.0	681.7	300.2
CA60	10.0	63.9	43.4
CA60	5.0	843.5	143
PESO TOTAL (kg)			
CA50		343.6	
CA60		143	

Volume de concreto (C-30) = 7.26 m³  
Área de forma = 120.60 m²

COR	ESP. PENNA
01	0.70
02	0.50
03	0.30
04	0.40
05	0.70
06	0.20
07	0.20
08	0.08
09	0.10
11	1.0%
13	15%



PROPRIETÁRIO \_\_\_\_\_

CALCULO \_\_\_\_\_

CONSTRUÇÃO \_\_\_\_\_

APROVA PM - \_\_\_\_\_

CREA \_\_\_\_\_

Nº	DATA	REVISÃO	DESENHO	APROVAÇÃO
01				

PROJETO ESTRUTURAL  
EFF JOSÉ HELVÉCIO

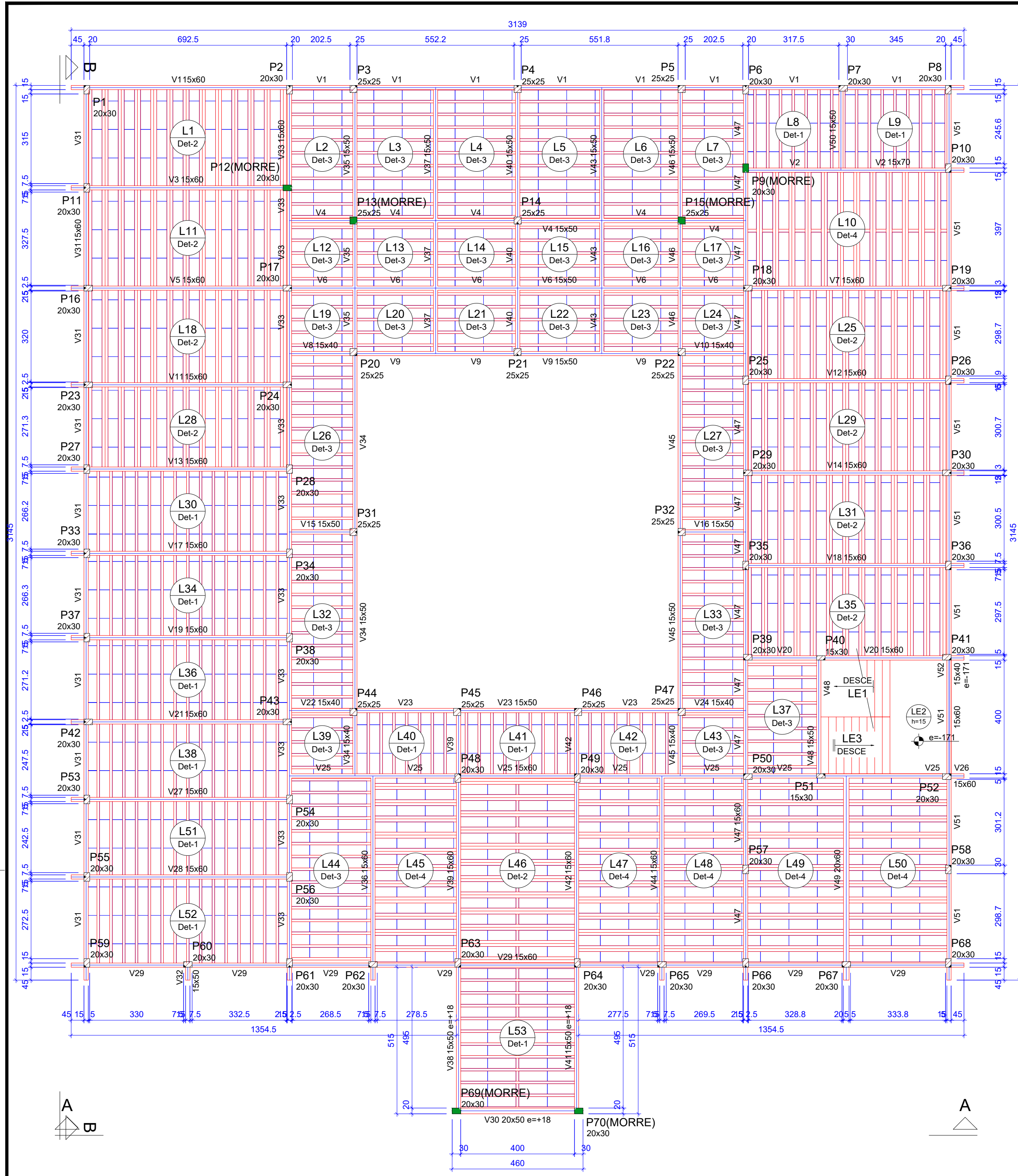
CLIENTE: MUNICÍPIO DE MARCO

LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO: 1 Detalhamento das Vigas Nível 000

ESCALA: INDICADA DESENHO: SEINFRA PRANCHA: 05/15  
DATA: AGOSTO/2023





Blocos de enchimento			
Detalhe	Tipo	Nome	Quantidade
1/2/3/4	EPS Unidirecional	B7/36/100	1857

Vigas		
Nome	Seção (cm)	Nível (cm)
V1	15x60	0 342
V2	15x70	0 342
V3	15x80	0 342
V4	15x50	0 342
V5	15x60	0 342
V6	15x50	0 342
V7	15x60	0 342
V8	15x40	0 342
V9	15x50	0 342
V10	15x40	0 342
V11	15x80	0 342
V12	15x80	0 342
V13	15x80	0 342
V14	15x60	0 342
V15	15x50	0 342
V16	15x50	0 342
V17	15x60	0 342
V18	15x80	0 342
V19	15x60	0 342
V20	15x80	18 360
V21	15x80	0 342
V22	15x40	0 342
V23	15x50	0 342
V24	15x40	0 342
V25	15x50	0 342
V26	15x80	0 342
V27	15x80	0 342
V28	15x80	0 342
V29	15x60	0 342
V30	20x30	18 360
V31	15x80	0 342
V32	15x50	0 342
V33	15x80	0 342
V34	15x40	0 342
V35	15x50	0 342
V36	15x80	0 342
V37	15x50	0 342
V38	15x50	18 360
V39	15x80	0 342
V40	15x50	0 342
V41	15x50	18 360
V42	15x80	0 342
V43	15x50	0 342
V44	15x80	0 342
V45	15x40	0 342
V46	15x50	0 342
V47	15x60	0 342
V48	15x50	0 342
V49	20x30	0 342
V50	15x50	0 342
V51	15x80	0 342
V52	15x40	-171 171

Lajes								
Nome	Tipo	Dados		Sobrecarga (kgf/m²)				
		Altura (cm)	Elevação (cm)	Nível (cm)	Peso próprio (kgf/m²)	Adicional	Acidental	Localizada
L1	Treliçada 1D	12	0	342	190	155	200	-
L2	Treliçada 1D	12	0	342	161	155	200	-
L3	Treliçada 1D	12	0	342	161	155	200	-
L4	Treliçada 1D	12	0	342	161	155	200	-
L5	Treliçada 1D	12	0	342	161	155	200	-
L6	Treliçada 1D	12	0	342	161	155	200	-
L7	Treliçada 1D	12	0	342	161	155	200	-
L8	Treliçada 1D	12	0	342	161	155	200	-
L9	Treliçada 1D	12	0	342	161	155	200	-
L10	Treliçada 1D	12	0	342	161	155	200	-
L11	Treliçada 1D	12	0	342	193	155	150	-
L12	Treliçada 1D	12	0	342	190	155	200	-
L13	Treliçada 1D	12	0	342	161	155	200	-
L14	Treliçada 1D	12	0	342	161	155	200	-
L15	Treliçada 1D	12	0	342	161	155	200	-
L16	Treliçada 1D	12	0	342	161	155	200	-
L17	Treliçada 1D	12	0	342	161	155	200	-
L18	Treliçada 1D	12	0	342	190	155	200	-
L19	Treliçada 1D	12	0	342	161	155	200	-
L20	Treliçada 1D	12	0	342	161	155	200	-
L21	Treliçada 1D	12	0	342	161	155	200	-
L22	Treliçada 1D	12	0	342	161	155	200	-
L23	Treliçada 1D	12	0	342	161	155	200	-
L24	Treliçada 1D	12	0	342	161	155	200	-
L25	Treliçada 1D	12	0	342	190	155	200	-
L26	Treliçada 1D	12	0	342	161	155	200	-
L27	Treliçada 1D	12	0	342	161	155	200	-
L28	Treliçada 1D	12	0	342	190	155	200	-
L29	Treliçada 1D	12	0	342	190	155	200	-
L30	Treliçada 1D	12	0	342	161	155	200	-
L31	Treliçada 1D	12	0	342	190	155	200	-
L32	Treliçada 1D	12	0	342	161	155	200	-
L33	Treliçada 1D	12	0	342	161	155	200	-
L34	Treliçada 1D	12	0	342	161	155	200	-
L35	Treliçada 1D	12	0	342	190	155	200	-
L36	Treliçada 1D	12	0	342	161	155	200	-
L37	Treliçada 1D	12	0	342	161	155	200	-
L38	Treliçada 1D	12	0	342	161	155	200	-
L39	Treliçada 1D	12	0	342	161	155	200	-
L40	Treliçada 1D	12	0	342	161	155	200	-
L41	Treliçada 1D	12	0	342	161	155	200	-
L42	Treliçada 1D	12	0	342	161	155	200	-
L43	Treliçada 1D	12	0	342	161	155	200	-
L44	Treliçada 1D	12	0	342	161	155	200	-
L45	Treliçada 1D	12	0	342	190	155	200	-
L46	Treliçada 1D	12	0	342	193	155	200	-
L47	Treliçada 1D	12	0	342	190	155	200	-
L48	Treliçada 1D	12	0	342	190	155	200	-
L49	Treliçada 1D	12	0	342	190	155	180	-
L50	Treliçada 1D	12	0	342	161	155	200	-
L51	Treliçada 1D	12	0	342	161	155	200	-
L52	Treliçada 1D	12	0	342	161	155	200	-
LE1	Maciça	15	-171	171	687	165	250	-
LE2	Maciça	15	-171	171	375	165	250	-
LE3	Maciça	15	0	342	673	165	250	-

Características dos materiais  
f<sub>ck</sub> (kgf/cm²)  
300

Pilares			
Nome	Seção (cm)	Elevação (cm)	Nível (cm)
P1	20x30	0	342
P2	20x30	0	342
P3	25x25	0	342
P4	25x25	0	342
P5	25x25	0	342
P6	20x30	0	342
P7	20x30	0	342
P8	20x30	0	342
P9	20x30	0	342
P10	20x30	0	342
P11	20x30	0	342
P12	20x30	0	342
P13	25x25	0	342
P14	25x25	0	342
P15	25x25	0	342
P16	20x30	0	342
P17	20x30	0	342
P18	20x30	0	342
P19	20x30	0	342
P20	25x25	0	342
P21	25x25	0	342
P22	25x25	0	342
P23	20x30	0	342
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P25	20x30	0	342
P26	20x30	0	342
P27	20x30	0	342
P28	20x30	0	342
P29	20x30	0	342
P30	25x25	0	342
P31	25x25	0	342
P32	25x25	0	342
P33	20x30	0	342
P34	20x30	0	342
P35	20x30	0	342
P36	20x30	0	342
P37	20x30	0	342
P38	20x30	0	342
P39	20x30	0	342
P40	15x30	0	342
P41	20x30	0	342
P42	20x30	0	342
P43	20x30	0	342
P44	25x25	0	342
P45	25x25	0	342
P46	25x25	0	342
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P48	20x30	0	342
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P51	15x30	0	342
P52	20x30	0	342
P53	20x30	0	342
P54	20x30	0	342
P55	20x30	0	342
P56	20x30	0	342
P57	20x30	0	342
P58	20x30	0	342
P59	20x30	0	342
P60	20x30	0	342
P61	20x30	0	342
P62	20x30	0	342
P63	20x30	0	342
P64	20x30	0	342
P65	20x30	0	342
P66	20x30	0	342
P67	20x30	0	342
P68	20x30	0	342
P69	20x30	18	360
P70	20x30	18	360

Legenda dos pilares

- Pilar que morre
- Pilar que passa

Legenda das vigas e paredes

- Viga

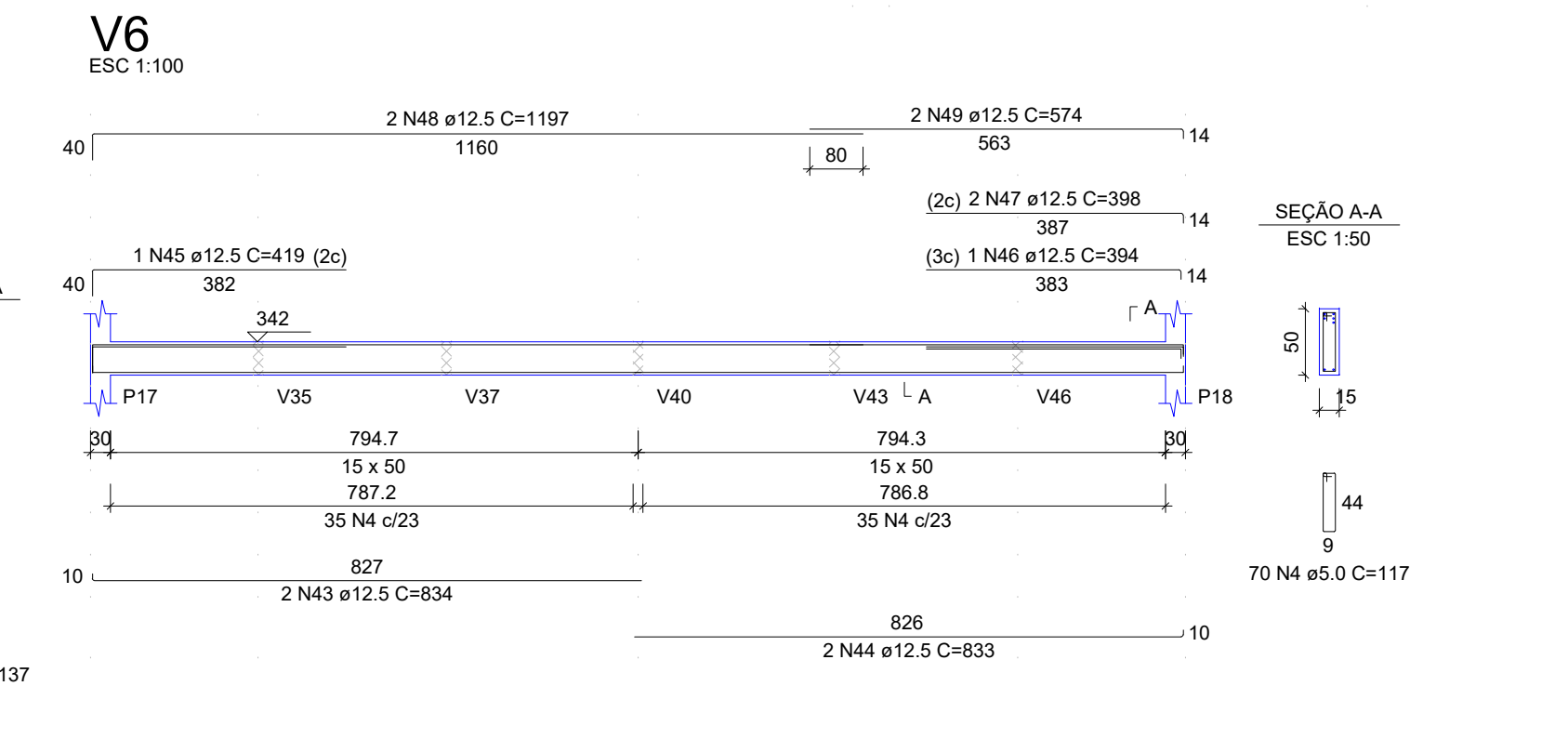
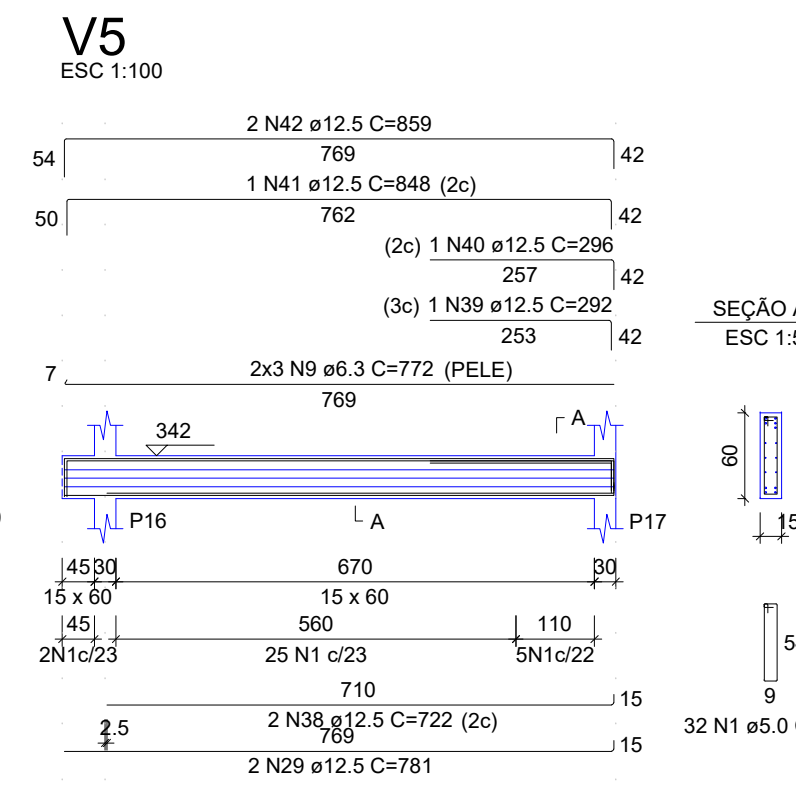
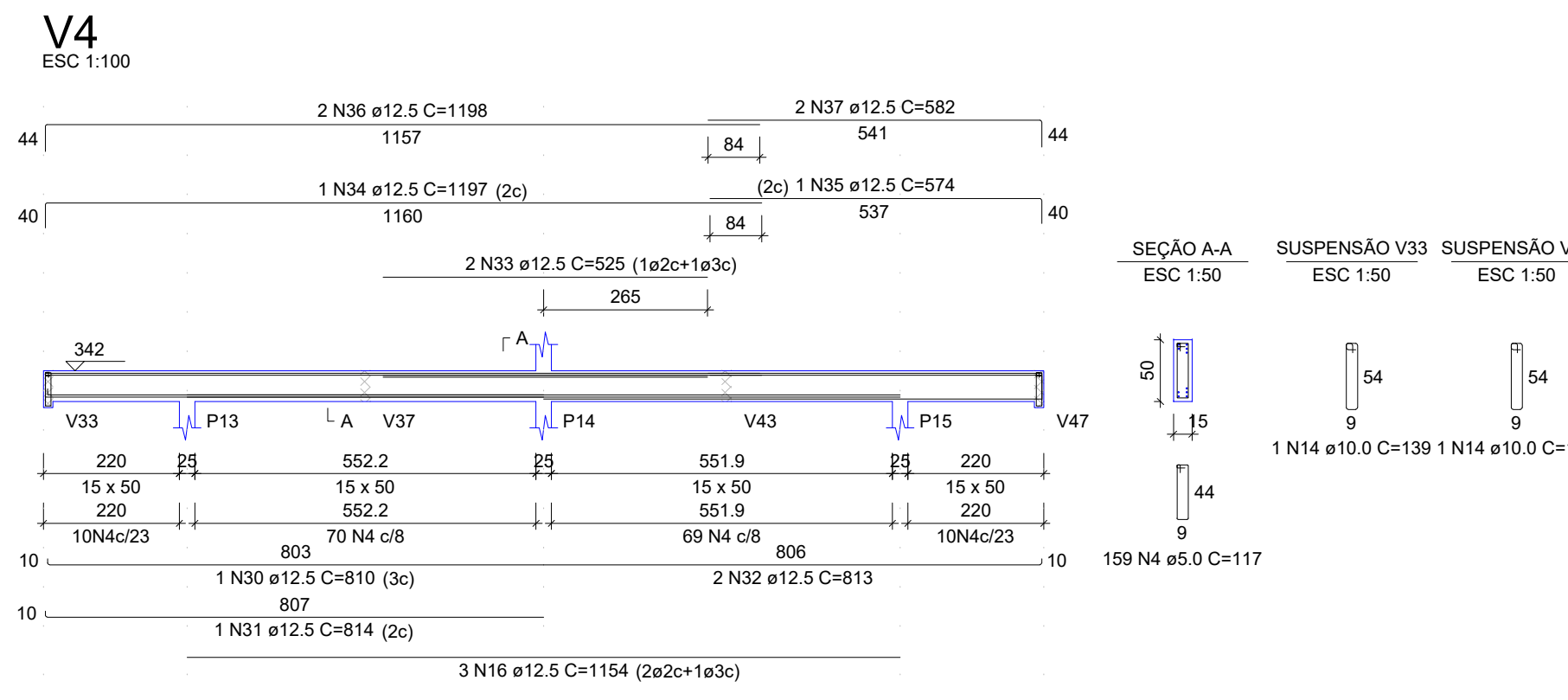
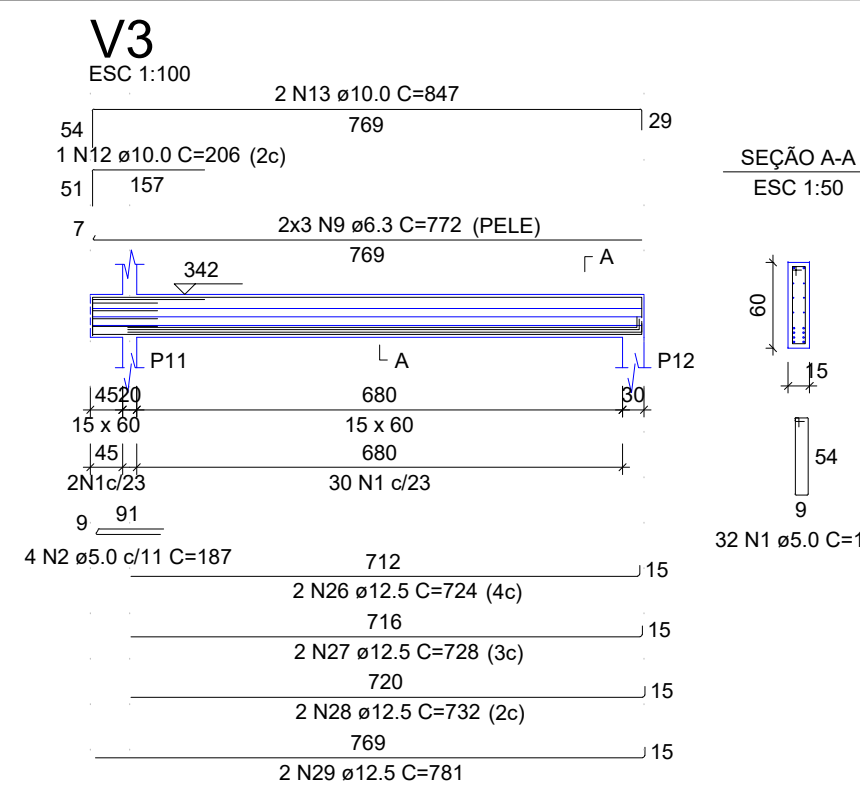
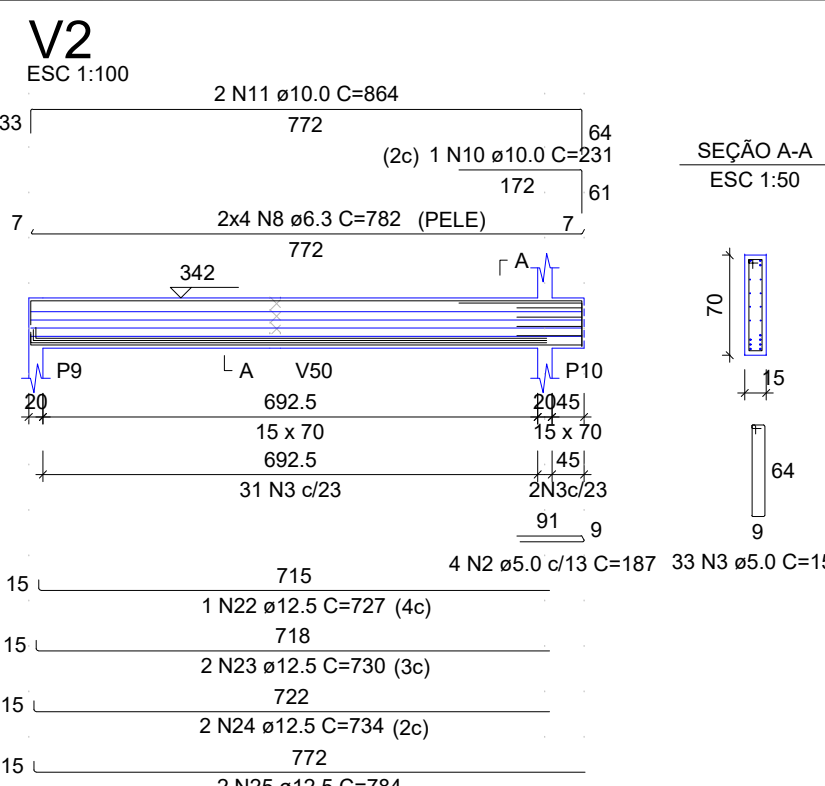
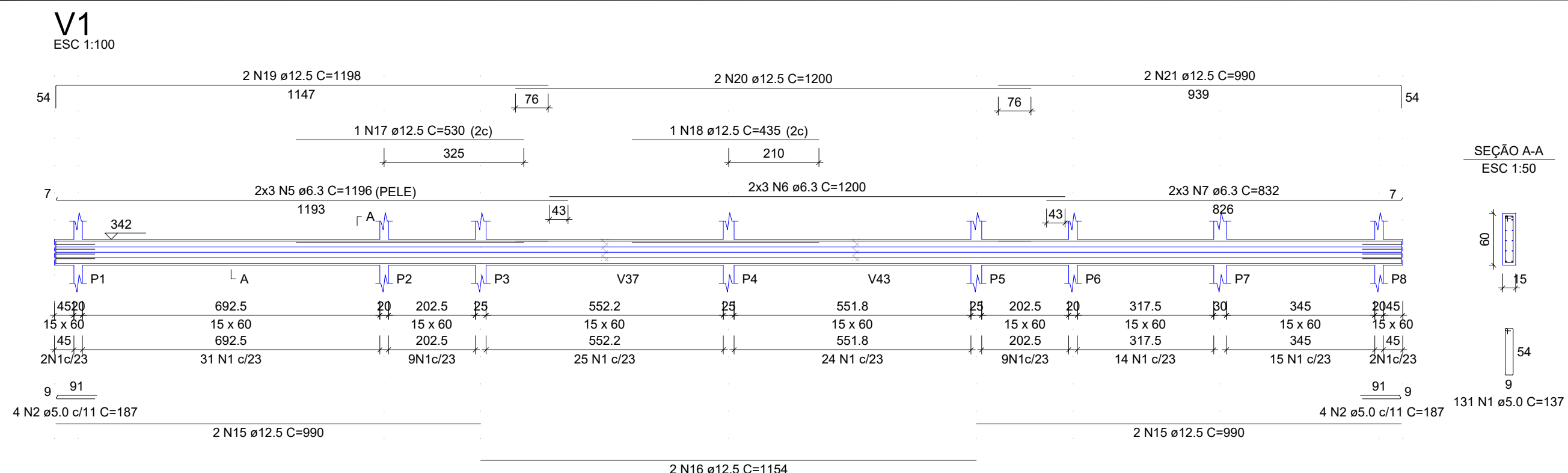


## Forma do pavimento NÍVEL 342

escala 1:100

PROPRIETÁRIO	
CALCULO	CREA  APROVO PM -
CONSTRUÇÃO	
REVISÃO PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO CLIENTE: MUNICÍPIO DE MARCO LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE CONTEÚDO: 1 Forma do pavimento Nível 342	
<p style="font-size: x-small; color: red;">         AV. PREFEITO GUIDO OSTERHO, S/N          CENTRO - MARCO - CE - 82500-000          BR 368-1210   BR 368-1415          www.marco.ce.gov.br          CNPJ: 07.546.516/0001-77       </p>	
ESCALA: INDICADA	DESENHO: SEINFRA
DATA:	<b>06/15</b>





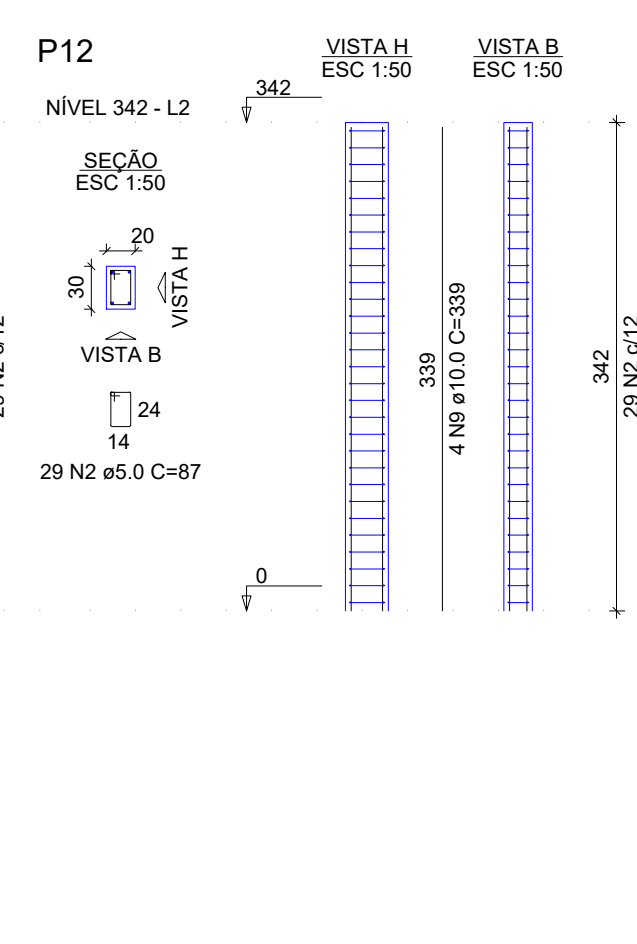
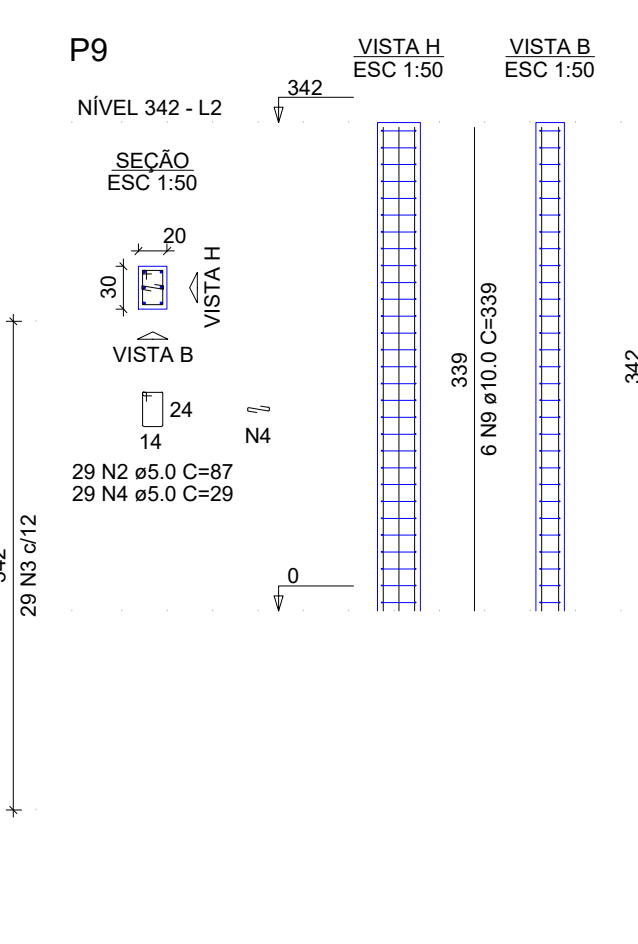
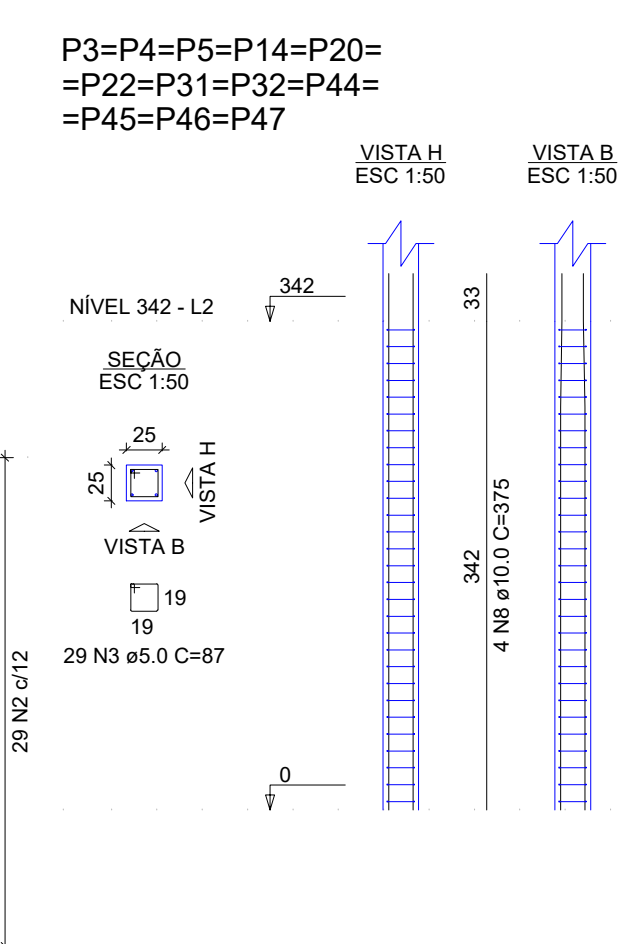
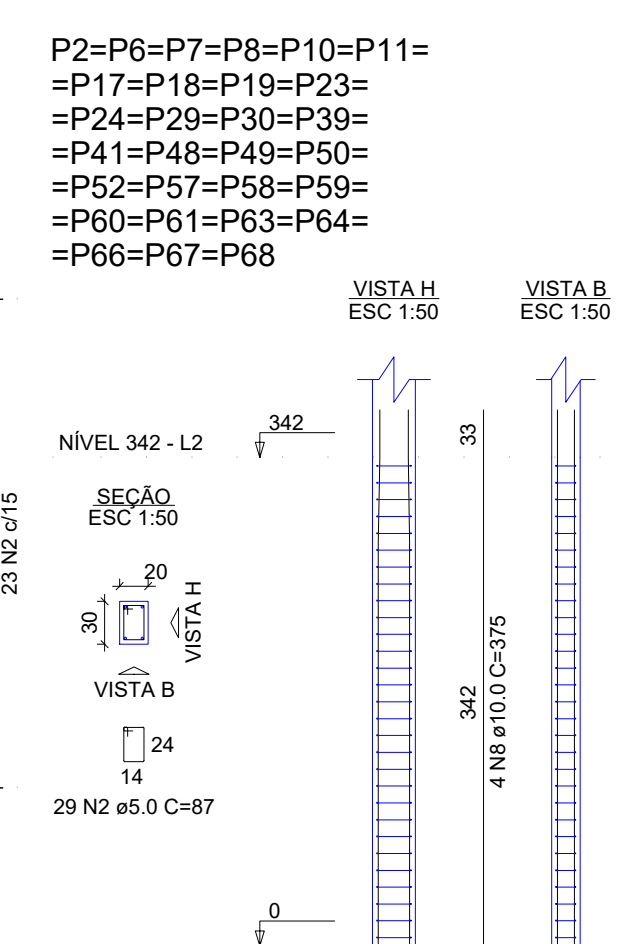
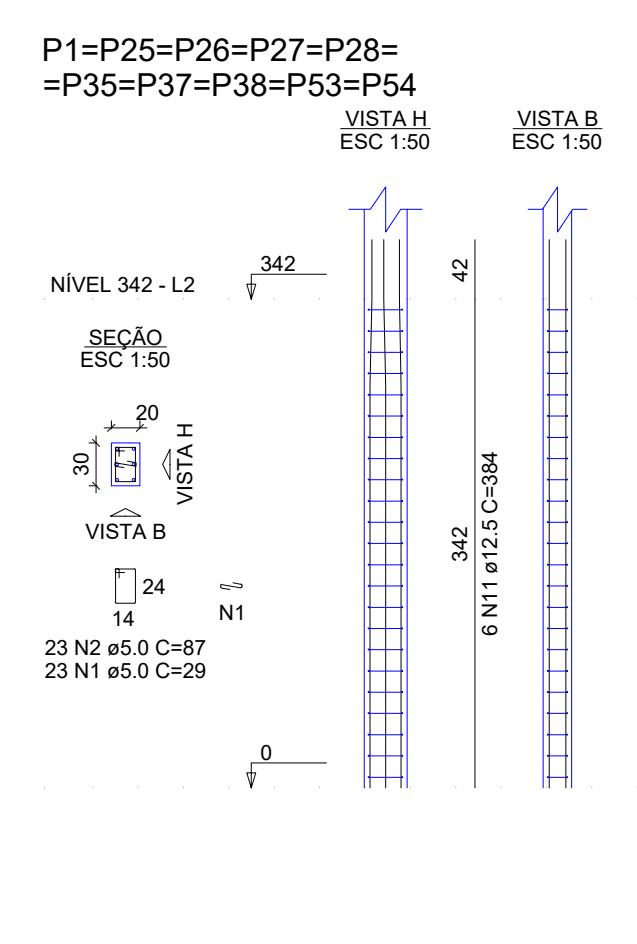
RELAÇÃO DO AÇO

AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA60	1	5.0	195	137	26715
	2	5.0	16	187	2992
	3	5.0	33	157	5181
	4	5.0	229	117	26793
	5	6.3	6	1196	7176
	6	6.3	6	1200	7200
	7	6.3	6	832	4992
	8	6.3	6	782	4692
	9	6.3	12	772	9264
	10	10.0	1	231	231
	11	10.0	2	864	1728
	12	10.0	1	206	206
	13	10.0	2	847	1694
	14	10.0	2	139	278
	15	12.5	4	990	3960
	16	12.5	5	1154	5770
	17	12.5	1	530	530
	18	12.5	1	435	435
	19	12.5	2	1198	2396
	20	12.5	2	1200	2400
	21	12.5	2	990	1980
	22	12.5	1	727	727
	23	12.5	2	730	1460
	24	12.5	2	734	1468
	25	12.5	2	784	1568
	26	12.5	2	724	1448
	27	12.5	2	728	1456
	28	12.5	2	732	1464
	29	12.5	4	781	3124
	30	12.5	1	810	810
	31	12.5	1	814	814
	32	12.5	2	813	1626
	33	12.5	2	525	1050
	34	12.5	1	1197	1197
	35	12.5	1	574	574
	36	12.5	2	1198	2396
	37	12.5	2	582	1164
	38	12.5	2	722	1444
	39	12.5	1	292	292
	40	12.5	1	296	296
	41	12.5	1	848	848
	42	12.5	2	859	1718
	43	12.5	2	834	1668
	44	12.5	2	833	1666
	45	12.5	1	419	419
	46	12.5	1	394	394
	47	12.5	2	388	776
	48	12.5	2	1197	2394
	49	12.5	2	574	1148

RESUMO DO AÇO

AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	6.3	348.9	83.9
CA50	10.0	41.4	28.1
CA50	12.5	529	560.6
CA60	5.0	616.8	104.6
<b>PESO TOTAL (kg)</b>			
CA50		682.5	
CA60		104.6	

Volume de concreto (C-30) = 7.07 m³  
Área de forma = 90.51 m²



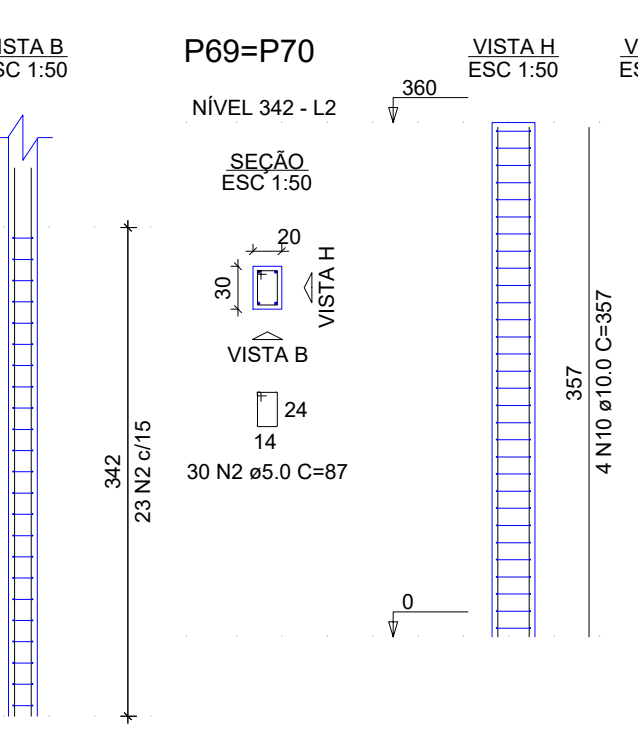
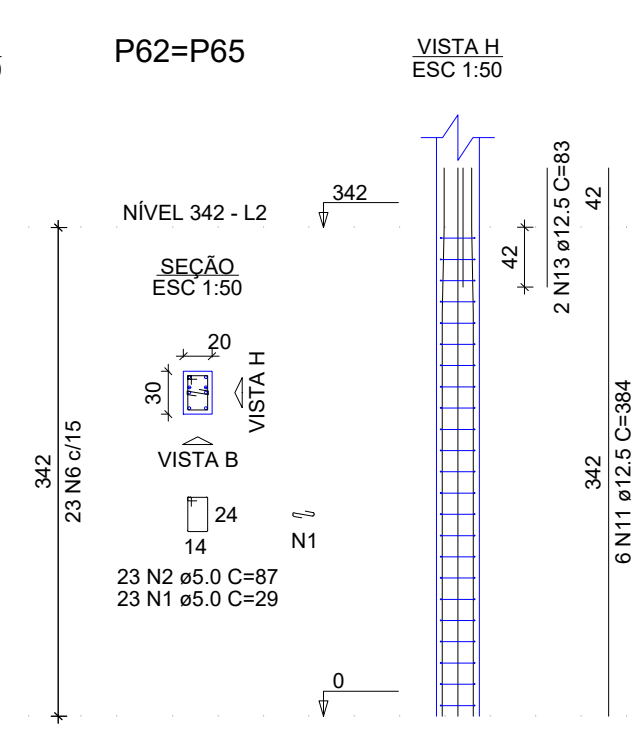
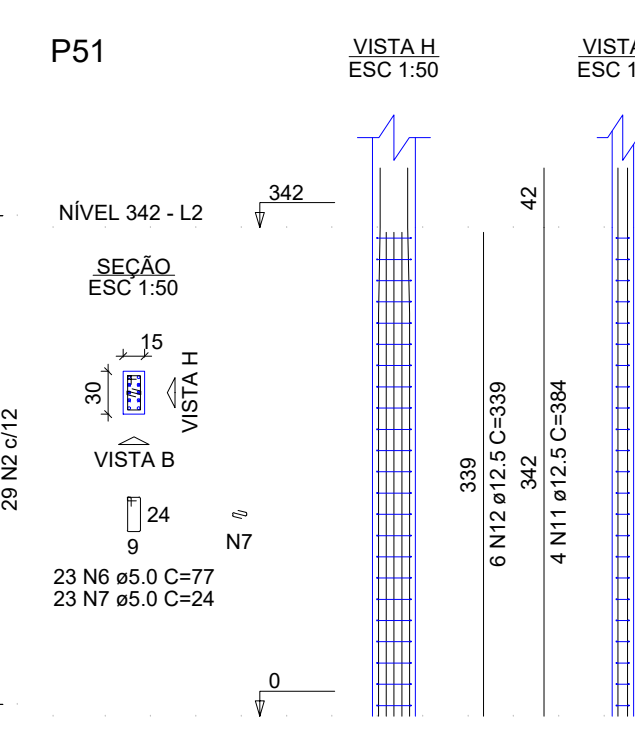
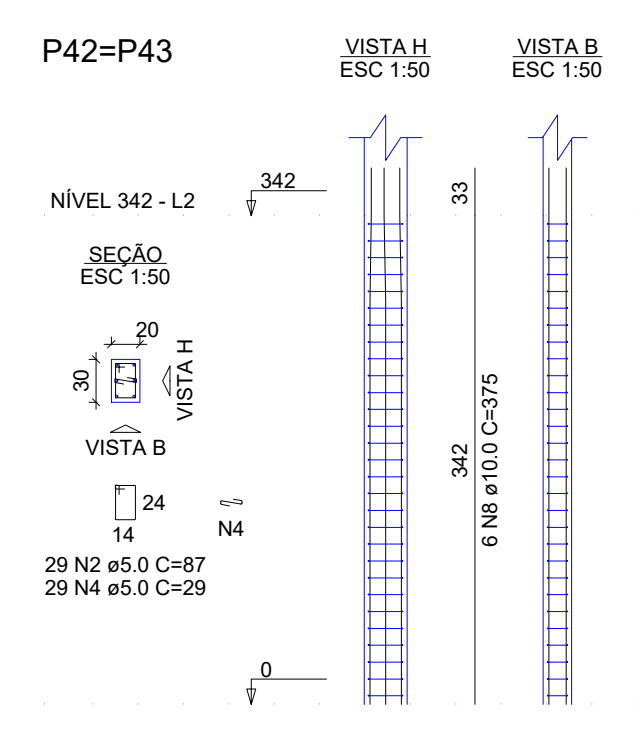
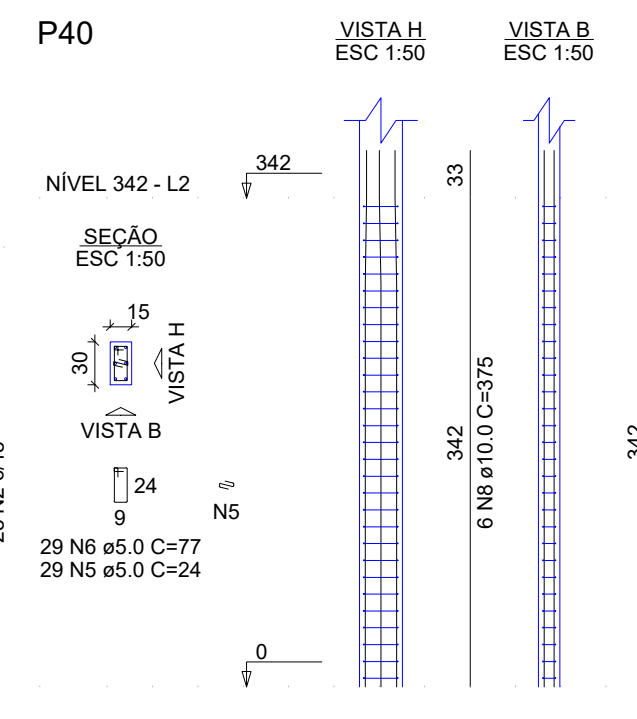
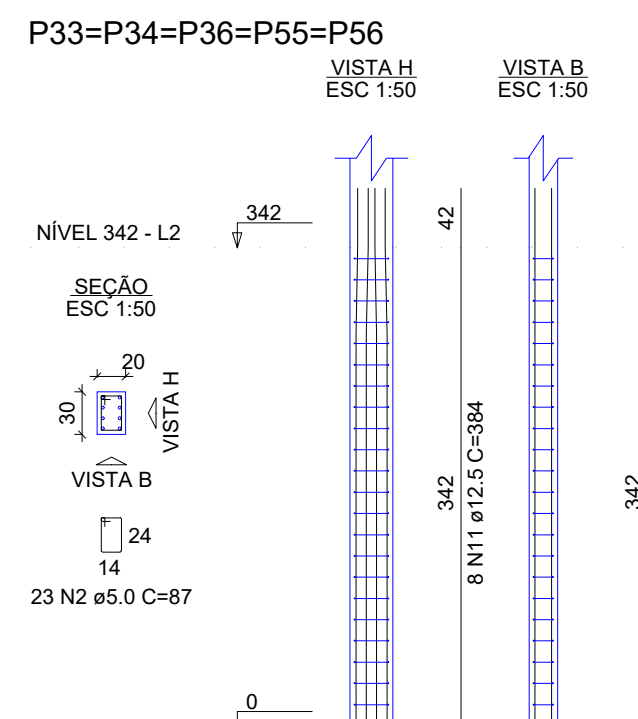
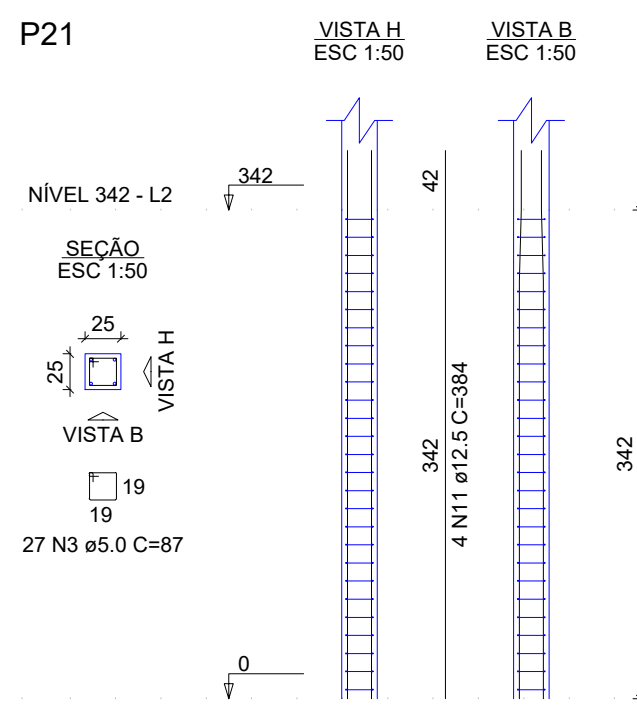
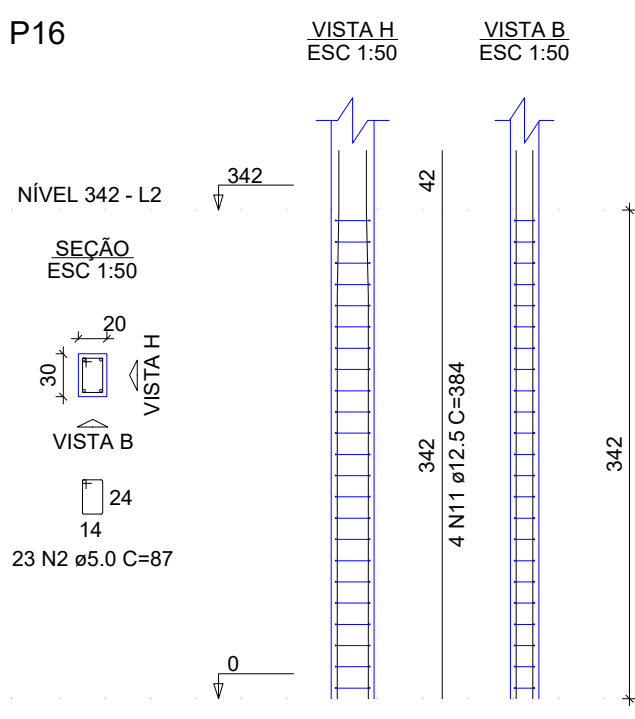
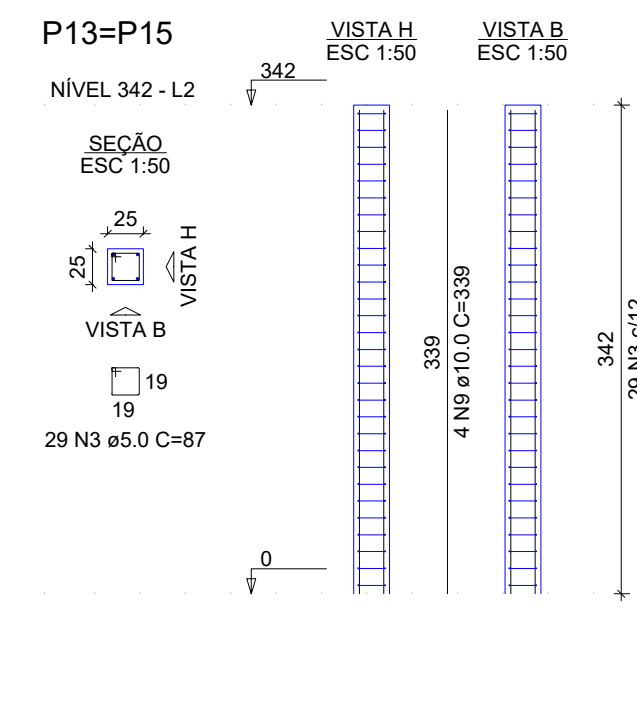
RELAÇÃO DO AÇO

AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA60	1	5.0	276	29	8004
	2	5.0	1431	87	124497
	3	5.0	433	87	37671
	4	5.0	87	29	2523
	5	5.0	29	24	696
	6	5.0	52	77	4004
	7	5.0	23	24	552
	8	10.0	182	375	68250
	9	10.0	18	339	6102
	10	10.0	8	357	2856
	11	12.5	124	384	47616
	12	12.5	6	339	2034
	13	12.5	4	83	332

RESUMO DO AÇO

AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	10.0	772.1	523.6
CA60	5.0	499.8	529.6
CA60	5.0	1779.5	301.7
<b>PESO TOTAL (kg)</b>			
CA50		1053.3	
CA60		301.7	

Volume de concreto (C-30) = 14.41 m³  
Área de forma = 239.08 m²



MODELAGEM 3D FORMAS

MODELAGEM 3D ARMADURA

PROPRIETÁRIO

CALCULO

CONSTRUÇÃO

APROVO PM -

PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO

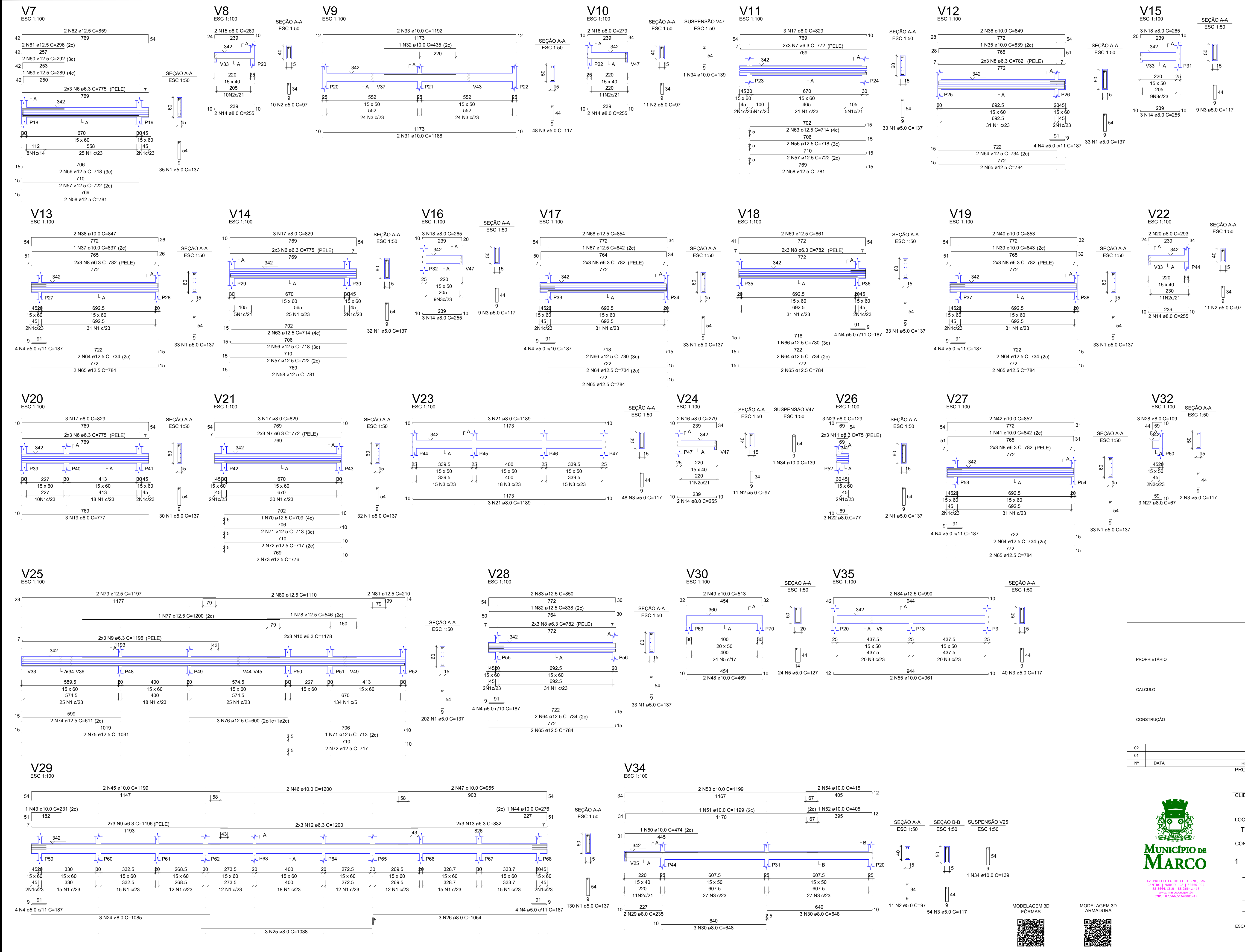
CLIENTE: MUNICÍPIO DE MARCO

LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO: 1 Detalhamento das Vigas Nível 342  
2 Detalhamento dos Pilares Nível 342

ESCALA: INDICADA DESENHO: SEINFRA PRANCHA: 07/15  
DATA: AGOSTO/2023





RELAÇÃO DO AÇO

CAÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA50	1	5.0	727	137	99599
CA50	2	5.0	54	97	5238
CA50	3	5.0	210	117	24570
CA50	4	5.0	36	187	6732
CA50	5	5.0	24	127	3048
CA50	6	6.3	18	775	13950
CA50	7	6.3	12	772	9264
CA50	8	6.3	42	782	32844
CA50	9	6.3	12	1196	14352
CA50	10	6.3	6	1178	7068
CA50	11	6.3	6	75	450
CA50	12	6.3	6	1200	7200
CA50	13	6.3	6	832	4992
CA50	14	8.0	14	255	3570
CA50	15	8.0	2	289	538
CA50	16	8.0	4	279	1116
CA50	17	8.0	12	829	9948
CA50	18	8.0	6	285	1590
CA50	19	8.0	3	777	2331
CA50	20	8.0	2	293	586
CA50	21	8.0	6	1189	7134
CA50	22	8.0	3	77	231
CA50	23	8.0	3	129	387
CA50	24	8.0	3	1085	3255
CA50	25	8.0	3	1038	3114
CA50	26	8.0	3	1054	3162
CA50	27	8.0	3	67	201
CA50	28	8.0	3	109	327
CA50	29	8.0	2	235	470
CA50	30	10.0	1	648	3888
CA50	31	10.0	2	1188	2376
CA50	32	10.0	1	435	435
CA50	33	10.0	1	1192	2384
CA50	34	10.0	3	139	417
CA50	35	10.0	1	839	839
CA50	36	10.0	1	849	849
CA50	37	10.0	1	837	837
CA50	38	10.0	2	847	1694
CA50	39	10.0	1	843	843
CA50	40	10.0	2	853	1706
CA50	41	10.0	1	842	842
CA50	42	10.0	2	852	1704
CA50	43	10.0	1	231	231
CA50	44	10.0	1	276	276
CA50	45	10.0	1	1199	1199
CA50	46	10.0	2	1200	2400
CA50	47	10.0	2	955	1910
CA50	48	10.0	2	469	938
CA50	49	10.0	2	513	1026
CA50	50	10.0	1	474	474
CA50	51	10.0	1	1199	1199
CA50	52	10.0	1	405	405
CA50	53	10.0	2	1199	2398
CA50	54	10.0	2	415	830
CA50	55	10.0	2	961	1922
CA50	56	12.5	6	718	4308
CA50	57	12.5	6	722	4332
CA50	58	12.5	6	781	4686
CA50	59	12.5	1	289	289
CA50	60	12.5	2	292	584
CA50	61	12.5	2	296	592
CA50	62	12.5	2	859	1718
CA50	63	12.5	4	714	2856
CA50	64	12.5	14	734	10276
CA50	65	12.5	14	784	10976
CA50	66	12.5	3	730	2190
CA50	67	12.5	1	842	842
CA50	68	12.5	2	854	1708
CA50	69	12.5	2	861	1722
CA50	70	12.5	1	709	709
CA50	71	12.5	3	713	2139
CA50	72	12.5	4	717	2868
CA50	73	12.5	2	776	1552
CA50	74	12.5	2	811	1622
CA50	75	12.5	2	1031	2062
CA50	76	12.5	3	600	1800
CA50	77	12.5	1	1200	1200
CA50	78	12.5	1	546	546
CA50	79	12.5	2	1197	2394
CA50	80	12.5	2	1110	2220
CA50	81	12.5	2	210	420
CA50	82	12.5	1	838	838
CA50	83	12.5	2	850	1700
CA50	84	12.5	2	990	1980

RESUMO DO AÇO

CAÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	6.3	901.2	242.6
CA50	8.0	418.5	181.6
CA50	10.0	321.8	218.3
CA50	12.5	707.3	749.5
CA60	5.0	1391.9	236
CA60	5.0	1392	236
CA60	5.0	236	236

Volume de concreto (C-30) = 17.06 m³  
Área de forma = 218.22 m²

PROPRIETÁRIO: \_\_\_\_\_

CALCULO: \_\_\_\_\_

CONSTRUÇÃO: \_\_\_\_\_

APROVAÇÃO: \_\_\_\_\_

PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO

CLIENTE: MUNICÍPIO DE MARCO

LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO: 1 Detalhamento das Vigas Nível 342

ESCALA: \_\_\_\_\_ DESENHO: SEINFRA PRANCHA: \_\_\_\_\_

DATA: \_\_\_\_\_

08/15

AGOSTO/2023



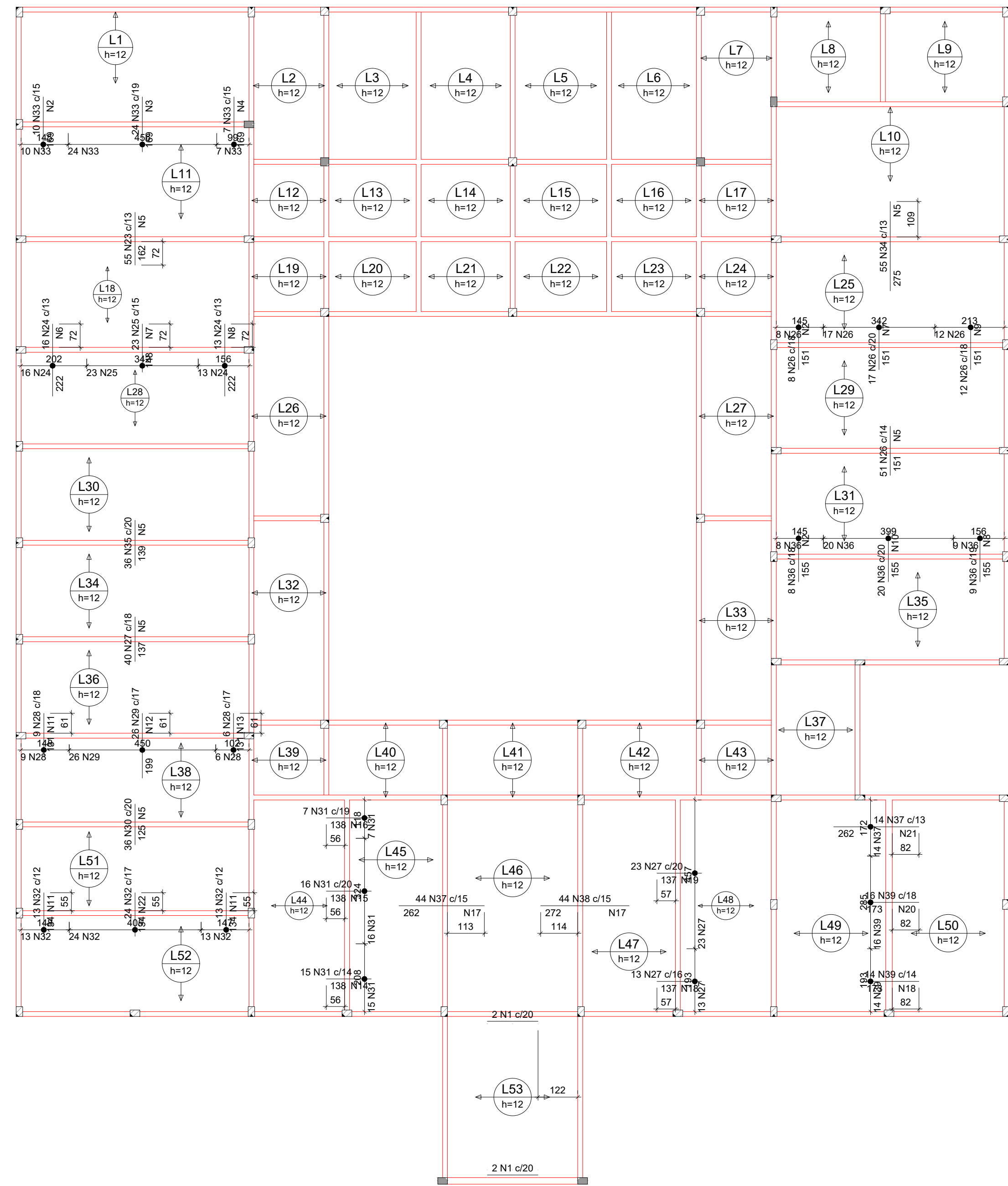
AV. PREFEITO GUIDO OSTENHO, S/N  
CENTRO - MARCO - CE - 84500-000  
FONE: (85) 3341-1111  
CNPJ: 07.546.316/0001-77









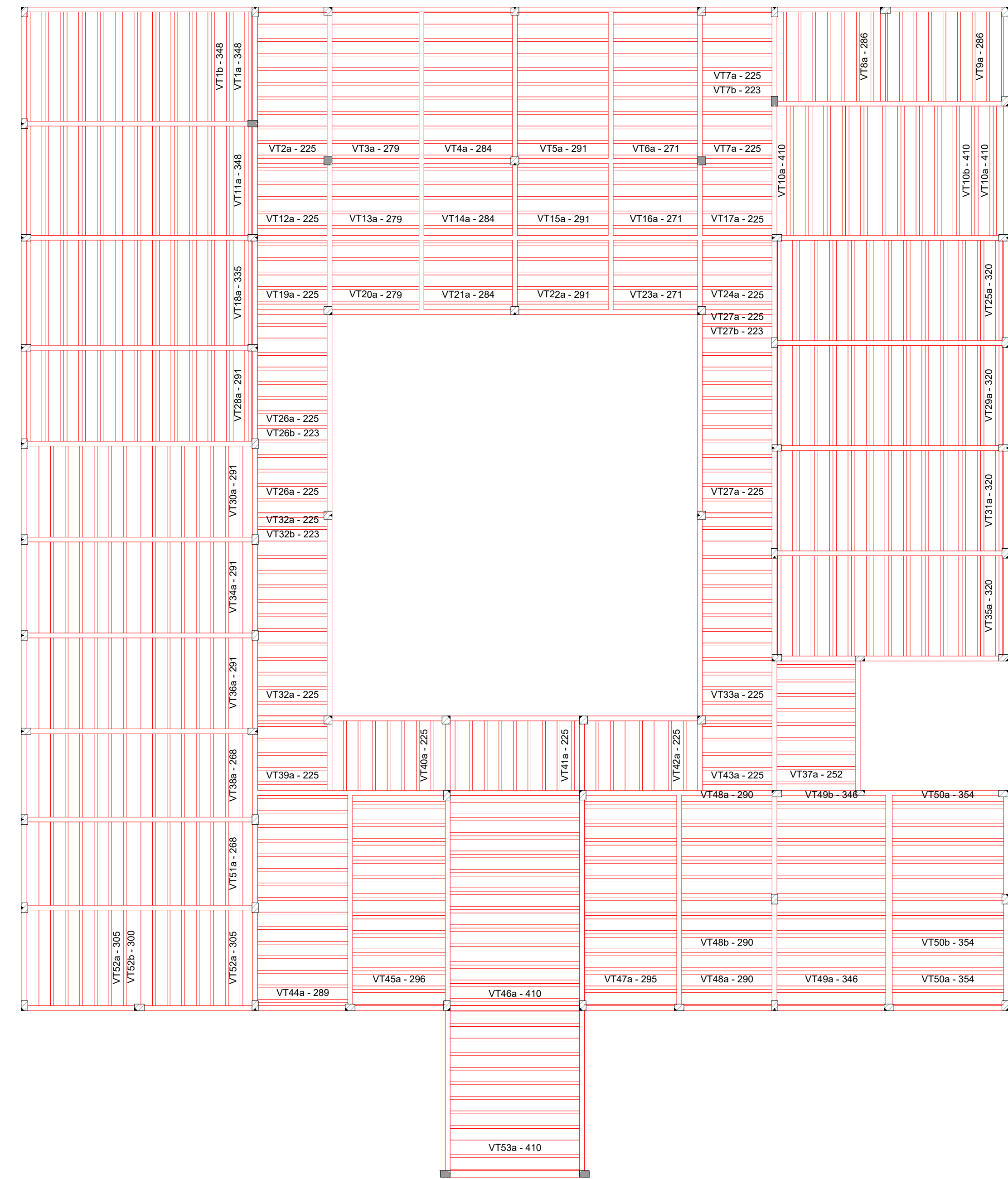
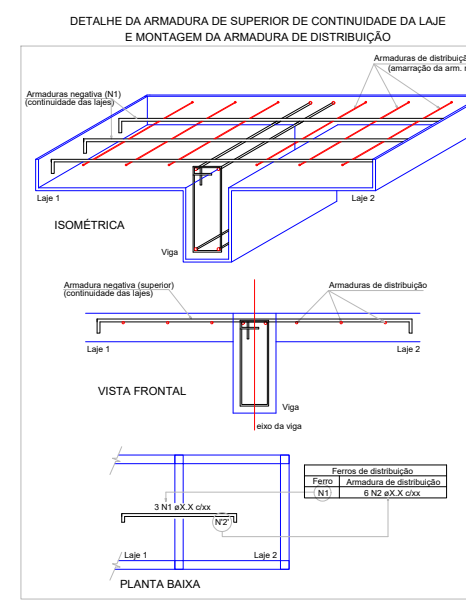


Armação negativa das lajes do pavimento NÍVEL 342

escala 1:100

Armaduras de distribuição

Armadura	Armadura de distribuição
N33	9 N2 e5.0 c/20 C=152
N33	9 N3 e5.0 c/20 C=456
N33	9 N4 e5.0 c/20 C=107
N34	14 N5 e5.0 c/20 C=715
N23	9 N5 e5.0 c/20 C=715
N24	12 N6 e5.0 c/20 C=209
N25	8 N7 e5.0 c/20 C=342
N24	12 N8 e5.0 c/20 C=164
N26	8 N2 e5.0 c/20 C=152
N26	8 N7 e5.0 c/20 C=342
N26	8 N9 e5.0 c/20 C=221
N26	8 N5 e5.0 c/20 C=715
N35	7 N5 e5.0 c/20 C=715
N36	8 N2 e5.0 c/20 C=152
N36	8 N10 e5.0 c/20 C=399
N36	8 N8 e5.0 c/20 C=164
N27	7 N5 e5.0 c/20 C=715
N28	7 N15 e5.0 c/20 C=155
N29	10 N12 e5.0 c/20 C=450
N28	7 N13 e5.0 c/20 C=110
N30	7 N5 e5.0 c/20 C=715
N31	7 N14 e5.0 c/20 C=216
N31	7 N15 e5.0 c/20 C=324
N31	7 N16 e5.0 c/20 C=126
N37	14 N17 e5.0 c/20 C=665
N38	14 N17 e5.0 c/20 C=665
N27	7 N18 e5.0 c/20 C=201
N27	7 N19 e5.0 c/20 C=465
N39	9 N18 e5.0 c/20 C=201
N39	9 N20 e5.0 c/20 C=285
N37	14 N21 e5.0 c/20 C=180
N32	7 N11 e5.0 c/20 C=405
N32	7 N11 e5.0 c/20 C=155



Planta de vigotas pré-moldadas

escala 1:100

RELAÇÃO DO AÇO

LE1	LE2	LE3			
CA50	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
1	6.3	17	206	3502	
2	8.0	10	219	2190	
3	8.0	10	465	4650	
4	8.0	4	209	836	
5	8.0	10	362	3620	
6	10.0	10	397	3970	
7	10.0	20	543	10860	
8	10.0	15	204	3060	

RESUMO DO AÇO

AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	6.3	35	8.4
CA50	8.0	113	49
CA50	10.0	178.9	121.3
<b>PESO TOTAL (kg)</b>			<b>179.8</b>

Volume de concreto (C-30) = 3.75 m³  
Área de forma = 30.95 m²

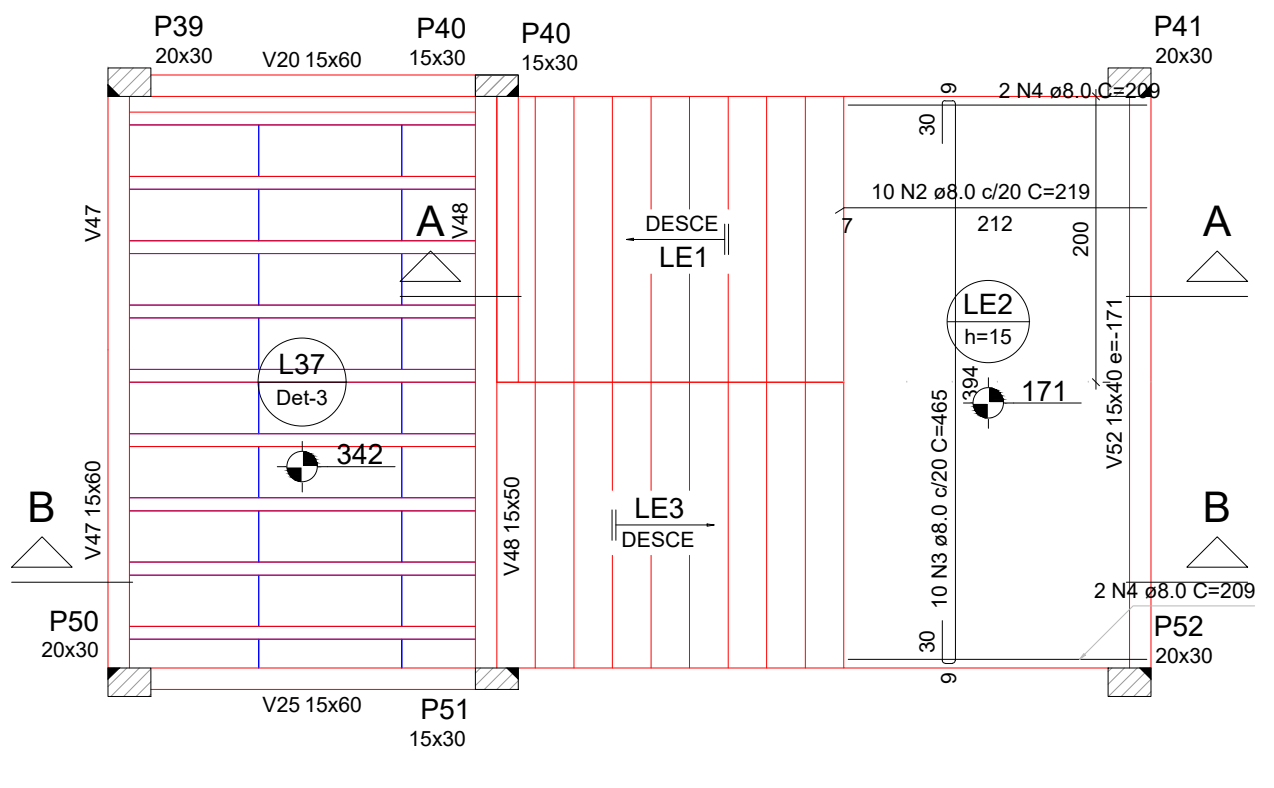
RELAÇÃO DO AÇO

AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA60	1	5.0	4	156	624
CA60	2	5.0	25	156	3900
CA60	3	5.0	9	456	4104
CA60	4	5.0	9	107	963
CA60	5	5.0	52	715	37180
CA60	6	5.0	12	209	2508
CA60	7	5.0	16	342	5472
CA60	8	5.0	20	34	3280
CA60	9	5.0	8	221	1768
CA60	10	5.0	8	399	3192
CA60	11	5.0	21	155	3255
CA60	12	5.0	10	450	4500
CA60	13	5.0	7	110	770
CA60	14	5.0	7	216	1512
CA60	15	5.0	7	324	2268
CA60	16	5.0	7	126	882
CA60	17	5.0	28	666	18620
CA60	18	5.0	16	201	3216
CA60	19	5.0	7	465	3255
CA60	20	5.0	9	285	2565
CA60	21	5.0	14	180	2520
CA60	22	5.0	7	405	2835
CA60	23	6.3	55	162	8910
CA60	24	6.3	29	222	6438
CA60	25	6.3	23	148	3404
CA60	26	6.3	88	151	13288
CA60	27	6.3	76	137	10412
CA60	28	6.3	15	131	1965
CA60	29	6.3	26	199	5174
CA60	30	6.3	36	125	4500
CA60	31	6.3	38	138	5244
CA60	32	6.3	50	134	6700
CA60	33	8.0	41	169	6929
CA60	34	8.0	55	275	15125
CA60	35	8.0	36	138	5004
CA60	36	8.0	37	155	5735
CA60	37	8.0	58	262	15196
CA60	38	8.0	44	272	11968
CA60	39	8.0	30	173	5190

RESUMO DO AÇO

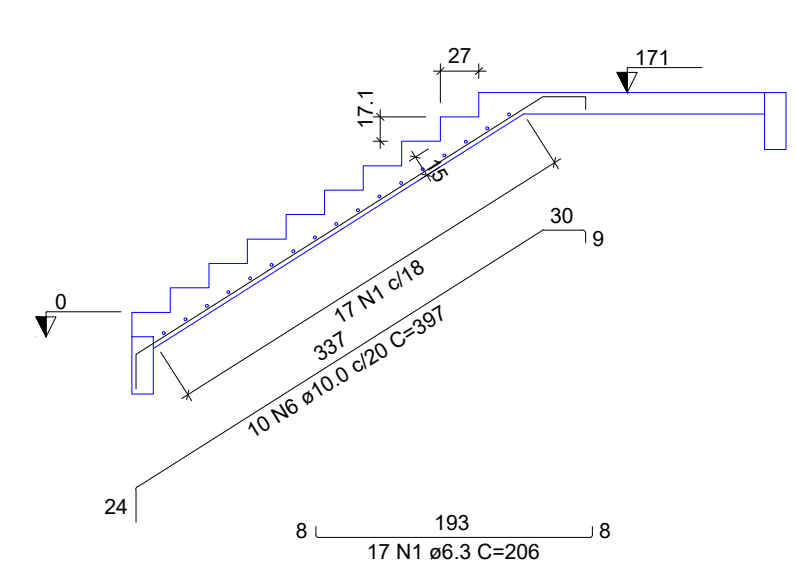
AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	6.3	660.4	177.7
CA60	8.0	651.5	292.8
CA60	5.0	1090.9	185
<b>PESO TOTAL (kg)</b>			<b>460.5</b>

Volume de concreto (C-30) = 0.00 m³  
Área de forma = 0.00 m²



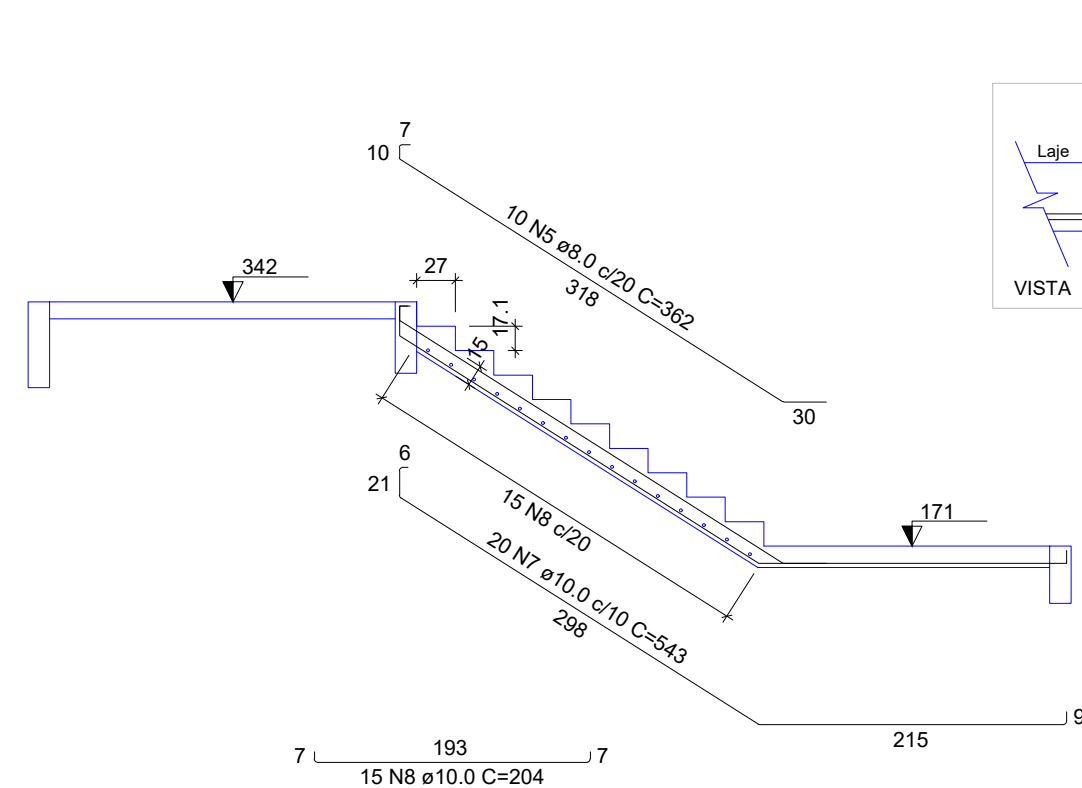
Armação positiva da escada E1

ESC 1:50



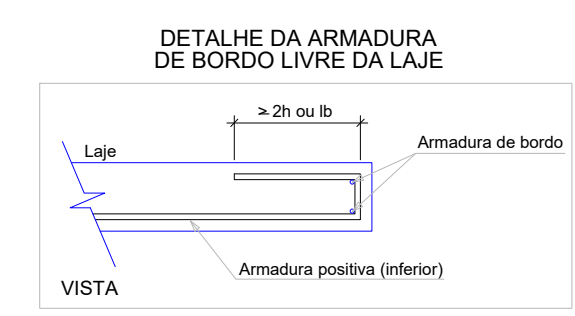
Corte A-A (LE1)

ESC 1:50



Corte B-B (LE3)

ESC 1:50



PROPRIETÁRIO \_\_\_\_\_

CALCULO \_\_\_\_\_

CONSTRUÇÃO \_\_\_\_\_

APROVO PM - \_\_\_\_\_

REVISÃO \_\_\_\_\_

DESENHO \_\_\_\_\_

APROVAÇÃO \_\_\_\_\_

PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO

CLIENTE: MUNICÍPIO DE MARCO

LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO:

- Armação neg. das lajes do Nível 342
- Planta de vigotas pré-moldadas
- Detalhamento da Escada E1

ESCALA: \_\_\_\_\_

DESENHO: SEINFRA

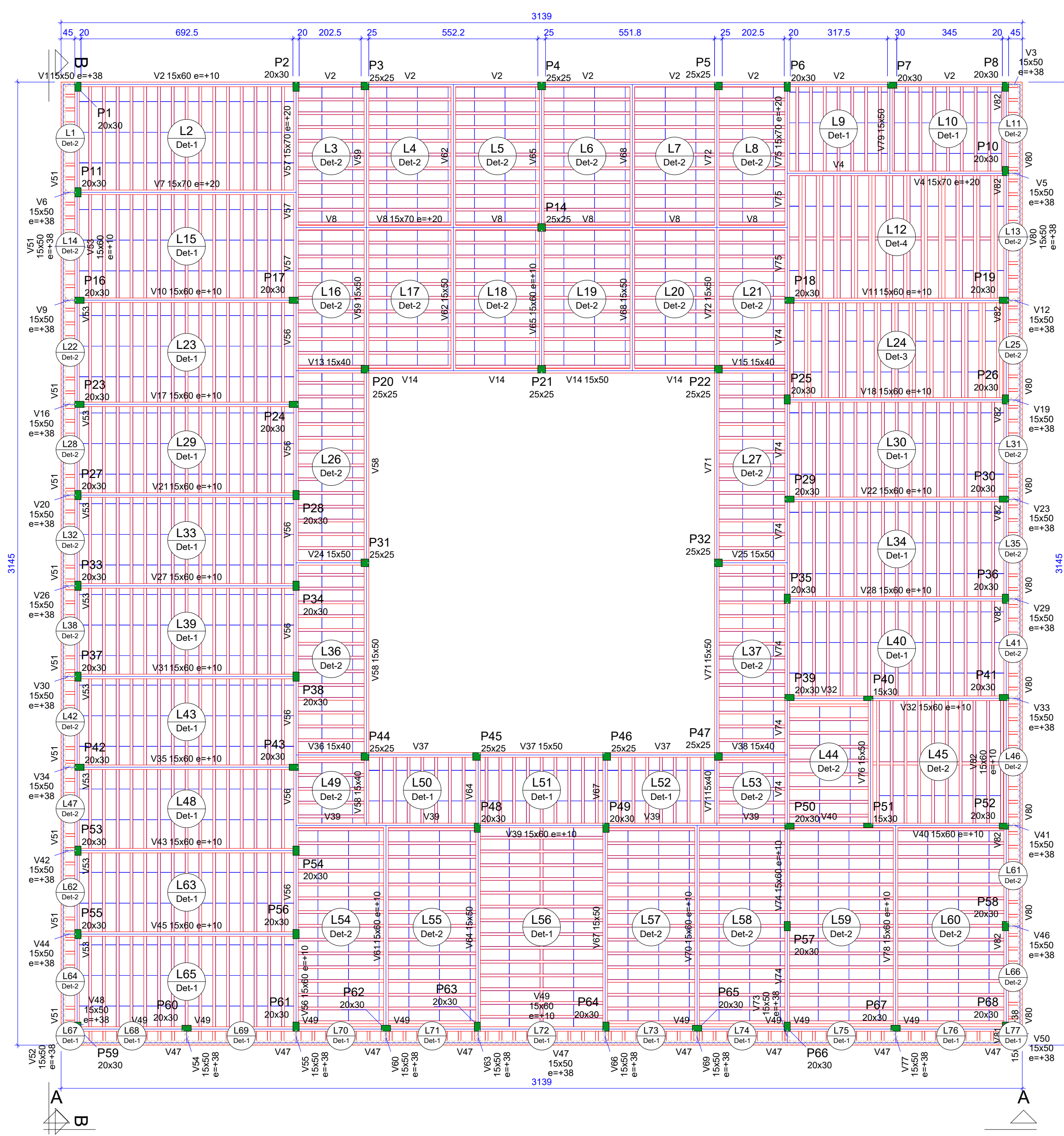
PRANCHA: 10/15

INDICADA: \_\_\_\_\_

DATA: AGOSTO/2023

AV. PREFEITO GUIDO OSTERHO, S/N  
CENTRO - MARCO - CE - 82500-000  
FONE: 3565-1210 / 3534-5115  
WWW.MARCO.CE.GOV.BR  
CNPJ: 07.546.516/0001-17





Forma do pavimento NÍVEL 684  
escala 1:100

Blocos de enchimento				
Detalhe	Tipo	Nome	Dimensões(cm)	Quantidade
1/2/3/4	EPS Unidirecional	B7/36/100	7   36   100	2065

Vigas			
Nome	Seção (cm)	Elevação (cm)	Nível (cm)
V1	15x50	38	722
V2	15x60	10	694
V3	15x50	38	722
V4	15x70	20	704
V5	15x50	38	722
V6	15x50	38	722
V7	15x70	20	704
V8	15x70	20	704
V9	15x50	38	722
V10	15x60	10	694
V11	15x60	10	694
V12	15x50	38	722
V13	15x40	0	684
V14	15x50	0	684
V15	15x40	0	684
V16	15x50	38	722
V17	15x60	10	694
V18	15x60	10	694
V19	15x50	38	722
V20	15x50	38	722
V21	15x60	10	694
V22	15x60	10	694
V23	15x50	38	722
V24	15x50	0	684
V25	15x50	0	684
V26	15x50	38	722
V27	15x60	10	694
V28	15x60	10	694
V29	15x50	38	722
V30	15x50	38	722
V31	15x60	10	694
V32	15x60	10	694
V33	15x50	38	722
V34	15x50	38	722
V35	15x60	10	694
V36	15x40	0	684
V37	15x50	0	684
V38	15x40	0	684
V39	15x60	10	694
V40	15x60	10	694
V41	15x50	38	722
V42	15x50	38	722
V43	15x60	10	694
V44	15x50	38	722
V45	15x60	10	694
V46	15x50	38	722
V47	15x50	38	722
V48	15x50	38	722
V49	15x60	10	694
V50	15x50	38	722
V51	15x50	38	722
V52	15x50	38	722
V53	15x60	10	694
V54	15x50	38	722
V55	15x50	38	722
V56	15x60	10	694
V57	15x70	20	704
V58	15x40	0	684
V59	15x50	0	684
V60	15x50	38	722
V61	15x60	10	694
V62	15x50	0	684
V63	15x50	38	722
V64	15x50	0	684
V65	15x60	10	694
V66	15x50	38	722
V67	15x50	0	684
V68	15x50	0	684
V69	15x50	38	722
V70	15x60	10	694
V71	15x40	0	684
V72	15x50	0	684
V73	15x50	38	722
V74	15x60	10	694
V75	15x70	20	704
V76	15x50	0	684
V77	15x50	38	722
V78	15x60	10	694
V79	15x50	0	684
V80	15x50	38	722
V82	15x60	10	694

Lajes						
Nome	Tipo	Altura (cm)	Elevação (cm)		Sobrecarga (kgf/m²)	
			Nível (cm)	Peso próprio (kgf/m²)	Acidental	Localizada
L1	Treliçada 1D	12	0	684	161	155
L2	Treliçada 1D	12	0	684	161	155
L3	Treliçada 1D	12	0	684	161	155
L4	Treliçada 1D	12	0	684	161	155
L5	Treliçada 1D	12	0	684	161	155
L6	Treliçada 1D	12	0	684	161	155
L7	Treliçada 1D	12	0	684	161	155
L8	Treliçada 1D	12	0	684	161	155
L9	Treliçada 1D	12	0	684	161	155
L10	Treliçada 1D	12	0	684	161	155
L11	Treliçada 1D	12	0	684	161	155
L12	Treliçada 1D	12	0	684	161	155
L13	Treliçada 1D	12	0	684	161	155
L14	Treliçada 1D	12	0	684	161	155
L15	Treliçada 1D	12	0	684	161	155
L16	Treliçada 1D	12	0	684	161	155
L17	Treliçada 1D	12	0	684	161	155
L18	Treliçada 1D	12	0	684	161	155
L19	Treliçada 1D	12	0	684	161	155
L20	Treliçada 1D	12	0	684	161	155
L21	Treliçada 1D	12	0	684	161	155
L22	Treliçada 1D	12	0	684	161	155
L23	Treliçada 1D	12	0	684	161	155
L24	Treliçada 1D	12	0	684	161	155
L25	Treliçada 1D	12	0	684	161	155
L26	Treliçada 1D	12	0	684	161	155
L27	Treliçada 1D	12	0	684	161	155
L28	Treliçada 1D	12	0	684	161	155
L29	Treliçada 1D	12	0	684	161	155
L30	Treliçada 1D	12	0	684	161	155
L31	Treliçada 1D	12	0	684	161	155
L32	Treliçada 1D	12	0	684	161	155
L33	Treliçada 1D	12	0	684	161	155
L34	Treliçada 1D	12	0	684	161	155
L35	Treliçada 1D	12	0	684	161	155
L36	Treliçada 1D	12	0	684	161	155
L37	Treliçada 1D	12	0	684	161	155
L38	Treliçada 1D	12	0	684	161	155
L39	Treliçada 1D	12	0	684	161	155
L40	Treliçada 1D	12	0	684	161	155
L41	Treliçada 1D	12	0	684	161	155
L42	Treliçada 1D	12	0	684	161	155
L43	Treliçada 1D	12	0	684	161	155
L44	Treliçada 1D	12	0	684	161	155
L45	Treliçada 1D	12	0	684	161	155
L46	Treliçada 1D	12	0	684	161	155
L47	Treliçada 1D	12	0	684	161	155
L48	Treliçada 1D	12	0	684	161	155
L49	Treliçada 1D	12	0	684	161	155
L50	Treliçada 1D	12	0	684	161	155
L51	Treliçada 1D	12	0	684	161	155
L52	Treliçada 1D	12	0	684	161	155
L53	Treliçada 1D	12	0	684	161	155
L54	Treliçada 1D	12	0	684	161	155
L55	Treliçada 1D	12	0	684	161	155
L56	Treliçada 1D	12	0	684	161	155
L57	Treliçada 1D	12	0	684	161	155
L58	Treliçada 1D	12	0	684	161	155
L59	Treliçada 1D	12	0	684	161	155
L60	Treliçada 1D	12	0	684	161	155
L61	Treliçada 1D	12	0	684	161	155
L62	Treliçada 1D	12	0	684	161	155
L63	Treliçada 1D	12	0	684	161	155
L64	Treliçada 1D	12	0	684	161	155
L65	Treliçada 1D	12	0	684	161	155
L66	Treliçada 1D	12	0	684	161	155
L67	Treliçada 1D	12	0	684	161	155
L68	Treliçada 1D	12	0	684	161	155
L69	Treliçada 1D	12	0	684	161	155
L70	Treliçada 1D	12	0	684	161	155
L71	Treliçada 1D	12	0	684	161	155
L72	Treliçada 1D	12	0	684	161	155
L73	Treliçada 1D	12	0	684	161	155
L74	Treliçada 1D	12	0	684	161	155
L75	Treliçada 1D	12	0	684	161	155
L76	Treliçada 1D	12	0	684	161	155
L77	Treliçada 1D	12	0	684	161	155

Pilares			
Nome	Seção (cm)	Elevação (cm)	Nível (cm)
P1	20x30	38	722
P2	20x30	0	684
P3	25x25	0	684
P4	25x25	0	684
P5	25x25	0	684
P6	20x30	0	684
P7	20x30	0	684
P8	20x30	38	722
P9	20x30	38	722
P10	20x30	38	722
P11	20x30	38	722
P12	25x25	0	684
P13	20x30	38	722
P14	25x25	0	684
P15	20x30	38	722
P16	20x30	38	722
P17	20x30	38	722
P18	20x30	0	684
P19	20x30	38	722
P20	25x25	0	684
P21	25x25	0	684
P22	20x30	38	722
P23	20x30	38	722
P24	20x30	0	684
P25	20x30	0	684
P26	20x30	38	722
P27	20x30	38	722
P28	20x30	0	684
P29	20x30	0	684
P30	20x30	38	722
P31	25x25	0	684
P32	25x25	0	684
P33	20x30	38	722
P34	20x30	0	684
P35	20x30	0	684
P36	20x30	38	722
P37	20x30	38	722
P38	20x30	0	684
P39	20x30	0	684
P40	15x30	0	684
P41	20x30	38	722
P42	20x30	38	722
P43	20x30	0	684
P44	25x25	0	684
P45	25x25	0	684
P46	25x25	0	684
P47	20x30	38	722
P48	20x30	0	684
P49	20x30	0	684
P50	20x30	38	722
P51	15x30	0	684
P52	20x30	38	722
P53	20x30	38	722
P54	20x30	0	684
P55	20x30	38	722
P56	20x30	0	684
P57	20x30	0	684
P58	20x30	38	722
P59	20x30	38	722
P60	20x30	38	722
P61	20x30	38	722
P62	20x30	38	722
P63	20x30	38	722
P64	20x30	38	722
P65	20x30	38	722
P66	20x30	38	722
P67	20x30	38	722
P68	20x30	38	722

**Legenda dos pilares**

Pilar que morre

**Legenda das vigas e paredes**

Viga

Viga chata ou invertida

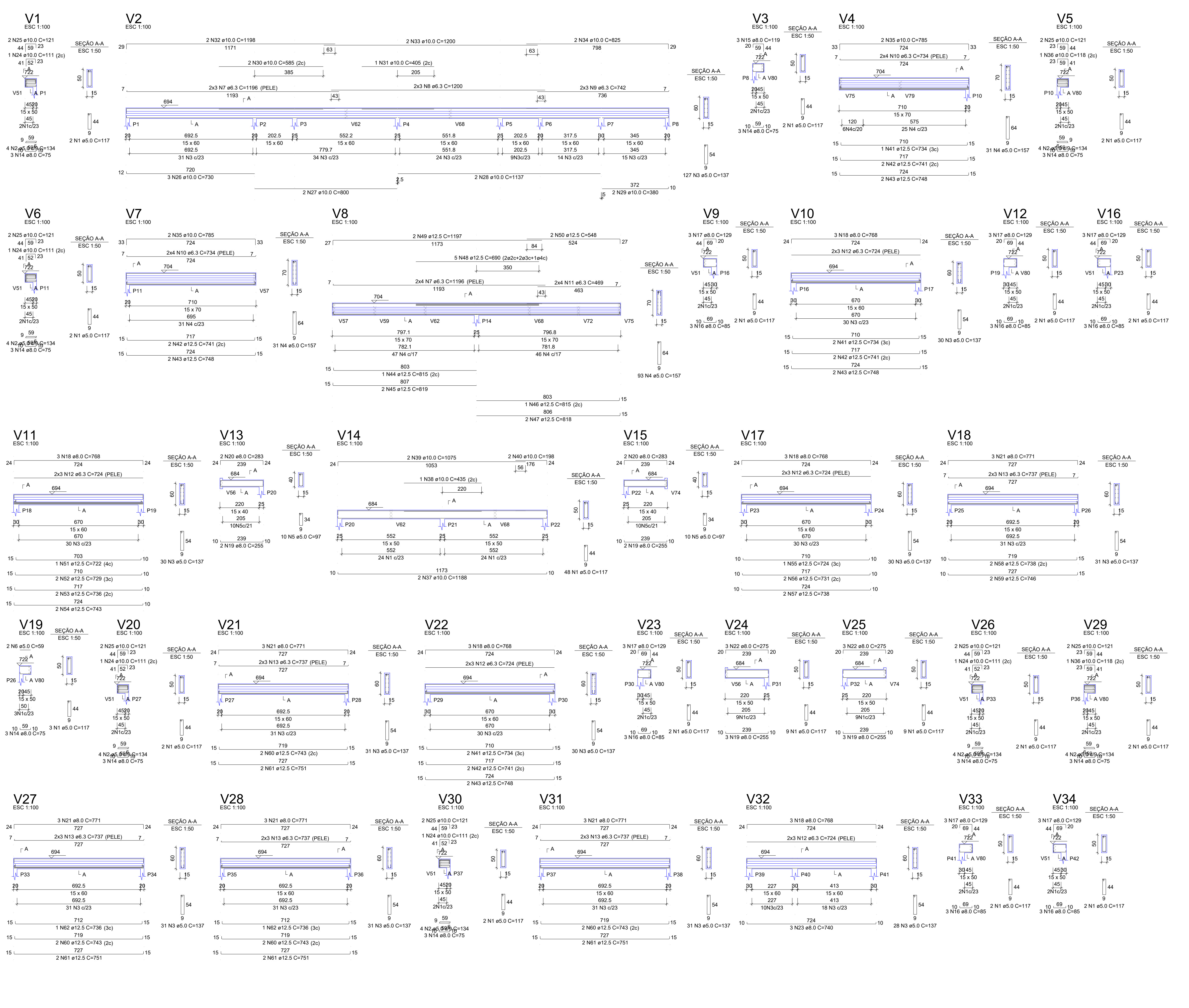
Características dos materiais

fck	300
-----	-----



PROPRIETÁRIO	
CALCULO	CREA
CONSTRUÇÃO	
APROVO PM -	
02	
01	
Nº	DATA
PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO	
CLIENTE: MUNICÍPIO DE MARCO	
LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE	
CONTEÚDO: 1 Forma do pavimento Nível 684	
<small>AV. PREFEITO GUIDO OSTENHO, S/N CENTRO - MARCO - CE - 83500-000 FONE: (85) 3341-1111   3341-1415 WWW.MARCO.CE.GOV.BR CNPJ: 07.546.516/0001-17</small>	
ESCALA:	DESENHO: PRANCHETA:
INDICADA	SEINFRA
DATA:	11/15
AGOSTO/2023	





RELAÇÃO DO AÇO

AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA60	1	5.0	97	117	11349
V7	2	5.0	28	134	3752
V10	3	5.0	430	137	58910
V13	4	5.0	155	157	24335
V16	5	5.0	20	97	1940
V19	6	5.0	2	59	118
V22	7	6.3	14	1196	16744
V25	8	6.3	6	1209	7254
V28	9	6.3	6	742	4452
V31	10	6.3	16	734	11744
V34	11	6.3	8	469	3752
	12	6.3	30	724	21720
	13	6.3	30	737	22110
	14	8.0	27	75	2025
	15	8.0	3	119	357
	16	8.0	18	85	1530
	17	8.0	17	129	2232
	18	8.0	15	768	11520
	19	8.0	10	255	2550
	20	8.0	4	283	1132
	21	8.0	15	771	11565
	22	8.0	6	275	1650
	23	8.0	23	740	17020
	24	10.0	5	111	555
	25	10.0	14	121	1694
	26	10.0	2	380	760
	27	10.0	2	800	1600
	28	10.0	2	1137	2274
	29	10.0	2	1198	2396
	30	10.0	2	585	1170
	31	10.0	1	405	405
	32	10.0	2	1198	2396
	33	10.0	2	1200	2400
	34	10.0	2	825	1650
	35	10.0	4	785	3140
	36	10.0	2	118	236
	37	10.0	2	1188	2376
	38	10.0	1	435	435
	39	10.0	2	1075	2150
	40	10.0	2	198	396
	41	12.5	5	734	3670
	42	12.5	8	815	6520
	43	12.5	8	748	5984
	44	12.5	4	815	3260
	45	12.5	2	819	1638
	46	12.5	1	815	815
	47	12.5	2	818	1636
	48	12.5	5	690	3450
	49	12.5	2	1197	2394
	50	12.5	2	736	1472
	51	12.5	1	722	722
	52	12.5	2	729	1458
	53	12.5	2	736	1472
	54	12.5	2	743	1486
	55	12.5	1	724	724
	56	12.5	2	731	1462
	57	12.5	2	738	1476
	58	12.5	2	738	1476
	59	12.5	2	746	1492
	60	12.5	8	743	5944
	61	12.5	8	751	6008
	62	12.5	2	736	1472

RESUMO DO AÇO

AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	6.3	877.2	236.1
	8.0	368.7	160
	10.0	258.3	175.2
	12.5	526.2	557.6
	5.0	1004	170.2
PESO TOTAL (kg)			
CA50		1128.9	
CA60		170.2	

Volume de concreto (C-30) = 14.04 m³  
 Área de forma = 178.16 m²



PROPRIETÁRIO \_\_\_\_\_

CALCULO \_\_\_\_\_

CONSTRUÇÃO \_\_\_\_\_

APROVA PM \_\_\_\_\_

Nº	DATA	REVISÃO	DESENHO	APROVAÇÃO
02				
01				

PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO

CLIENTE: MUNICÍPIO DE MARCO

LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO: 1 Detalhamento das Vigas Nível 684

ESCALA: INDICADA DESENHO: SEINFRA PRANCHA: 12/15

DATA: AGOSTO/2023



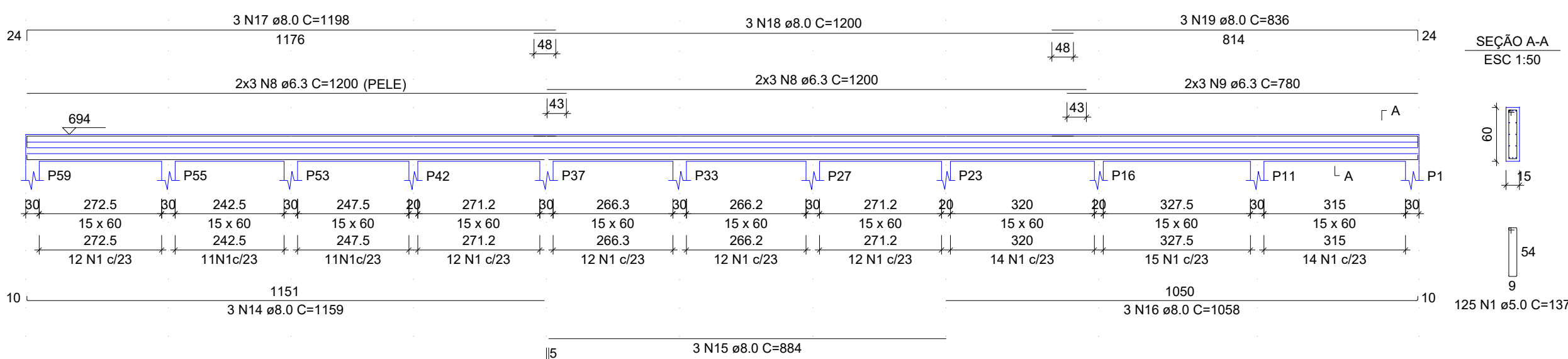
AV. PREFEITO GUIDO OSTERHO, S/N  
 CENTRO - MARCO - CE - 83500-000  
 FONE: (85) 3210-1836 / 3214-1415  
 WWW.MARCO.CE.GOV.BR  
 CNPJ: 07.546.316/0001-77



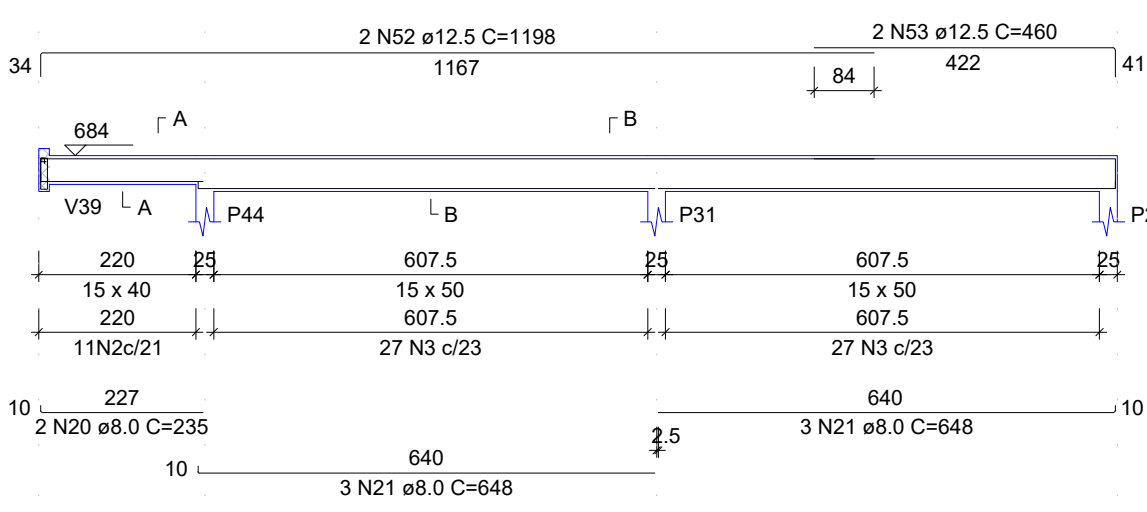




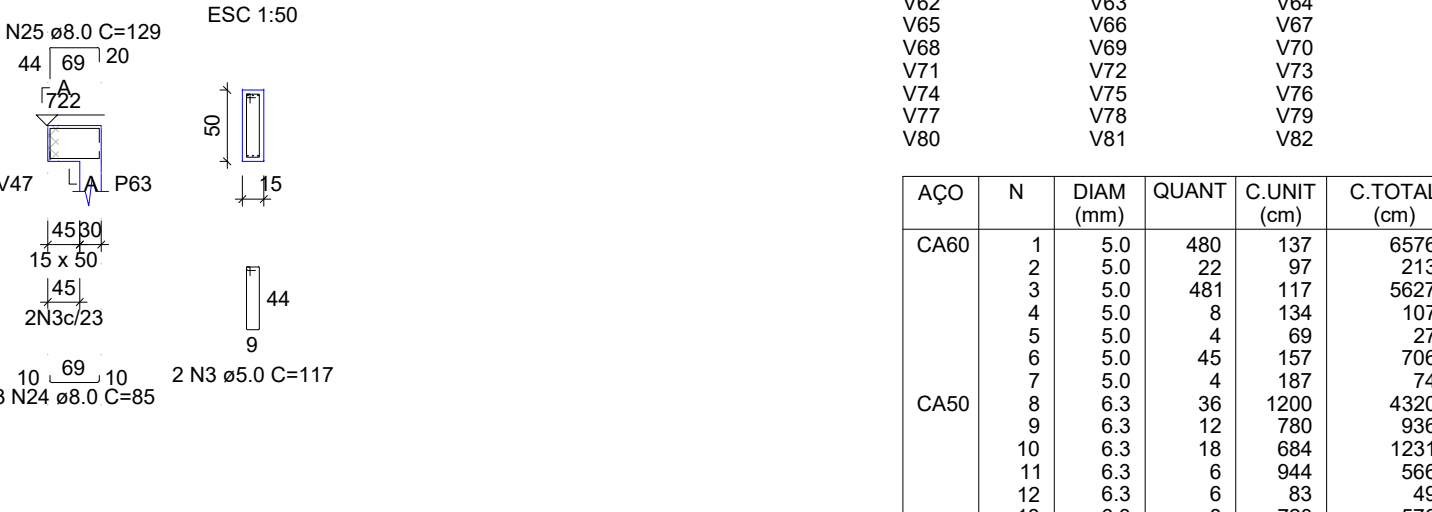
**V53**  
ESC 1:100



**V58**  
ESC 1:100



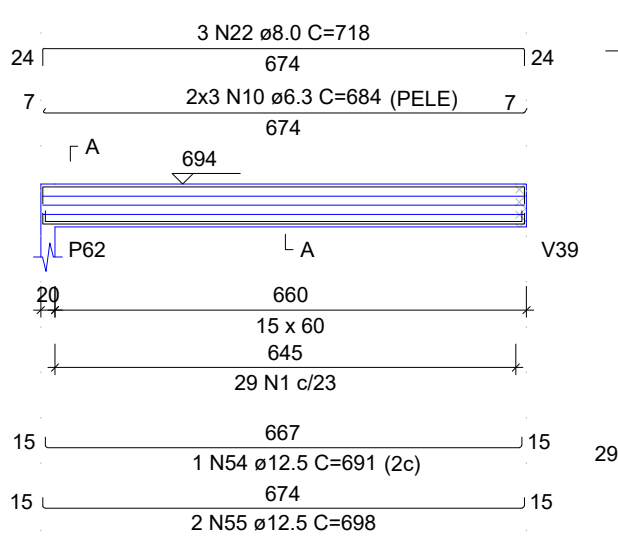
**V63**  
ESC 1:100



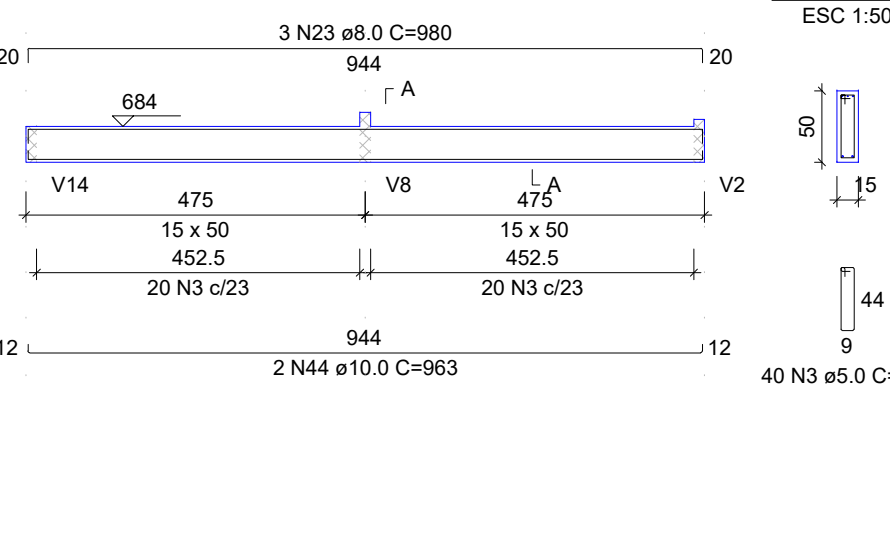
RELAÇÃO DO AÇO

AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA60	1	5.0	480	137	65760
	2	5.0	97	97	2124
	3	5.0	481	117	56277
	4	5.0	8	134	1072
	5	5.0	4	69	276
	6	5.0	45	157	7065
	7	5.0	4	187	748
	8	5.0	3	1200	4300
	9	6.3	12	780	9360
	10	6.3	18	684	12312
	11	6.3	6	944	5664
	12	6.3	6	83	498
	13	6.3	8	720	5760
	14	8.0	3	1159	3477
	15	8.0	3	884	2652
	16	8.0	3	1058	3174
	17	8.0	6	1198	7188
	18	8.0	6	1200	7200
	19	8.0	6	836	5016
	20	8.0	4	235	940
	21	8.0	12	648	7776
	22	8.0	9	718	6462
	23	8.0	3	1159	3477
	24	8.0	12	85	1020
	25	8.0	6	129	774
	26	8.0	3	960	2880
	27	8.0	6	75	450
	28	8.0	2	112	224
	29	8.0	2	121	242
	30	8.0	6	1095	6570
	31	8.0	3	648	1944
	32	8.0	3	664	1992
	33	8.0	3	93	279
	34	8.0	3	460	1380
	35	8.0	3	318	948
	36	8.0	3	360	1080
	37	8.0	3	725	2175
	38	8.0	3	1070	3210
	39	8.0	3	1069	3207
	40	8.0	3	306	918
	41	8.0	3	969	2907
	42	8.0	3	1036	3108
	43	10.0	2	119	238
	44	10.0	4	963	3852
	45	10.0	2	997	1994
	46	10.0	3	959	2877
	47	10.0	2	443	886
	48	10.0	1	244	244
	49	10.0	2	1199	2398
	50	10.0	2	1200	2400
	51	10.0	2	921	1842
	52	12.5	4	1198	4792
	53	12.5	2	460	920
	54	12.5	3	691	2073
	55	12.5	4	698	2792
	56	12.5	4	667	2668
	57	12.5	4	918	3672
	58	12.5	4	503	2012
	59	12.5	2	459	918
	60	12.5	1	686	686
	61	12.5	2	893	1386
	62	12.5	2	374	748
	63	12.5	1	282	282
	64	12.5	2	997	1994
	65	12.5	2	374	748
	66	12.5	2	378	756
	67	12.5	2	1197	2394
	68	12.5	2	1173	2346
	69	12.5	2	235	470
	70	12.5	2	273	546
	71	12.5	2	277	554
	72	12.5	2	780	1560
	73	12.5	2	736	1472
	74	12.5	2	729	1458
	75	12.5	2	721	1442
	76	12.5	1	714	714

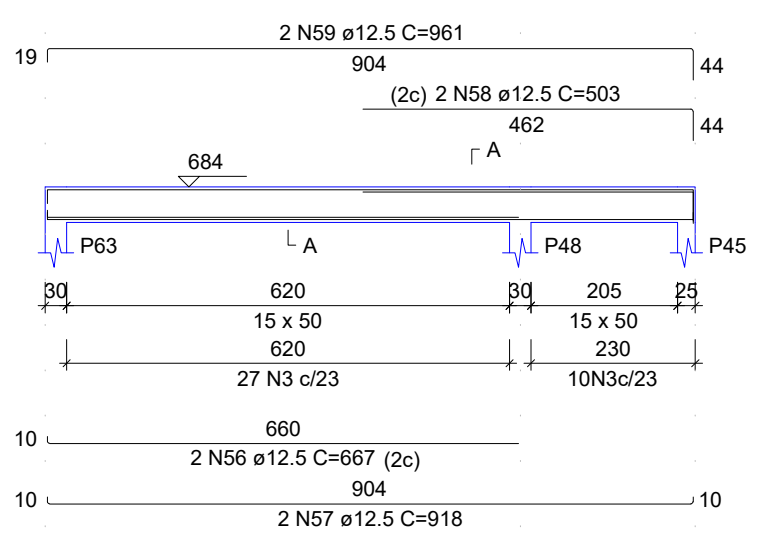
**V61**  
ESC 1:100



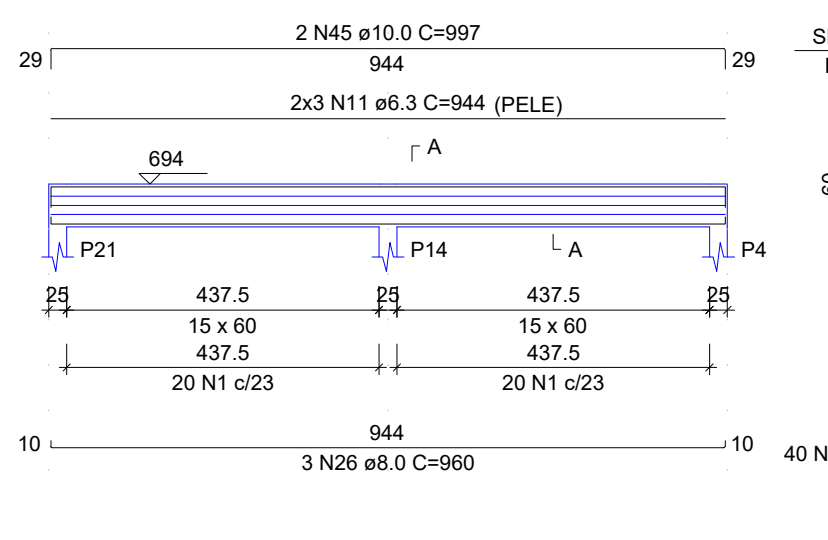
**V62**  
ESC 1:100



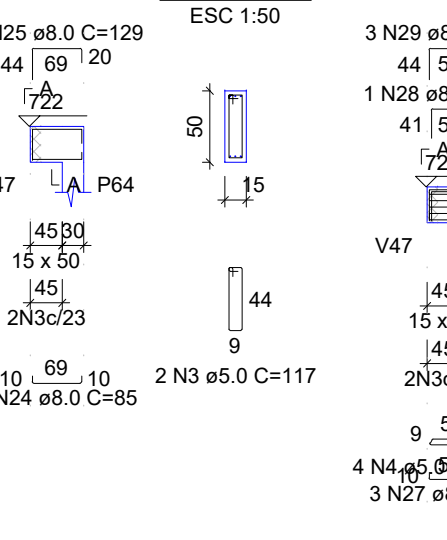
**V64**  
ESC 1:100



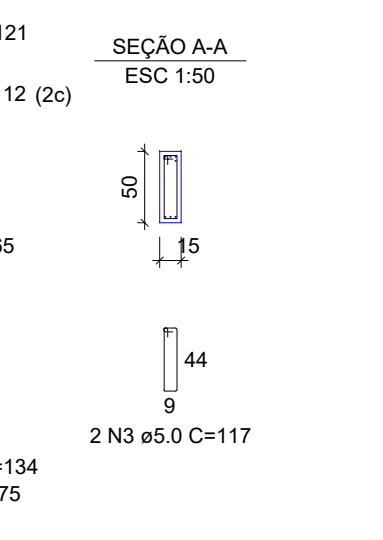
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ESC 1:100



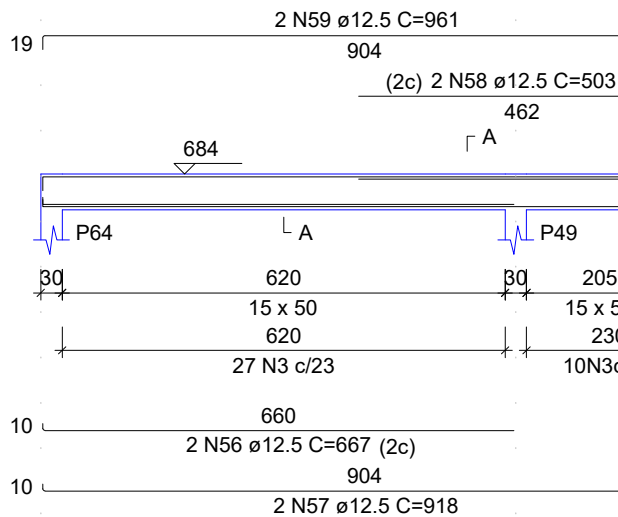
**V66**  
ESC 1:100



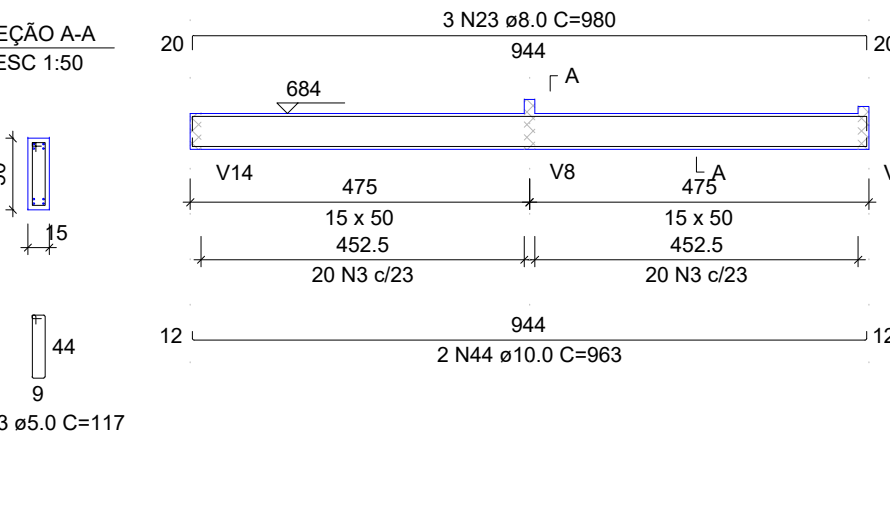
**V69**  
ESC 1:100



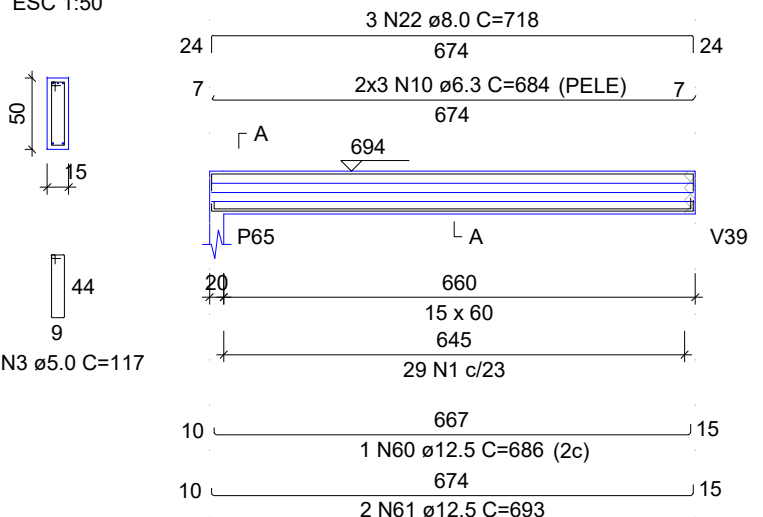
**V67**  
ESC 1:100



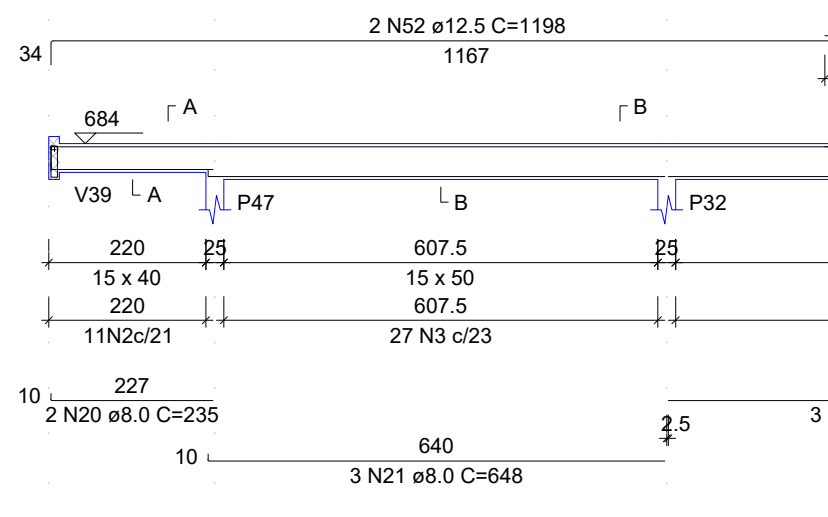
**V68**  
ESC 1:100



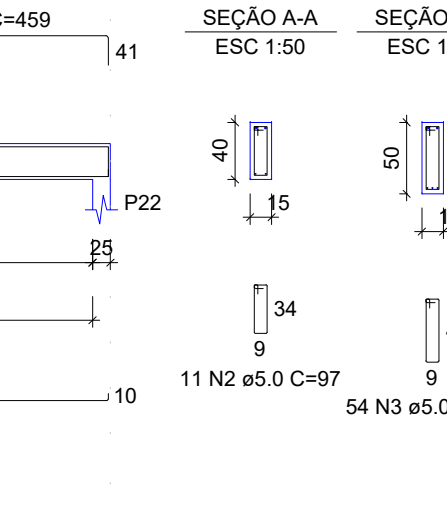
**V70**  
ESC 1:100



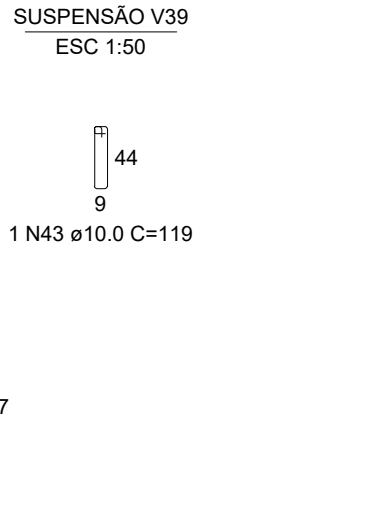
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ESC 1:100



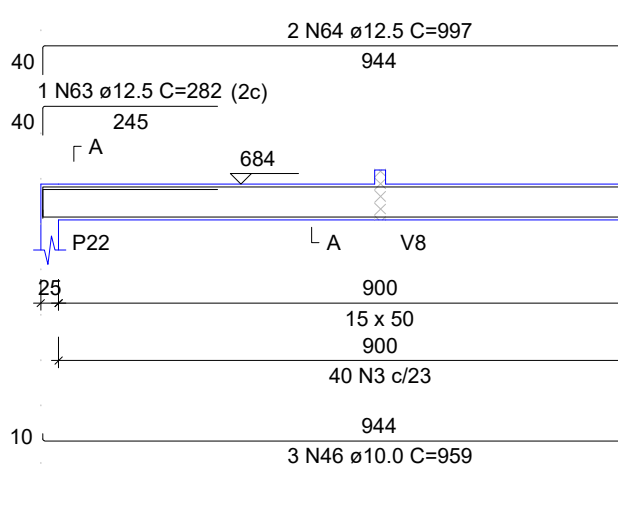
**V75**  
ESC 1:100



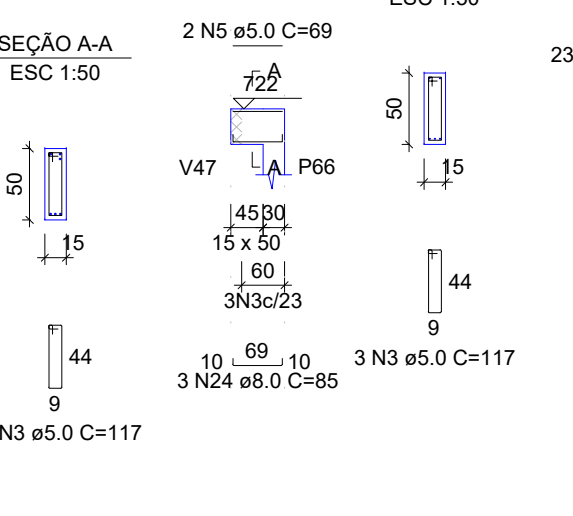
**V77**  
ESC 1:100



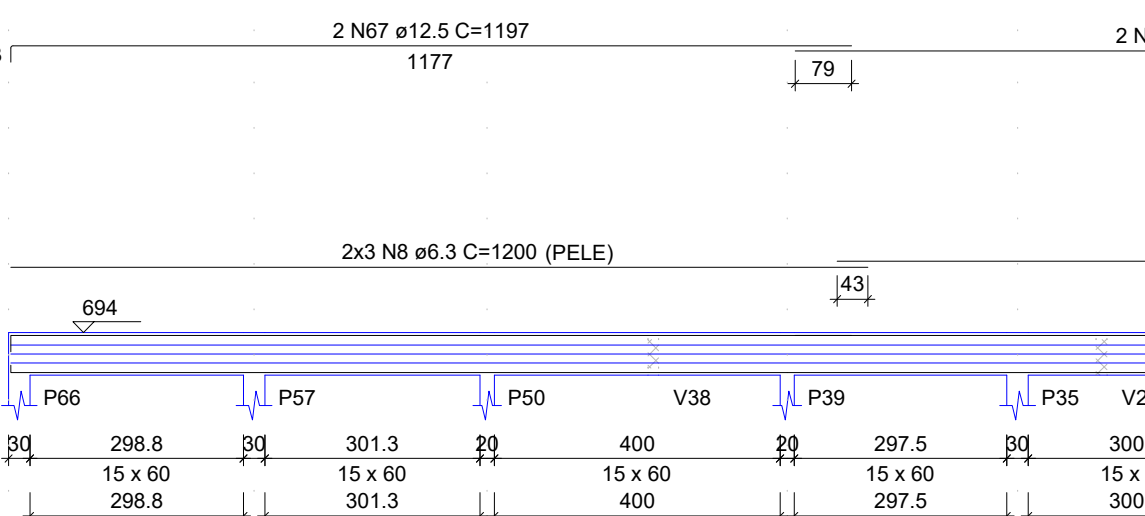
**V72**  
ESC 1:100



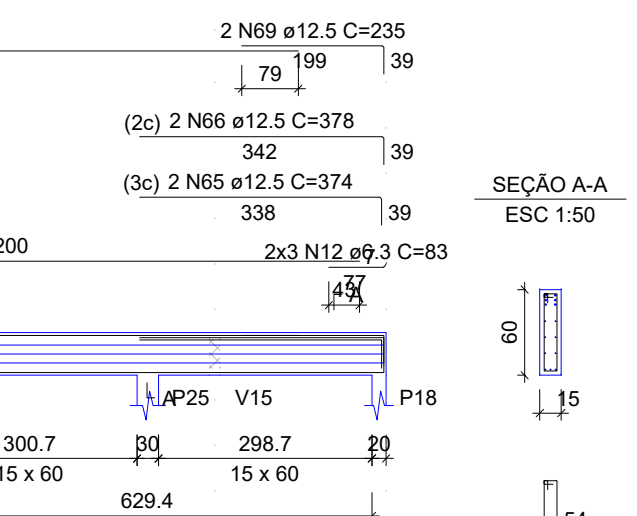
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ESC 1:100



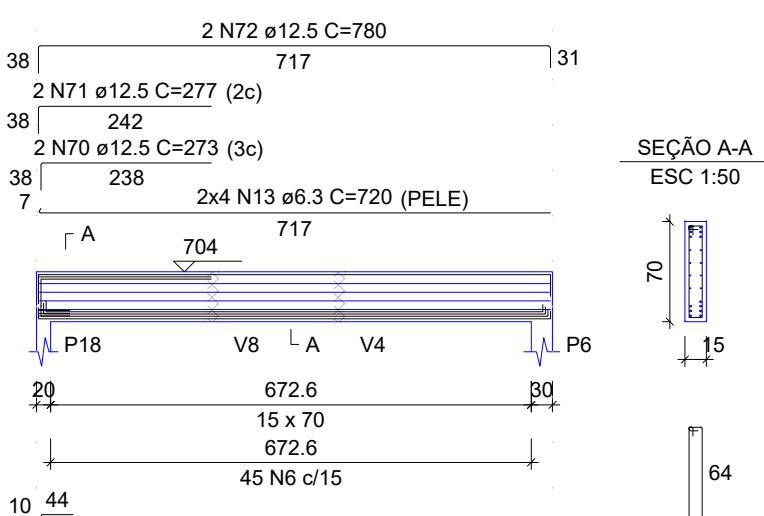
**V74**  
ESC 1:100



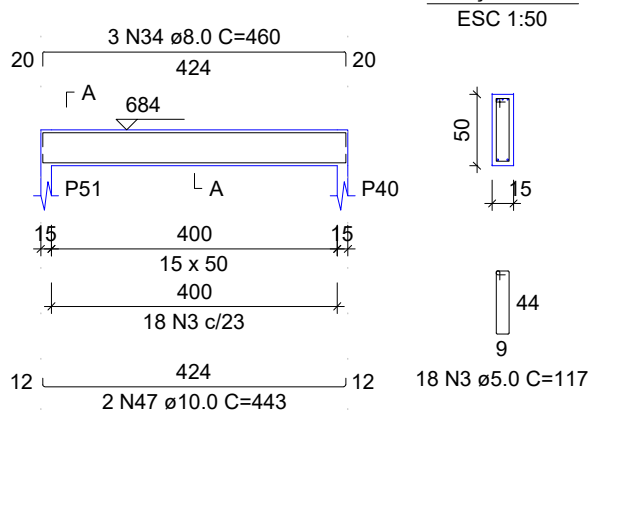
**V76**  
ESC 1:100



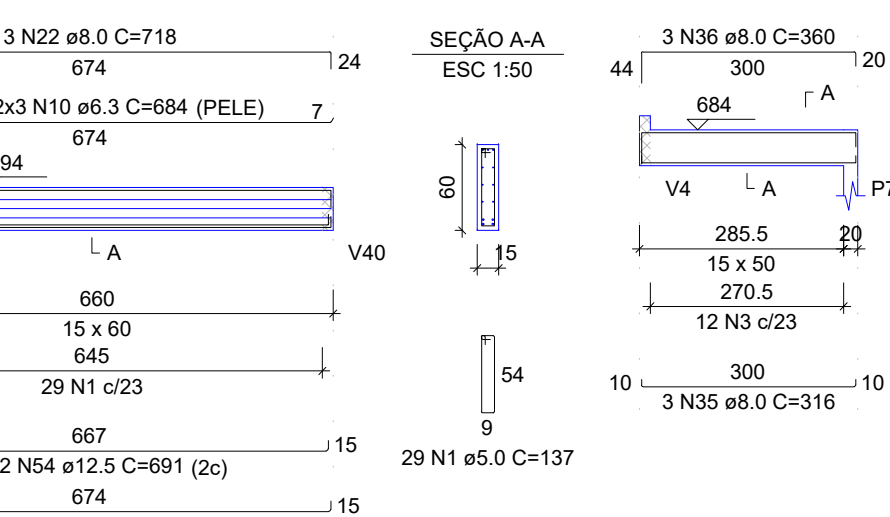
**V77**  
ESC 1:100



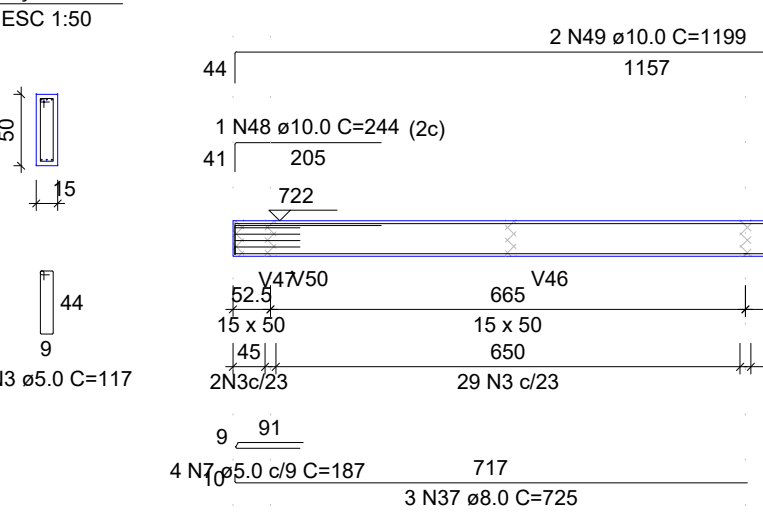
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ESC 1:100



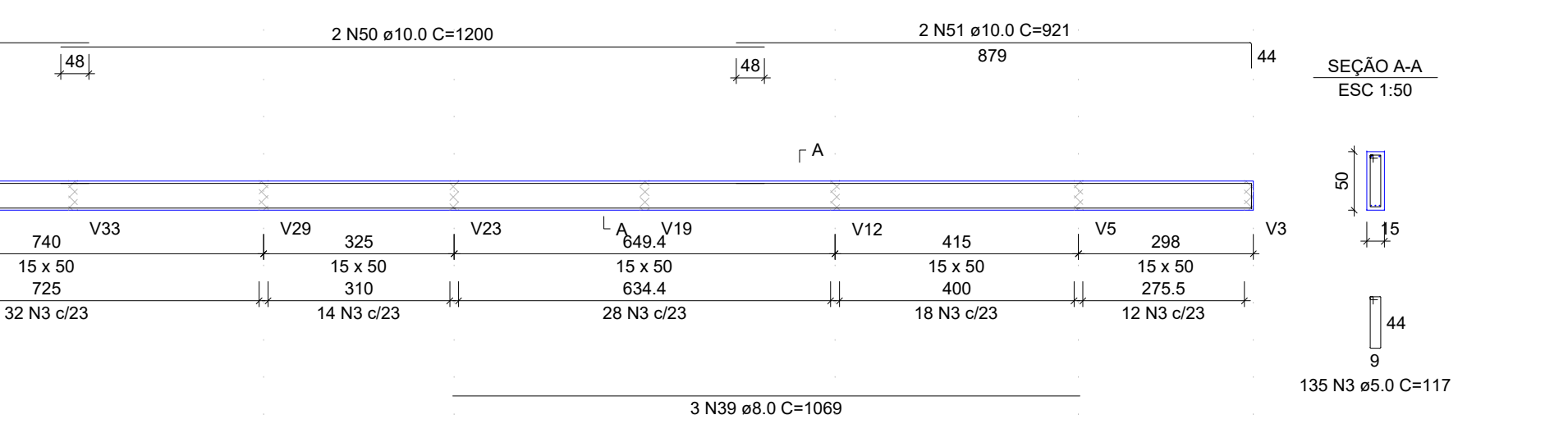
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ESC 1:100



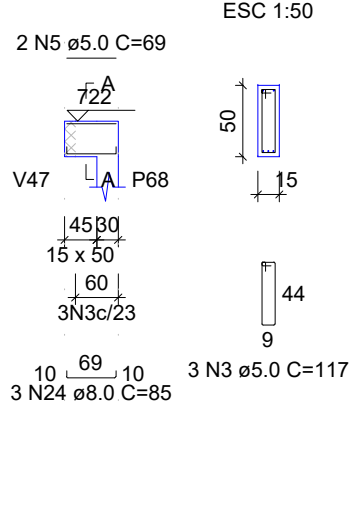
**V79**  
ESC 1:100



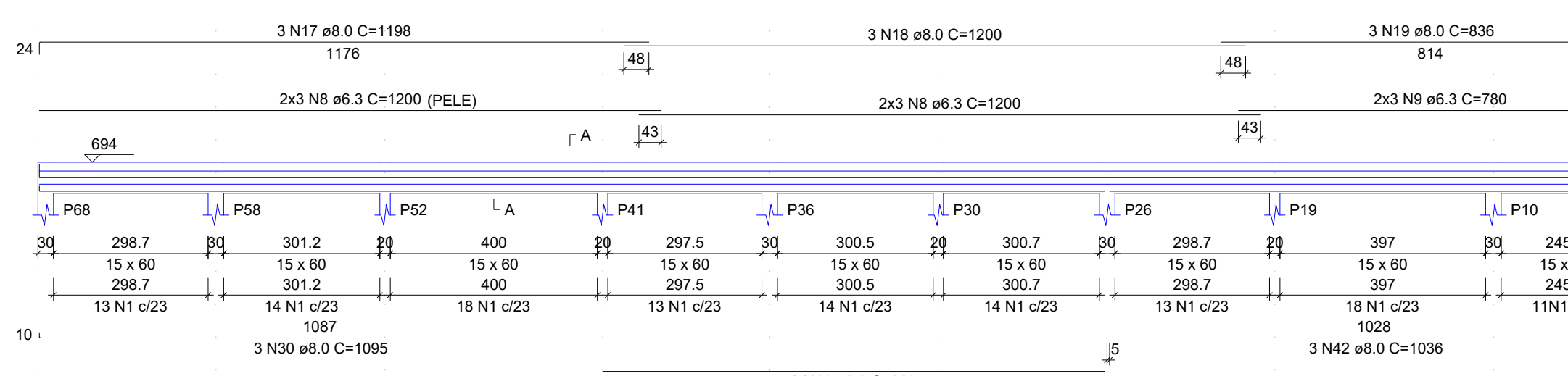
**V80**  
ESC 1:100



**V81**  
ESC 1:100



**V82**  
ESC 1:100



RESUMO DO AÇO

AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	6.3	767.9	206.7
	8.0	855.6	371.4
	10.0	167.3	113.5
	12.5	425	450.4
	5.0	1333.3	226.1
PESO TOTAL (kg)			
CA50		1141.9	
CA60		226.1	

Volume de concreto (C-30) = 18.97 m³  
Área de forma = 238.52 m²

PROPRIETÁRIO: \_\_\_\_\_

CALCULO: \_\_\_\_\_

CONSTRUÇÃO: \_\_\_\_\_

APROV. PM: \_\_\_\_\_

REVISÃO: \_\_\_\_\_

DESENHO: \_\_\_\_\_

APROVAÇÃO: \_\_\_\_\_

PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO

CLIENTE: MUNICÍPIO DE MARCO

LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO: 1 Detalhamento das Vigas Nível 684

ESCALA: \_\_\_\_\_

DESENHO: SEINFRA

PRANCHA: 14/15

DATA: AGOSTO/2023

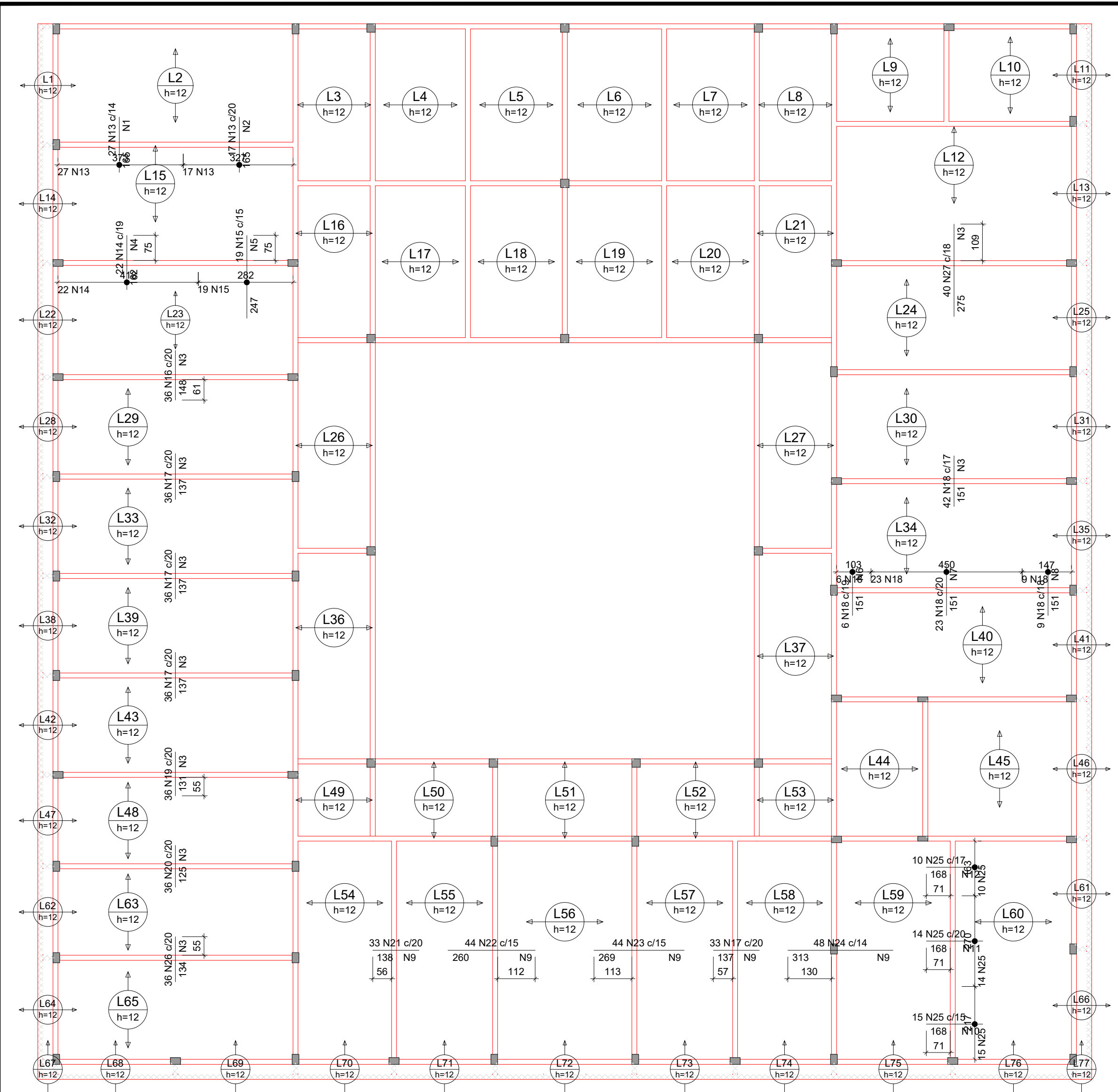


AV. PREFEITO GUIDO OSTENHO, S/N  
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WWW.MARCO.CE.GOV.BR  
CNPJ: 07.546.316/0001-17



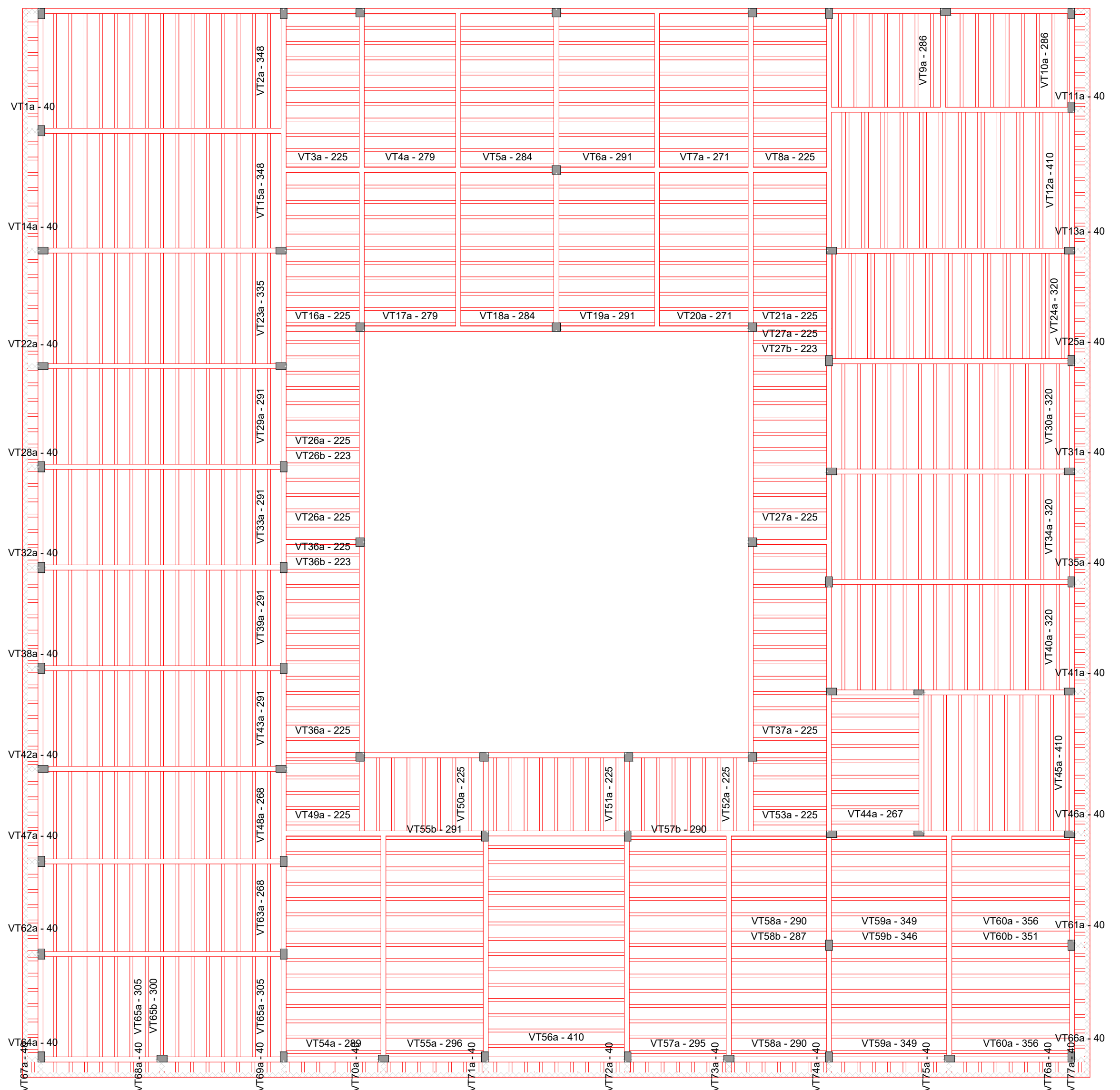
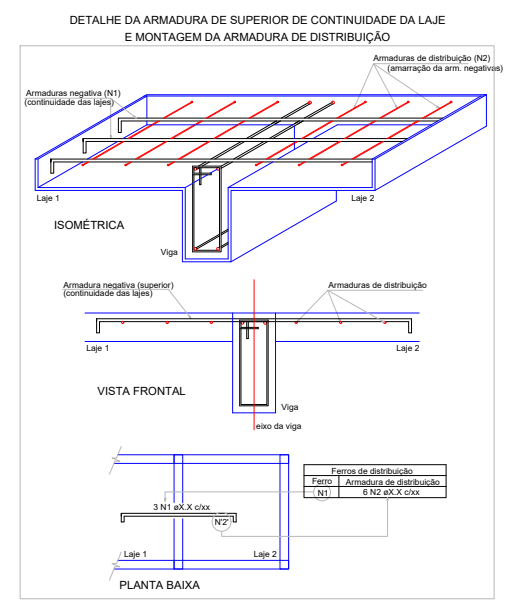
COR	ESP. PENNA
01	0.70
02	0.50
03	0.30
04	0.40
05	0.70
06	0.20
07	0.20
08	0.20
09	0.10
10	1.0%
13	15%





**Armaduras de distribuição**

Armadura	Armadura de distribuição
N13	9 N1 ø5.0 c/20 C=380
N13	9 N2 ø5.0 c/20 C=335
N27	14 N3 ø5.0 c/20 C=715
N14	9 N4 ø5.0 c/20 C=425
N15	13 N5 ø5.0 c/20 C=290
N16	8 N3 ø5.0 c/20 C=715
N17	7 N3 ø5.0 c/20 C=715
N18	7 N3 ø5.0 c/20 C=715
N18	8 N6 ø5.0 c/20 C=110
N18	8 N7 ø5.0 c/20 C=450
N18	8 N8 ø5.0 c/20 C=155
N17	7 N3 ø5.0 c/20 C=715
N19	7 N3 ø5.0 c/20 C=715
N21	7 N9 ø5.0 c/20 C=665
N22	13 N9 ø5.0 c/20 C=665
N23	14 N9 ø5.0 c/20 C=665
N17	7 N9 ø5.0 c/20 C=665
N24	16 N9 ø5.0 c/20 C=665
N25	9 N10 ø5.0 c/20 C=270
N25	9 N11 ø5.0 c/20 C=270
N25	9 N12 ø5.0 c/20 C=171
N26	7 N3 ø5.0 c/20 C=715



**RELAÇÃO DO AÇO**

AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA60	1	5.0	9	360	3240
CA60	2	5.0	9	335	3015
CA60	3	5.0	72	715	51480
CA60	4	5.0	9	425	3825
CA60	5	5.0	13	290	3770
CA60	6	5.0	8	110	880
CA60	7	5.0	8	450	3600
CA60	8	5.0	8	155	1240
CA60	9	5.0	57	665	37905
CA60	10	5.0	9	225	2025
CA60	11	5.0	9	240	2160
CA60	12	5.0	9	171	1539
CA50	13	6.3	44	165	7260
CA50	14	6.3	22	162	3564
CA50	15	6.3	19	247	4693
CA50	16	6.3	36	148	5328
CA50	17	6.3	141	137	19317
CA50	18	6.3	80	151	12080
CA50	19	6.3	36	131	4716
CA50	20	6.3	36	123	4500
CA50	21	6.3	33	138	4554
CA50	22	6.3	44	200	11440
CA50	23	6.3	44	209	11536
CA50	24	6.3	48	313	15024
CA50	25	6.3	39	168	6552
CA50	26	6.3	38	134	4824
CA50	27	8.0	40	275	11000

**RESUMO DO AÇO**

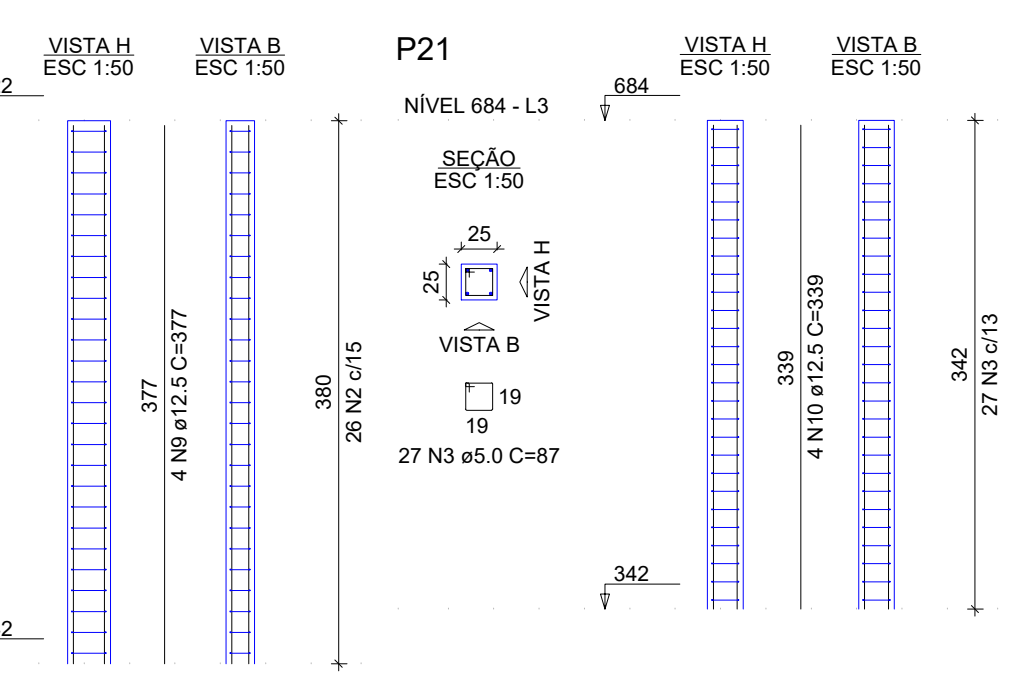
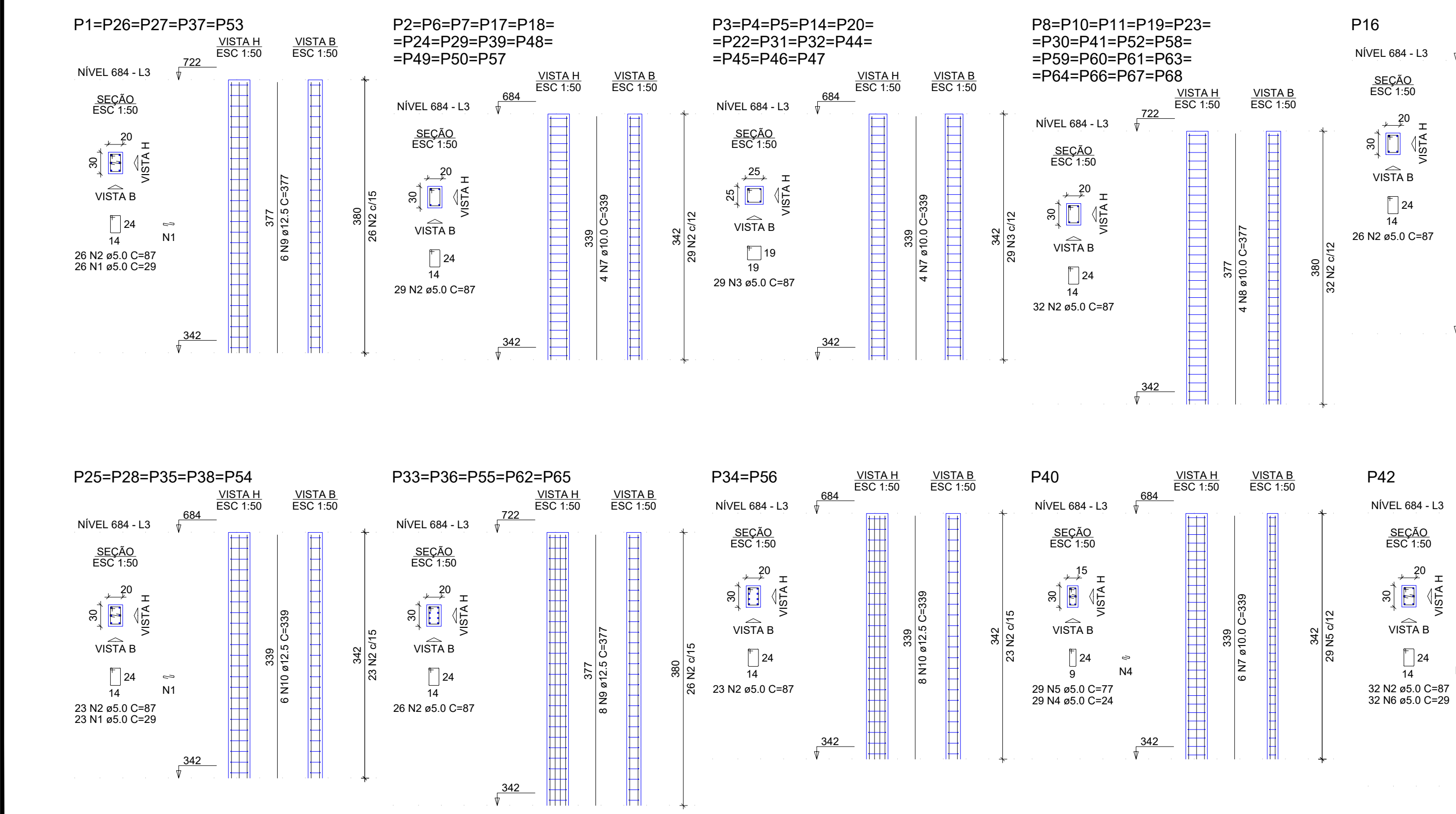
AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	6.3	1156.9	311.4
CA60	5.0	1151.3	47.7
<b>PESO TOTAL (kg)</b>			<b>359.1</b>
CA50			359.1
CA60			195.2

Volume de concreto (C-30) = 0.00 m³  
Área de forma = 0.00 m²

**Armação negativa das lajes do pavimento NÍVEL 684**  
escala 1:100

**Planta de vigotas pré-moldadas**  
escala 1:100

COR	ESP. PENIA
01	0.70
02	0.50
03	1.30
04	0.40
05	1.70
06	0.20
07	0.20
08	0.20
09	0.10
10	0.60
11	1.00
13	1.50



**RELAÇÃO DO AÇO**

AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA60	1	5.0	245	29	7105
CA60	2	5.0	1400	87	121800
CA60	3	5.0	375	87	32825
CA60	4	5.0	29	24	696
CA60	5	5.0	52	77	4004
CA50	6	5.0	61	29	1769
CA50	7	10.0	108	339	36612
CA50	8	10.0	74	377	27898
CA50	9	12.5	54	339	18306

**RESUMO DO AÇO**

AÇO	DIAM (mm)	C.TOTAL (m)	PESO + 10% (kg)
CA50	10.0	645.1	437.5
CA60	5.0	462	489.6
<b>PESO TOTAL (kg)</b>			<b>927.1</b>
CA50			927.1
CA60			284.8

Volume de concreto (C-30) = 13.80 m³  
Área de forma = 228.22 m²

MODELAGEM 3D FORMAS

MODELAGEM 3D ARMADURA

PROPRIETÁRIO

CALCULO

CONSTRUÇÃO

APROVA PM

REVISÃO

DESENHO

APROVAÇÃO

PROJETO: PROJETO ESTRUTURAL EEF JOSÉ HELVÉCIO

CLIENTE: MUNICÍPIO DE MARCO

LOCAL: TRAVESSA JOÃO JOVINO - SEDE - MARCO-CE

CONTEÚDO:

- Armação neg. das lajes do Nível 684
- Planta de vigotas pré-moldadas
- Detalhamento dos Pilares Nível 684

ESCALA: INDICADA

DESENHO: SEINFRA

PRANCHA: 15/15

DATA: AGOSTO/2023