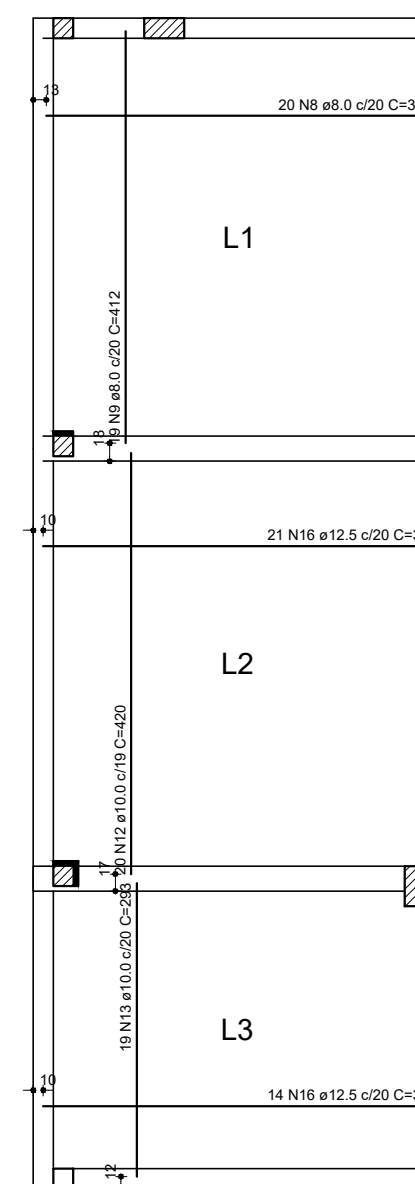


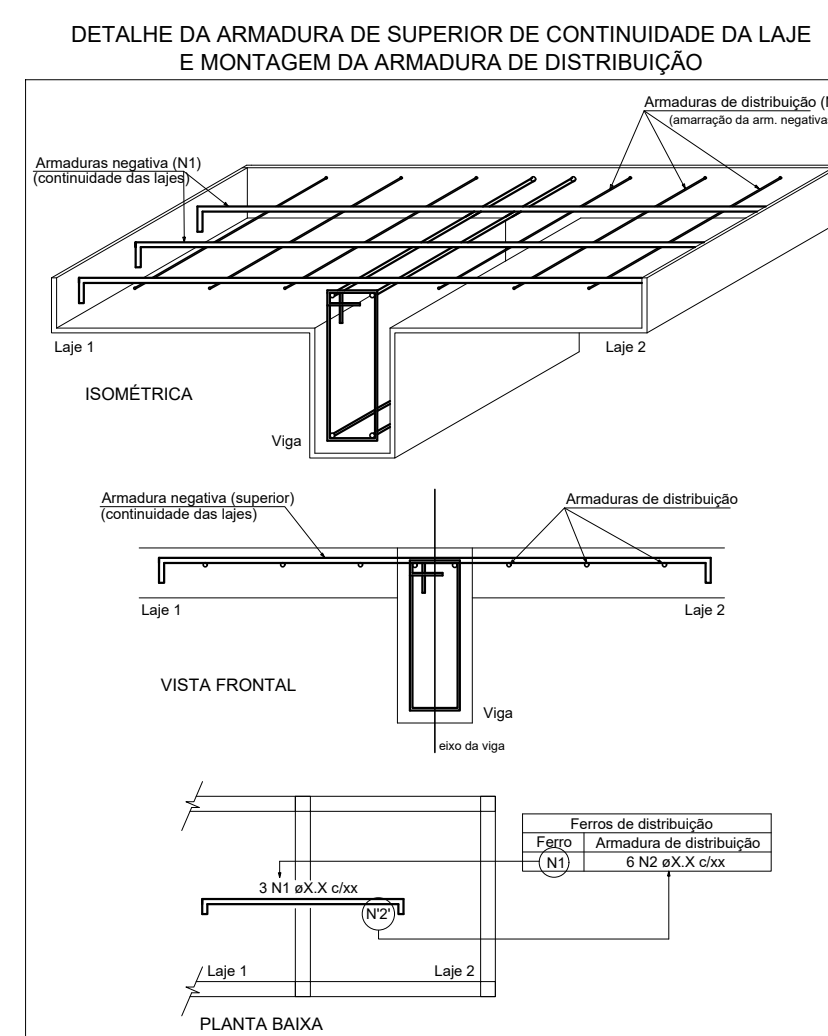


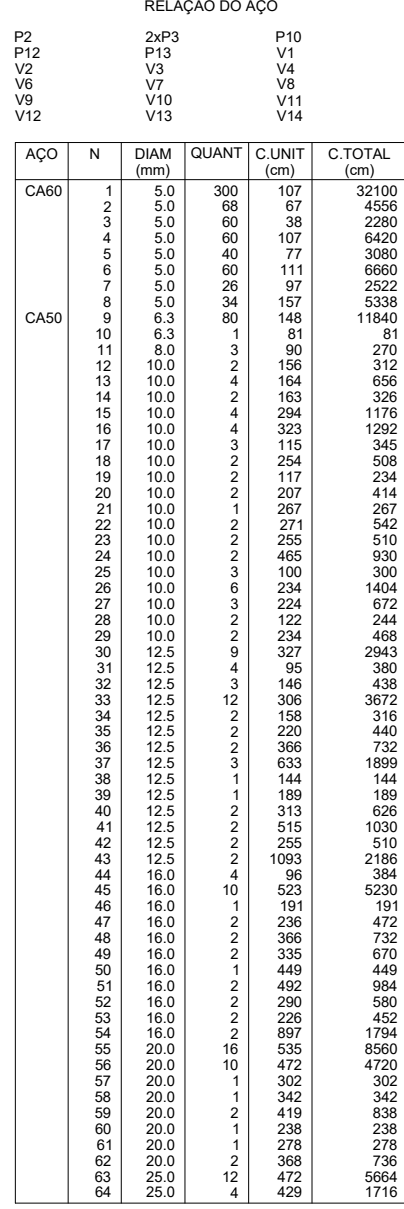
RELATÃO DO AÇO						
Negativos P5 P9			Positivos P6		P3 P8	
CABO	N	DMM	Q12	C LUNT	C	T. TOTAL
CABO 1	1	5,5	12	31	1644	6444
	2	5,0	29	371	7210	7210
	3	5,0	69	62	2820	2820
	4	5,0	34	77	2820	2820
	5	5,0	48	87	1872	1872
CABO 5	6	8,3	3	94	2820	2820
	7	8,3	24	78	1872	1872
	8	8,0	3	305	1872	1872
	9	8,0	19	412	7210	7210
	10	10,0	10	305	1872	1872
	11	10,0	8	143	1434	1434
	12	10,0	20	420	6444	6444
	13	10,0	19	900	2561	2561
	14	12,5	7	118	1337	1337
	15	12,5	10	118	1880	1880
CABO 6	16	12,5	35	391	9365	9365
	17	12,5	5	62	1880	1880
	18	12,5	10	613	9130	9130
	19	12,5	9	5	675	675
	20	16,0	4	472	944	944
	21	16,0	6	503	3130	3130
	22	20,0	6	503	2800	2800
CABO 7	23	20,0	5	536	2870	2870
	24	25,0	4	550	2925	2925
	25	25,0	4	550	2290	2290

AÇO	DIAM. (mm)	C. TOTAL (m)	QUANT. = 19% (Barra)	PEÇO = 19% (kg)
CA50	6,3	21,5	2	5,8
	8,0	155,3	15	67,4
	10,0	179,3	16	115,5
	12,5	289,5	27	306,7
	16,0	42,8	4	72,9
	20,0	50,4	5	136,6
CA60	25,0	49,9	4	173,3
	5,0	204,1	-	34,6
PEÇO TOTAL				

Volume de concreto (C-35) = 7,18 m³
Área de forma = 61,11 m²

Ferra de distribuição	
Ferro	Armadura de distribuição
N14	12 N1 e 5 Ø 0/93 C=137
N15	20 N2 e 5 Ø 0/16 C=371

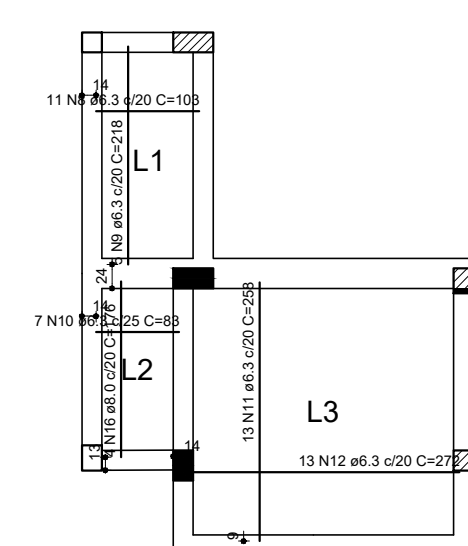
[illegible]



AÇO	DIAM (mm)	C.TOTAL (m)	QUANT = 10% (Barra)	PERÇO (m)
CABO	6,3	119,2	12	
	8,0	2,7	1	
	10,0	106	10	
	12,5	190,1	15	
	16,0	118,4	11	
	20,0	180,1	15	
CABO	25,0	73,8	7	
	5,0	626,6	-	
PERÇO TOTAL (kg)				
CABO	1224			
CABO	136,7			

Volume de concreto (C-35) = 6,64 m³
 Área de forma = 33,06 m²

 EDSON DIEL LOPES		 SERVIÇOS DE ENGENHARIA RUA DO COMÉRCIO, 100 - 1º ANDAR CENTRO - JARDIM BOA VISTA - SÃO PAULO - SP	
EMPRESA		NOME	
INSTITUCIONAL PREVIDA DA FOLAR		NOME	
ESTRUTURA DO 4º PAVIMENTO ESCADA		ESCALA	
		1:50	
PROFESSOR		PROFESSOR	
FOLAR ESTRELA		ESTRUTURAL	
RESPONSÁVEL TÉCNICO		10	
Eng. Celso Edson Diel Lopes CREA 45.861 - D		DATA	
		15/08/2008	
TÍTULO: ESTRELA-45		DESCRIÇÃO	
		EDSON	



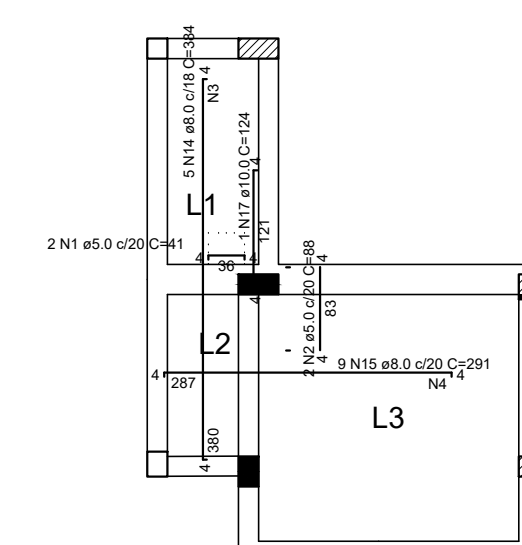
Negativos P5		Positivos		P4		
CAQ6	N	DAM LIM	QUANT	C.LIMIT	C. TOTAL	J.
A00	1	5.0	2	41	81	82
2	5.0	2	85	178		
3	5.0	5.0	109	91	1729	
4	5.0	5.0	156	186	2190	
5	5.0	5.0	24	26	266	
6	5.0	3.4	107	367	3678	
7	5.0	3.4	97	223	2233	
8	6.3	6.3	11	909	1123	
9	6.3	5	218	100	1000	
10	6.3	6.3	13	185	1852	
11	6.3	6.3	153	255	3264	
12	6.3	6.3	18	131	1272	
13	6.3	6.3	153	117	1521	
14	6.3	5	334	105	1050	
15	8.0	8.0	9	201	2019	
16	8.0	8.0	14	124	1242	
17	10.0	10.0	1	704	704	
18	12.5	4	513	202	2024	

RESUMO DO AÇO				
AÇO	DIAM (mm)	C. TOTAL (m)	QUANT. = 16% (bars)	PESO = 16% (kg)
CA50	8.3	128.5	12	34.6
	5.0	52.4	5	22.6
	9.0	1.2	1	0.8
	12.5	20.5	2	21.7
	15.0	96.6	6	38.3
CA60	5.0	116.0	-	19.0
PESO TOTAL (kg)				
CA50	178.3			
CA60	19.0			

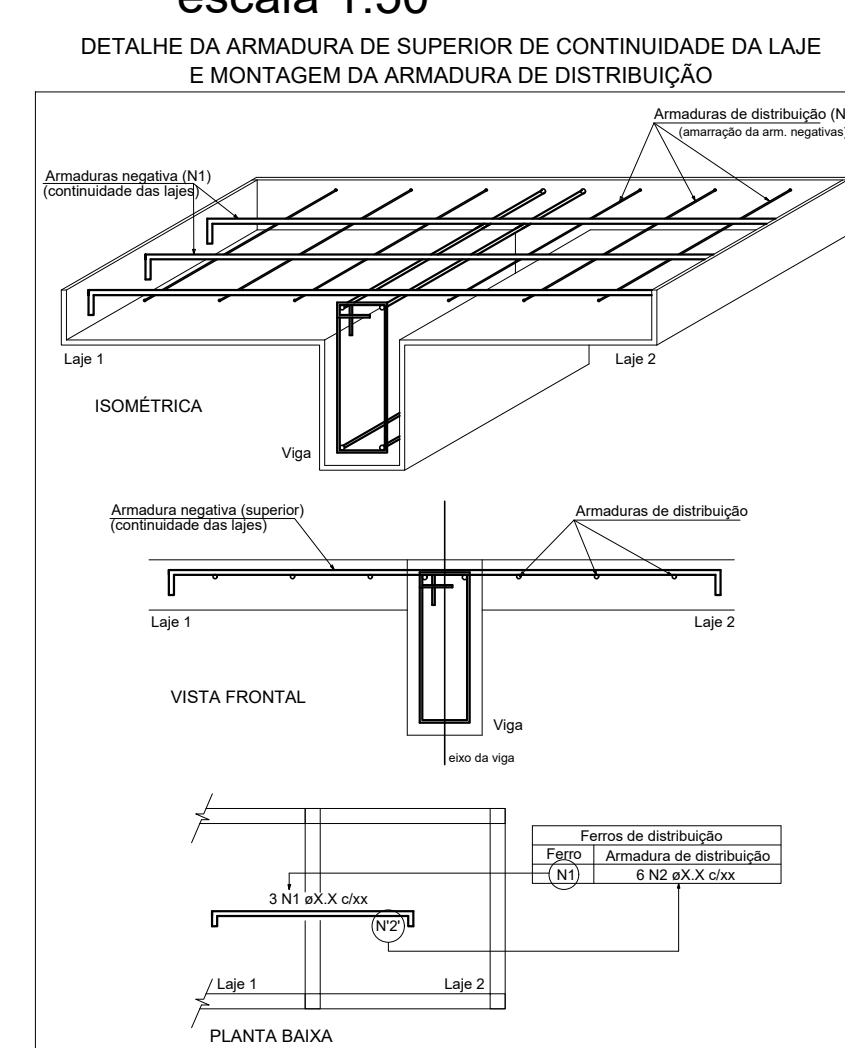
Volume de concreto (C-35) = 1.80 m³
 Área de forma = 21.79 m²

Volume de concreto (C-35) = 1,80 m³
Área de forma = 21,70 m²

DETALHE DA ARMADURA DE SUPERIOR DE CONTINUIDADE DA LAJE
E MONTAGEM DA ARMADURA DE DISTRIBUIÇÃO



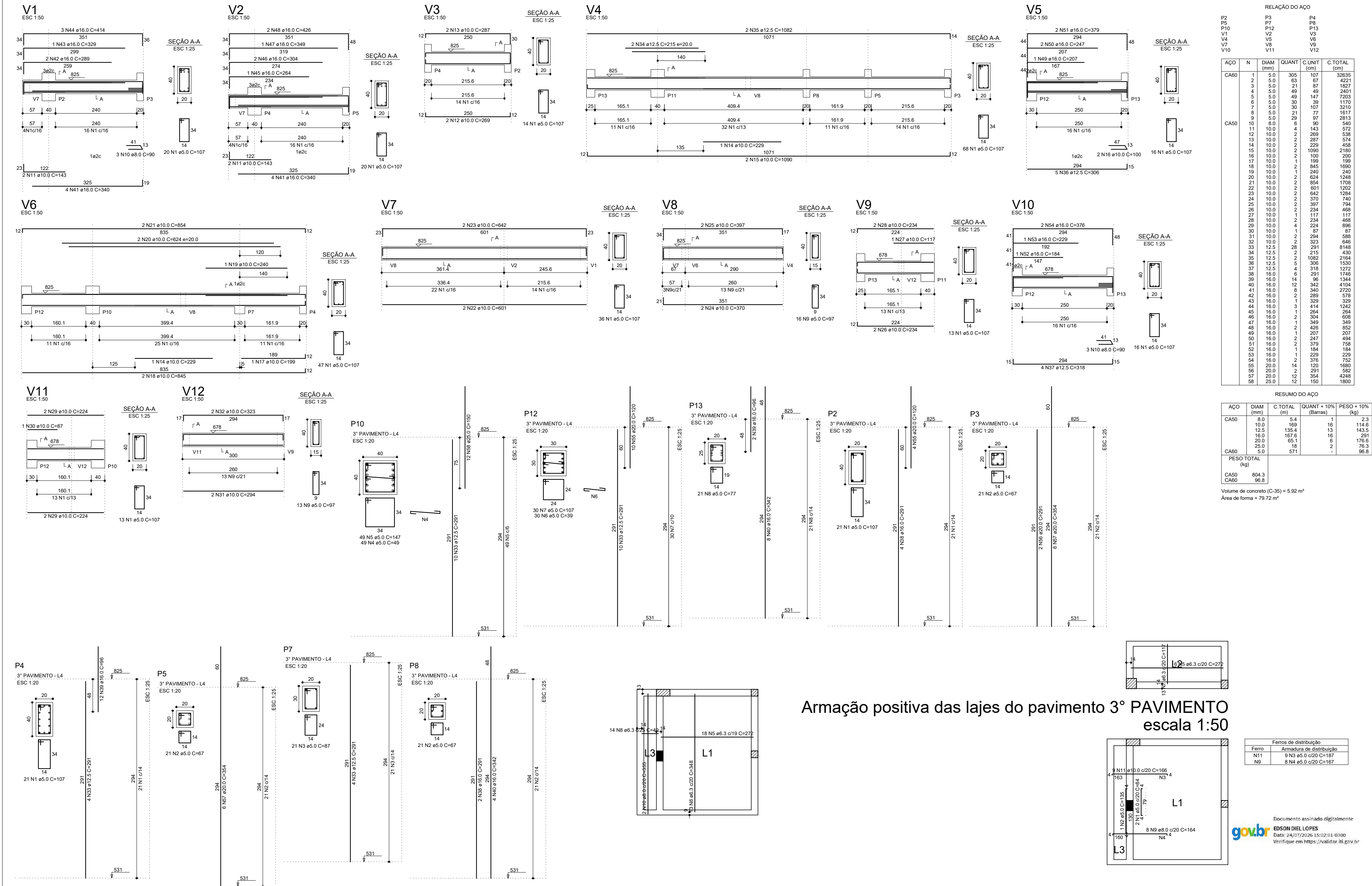
Ferro de distribuição	
Ferro	Armadura de distribuição
N14	19 N3 e5.0 c/20 C=91
N15	15 N4 e5.0 c/20 C=186



Armação negativa das lajes do pavimento 4º PAVIMENTO
escala 1:50



 EDSON DIEL LOPES		SERVICOS DE ENGENHARIA ENGENHARIA DE ENGENHARIA DE ENGENHARIA Rua 101 - JARDIM LINDA - FLORESTAL - RS	
EMPRESA: INSTITUCIONAL PROJETO DA POLAR		DATA: 20/11	
DESCRICAO: ESTRUTURA DO 4º PAVIMENTO ESCADA		ESCALA: 1:50	
PROPOSTO/ELABORADO: POLAR ESTRELA		PROJECAO: 11	
RESPONSÁVEL TÉCNICO: Eng. Celso Edson Diel Lopes CREA - 02.801 / D		DATA: 11/08/2006	
LOCAL: FLORESTAL - RS		DESIGNADO: EDSON	



RELAÇÃO DO AÇO

ACO	N	DIAM	QUANT	C TOTAL
CAO	1	10	107	2025
CAO	2	10	107	2025
CAO	3	10	107	2025
CAO	4	10	107	2025
CAO	5	10	107	2025
CAO	6	10	107	2025
CAO	7	10	107	2025
CAO	8	10	107	2025
CAO	9	10	107	2025
CAO	10	10	107	2025
CAO	11	10	107	2025
CAO	12	10	107	2025
CAO	13	10	107	2025
CAO	14	10	107	2025
CAO	15	10	107	2025
CAO	16	10	107	2025
CAO	17	10	107	2025
CAO	18	10	107	2025
CAO	19	10	107	2025
CAO	20	10	107	2025
CAO	21	10	107	2025
CAO	22	10	107	2025
CAO	23	10	107	2025
CAO	24	10	107	2025
CAO	25	10	107	2025
CAO	26	10	107	2025
CAO	27	10	107	2025
CAO	28	10	107	2025
CAO	29	10	107	2025
CAO	30	10	107	2025
CAO	31	10	107	2025
CAO	32	10	107	2025
CAO	33	10	107	2025
CAO	34	10	107	2025
CAO	35	10	107	2025
CAO	36	10	107	2025
CAO	37	10	107	2025
CAO	38	10	107	2025
CAO	39	10	107	2025
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CAO	63	10	107	2025
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CAO	88	10	107	2025
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CAO	95	10	107	2025
CAO	96	10	107	2025
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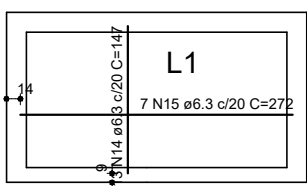
RESUMO DO AÇO

ACO	N	DIAM	QUANT	C TOTAL	PERO	TON
CAO	1	10	107	2025	10	2.0
CAO	2	10	107	2025	10	2.0
CAO	3	10	107	2025	10	2.0
CAO	4	10	107	2025	10	2.0
CAO	5	10	107	2025	10	2.0
CAO	6	10	107	2025	10	2.0
CAO	7	10	107	2025	10	2.0
CAO	8	10	107	2025	10	2.0
CAO	9	10	107	2025	10	2.0
CAO	10	10	107	2025	10	2.0
CAO	11	10	107	2025	10	2.0
CAO	12	10	107	2025	10	2.0
CAO	13	10	107	2025	10	2.0
CAO	14	10	107	2025	10	2.0
CAO	15	10	107	2025	10	2.0
CAO	16	10	107	2025	10	2.0
CAO	17	10	107	2025	10	2.0
CAO	18	10	107	2025	10	2.0
CAO	19	10	107	2025	10	2.0
CAO	20	10	107	2025	10	2.0
CAO	21	10	107	2025	10	2.0
CAO	22	10	107	2025	10	2.0
CAO	23	10	107	2025	10	2.0
CAO	24	10	107	2025	10	2.0
CAO	25	10	107	2025	10	2.0
CAO	26	10	107	2025	10	2.0
CAO	27	10	107	2025	10	2.0
CAO	28	10	107	2025	10	2.0
CAO	29	10	107	2025	10	2.0
CAO	30	10	107	2025	10	2.0
CAO	31	10	107	2025	10	2.0
CAO	32	10	107	2025	10	2.0
CAO	33	10	107	2025	10	2.0
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CAO	35	10	107	2025	10	2.0
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CAO	55	10	107	2025	10	2.0
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CAO	57	10	107	2025	10	2.0
CAO	58	10	107	2025	10	2.0
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CAO	60	10	107	2025	10	2.0
CAO	61	10	107	2025	10	2.0
CAO	62	10	107	2025	10	2.0
CAO	63	10	107	2025	10	2.0
CAO	64	10	107	2025	10	2.0
CAO	65	10	107	2025	10	2.0
CAO	66	10	107	2025	10	2.0
CAO	67	10	107	2025	10	2.0
CAO	68	10	107	2025	10	2.0
CAO	69	10	107	2025	10	2.0
CAO	70	10	107	2025	10	2.0
CAO	71	10	107	2025	10	2.0
CAO	72	10	107	2025	10	2.0
CAO	73	10	107	2025	10	2.0
CAO	74	10	107	2025	10	2.0
CAO	75	10	107	2025	10	2.0
CAO	76	10	107	2025	10	2.0
CAO	77	10	107	2025	10	2.0
CAO	78	10	107	2025	10	2.0
CAO	79	10	107	2025	10	2.0
CAO	80	10	107	2025	10	2.0
CAO	81	10	107	2025	10	2.0
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CAO	89	10	107	2025	10	2.0
CAO	90	10	107	2025	10	2.0
CAO	91	10	107	2025	10	2.0
CAO	92	10	107	2025	10	2.0
CAO	93	10	107	2025	10	2.0
CAO	94	10	107	2025	10	2.0
CAO	95	10	107	2025	10	2.0
CAO	96	10	107	2025	10	2.0
CAO	97	10	107	2025	10	2.0
CAO	98	10	107	2025	10	2.0
CAO	99	10	107	2025	10	2.0
CAO	100	10	107	2025	10	2.0

Volume de concreto (C-35) = 1.32 m³
Área de forma = 72.72 m²

RELAÇÃO DO AÇO

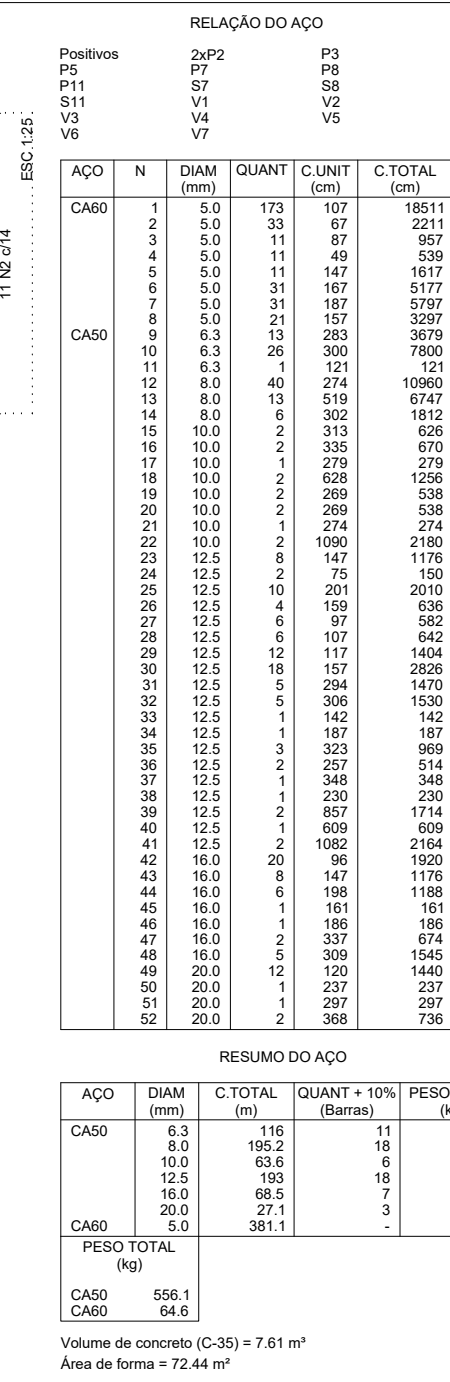
ACO	N	DIAM	QUANT	C TOTAL
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CAO	2	10	107	2025
CAO	3	10	107	2025
CAO	4	10	107	2025
CAO	5	10	107	2025
CAO	6	10	107	2025
CAO	7	10	107	2025
CAO	8	10	107	2025
CAO	9	10	107	2025
CAO	10	10	107	2025
CAO	11	10	107	2025
CAO	12	10	107	2025
CAO	13	10	107	2025
CAO	14	10	107	2025
CAO	15	10	107	2025
CAO	16	10	107	2025
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CAO	21	10	107	2025
CAO	22	10	107	2025
CAO	23	10	107	2025
CAO	24	10	107	2025
CAO	25	10	107	2025
CAO	26	10	107	2025
CAO	27	10	107	2025
CAO	28	10	107	2025
CAO	29	10	107	2025
CAO	30	10	107	2025
CAO	31	10	107	2025
CAO	32	10	107	2025
CAO	33	10	107	2025
CAO	34	10	107	2025
CAO	35	10	107	2025
CAO	36	10	107	2025
CAO	37	10	107	2025
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CAO	42	10	107	2025
CAO	43	10	107	2025
CAO	44	10	107	2025
CAO	45	10	107	2025
CAO	46	10	107	2025
CAO	47	10	107	2025
CAO	48	10	107	2025

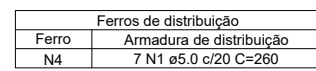


Armação positiva das lajes do pavimento PAVIMENTO INTERMEDIÁRIO
escala 1:50

CASO	735,7
CAG0	115,8

Volume de concreto (C-35) = 6,30 m³
 Área da forma = 81,16 m²



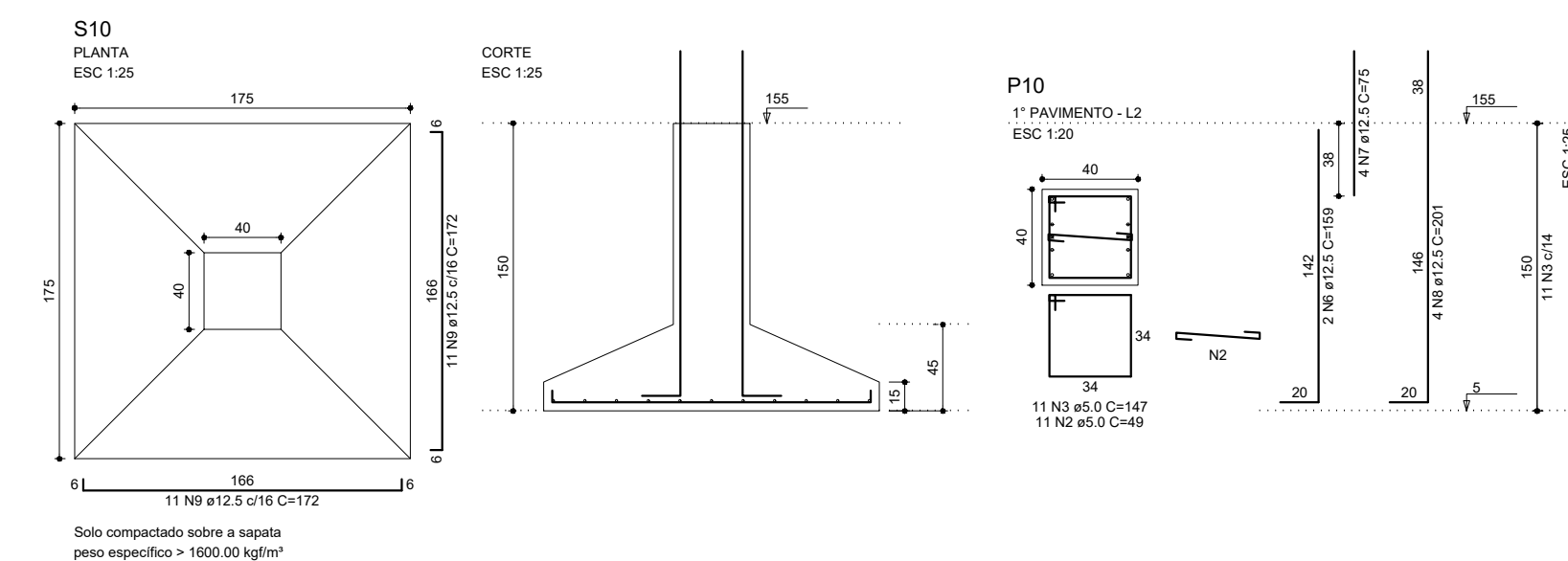
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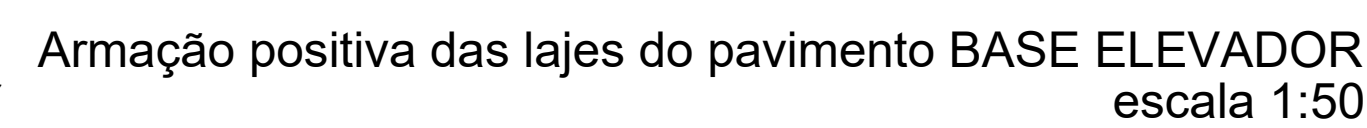
Negativos		P10	810		
AÇO	N	DIAM (mm)	QUANT	C.UNIT (cm)	C.TOTAL (cm)
CA60	1	5.0	7	390	9326
	2	5.0	11	49	538
	3	8.0	11	147	9617
CA50	4	6.3	15	120	1935
	5	8.0	10	74	740
	6	12.5	2	159	318
	7	12.5	4	75	300
	8	12.5	4	201	804
	9	12.5	22	172	3784

RESUMO DO AÇO				
AÇO	DIAM (mm)	C.TOTAL (m)	QUANT + 10% (Barras)	PESO (kg)
CA50	6.3	19.4	2	
	8.0	7.4	1	
	12.5	52.1	5	
CA60	5.0	39.8	-	

PEÇO TOTAL (q2)	
CASS	63.6
CMS	6.7

Volume de concreto (C-35) = 1.09 m³
 Área de forma = 2.45 m²





AÇO	DIAM (mm)	C.TOTAL (m)	QUANT = 12% (Barra)	PESO = 15% (kg)
CA50	6,3	79,3	8	21,3
	8,0	50,5	5	22
	10,0	21,5	2	14,6
	12,5	115,1	11	122
	16,0	29,4	3	31,5
CA60	5,0	169,5	-	28,8
PESO TOTAL (kg)				
CA50		231		
CA60		28,8		

Volume de concreto [C-35] = 3,08 m³
 Área de fôrma = 24,94 m²

Volume do concreto (C-35) = 3,98 m³
Área de forma = 24,94 m²