

Índice

Anexo A – Dimensões dos elementos estruturais	1
Anexo B – Definição dos centros de rigidez e identificação dos centros de massa de cada piso	3
Anexo C – Modos de vibração e fatores de participação modal	7
Anexo D – Comprimentos críticos e espaçamentos máximos da armadura transversal em vigas.....	9
Anexo E – Armadura longitudinal, taxa da armadura longitudinal e armadura transversal em vigas	13
Anexo F – Comprimentos críticos e espaçamentos máximos de armadura transversal em pilares sísmicos primários.....	31
Anexo G – Armadura longitudinal, armadura transversal em pilares sísmicos primários.....	34
Anexo H - Características e disposições construtivas das paredes estruturais	49
Anexo I - Armadura longitudinal e transversal nos pilares fictícios das paredes.....	51
Anexo J - Pilares de extremidade das paredes que constituem os núcleos dos elevadores (NU).....	60
Anexo K – Vigas de escadas, vigas e lajes das rampas de acesso ao estacionamento, pilares e paredes nas caves.....	67
Anexo L – Armaduras de lajes	74
Anexo M – Verificação ao estado limite último de punçoamento nas lajes.....	98
Anexo N – Fundações	107
Anexo O – Espessura equivalente das escadas, cargas equivalentes utilizadas no processo de modelação e vigas de cobertura.....	116
Anexo P – Controlo das deformações	118

Anexo A – Dimensões dos elementos estruturais

Pilares nas caves					
Pilar	Dim X [m]	Dim Y [m]	Diâmetro [m]	AS _{min} [cm ²]	AS _{máx} [cm ²]
P6	0.20	0.80	---	3.20	64.00
P7	---	---	0.70	0.00	153.94
P8	0.60	0.60	---	7.20	144.00
P10	0.20	0.80	---	3.20	64.00
P11	---	---	0.70	0.00	153.94
P12	---	---	0.70	0.00	153.94
P13	---	---	0.70	0.00	153.94
P14	0.90	0.40	---	7.20	144.00
P15	---	---	0.70	0.00	153.94
P16	0.20	0.80	---	3.20	64.00
P18	---	---	0.70	0.00	153.94
P19	---	---	0.70	0.00	153.94
P21	---	---	0.70	0.00	153.94

Anexo A. 1- Dimensões dos pilares nas caves e as respetivas armaduras regulamentares

Pilares nos pisos acima da cave rígida				
Pilar	Dim x [m]	Dim y [m]	AS _{min} [cm ²]	AS _{máx} [cm ²]
P1	0.30	1.00	30.00	120.00
P2	0.80	0.30	24.00	96.00
P3	1.10	0.30	33.00	132.00
P4	1.10	0.30	33.00	132.00
P5	0.30	0.80	24.00	96.00
P7	0.50	0.50	25.00	100.00
P8	0.60	0.60	36.00	144.00
P9	0.30	0.80	24.00	96.00
P11	0.60	0.40	24.00	96.00
P12	0.55	0.40	22.00	88.00
P13	0.55	0.40	22.00	88.00
P14	0.90	0.40	36.00	144.00
P15	0.55	0.40	22.00	88.00
P17	0.30	1.00	30.00	120.00
P18	0.50	0.40	20.00	80.00
P19	0.50	0.40	20.00	80.00
P20	0.50	0.50	25.00	100.00
P21	0.50	0.40	20.00	80.00

Anexo A. 2 - Dimensões dos pilares e as respetivas armaduras regulamentares

Parede	Dim X [m]	Dim Y [m]
Pb1	0.30	1.50
Pb2	3.19	0.20
Pb3-a	3.71	0.20
Pb3-b	3.71	0.20
Pb4-a	2.03	0.20
Pb4-b	2.03	0.20
Pb5	3.20	0.20
Pb6-a	1.77	0.20
Pb6-b	1.77	0.20
Pb7	0.20	3.37
Pb8	0.20	3.37
Pb9	0.20	3.37
Pb10	0.20	2.37
Pb11	2.25	0.20
Pb12	3.94	0.20
Pb13	1.50	0.30
Pb14	1.50	0.30
Pb15	1.50	0.30

Anexo A. 3 - Dimensões das paredes estruturais

Vigas	Largura [m]	Altura [m]	A_{smin} [cm ²]	$A_{smáx}$ [cm ²]	$A_{sw,min}$ [Cm ² /m]
Vigas exteriores (V)	0.30	0.50	5.11	60.00	3.29
Vigas das rampas (VR)	0.20	0.65	2.34	52.00	2.19
Vigas de suporte das Lojas_Inter (Vi)	0.20	1.00	7.03	80.00	2.19
Vigas de escadas (VE)	0.20	0.40	2.68	32.00	2.19
Vigas de Fundação (VF)	0.25	0.50	2.21	50.00	2.74

Anexo A. 4 - Dimensões das vigas e as respetivas armaduras regulamentares

Lajes	Espessura
Cobertura	0.20
Fungiformes	0.30
Vigadas maciças (Rampas)	0.25
Paredes de betão	0.20
Muro de suporte	0.40

Anexo A. 5 - Espessura das lajes

Anexo B – Definição dos centros de rigidez e identificação dos centros de massa de cada piso

Pilares/Paredes	Centro de Rigidez Piso Intermédio							
	x (m)	y (m)	Iy(m ⁴)	Ix(m ⁴)	xi(m)	yi(m)	Iy*xi	Ix*yi
P1	0.300	1.000	0.024	0.0033	-0.079	0.368	-0.00189	0.00121
P2	0.800	0.300	0.0018	0.0128	8.062	0.000	0.01451	0.00000
P3	1.100	0.300	0.002475	0.033275	17.217	0.000	0.04261	0.00000
P4	1.100	0.300	0.002475	0.033275	26.562	0.000	0.06574	0.00000
P5	0.300	0.800	0.0123	0.0023	-1.178	5.489	-0.01449	0.01262
P8	0.600	0.600	0.0108	0.0108	8.635	9.064	0.09326	0.09789
P9	0.300	0.800	0.0123	0.0023	-2.814	13.111	-0.03461	0.03015
P11	0.600	0.400	0.0032	0.0072	7.213	18.763	0.02308	0.13509
P12	0.550	0.400	0.002933	0.005546	14.469	18.763	0.04244	0.10406
P13	0.550	0.400	0.002933	0.005546	18.562	18.763	0.05444	0.10406
P14	0.900	0.400	0.0048	0.0243	25.893	18.763	0.12429	0.45594
P15	0.550	0.400	0.002933	0.005546	30.074	18.763	0.08821	0.10406
P17	0.300	1.000	0.0244	0.0029	34.993	18.437	0.85383	0.05347
P18	0.500	0.400	0.002667	0.004167	25.893	23.250	0.06906	0.09688
P19	0.500	0.400	0.002667	0.004167	29.840	22.819	0.07958	0.09509
P20	0.500	0.500	0.005208	0.005208	34.095	23.604	0.17757	0.12293
P21	0.500	0.400	0.002667	0.004167	31.344	28.440	0.08359	0.11851
Pb1	0.300	1.500	0.0831	0.0047	37.740	0.371	3.13619	0.00174
Pb2	3.190	0.200	0.002127	0.541029	10.605	7.644	0.02256	4.13563
Pb4-a	2.030	0.200	0.001353	0.139424	18.852	7.614	0.02551	1.06157
Pb4-b	2.030	0.200	0.001353	0.139424	18.852	10.779	0.02551	1.50285
Pb5	3.200	0.200	0.002133	0.546133	24.523	7.614	0.05231	4.15826
Pb6-a	1.770	0.200	0.00118	0.092421	28.967	8.609	0.03418	0.79565
Pb6-b	1.770	0.200	0.00118	0.092421	28.967	10.779	0.03418	0.99621
Pb7	0.200	3.370	0.6112	0.0207	36.607	9.152	22.37420	0.18945
Pb9	0.200	3.365	0.635044	0.002243	17.737	9.197	11.26378	0.02063
Pb10	0.200	2.370	0.221868	0.00158	27.981	9.694	6.20809	0.01532
Pb11	2.250	0.200	0.0015	0.189844	9.426	10.779	0.01414	2.04633
Pb12	3.944	0.200	0.002629	1.022491	24.895	10.779	0.06545	11.02143
Pb13	1.500	0.300	0.0069	0.0808	-3.736	18.943	-0.02578	1.53059
Pb14	1.500	0.300	0.0069	0.0808	0.640	19.882	0.00441	1.60649
Pb15	1.500	0.300	0.003375	0.084375	1.860	18.763	0.00628	1.58309
			1.70240	3.20518			45.00221	32.19720

CR(Piso)	$\sum (I_y \cdot x_i) / \sum I_y$	$\sum (I_x \cdot y_i) / \sum I_x$
X _{cr}	26.43	
Y _{cr}		10.05

Anexo B. 1 - Coordenadas do centro de rigidez do piso intermédio

Centro de Rigidez dos Pisos 1,2,3 e 4								
Pilares/Paredes	x (m)	y (m)	Iy(m ⁴)	Ix(m ⁴)	xi(m)	yi(m)	Iy*xi	Ix*yi
P1	0.300	1.000	0.024	0.0033	-0.079	0.368	-0.00189	0.00121
P2	0.800	0.300	0.0018	0.0128	8.062	0.000	0.01451	0.00000
P3	1.100	0.300	0.002475	0.033275	17.217	0.000	0.04261	0.00000
P4	1.100	0.300	0.002475	0.033275	26.562	0.000	0.06574	0.00000
P5	0.300	0.800	0.0123	0.0023	-1.178	5.489	-0.01449	0.01262
P8	0.600	0.600	0.0108	0.0108	8.635	9.064	0.09326	0.09789
P9	0.300	0.800	0.0123	0.0023	-2.814	13.111	-0.03461	0.03015
P11	0.600	0.400	0.0032	0.0072	7.213	18.763	0.02308	0.13509
P12	0.550	0.400	0.002933	0.005546	14.469	18.763	0.04244	0.10406
P13	0.550	0.400	0.002933	0.005546	18.562	18.763	0.05444	0.10406
P14	0.900	0.400	0.0048	0.0243	25.893	18.763	0.12429	0.45594
P15	0.550	0.400	0.002933	0.005546	30.074	18.763	0.08821	0.10406
P17	0.300	1.000	0.0244	0.0029	34.993	18.437	0.85383	0.05347
Pb1	0.300	1.500	0.0831	0.0047	37.740	0.371	3.13619	0.00174
Pb2	3.190	0.200	0.002127	0.541029	10.605	7.644	0.02256	4.13563
Pb4-a	2.030	0.200	0.001353	0.139424	18.852	7.614	0.02551	1.06157
Pb4-b	2.030	0.200	0.001353	0.139424	18.852	10.779	0.02551	1.50285
Pb5	3.200	0.200	0.002133	0.546133	24.523	7.614	0.05231	4.15826
Pb6-a	1.770	0.200	0.00118	0.092421	28.967	8.609	0.03418	0.79565
Pb6-b	1.770	0.200	0.00118	0.092421	28.967	10.779	0.03418	0.99621
Pb7	0.200	3.370	0.6112	0.0207	36.607	9.152	22.37420	0.18945
Pb9	0.200	3.365	0.635044	0.002243	17.737	9.197	11.26378	0.02063
Pb10	0.200	2.370	0.221868	0.00158	27.981	9.694	6.20809	0.01532
Pb11	2.250	0.200	0.0015	0.189844	9.426	10.779	0.01414	2.04633
Pb12	3.944	0.200	0.002629	1.022491	24.895	10.779	0.06545	11.02143
Pb13	1.500	0.300	0.0069	0.0808	-3.736	18.943	-0.02578	1.53059
Pb14	1.500	0.300	0.0069	0.0808	0.640	19.882	0.00441	1.60649
Pb15	1.500	0.300	0.003375	0.084375	1.860	18.763	0.00628	1.58309
			1.68919	3.18747			44.59241	31.76379

CR(Piso)	$\sum (Iy*xi)/\sum Iy$	$\sum (Ix*yi)/\sum Ix$
Xcr	26.40	
Ycr		9.97

Anexo B. 2 - Coordenadas do centro de rigidez dos pisos 1, 2, 3 e 4

Centro de Rigidez do Piso 5								
Pilares/Paredes	x (m)	y (m)	Iy(m ⁴)	Ix(m ⁴)	xi(m)	yi(m)	Iy*xi	Ix*yi
P8	0.600	0.600	0.0108	0.0108	8.635	9.064	0.09326	0.09789
P11	0.600	0.400	0.0032	0.0072	7.213	18.763	0.02308	0.13509
P12	0.550	0.400	0.002933	0.005546	14.469	18.763	0.04244	0.10406
P13	0.550	0.400	0.002933	0.005546	18.562	18.763	0.05444	0.10406
P14	0.900	0.400	0.0048	0.0243	25.893	18.763	0.12429	0.45594
P15	0.550	0.400	0.002933	0.005546	30.074	18.763	0.08821	0.10406
P17	0.300	1.000	0.0244	0.0029	34.993	18.437	0.85383	0.05347
Pb2	3.190	0.200	0.002127	0.541029	10.605	7.644	0.02256	4.13563
Pb4-a	2.030	0.200	0.001353	0.139424	18.852	7.614	0.02551	1.06157
Pb4-b	2.030	0.200	0.001353	0.139424	18.852	10.779	0.02551	1.50285
Pb5	3.200	0.200	0.002133	0.546133	24.523	7.614	0.05231	4.15826
Pb6-a	1.770	0.200	0.00118	0.092421	28.967	8.609	0.03418	0.79565
Pb6-b	1.770	0.200	0.00118	0.092421	28.967	10.779	0.03418	0.99621
Pb7	0.200	3.370	0.6112	0.0207	36.607	9.152	22.37420	0.18945
Pb9	0.200	3.365	0.635044	0.002243	17.737	9.197	11.26378	0.02063
Pb10	0.200	2.370	0.221868	0.00158	27.981	9.694	6.20809	0.01532
Pb11	2.250	0.200	0.0015	0.189844	9.426	10.779	0.01414	2.04633
Pb12	3.944	0.200	0.002629	1.022491	24.895	10.779	0.06545	11.02143
Pb15	1.500	0.300	0.003375	0.084375	1.860	18.763	0.00628	1.58309
			1.53694	2.93392			41.40571	28.58097

CR(Piso)	$\sum (Iy*xi)/\sum Iy$	$\sum (Ix*yi)/\sum Ix$
Xcr	26.94	
Ycr		9.74

Anexo B. 3 - Coordenadas do centro de rigidez do piso 5

C.M e CR	X _{cm}	Y _{cm}	X _{cr}	Y _{cr}	EX	EY
Piso 5	23.984	9.695	26.940	9.742	2.956	0.047
Piso 4	24.619	9.259	26.399	9.965	1.780	0.706
Piso 3	24.523	9.352	26.399	9.965	1.876	0.613
Piso 2	24.523	9.351	26.399	9.965	1.876	0.614
Piso 1	24.515	9.363	26.399	9.965	1.884	0.602
Piso Inter	24.414	6.448	26.435	10.045	2.021	3.597

Anexo B. 4 - Coordenadas dos centros de massa e dos centros de rigidez

Pisos	Massa (Ton)	Área [m ²]	I _x (m ⁴)	I _y (m ⁴)	I _p (Ton/m ²)
Piso 5	1320.26	685.40	21156.16	89955.98	214030.4796
Piso 4	1050.29	760.11	21567.57	91268.33	155912.2117
Piso 3	1160.14	799.92	21567.57	91268.33	163648.6525
Piso 2	1191.21	799.92	21567.57	91268.33	168030.5544
Piso 1	1167.58	799.92	21567.57	91268.33	164697.181
Piso Inter	744.69	482.46	14989.27	41364.49	86982.93202

Anexo B. 5 – Massas, áreas, momentos de inércia, e momento polar de inércia de cada piso

Anexo C – Modos de vibração e fatores de participação modal

Modo	Período [s]	UX [%]	UY [%]	RZ [%]	Σ UX [%]	Σ UY [%]	Σ RZ [%]
1	1.630	1.58E-05	0.01561	0.2295	1.58E-05	0.016	0.230
2	1.031	0.00014	0.49457	0.00554	0.00016	0.510	0.235
3	0.976	0.42366	0.00012	0.00797	0.42382	0.510	0.243
4	0.420	0.01488	0.00108	0.01599	0.4387	0.511	0.259
5	0.301	5.34E-06	4.46E-08	5.82E-07	0.4387	0.511	0.259
6	0.283	0.00097	2.25E-07	8.34E-05	0.43967	0.511	0.259
7	0.256	0.0026	0.09844	0.00082	0.44227	0.610	0.260
8	0.245	0.00013	2.91E-06	3.59E-05	0.4424	0.610	0.260
9	0.216	0.07913	0.00183	0.00292	0.52153	0.612	0.263
10	0.209	0.02893	9.08E-05	0.00078	0.55046	0.612	0.264
11	0.207	0.06474	0.00273	0.06678	0.6152	0.614	0.330
12	0.186	2.31E-06	1.13E-09	1.31E-05	0.61521	0.614	0.330
13	0.183	0.00022	2.88E-06	0.00025	0.61543	0.614	0.331
14	0.179	0.00034	2.14E-05	9.78E-05	0.61577	0.614	0.331
15	0.169	3.12E-06	1.93E-05	1.38E-06	0.61578	0.615	0.331
16	0.156	1.16E-05	4.25E-06	3.14E-05	0.61579	0.615	0.331
17	0.153	1.67E-05	8.94E-05	0.0002	0.6158	0.615	0.331
18	0.152	0.00011	0.0003	4.03E-07	0.61591	0.615	0.331
19	0.149	5.72E-06	5.28E-06	6.24E-05	0.61592	0.615	0.331
20	0.148	0.00012	9.48E-05	3.51E-05	0.61604	0.615	0.331
21	0.146	1.63E-06	7.83E-06	8.64E-06	0.61604	0.615	0.331
22	0.146	3.87E-06	1.65E-08	2.56E-05	0.61604	0.615	0.331
23	0.142	1.61E-05	2.73E-06	2.25E-06	0.61606	0.615	0.331
24	0.139	1.62E-06	2.51E-05	1.08E-06	0.61606	0.615	0.331
25	0.138	4.22E-05	5.16E-05	4.39E-05	0.6161	0.615	0.331

Anexo C. 1 – Modos de vibração e fatores de participação modal [1º modo ao 25º modo]

Modo	Período [s]	UX [%]	UY [%]	RZ [%]	ΣUX [%]	ΣUY [%]	ΣRZ [%]
26	0.138	4.17E-05	8.49E-07	1.65E-05	0.61615	0.615	0.331
27	0.135	0.00084	0.01772	0.00031	0.61699	0.633	0.332
28	0.134	0.0009	0.01298	6.73E-05	0.61789	0.646	0.332
29	0.133	0.00017	0.00261	2.59E-06	0.61805	0.648	0.332
30	0.132	0.00055	0.00215	2.1E-05	0.6186	0.651	0.332
31	0.130	1.62E-07	1.81E-05	5.71E-06	0.6186	0.651	0.332
32	0.130	9.86E-09	0.00072	0.00044	0.6186	0.651	0.332
33	0.129	2.21E-06	0.00057	0.00019	0.6186	0.652	0.332
34	0.128	1.22E-11	0.00088	0.00061	0.6186	0.653	0.333
35	0.128	4.93E-05	0.00335	0.00124	0.61865	0.656	0.334
36	0.128	7.54E-06	0.01275	0.00457	0.61866	0.669	0.339
37	0.127	7.35E-05	0.00551	0.00121	0.61873	0.674	0.340
38	0.126	0.00013	0.00403	0.00074	0.61886	0.678	0.341
39	0.126	1.66E-05	0.00195	0.00074	0.61888	0.680	0.341
40	0.124	7.98E-05	0.002	0.0002	0.61896	0.682	0.342
41	0.123	2.18E-05	0.00042	1.36E-05	0.61898	0.683	0.342
42	0.122	6.99E-05	0.00035	2.68E-06	0.61905	0.683	0.342
43	0.122	5.08E-07	0.0002	8.83E-06	0.61905	0.683	0.342
44	0.121	6.08E-06	0.00014	3.97E-06	0.61906	0.683	0.342
45	0.121	7.59E-06	2.35E-05	1.33E-05	0.61907	0.683	0.342
46	0.119	3.5E-06	0.00012	1.12E-06	0.61907	0.684	0.342
47	0.119	2.89E-09	6.06E-05	1.15E-05	0.61907	0.684	0.342
48	0.118	3.47E-09	8.07E-05	5.62E-06	0.61907	0.684	0.342
49	0.118	1.68E-05	6.5E-05	1.18E-07	0.61909	0.684	0.342
50	0.117	3.36E-05	0.00113	7.29E-05	0.61912	0.685	0.342

Anexo C. 2 - Modos de vibração e fatores de participação modal [26º modo ao 50º modo]

Anexo D – Comprimentos críticos e espaçamentos máximos da armadura transversal em vigas

Vigas Piso 0	$h_w = l_{cr}$ [m]	d_{bw} [mm]	225 [mm]	d_{bL} [mm]	$s_{t,max}$ [m]	
					Zona corrente	Zona crítica
Vi.1	1.00	10	225	20	0.714	0.25

Anexo D. 1- Comprimento crítico e espaçamento máximo da armadura transversal na viga do piso 0

Vigas P-Inter	$h_w = l_{cr}$ [m]	d_{bw} [mm]	225 [mm]	d_{bL} [mm]	$s_{t,max}$ [m]	
					Zona corrente	Zona crítica
V1.1	0.50	10	225	20	0.339	0.125
V1.2	0.50	10	225	20	0.339	0.125
V1.3	0.50	10	225	20	0.339	0.125
V1.4	0.50	10	225	20	0.339	0.125
V2.1	0.50	10	225	20	0.339	0.125
V2.2	0.50	10	225	20	0.339	0.125
V2.3	0.50	10	225	20	0.339	0.125
V2.4	0.50	10	225	20	0.339	0.125
V2.5	0.50	10	225	20	0.339	0.125
V2.6	0.50	10	225	20	0.339	0.125
V3.1	0.50	10	225	20	0.339	0.125
V3.2	0.50	10	225	20	0.339	0.125
V3.3	0.50	10	225	20	0.339	0.125
V4.1	0.50	10	225	20	0.339	0.125
V5.1	0.50	10	225	20	0.339	0.125
V6.1	0.50	10	225	20	0.339	0.125
V6.2	0.50	10	225	20	0.339	0.125
V7.1	0.50	10	225	20	0.339	0.125
V8.1	0.50	10	225	20	0.339	0.125
V9.1	0.50	10	225	20	0.339	0.125
V10.1	0.50	10	225	20	0.339	0.125
Vi.1	1.00	10	225	20	0.714	0.250

Anexo D. 2 - Comprimento crítico e espaçamento máximo da armadura transversal nas vigas do piso intermédio

Vigas Piso 1	$h_w = l_{cr}$ [m]	d_{bw} [mm]	225 [mm]	d_{bL} [mm]	$s_{t,max}$ [m]	
					Zona corrente	Zona crítica
V1.1	0.50	10	225	20	0.339	0.125
V1.2	0.50	10	225	20	0.339	0.125
V1.3	0.50	10	225	20	0.339	0.125
V1.4	0.50	10	225	20	0.339	0.125
V2.1	0.50	10	225	20	0.339	0.125
V2.2	0.50	10	225	20	0.339	0.125
V2.3	0.50	10	225	20	0.339	0.125
V2.4	0.50	10	225	20	0.339	0.125
V2.5	0.50	10	225	20	0.339	0.125
V2.6	0.50	10	225	20	0.339	0.125
V3.1	0.50	10	225	20	0.339	0.125
V3.2	0.50	10	225	20	0.339	0.125
V3.3	0.50	10	225	20	0.339	0.125
V4.1	0.50	10	225	20	0.339	0.125
V5.1	0.50	10	225	20	0.339	0.125
V6.1	0.50	10	225	20	0.339	0.125
V6.2	0.50	10	225	20	0.339	0.125

Anexo D. 3 - Comprimento crítico e espaçamento máximo da armadura transversal nas vigas do piso 1

Vigas Piso 2	$h_w = l_{cr}$ [m]	d_{bw} [mm]	225 [mm]	d_{bL} [mm]	$s_{t,max}$ [m]	
					Zona corrente	Zona crítica
V1.1	0.50	10	225	20	0.339	0.125
V1.2	0.50	10	225	20	0.339	0.125
V1.3	0.50	10	225	20	0.339	0.125
V1.4	0.50	10	225	20	0.339	0.125
V2.1	0.50	10	225	20	0.339	0.125
V2.2	0.50	10	225	20	0.339	0.125
V2.3	0.50	10	225	20	0.339	0.125
V2.4	0.50	10	225	20	0.339	0.125
V2.5	0.50	10	225	20	0.339	0.125
V2.6	0.50	10	225	20	0.339	0.125
V3.1	0.50	10	225	20	0.339	0.125
V3.2	0.50	10	225	20	0.339	0.125
V3.3	0.50	10	225	20	0.339	0.125
V4.1	0.50	10	225	20	0.339	0.125
V5.1	0.50	10	225	20	0.339	0.125
V6.1	0.50	10	225	20	0.339	0.125
V6.2	0.50	10	225	20	0.339	0.125

Anexo D. 4 - Comprimento crítico e espaçamento máximo da armadura transversal nas vigas do piso 2

Vigas Piso 3	$h_w = l_{cr}$ [m]	d_{bw} [mm]	225 [mm]	d_{bL} [mm]	$S_{t,max}$ [m]	
					Zona corrente	Zona crítica
V1.1	0.50	10	225	20	0.339	0.125
V1.2	0.50	10	225	20	0.339	0.125
V1.3	0.50	10	225	20	0.339	0.125
V1.4	0.50	10	225	20	0.339	0.125
V2.1	0.50	10	225	20	0.339	0.125
V2.2	0.50	10	225	20	0.339	0.125
V2.3	0.50	10	225	20	0.339	0.125
V2.4	0.50	10	225	20	0.339	0.125
V2.5	0.50	10	225	20	0.339	0.125
V2.6	0.50	10	225	20	0.339	0.125
V3.1	0.50	10	225	20	0.339	0.125
V3.2	0.50	10	225	20	0.339	0.125
V3.3	0.50	10	225	20	0.339	0.125
V4.1	0.50	10	225	20	0.339	0.125
V5.1	0.50	10	225	20	0.339	0.125
V6.1	0.50	10	225	20	0.339	0.125
V6.2	0.50	10	225	20	0.339	0.125

Anexo D. 5 - Comprimento crítico e espaçamento máximo da armadura transversal nas vigas do piso 3

Vigas Piso 4	$h_w = l_{cr}$ [m]	d_{bw} [mm]	225 [mm]	d_{bL} [mm]	$S_{t,max}$ [m]	
					Zona corrente	Zona crítica
V1.1	0.50	10	225	20	0.339	0.125
V1.2	0.50	10	225	20	0.339	0.125
V1.3	0.50	10	225	20	0.339	0.125
V1.4	0.50	10	225	20	0.339	0.125
V2.1	0.50	10	225	20	0.339	0.125
V2.2	0.50	10	225	20	0.339	0.125
V2.3	0.50	10	225	20	0.339	0.125
V2.4	0.50	10	225	20	0.339	0.125
V2.5	0.50	10	225	20	0.339	0.125
V2.6	0.50	10	225	20	0.339	0.125
V3.1	0.50	10	225	20	0.339	0.125
V3.2	0.50	10	225	20	0.339	0.125
V3.3	0.50	10	225	20	0.339	0.125
V4.1	0.50	10	225	20	0.339	0.125
V5.1	0.50	10	225	20	0.339	0.125
V6.1	0.50	10	225	20	0.339	0.125
V6.2	0.50	10	225	20	0.339	0.125

Anexo D. 6 - Comprimento crítico e espaçamento máximo da armadura transversal nas vigas do piso 4

Vigas Piso 5	$h_w = l_{cr}$ [m]	d_{bw} [mm]	225 [mm]	d_{bL} [mm]	$s_{t,max}$ [m]	
					Zona corrente	Zona crítica
V2.1	0.50	10	225	20	0.339	0.125
V2.2	0.50	10	225	20	0.339	0.125
V2.3	0.50	10	225	20	0.339	0.125
V2.4	0.50	10	225	20	0.339	0.125
V2.5	0.50	10	225	20	0.339	0.125
V2.6	0.50	10	225	20	0.339	0.125
V2.7	0.50	10	225	20	0.339	0.125

Anexo D. 7 - Comprimento crítico e espaçamento máximo da armadura transversal nas vigas do piso 5

Anexo E – Armadura longitudinal, taxa da armadura longitudinal e armadura transversal em vigas

Piso Intermédio			Armadura (Sap 2000) [cm ²]			Armadura longitudinal adotada [cm ²]					
Viga	Troço (início-fim)	Face	ASinício	ASmeio Vão	ASFinal	Início		Meio vão		Fim	
						Ø	As[cm ²]	Ø	As[cm ²]	Ø	As[cm ²]
Vi.1	Pb14-P7	Superior	11.40	7.02	10.00	4Ø20	12.56	3Ø20	9.42	4Ø20	12.56
		Inferior	7.02	7.20	7.02	3Ø20	9.42	3Ø20	9.42	3Ø20	9.42

Anexo E.1 – Armadura longitudinal na viga do piso 0

Viga	Ac [m ²]	Face	Armadura longitudinal adotada [cm ²]					
			Início		Meio vão		Fim	
			As[cm ²]	ρ	As[cm ²]	ρ	As[cm ²]	ρ
Vi.1	0.2	Superior	6.28	0.0031	6.28	0.0031	9.42	0.0047
		Inferior	6.28	0.0031	6.28	0.0031	6.28	0.0031

Anexo E.2 – Taxa de armadura longitudinal na viga do piso 0

Piso Intermédio	Armadura (Sap 2000) [cm ² /m]			Armadura transversal adotada [cm ²]					
Viga	ASinício	ASmeio Vão	ASFinal	Início		Meio vão		Fim	
				Ø	As[cm ² /m]	Ø	As[cm ² /m]	Ø	As[cm ² /m]
Vi.1	4.80	3.98	4.80	Ø8//0.20 (2r)	5.00	Ø8//0.25 (2r)	4.00	Ø8//0.20 (2r)	5.00

Anexo E. 3 - Anexo E.1 – Armadura transversal na viga do piso 0

Piso Intermédio			Armadura (Sap 2000) [cm ²]			Armadura longitudinal adotada [cm ²]					
Viga	Troço (início-fim)	Face	As _{início}	As _{meio Vão}	As _{Final}	Início		Meio vão		Fim	
						Ø	As[cm ²]	Ø	As[cm ²]	Ø	As[cm ²]
V1.1	P1-P2	Superior	5.11	5.11	6.53	2Ø20	6.28	2Ø20	6.28	4Ø20	12.56
		Inferior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	3Ø20	9.42
V1.2	P2-P3	Superior	10.21	5.11	10.78	4Ø20	12.56	2Ø20	6.28	4Ø20	12.56
		Inferior	8.00	5.11	7.17	3Ø20	9.42	2Ø20	6.28	3Ø20	9.42
V1.3	P3-P4	Superior	11.23	6.43	14.90	4Ø20	12.56	3Ø20	9.42	2Ø20+2Ø25	16.1
		Inferior	8.80	6.42	12.80	3Ø20	9.42	3Ø20	9.42	2Ø20+2Ø25	16.1
V1.4	P4-P5	Superior	11.32	5.11	5.11	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20	6.28
		Inferior	5.45	5.11	5.11	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20	6.28
V2.1	Pb15-P11	Superior	22.44	7.54	15.92	8Ø20	25.12	3Ø20	9.42	6Ø20	18.84
		Inferior	16.73	6.90	14.37	6Ø20	18.84	3Ø20	9.42	6Ø20	18.84
V2.2	P11-P12	Superior	16.42	5.11	16.12	6Ø20	18.84	2Ø20	6.28	6Ø20	18.84
		Inferior	7.75	5.11	7.62	6Ø20	18.84	2Ø20	6.28	4Ø20	12.56
V2.3	P12-P13	Superior	12.86	5.11	15.93	6Ø20	18.84	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	11.38	5.11	12.26	4Ø20	12.56	2Ø20	6.28	4Ø20	12.56
V2.4	P13-P14	Superior	13.87	5.11	18.18	2Ø20+2Ø25	16.1	2Ø20	6.28	8Ø20	25.12
		Inferior	6.61	5.11	8.52	4Ø20	12.56	2Ø20	6.28	8Ø20	25.12
V2.5	P14-P15	Superior	20.67	5.11	14.57	8Ø20	25.12	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	20.68	5.11	7.33	8Ø20	25.12	2Ø20	6.28	3Ø20	9.42
V2.6	P15-P17	Superior	10.54	5.11	8.86	2Ø20+2Ø25	16.1	2Ø20	6.28	3Ø20	9.42
		Inferior	5.92	5.11	7.08	3Ø20	9.42	2Ø20	6.28	3Ø20	9.42
V3.1	Pb13-P9	Superior	17.48	7.17	18.03	6Ø20	18.84	3Ø20	9.42	6Ø20	18.84
		Inferior	16.85	7.66	15.81	6Ø20	18.84	3Ø20	9.42	6Ø20	18.84
V3.2	P9-P5	Superior	13.92	5.35	14.94	6Ø20	18.84	2Ø20	6.28	8Ø20	25.12
		Inferior	12.79	5.90	11.54	6Ø20	18.84	2Ø20	6.28	8Ø20	25.12
V3.3	P5-P1	Superior	22.69	7.37	25.73	8Ø20	25.12	3Ø20	9.42	4Ø20+4Ø25	32.2
		Inferior	24.41	7.43	21.96	8Ø20	25.12	3Ø20	9.42	8Ø20	25.12
V4.1	Pb13-P14	Superior	29.18	12.57	29.63	4Ø20+4Ø25	32.2	2Ø25+2Ø20	16.1	4Ø20+4Ø25	32.2
		Inferior	27.92	12.97	27.39	4Ø20+4Ø25	32.2	2Ø25+2Ø20	16.1	4Ø20+4Ø25	32.2
V5.1	Pb14-P15	Superior	14.99	6.86	7.22	2Ø20+2Ø25	16.1	2Ø20+2Ø25	16.1	2Ø20+2Ø25	16.1
		Inferior	10.53	5.11	7.64	4Ø20	12.56	4Ø20	12.56	4Ø20	12.56
V6.1	Pb1-Pb7	Superior	25.28	10.11	25.01	4Ø20+4Ø25	32.2	4Ø20	12.56	4Ø20+4Ø25	32.2
		Inferior	17.99	12.28	16.84	6Ø20	18.84	4Ø20	12.56	6Ø20	18.84
V6.2	Pb7-P17	Superior	30.51	5.11	29.65	4Ø20+4Ø25	32.2	2Ø20	6.28	4Ø20+4Ø25	32.2
		Inferior	13.77	5.11	13.29	6Ø20	18.84	2Ø20	6.28	2Ø20+2Ø25	16.1
V7.1	P14-P18	Superior	10.29	5.11	8.85	4Ø20	12.56	2Ø20	6.28	3Ø20	9.42
		Inferior	9.89	5.11	5.11	4Ø20	12.56	2Ø20	6.28	2Ø20	6.28
V8.1	P18-P21	Superior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
		Inferior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
V9.1	P21-P20	Superior	7.17	5.11	5.11	3Ø20	9.42	2Ø20	6.28	2Ø20	6.28
		Inferior	6.49	5.11	5.11	3Ø20	9.42	2Ø20	6.28	2Ø20	6.28
V10.1	P20-P17	Superior	7.17	5.11	9.51	3Ø20	9.42	2Ø20	6.28	4Ø20+4Ø25	32.2
		Inferior	6.49	5.11	6.12	3Ø20	9.42	2Ø20	6.28	6Ø20	18.84
Vi.1	Pb14-P7	Superior	27.95	7.02	7.02	4Ø20+4Ø25	32.2	3Ø20	9.42	3Ø20	9.42
		Inferior	15.42	10.24	8.94	2Ø20+2Ø25	16.1	4Ø20	12.56	3Ø20	9.42

Anexo E.4 – Armadura longitudinal nas vigas do piso intermédio

Viga	A _c [m ²]	Face	Armadura longitudinal adotada [cm ²]					
			Início		Meio vão		Fim	
			As[cm ²]	ρ	As[cm ²]	ρ	As[cm ²]	ρ
V1.1	0.15	Superior	6.28	0.0042	6.28	0.0042	12.56	0.0084
		Inferior	6.28	0.0042	6.28	0.0042	9.42	0.0063
V1.2	0.15	Superior	12.56	0.0084	6.28	0.0042	12.56	0.0084
		Inferior	9.42	0.0063	6.28	0.0042	9.42	0.0063
V1.3	0.15	Superior	12.56	0.0084	9.42	0.0063	16.1	0.0107
		Inferior	9.42	0.0063	9.42	0.0063	16.1	0.0107
V1.4	0.15	Superior	16.10	0.0107	6.28	0.0042	6.28	0.0042
		Inferior	16.10	0.0107	6.28	0.0042	6.28	0.0042
V2.1	0.15	Superior	25.12	0.0167	9.42	0.0063	18.84	0.0126
		Inferior	18.84	0.0126	9.42	0.0063	18.84	0.0126
V2.2	0.15	Superior	18.84	0.0126	6.28	0.0042	18.84	0.0126
		Inferior	18.84	0.0126	6.28	0.0042	12.56	0.0084
V2.3	0.15	Superior	18.84	0.0126	6.28	0.0042	16.1	0.0107
		Inferior	12.56	0.0084	6.28	0.0042	12.56	0.0084
V2.4	0.15	Superior	16.10	0.0107	6.28	0.0042	25.12	0.0167
		Inferior	12.56	0.0084	6.28	0.0042	25.12	0.0167
V2.5	0.15	Superior	25.12	0.0167	6.28	0.0042	16.1	0.0107
		Inferior	25.12	0.0167	6.28	0.0042	9.42	0.0063
V2.6	0.15	Superior	16.10	0.0107	6.28	0.0042	9.42	0.0063
		Inferior	9.42	0.0063	6.28	0.0042	9.42	0.0063
V3.1	0.15	Superior	18.84	0.0126	9.42	0.0063	18.84	0.0126
		Inferior	18.84	0.0126	9.42	0.0063	18.84	0.0126
V3.2	0.15	Superior	18.84	0.0126	6.28	0.0042	25.12	0.0167
		Inferior	18.84	0.0126	6.28	0.0042	25.12	0.0167
V3.3	0.15	Superior	25.12	0.0167	9.42	0.0063	32.2	0.0215
		Inferior	25.12	0.0167	9.42	0.0063	25.12	0.0167
V4.1	0.15	Superior	32.20	0.0215	16.10	0.0107	32.2	0.0215
		Inferior	32.20	0.0215	16.10	0.0107	32.2	0.0215
V5.1	0.15	Superior	16.10	0.0107	16.10	0.0107	16.1	0.0107
		Inferior	12.56	0.0084	12.56	0.0084	12.56	0.0084
V6.1	0.15	Superior	32.20	0.0215	12.56	0.0084	32.2	0.0215
		Inferior	18.84	0.0126	12.56	0.0084	18.84	0.0126
V6.2	0.15	Superior	32.20	0.0215	6.28	0.0042	32.2	0.0215
		Inferior	18.84	0.0126	6.28	0.0042	16.1	0.0107
V7.1	0.15	Superior	12.56	0.0084	6.28	0.0042	9.42	0.0063
		Inferior	12.56	0.0084	6.28	0.0042	6.28	0.0042
V8.1	0.15	Superior	6.28	0.0042	6.28	0.0042	6.28	0.0042
		Inferior	6.28	0.0042	6.28	0.0042	6.28	0.0042
V9.1	0.15	Superior	9.42	0.0063	6.28	0.0042	6.28	0.0042
		Inferior	9.42	0.0063	6.28	0.0042	6.28	0.0042
V10.1	0.15	Superior	9.42	0.0063	6.28	0.0042	32.2	0.0215
		Inferior	9.42	0.0063	6.28	0.0042	18.84	0.0126
Vi.1	0.2	Superior	32.20	0.0161	9.42	0.0047	9.42	0.0047
		Inferior	16.10	0.0081	12.56	0.0063	9.42	0.0047

Anexo E.5 – Taxa de armadura longitudinal nas vigas do piso intermédio

Piso Intermédio	Armadura (Sap 2000) [cm ² /m]			Armadura transversal adotada [cm ²]					
Viga	AS _{Inicio}	AS _{meio Vão}	AS _{Final}	Inicio		Meio vão		Fim	
				Ø	As[cm ² /m]	Ø	As[cm ² /m]	Ø	As[cm ² /m]
V1.1	3.90	3.90	3.90	Ø8//0.125 (2r)	8.00	Ø8//0.25 (2r)	4.00	Ø8//0.125 (2r)	8.00
V1.2	3.90	3.90	3.90	Ø8//0.125 (2r)	8.00	Ø8//0.25 (2r)	4.00	Ø8//0.125 (2r)	8.00
V1.3	3.90	3.90	3.90	Ø8//0.125 (2r)	8.00	Ø8//0.25 (2r)	4.00	Ø8//0.125 (2r)	8.00
V1.4	13.99	7.21	9.27	Ø10//0.10 (2r)	15.80	Ø10//0.20 (2r)	7.90	Ø10//0.125 (2r)	12.64
V2.1	12.45	11.70	33.95	Ø10//0.125 (2r)	12.64	Ø10//0.25 (4r)	12.64	Ø10//0.075 (4r)	42.12
V2.2	25.18	7.46	18.27	Ø8//0.075 (4r)	26.68	Ø8//0.20 (4r)	10.00	Ø8//0.075 (4r)	26.68
V2.3	20.32	9.89	10.83	Ø10//0.075 (2r)	21.06	Ø10//0.15 (2r)	10.54	Ø10//0.125 (2r)	12.64
V2.4	17.22	5.77	10.56	Ø8//0.10 (4r)	20.00	Ø8//0.25 (4r)	8.00	Ø8//0.125 (4r)	16.00
V2.5	17.29	13.38	26.08	Ø10//0.125 (4r)	25.28	Ø10//0.20 (4r)	15.80	Ø10//0.10 (4r)	31.60
V2.6	10.95	10.57	10.08	Ø10//0.125 (2r)	12.64	Ø10//0.25 (4r)	12.64	Ø10//0.125 (2r)	12.64
V3.1	8.65	8.39	8.39	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00
V3.2	5.75	5.57	6.18	Ø8//0.125 (2r)	8.00	Ø8//0.15(2r)	6.66	Ø8//0.125 (2r)	8.00
V3.3	13.38	13.87	14.36	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80
V4.1	19.52	18.94	19.76	Ø8//0.10 (4r)	20.00	Ø8//0.10 (4r)	20.00	Ø8//0.10 (4r)	20.00
V5.1	3.29	3.29	3.29	Ø8//0.125 (2r)	8.00	Ø8//0.125 (2r)	8.00	Ø8//0.125 (2r)	8.00
V6.1	23.89	10.25	24.19	Ø8//0.075 (4r)	26.68	Ø8//0.15(4r)	13.32	Ø8//0.075 (4r)	26.68
V6.2	10.49	9.12	12.64	Ø10//0.125 (2r)	12.64	Ø10//0.15 (2r)	10.54	Ø10//0.10 (2r)	15.80
V7.1	7.22	7.01	13.89	Ø10//0.125 (2r)	12.64	Ø10//0.20 (2r)	7.90	Ø10//0.10 (2r)	15.80
V8.1	3.29	3.29	3.29	Ø8//0.125 (2r)	8.00	Ø8//0.25 (2r)	4.00	Ø8//0.125 (2r)	8.00
V9.1	9.60	9.60	8.06	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00
V10.1	9.83	9.32	10.23	Ø10//0.125 (2r)	12.64	Ø10//0.15 (2r)	10.54	Ø10//0.125 (2r)	12.64
Vi.1	23.91	7.34	9.49	Ø8//0.075 (4r)	26.68	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00

Anexo E.6- Armadura transversal nas vigas do piso intermédio

Piso 1			Armadura (Sap 2000) [cm ²]			Armadura longitudinal adotada [cm ²]					
Viga	Troço (início-fim)	Face	ASinício	ASmeio Vão	ASFinal	Início		Meio vão		Fim	
						Ø	As[cm ²]	Ø	As[cm ²]	Ø	As[cm ²]
V1.1	P1-P2	Superior	5.11	5.11	19.49	2Ø20	6.28	2Ø20	6.28	8Ø20	25.12
		Inferior	5.11	5.11	9.08	2Ø20	6.28	2Ø20	6.28	4Ø20	12.56
V1.2	P2-P3	Superior	21.64	5.11	23.63	8Ø20	25.12	2Ø20	6.28	8Ø20	25.12
		Inferior	9.99	5.11	10.81	4Ø20	12.56	2Ø20	6.28	4Ø20	12.56
V1.3	P3-P4	Superior	20.81	8.14	24.75	8Ø20	25.12	4Ø20	12.56	4Ø20+4Ø25	32.2
		Inferior	9.65	5.11	15.08	4Ø20	12.56	4Ø20	12.56	2Ø20+2Ø25	16.1
V1.4	P4-P5	Superior	25.99	5.11	9.16	4Ø20+4Ø25	32.2	2Ø20	6.28	3Ø20	9.42
		Inferior	11.77	7.42	5.11	2Ø20+2Ø25	16.1	3Ø20	9.42	2Ø20	6.28
V2.1	Pb15-P11	Superior	28.79	9.20	19.34	4Ø20+4Ø25	32.2	3Ø20	9.42	8Ø20	25.12
		Inferior	23.06	7.98	17.78	8Ø20	25.12	3Ø20	9.42	6Ø20	18.84
V2.2	P11-P12	Superior	19.75	5.11	19.20	8Ø20	25.12	2Ø20	6.28	8Ø20	25.12
		Inferior	9.21	5.11	8.96	4Ø20	12.56	2Ø20	6.28	2Ø20+2Ø25	16.1
V2.3	P12-P13	Superior	15.37	5.11	19.85	8Ø20	25.12	2Ø20	6.28	8Ø20	25.12
		Inferior	14.00	5.11	15.31	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20+2Ø25	16.1
V2.4	P13-P14	Superior	16.48	5.11	24.41	8Ø20	25.12	2Ø20	6.28	8Ø20	25.12
		Inferior	7.77	5.11	11.13	2Ø20+2Ø25	16.1	2Ø20	6.28	8Ø20	25.12
V2.5	P14-P15	Superior	23.71	5.74	21.44	8Ø20	25.12	2Ø20	6.28	8Ø20	25.12
		Inferior	24.53	6.40	16.26	8Ø20	25.12	3Ø20	9.42	6Ø20	18.84
V2.6	P15-P17	Superior	14.71	5.11	11.94	8Ø20	25.12	2Ø20	6.28	4Ø20	12.56
		Inferior	12.37	5.11	10.48	6Ø20	18.84	2Ø20	6.28	4Ø20	12.56
V3.1	Pb13-P9	Superior	11.04	5.11	19.01	4Ø20	12.56	2Ø20	6.28	4Ø20+4Ø25	32.2
		Inferior	10.50	5.12	14.01	4Ø20	12.56	2Ø20	6.28	6Ø20	18.84
V3.2	P9-P5	Superior	28.23	5.11	22.74	4Ø20+4Ø25	32.2	2Ø20	6.28	8Ø20	25.12
		Inferior	17.92	5.11	10.45	6Ø20	18.84	2Ø20	6.28	8Ø20	25.12
V3.3	P5-P1	Superior	22.56	5.11	26.43	8Ø20	25.12	2Ø20	6.28	8Ø20	25.12
		Inferior	20.82	5.11	21.14	8Ø20	25.12	2Ø20	6.28	8Ø20	25.12
V4.1	Pb13-P14	Superior	32.94	11.33	29.14	2Ø20+6Ø25	35.74	4Ø20	12.56	4Ø20+4Ø25	32.2
		Inferior	30.21	11.70	27.24	4Ø20+4Ø25	32.2	4Ø20	12.56	4Ø20+4Ø25	32.2
V5.1	Pb14-P15	Superior	14.22	5.35	9.68	2Ø20+2Ø25	16.1	2Ø20+2Ø25	16.1	2Ø20+2Ø25	16.1
		Inferior	8.35	5.11	10.89	4Ø20	12.56	4Ø20	12.56	4Ø20	12.56
V6.1	Pb1-Pb7	Superior	32.18	5.11	34.70	4Ø20+4Ø25	32.2	3Ø20	9.42	2Ø20+6Ø25	35.74
		Inferior	14.72	5.91	16.97	2Ø20+2Ø25	16.1	3Ø20	9.42	6Ø20	18.84
V6.2	Pb7-P17	Superior	31.21	6.66	29.82	4Ø20+4Ø25	32.2	3Ø20	9.42	4Ø20+4Ø25	32.2
		Inferior	23.04	9.38	25.91	4Ø20+4Ø25	32.2	3Ø20	9.42	4Ø20+4Ø25	32.2

Anexo E. 7 - Armadura longitudinal nas vigas do piso 1

Viga	A _c [m ²]	Face	Armadura longitudinal adotada [cm ²]					
			Início		Meio vão		Fim	
			As[cm ²]	ρ	As[cm ²]	ρ	As[cm ²]	ρ
V1.1	0.15	Superior	6.28	0.0042	6.28	0.0042	25.12	0.0167
		Inferior	6.28	0.0042	6.28	0.0042	12.56	0.0084
V1.2	0.15	Superior	25.12	0.0167	6.28	0.0042	25.12	0.0167
		Inferior	12.56	0.0084	6.28	0.0042	12.56	0.0084
V1.3	0.15	Superior	25.12	0.0167	12.56	0.0084	32.2	0.0215
		Inferior	12.56	0.0084	12.56	0.0084	16.1	0.0107
V1.4	0.15	Superior	32.20	0.0215	6.28	0.0042	9.42	0.0063
		Inferior	16.10	0.0107	9.42	0.0063	6.28	0.0042
V2.1	0.15	Superior	32.20	0.0215	9.42	0.0063	25.12	0.0167
		Inferior	25.12	0.0167	9.42	0.0063	18.84	0.0126
V2.2	0.15	Superior	25.12	0.0167	6.28	0.0042	25.12	0.0167
		Inferior	12.56	0.0084	6.28	0.0042	16.1	0.0107
V2.3	0.15	Superior	25.12	0.0167	6.28	0.0042	25.12	0.0167
		Inferior	16.10	0.0107	6.28	0.0042	16.1	0.0107
V2.4	0.15	Superior	25.12	0.0167	6.28	0.0042	25.12	0.0167
		Inferior	16.10	0.0107	6.28	0.0042	25.12	0.0167
V2.5	0.15	Superior	25.12	0.0167	6.28	0.0042	25.12	0.0167
		Inferior	25.12	0.0167	9.42	0.0063	18.84	0.0126
V2.6	0.15	Superior	25.12	0.0167	6.28	0.0042	12.56	0.0084
		Inferior	18.84	0.0126	6.28	0.0042	12.56	0.0084
V3.1	0.15	Superior	12.56	0.0084	6.28	0.0042	32.2	0.0215
		Inferior	12.56	0.0084	6.28	0.0042	18.84	0.0126
V3.2	0.15	Superior	32.20	0.0215	6.28	0.0042	25.12	0.0167
		Inferior	18.84	0.0126	6.28	0.0042	25.12	0.0167
V3.3	0.15	Superior	25.12	0.0167	6.28	0.0042	25.12	0.0167
		Inferior	25.12	0.0167	6.28	0.0042	25.12	0.0167
V4.1	0.15	Superior	35.74	0.0238	12.56	0.0084	32.2	0.0215
		Inferior	32.20	0.0215	12.56	0.0084	32.2	0.0215
V5.1	0.15	Superior	16.10	0.0107	16.10	0.0107	16.1	0.0107
		Inferior	12.56	0.0084	12.56	0.0084	12.56	0.0084
V6.1	0.15	Superior	32.20	0.0215	9.42	0.0063	35.74	0.0238
		Inferior	16.10	0.0107	9.42	0.0063	18.84	0.0126
V6.2	0.15	Superior	32.20	0.0215	9.42	0.0063	32.20	0.0215
		Inferior	32.20	0.0215	9.42	0.0063	32.20	0.0215

Anexo E. 8 – Taxa de armadura longitudinal nas vigas do piso 1

Piso 1	Armadura (Sap 2000) [cm ² /m]			Armadura transversal adotada [cm ²]					
Viga	ASinício	ASmeio Vão	ASFinal	Início		Meio vão		Fim	
				Ø	As[cm ² /m]	Ø	As[cm ² /m]	Ø	As[cm ² /m]
V1.1	8.30	5.40	10.00	Ø8//0.10 (2r)	10.00	Ø8//0.15(2r)	6.66	Ø8//0.10 (2r)	10.00
V1.2	24.50	13.40	23.19	Ø10//0.125 (4r)	25.28	Ø10//0.20 (4r)	15.80	Ø10//0.125 (4r)	25.28
V1.3	34.40	15.00	32.90	Ø10//0.075 (4r)	42.12	Ø10//0.20 (4r)	15.80	Ø10//0.075 (4r)	42.12
V1.4	29.14	12.86	20.80	Ø10//0.10 (4r)	31.60	Ø10//0.20 (4r)	15.80	Ø10//0.125 (4r)	25.28
V2.1	15.06	12.43	18.11	Ø8//0.125 (4r)	16.00	Ø8//0.125 (4r)	16.00	Ø8//0.10 (4r)	20.00
V2.2	27.90	9.01	21.40	Ø10//0.10 (4r)	31.60	Ø10//0.25 (4r)	12.64	Ø10//0.125 (4r)	25.28
V2.3	27.09	12.30	32.90	Ø10//0.10 (4r)	31.60	Ø10//0.25 (4r)	12.64	Ø10//0.075 (4r)	42.12
V2.4	29.40	13.03	29.40	Ø10//0.10 (4r)	31.60	Ø10//0.20 (4r)	15.80	Ø10//0.10 (4r)	31.60
V2.5	29.40	11.39	29.40	Ø10//0.10 (4r)	31.60	Ø10//0.25 (4r)	12.64	Ø10//0.10 (4r)	31.60
V2.6	10.60	6.50	10.60	Ø10//0.125 (2r)	12.64	Ø10//0.20 (2r)	7.90	Ø10//0.125 (2r)	12.64
V3.1	10.60	6.90	7.46	Ø10//0.125 (2r)	12.64	Ø10//0.20 (2r)	7.90	Ø10//0.10 (2r)	15.80
V3.2	24.70	12.70	24.70	Ø10//0.125 (4r)	25.28	Ø10//0.10 (2r)	15.80	Ø10//0.125 (4r)	25.28
V3.3	12.30	10.68	12.30	Ø10//0.125 (2r)	12.64	Ø10//0.25 (4r)	12.64	Ø10//0.125 (2r)	12.64
V4.1	20.90	16.50	20.40	Ø10//0.125 (4r)	25.28	Ø10//0.15 (4r)	21.08	Ø10//0.125 (4r)	25.28
V5.1	3.29	3.29	3.29	Ø8//0.125 (4r)	16.00	Ø8//0.125 (4r)	16.00	Ø8//0.125 (4r)	16.00
V6.1	26.43	10.14	26.60	Ø10//0.10 (4r)	31.60	Ø10//0.15 (2r)	10.54	Ø10//0.10 (4r)	31.60
V6.2	32.50	13.70	33.30	Ø10//0.075 (4r)	42.12	Ø10//0.20 (4r)	15.80	Ø10//0.075 (4r)	42.12

Anexo E.9- Armadura transversal nas vigas do piso 1

Piso 2			Armadura (Sap 2000) [cm²]			Armadura longitudinal adotada [cm²]					
Viga	Troço (início-fim)	Face	As _{início}	As _{meio Vão}	As _{Final}	Início		Meio vão		Fim	
						Ø	As[cm²]	Ø	As[cm²]	Ø	As[cm²]
V1.1	P1-P2	Superior	5.50	5.11	20.00	2Ø20	6.28	2Ø20	6.28	8Ø20	25.12
		Inferior	5.11	5.11	10.00	2Ø20	6.28	2Ø20	6.28	4Ø20	12.56
V1.2	P2-P3	Superior	23.42	5.11	25.25	8Ø20	25.12	2Ø20	6.28	4Ø20+4Ø25	32.2
		Inferior	10.73	5.11	11.47	4Ø20	12.56	2Ø20	6.28	2Ø20+2Ø25	16.1
V1.3	P3-P4	Superior	22.66	5.11	27.30	4Ø20+4Ø25	32.2	2Ø20	6.28	4Ø20+4Ø25	32.2
		Inferior	10.41	5.11	15.86	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20+2Ø25	16.1
V1.4	P4-P5	Superior	27.97	8.69	9.63	4Ø20+4Ø25	32.2	2Ø20	6.28	4Ø20	12.56
		Inferior	12.54	5.11	5.11	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20	6.28
V2.1	Pb15-P11	Superior	27.60	9.02	18.16	4Ø20+4Ø25	32.2	3Ø20	9.42	6Ø20	18.84
		Inferior	21.27	7.69	16.08	8Ø20	25.12	3Ø20	9.42	2Ø20+2Ø25	16.1
V2.2	P11-P12	Superior	17.78	5.11	17.92	6Ø20	18.84	2Ø20	6.28	6Ø20	18.84
		Inferior	8.34	5.11	8.40	2Ø20+2Ø25	16.1	2Ø20	6.28	4Ø20	12.56
V2.3	P12-P13	Superior	13.38	5.11	17.66	6Ø20	18.84	2Ø20	6.28	6Ø20	18.84
		Inferior	11.39	5.11	12.35	4Ø20	12.56	2Ø20	6.28	2Ø20+2Ø25	16.1
V2.4	P13-P14	Superior	14.86	5.11	23.19	6Ø20	18.84	2Ø20	6.28	8Ø20	25.12
		Inferior	7.05	5.11	10.64	2Ø20+2Ø25	16.1	2Ø20	6.28	8Ø20	25.12
V2.5	P14-P15	Superior	21.12	5.32	17.91	8Ø20	25.12	2Ø20	6.28	6Ø20	18.84
		Inferior	21.13	5.88	13.11	8Ø20	25.12	2Ø20	6.28	2Ø20+2Ø25	16.1
V2.6	P15-P17	Superior	11.99	5.11	9.90	6Ø20	18.84	2Ø20	6.28	4Ø20	12.56
		Inferior	9.39	5.11	9.97	2Ø20+2Ø25	16.1	2Ø20	6.28	4Ø20	12.56
V3.1	Pb13-P9	Superior	11.28	5.11	19.36	4Ø20	12.56	2Ø20	6.28	4Ø20+4Ø25	32.2
		Inferior	10.37	5.23	15.28	4Ø20	12.56	2Ø20	6.28	6Ø20	18.84
V3.2	P9-P5	Superior	29.15	5.11	23.65	4Ø20+4Ø25	32.2	2Ø20	6.28	4Ø20+4Ø25	32.2
		Inferior	18.66	5.27	11.20	6Ø20	18.84	2Ø20	6.28	4Ø20+4Ø25	32.2
V3.3	P5-P1	Superior	27.80	7.17	25.60	4Ø20+4Ø25	32.2	3Ø20	9.42	4Ø20+4Ø25	32.2
		Inferior	26.07	9.09	21.56	4Ø20+4Ø25	32.2	3Ø20	9.42	8Ø20	25.12
V4.1	Pb13-P14	Superior	32.11	11.43	29.67	4Ø20+4Ø25	32.2	4Ø20	12.56	4Ø20+4Ø25	32.2
		Inferior	29.96	11.40	26.33	4Ø20+4Ø25	32.2	4Ø20	12.56	4Ø20+4Ø25	32.2
V5.1	Pb14-P15	Superior	10.92	5.11	7.31	4Ø20	12.56	4Ø20	12.56	4Ø20	12.56
		Inferior	6.14	5.11	7.64	3Ø20	9.42	3Ø20	9.42	3Ø20	9.42
V6.1	Pb1-Pb7	Superior	32.73	5.11	37.39	2Ø20+6Ø25	35.74	2Ø20	6.28	8Ø25	39.28
		Inferior	15.04	6.09	21.21	2Ø20+2Ø25	16.1	2Ø20	6.28	8Ø20	25.12
V6.2	Pb7-P17	Superior	38.18	5.64	37.98	8Ø25	39.28	2Ø20	6.28	8Ø25	39.28
		Inferior	22.69	11.41	23.97	8Ø20	25.12	4Ø20	12.56	8Ø20	25.12

Anexo E.10- Armadura longitudinal nas vigas do piso 2

Viga	A _c [m ²]	Face	Armadura longitudinal adotada [cm ²]					
			Início		Meio vão		Fim	
			As[cm ²]	ρ	As[cm ²]	ρ	As[cm ²]	ρ
V1.1	0.15	Superior	6.28	0.0042	6.28	0.0042	25.12	0.0167
		Inferior	6.28	0.0042	6.28	0.0042	12.56	0.0084
V1.2	0.15	Superior	25.12	0.0167	6.28	0.0042	32.2	0.0215
		Inferior	12.56	0.0084	6.28	0.0042	16.1	0.0107
V1.3	0.15	Superior	32.20	0.0215	6.28	0.0042	32.2	0.0215
		Inferior	16.10	0.0107	6.28	0.0042	16.1	0.0107
V1.4	0.15	Superior	32.20	0.0215	6.28	0.0042	12.56	0.0084
		Inferior	16.10	0.0107	6.28	0.0042	6.28	0.0042
V2.1	0.15	Superior	32.20	0.0215	9.42	0.0063	18.84	0.0126
		Inferior	25.12	0.0167	9.42	0.0063	16.1	0.0107
V2.2	0.15	Superior	18.84	0.0126	6.28	0.0042	18.84	0.0126
		Inferior	16.10	0.0107	6.28	0.0042	12.56	0.0084
V2.3	0.15	Superior	18.84	0.0126	6.28	0.0042	18.84	0.0126
		Inferior	12.56	0.0084	6.28	0.0042	16.1	0.0107
V2.4	0.15	Superior	18.84	0.0126	6.28	0.0042	25.12	0.0167
		Inferior	16.10	0.0107	6.28	0.0042	25.12	0.0167
V2.5	0.15	Superior	25.12	0.0167	6.28	0.0042	18.84	0.0126
		Inferior	25.12	0.0167	6.28	0.0042	16.1	0.0107
V2.6	0.15	Superior	18.84	0.0126	6.28	0.0042	12.56	0.0084
		Inferior	16.10	0.0107	6.28	0.0042	12.56	0.0084
V3.1	0.15	Superior	12.56	0.0084	6.28	0.0042	32.2	0.0215
		Inferior	12.56	0.0084	6.28	0.0042	18.84	0.0126
V3.2	0.15	Superior	32.20	0.0215	6.28	0.0042	32.2	0.0215
		Inferior	18.84	0.0126	6.28	0.0042	32.2	0.0215
V3.3	0.15	Superior	32.20	0.0215	9.42	0.0063	32.2	0.0215
		Inferior	32.20	0.0215	9.42	0.0063	25.12	0.0167
V4.1	0.15	Superior	32.20	0.0215	12.56	0.0084	32.2	0.0215
		Inferior	32.20	0.0215	12.56	0.0084	32.2	0.0215
V5.1	0.15	Superior	12.56	0.0084	12.56	0.0084	12.56	0.0084
		Inferior	9.42	0.0063	9.42	0.0063	9.42	0.0063
V6.1	0.15	Superior	35.74	0.0238	6.28	0.0042	39.28	0.0262
		Inferior	16.10	0.0107	6.28	0.0042	25.12	0.0167
V6.2	0.15	Superior	39.28	0.0262	6.28	0.0042	39.28	0.0262
		Inferior	25.12	0.0167	12.56	0.0084	25.12	0.0167

Anexo E.11- Taxa de armadura longitudinal nas vigas do piso 2

Piso 2	Armadura (Sap 2000) [cm ² /m]			Armadura transversal adotada [cm ²]					
Viga	As _{início}	As _{meio Vão}	As _{Final}	Início		Meio vão		Fim	
				Ø	As [cm ² /m]	Ø	As [cm ² /m]	Ø	As [cm ² /m]
V1.1	13.07	11.73	10.13	Ø10//0.10 (2r)	15.80	Ø10//0.125 (2r)	12.64	Ø10//0.10 (2r)	15.8
V1.2	16.09	10.50	17.30	Ø10//0.075 (2r)	21.06	Ø10//0.10 (2r)	15.8	Ø10//0.075 (2r)	21.06
V1.3	22.70	8.20	22.70	Ø10//0.125 (4r)	25.28	Ø10//0.15 (2r)	10.54	Ø10//0.125 (4r)	25.28
V1.4	13.40	4.70	13.85	Ø10//0.10 (2r)	15.80	Ø10//0.25 (2r)	6.32	Ø10//0.10 (2r)	15.80
V2.1	14.50	12.95	14.50	Ø10//0.10 (2r)	15.80	Ø10//0.20 (4r)	15.80	Ø10//0.10 (2r)	15.80
V2.2	26.30	7.60	20.19	Ø10//0.10 (4r)	31.60	Ø10//0.20 (2r)	7.90	Ø10//0.075 (2r)	21.06
V2.3	24.40	10.00	12.20	Ø10//0.125 (4r)	25.28	Ø10//0.15 (2r)	10.54	Ø10//0.125 (2r)	12.64
V2.4	28.50	8.13	28.50	Ø10//0.10 (4r)	31.60	Ø10//0.15 (2r)	10.54	Ø10//0.10 (4r)	31.60
V2.5	17.50	12.70	23.01	Ø8//0.10 (4r)	20.00	Ø8//0.15 (4r)	13.32	Ø8//0.075 (4r)	26.68
V2.6	11.30	6.70	13.19	Ø10//0.125 (2r)	12.64	Ø10//0.20 (2r)	7.90	Ø10//0.10 (2r)	15.80
V3.1	10.50	6.90	8.20	Ø10//0.125 (2r)	12.64	Ø10//0.20 (2r)	7.90	Ø10//0.125 (2r)	12.64
V3.2	24.10	9.05	14.80	Ø10//0.125 (4r)	25.28	Ø10//0.15 (2r)	10.54	Ø10//0.10 (2r)	15.80
V3.3	26.84	13.27	16.16	Ø10//0.10 (4r)	31.60	Ø10//0.10 (2r)	15.80	Ø10//0.075 (2r)	21.06
V4.1	28.30	16.40	23.40	Ø10//0.10 (4r)	31.60	Ø10//0.15 (4r)	21.08	Ø10//0.125 (4r)	25.28
V5.1	20.90	19.90	20.90	Ø10//0.125 (4r)	25.28	Ø10//0.125 (4r)	25.28	Ø10//0.125 (4r)	25.28
V6.1	23.80	11.70	27.50	Ø10//0.125 (4r)	25.28	Ø10//0.125 (2r)	12.64	Ø10//0.10 (4r)	31.60
V6.2	22.90	11.55	18.20	Ø8//0.075 (4r)	26.68	Ø8//0.15 (4r)	13.32	Ø8//0.10 (4r)	20.00

Anexo E.12- Armadura transversal nas vigas do piso 2

Piso 3			Armadura (Sap 2000) [cm²]			Armadura longitudinal adotada [cm²]					
Viga	Troço (início-fim)	Face	ASinício	ASmeio Vão	ASFinal	Início		Meio vão		Fim	
						Ø	As[cm²]	Ø	As[cm²]	Ø	As[cm²]
V1.1	P1-P2	Superior	5.11	5.11	18.96	2Ø20	6.28	2Ø20	6.28	8Ø20	25.12
		Inferior	5.11	5.11	8.85	2Ø20	6.28	2Ø20	6.28	4Ø20	12.56
V1.2	P2-P3	Superior	21.30	5.11	22.77	8Ø20	25.12	2Ø20	6.28	8Ø20	25.12
		Inferior	9.89	5.11	10.46	4Ø20	12.56	2Ø20	6.28	4Ø20	12.56
V1.3	P3-P4	Superior	19.81	10.15	23.87	8Ø20	25.12	4Ø20	12.56	8Ø20	25.12
		Inferior	9.22	5.11	13.52	4Ø20	12.56	2Ø20	6.28	2Ø20+2Ø25	16.1
V1.4	P4-P5	Superior	24.94	5.11	9.13	8Ø20	25.12	2Ø20	6.28	3Ø20	9.42
		Inferior	11.35	7.05	5.11	2Ø20+2Ø25	16.1	3Ø20	9.42	2Ø20	6.28
V2.1	Pb15-P11	Superior	20.92	7.29	14.31	8Ø20	25.12	3Ø20	9.42	2Ø20+2Ø25	16.1
		Inferior	14.74	5.79	13.15	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20+2Ø25	16.1
V2.2	P11-P12	Superior	14.97	5.11	15.94	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	7.10	5.11	7.54	2Ø20+2Ø25	16.1	2Ø20	6.28	3Ø20	9.42
V2.3	P12-P13	Superior	10.29	5.11	14.56	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	8.69	5.11	9.79	3Ø20	9.42	2Ø20	6.28	4Ø20	12.56
V2.4	P13-P14	Superior	12.32	5.11	19.67	2Ø20+2Ø25	16.1	2Ø20	6.28	8Ø20	25.12
		Inferior	5.91	5.11	9.16	4Ø20	12.56	2Ø20	6.28	2Ø20+2Ø25	16.1
V2.5	P14-P15	Superior	16.00	5.11	14.32	8Ø20	25.12	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	15.62	5.11	10.30	2Ø20+2Ø25	16.1	2Ø20	6.28	4Ø20	12.56
V2.6	P15-P17	Superior	9.76	5.11	8.69	2Ø20+2Ø25	16.1	2Ø20	6.28	3Ø20	9.42
		Inferior	7.54	5.11	8.66	4Ø20	12.56	2Ø20	6.28	3Ø20	9.42
V3.1	Pb13-P9	Superior	9.48	5.11	16.95	4Ø20	12.56	2Ø20	6.28	8Ø20	25.12
		Inferior	8.41	5.11	13.69	3Ø20	9.42	2Ø20	6.28	2Ø20+2Ø25	16.1
V3.2	P9-P5	Superior	25.01	5.11	21.26	8Ø20	25.12	2Ø20	6.28	8Ø20	25.12
		Inferior	15.30	5.11	9.83	2Ø20+2Ø25	16.1	2Ø20	6.28	8Ø20	25.12
V3.3	P5-P1	Superior	22.27	9.40	28.64	8Ø20	25.12	3Ø20	9.42	4Ø20+4Ø25	32.2
		Inferior	22.30	9.04	22.86	8Ø20	25.12	3Ø20	9.42	8Ø20	25.12
V4.1	Pb13-P14	Superior	21.67	8.20	20.95	8Ø20	25.12	3Ø20	9.42	8Ø20	25.12
		Inferior	20.04	8.34	17.84	8Ø20	25.12	3Ø20	9.42	6Ø20	18.84
V5.1	Pb14-P15	Superior	10.15	5.11	5.11	4Ø20	12.56	4Ø20	12.56	4Ø20	12.56
		Inferior	5.11	5.11	7.07	3Ø20	9.42	3Ø20	9.42	3Ø20	9.42
V6.1	Pb1-Pb7	Superior	30.45	5.11	27.40	4Ø20+4Ø25	32.2	2Ø20	6.28	4Ø20+4Ø25	32.2
		Inferior	13.74	5.46	15.60	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20+2Ø25	16.1
V6.2	Pb7-P17	Superior	31.40	5.11	34.31	4Ø20+4Ø25	32.2	2Ø20	6.28	2Ø20+6Ø25	35.74
		Inferior	21.47	7.13	21.32	8Ø20	25.12	3Ø20	9.42	8Ø20	25.12

Anexo E.13- Armadura longitudinal nas vigas do piso 3

Viga	A _c [m ²]	Face	Armadura longitudinal adotada [cm ²]					
			Inicio		Meio vão		Fim	
			As[cm ²]	ρ	As[cm ²]	ρ	As[cm ²]	ρ
V1.1	0.15	Superior	6.28	0.0042	6.28	0.0042	25.12	0.0167
		Inferior	6.28	0.0042	6.28	0.0042	12.56	0.0084
V1.2	0.15	Superior	25.12	0.0167	6.28	0.0042	25.12	0.0167
		Inferior	12.56	0.0084	6.28	0.0042	12.56	0.0084
V1.3	0.15	Superior	25.12	0.0167	12.56	0.0084	25.12	0.0167
		Inferior	12.56	0.0084	6.28	0.0042	16.1	0.0107
V1.4	0.15	Superior	25.12	0.0167	6.28	0.0042	9.42	0.0063
		Inferior	16.10	0.0107	9.42	0.0063	6.28	0.0042
V2.1	0.15	Superior	25.12	0.0167	9.42	0.0063	16.1	0.0107
		Inferior	16.10	0.0107	6.28	0.0042	16.1	0.0107
V2.2	0.15	Superior	16.10	0.0107	6.28	0.0042	16.1	0.0107
		Inferior	16.10	0.0107	6.28	0.0042	9.42	0.0063
V2.3	0.15	Superior	16.10	0.0107	6.28	0.0042	16.1	0.0107
		Inferior	9.42	0.0063	6.28	0.0042	12.56	0.0084
V2.4	0.15	Superior	16.10	0.0107	6.28	0.0042	25.12	0.0167
		Inferior	12.56	0.0084	6.28	0.0042	16.1	0.0107
V2.5	0.15	Superior	25.12	0.0167	6.28	0.0042	16.1	0.0107
		Inferior	16.10	0.0107	6.28	0.0042	12.56	0.0084
V2.6	0.15	Superior	16.10	0.0107	6.28	0.0042	9.42	0.0063
		Inferior	12.56	0.0084	6.28	0.0042	9.42	0.0063
V3.1	0.15	Superior	12.56	0.0084	6.28	0.0042	25.12	0.0167
		Inferior	9.42	0.0063	6.28	0.0042	16.1	0.0107
V3.2	0.15	Superior	25.12	0.0167	6.28	0.0042	25.12	0.0167
		Inferior	16.10	0.0107	6.28	0.0042	25.12	0.0167
V3.3	0.15	Superior	25.12	0.0167	9.42	0.0063	32.2	0.0215
		Inferior	25.12	0.0167	9.42	0.0063	25.12	0.0167
V4.1	0.15	Superior	25.12	0.0167	9.42	0.0063	25.12	0.0167
		Inferior	25.12	0.0167	9.42	0.0063	18.84	0.0126
V5.1	0.15	Superior	12.56	0.0084	12.56	0.0084	12.56	0.0084
		Inferior	9.42	0.0063	9.42	0.0063	9.42	0.0063
V6.1	0.15	Superior	32.20	0.0215	6.28	0.0042	32.2	0.0215
		Inferior	16.10	0.0107	6.28	0.0042	16.1	0.0107
V6.2	0.15	Superior	32.20	0.0215	6.28	0.0042	35.74	0.0238
		Inferior	25.12	0.0167	9.42	0.0063	25.12	0.0167

Anexo E.14- Taxa armadura longitudinal nas vigas do piso 3

Piso 3	Armadura (Sap 2000) [cm ² /m]			Armadura transversal adotada [cm ²]				
Viga	As _{início}	As _{meio Vão}	As _{Final}	Início		Meio vão		Fim
				Ø	As[cm ² /m]	Ø	As[cm ² /m]	Ø
V1.1	7.90	5.16	16.81	Ø8//0.125 (2r)	8.00	Ø8//0.15(2r)	6.66	Ø8//0.10 (4r)
V1.2	24.06	13.59	22.36	Ø10//0.125 (4r)	25.28	Ø10//0.20 (4r)	15.80	Ø10//0.125 (4r)
V1.3	28.82	16.92	28.80	Ø10//0.10 (4r)	31.60	Ø10//0.15 (4r)	21.08	Ø10//0.10 (4r)
V1.4	28.27	18.83	28.80	Ø10//0.10 (4r)	31.60	Ø10//0.15 (4r)	21.08	Ø10//0.10 (4r)
V2.1	12.02	10.00	19.00	Ø10//0.125 (2r)	12.64	Ø10//0.15 (2r)	10.54	Ø10//0.075 (2r)
V2.2	23.72	12.32	18.47	Ø10//0.125 (4r)	25.28	Ø10//0.25 (4r)	12.64	Ø10//0.125 (4r)
V2.3	20.60	9.77	10.40	Ø10//0.125 (4r)	25.28	Ø10//0.15 (2r)	10.54	Ø10//0.125 (2r)
V2.4	24.96	7.92	10.25	Ø10//0.125 (4r)	25.28	Ø10//0.15 (2r)	10.54	Ø10//0.125 (2r)
V2.5	13.13	9.45	18.42	Ø10//0.10 (2r)	15.80	Ø10//0.15 (2r)	10.54	Ø10//0.125 (4r)
V2.6	9.92	5.22	12.28	Ø8//0.10 (2r)	10.00	Ø8//0.15(2r)	6.66	Ø8//0.075 (2r)
V3.1	8.42	6.77	7.25	Ø8//0.10 (2r)	10.00	Ø8//0.125 (2r)	8.00	Ø8//0.125 (2r)
V3.2	24.17	7.95	13.56	Ø10//0.125 (4r)	25.28	Ø10//0.15 (2r)	10.54	Ø10//0.10 (2r)
V3.3	31.53	12.43	19.88	Ø10//0.10 (4r)	31.60	Ø10//0.25 (4r)	12.64	Ø10//0.125 (4r)
V4.1	16.78	11.83	22.04	Ø10//0.075 (2r)	21.06	Ø10//0.25 (4r)	12.64	Ø10//0.125 (4r)
V5.1	21.48	5.81	21.97	Ø10//0.125 (4r)	25.28	Ø10//0.125 (4r)	25.28	Ø10//0.125 (4r)
V6.1	23.67	10.11	37.51	Ø10//0.125 (4r)	25.28	Ø10//0.25 (4r)	12.64	Ø10//0.075 (4r)
V6.2	29.37	16.23	27.35	Ø10//0.10 (4r)	31.60	Ø10//0.15 (4r)	21.08	Ø10//0.10 (4r)

Anexo E.15- Armadura transversal nas vigas do piso 3

Piso 4			Armadura (Sap 2000) [cm²]			Armadura longitudinal adotada [cm²]					
Viga	Troço (início-fim)	Face	ASinício	ASmeio Vão	ASFinal	Início		Meio vão		Fim	
						Ø	As[cm²]	Ø	As[cm²]	Ø	As[cm²]
V1.1	P1-P2	Superior	5.11	5.42	12.37	2Ø20	6.28	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	5.02	5.11	5.93	2Ø20	6.28	2Ø20	6.28	3Ø20	9.42
V1.2	P2-P3	Superior	13.43	5.11	18.34	2Ø20+2Ø25	16.1	2Ø20	6.28	8Ø20	25.12
		Inferior	6.41	5.60	8.59	3Ø20	9.42	2Ø20	6.28	4Ø20	12.56
V1.3	P3-P4	Superior	20.80	5.11	19.98	8Ø20	25.12	2Ø20	6.28	4Ø20+4Ø25	32.23
		Inferior	9.64	5.26	9.29	4Ø20	12.56	2Ø20	6.28	2Ø20+2Ø25	16.1
V1.4	P4-P5	Superior	26.08	7.15	6.09	4Ø20+4Ø25	32.23	3Ø20	9.42	2Ø20	6.28
		Inferior	11.80	7.28	5.11	2Ø20+2Ø25	16.1	3Ø20	9.42	2Ø20	6.28
V2.1	Pb15-P11	Superior	13.83	5.23	10.06	2Ø20+2Ø25	16.1	2Ø20	6.28	4Ø20	12.56
		Inferior	8.36	5.11	9.73	3Ø20	9.42	2Ø20	6.28	4Ø20	12.56
V2.2	P11-P12	Superior	11.20	5.11	13.08	4Ø20	12.56	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	5.39	5.11	6.25	4Ø20	12.56	2Ø20	6.28	3Ø20	9.42
V2.3	P12-P13	Superior	6.41	5.11	11.56	2Ø20+2Ø25	16.1	3Ø20	9.42	4Ø20	12.56
		Inferior	5.71	5.11	8.22	3Ø20	9.42	3Ø20	9.42	3Ø20	9.42
V2.4	P13-P14	Superior	7.93	5.11	15.80	4Ø20	12.56	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	5.11	5.11	7.47	3Ø20	9.42	2Ø20	6.28	3Ø20	9.42
V2.5	P14-P15	Superior	8.76	5.11	10.78	2Ø20+2Ø25	16.1	2Ø20	6.28	4Ø20	12.56
		Inferior	9.00	5.11	7.46	3Ø20	9.42	2Ø20	6.28	3Ø20	9.42
V2.6	P15-P17	Superior	6.15	5.11	7.30	4Ø20	12.56	2Ø20	6.28	3Ø20	9.42
		Inferior	5.11	5.11	7.26	3Ø20	9.42	2Ø20	6.28	3Ø20	9.42
V3.1	Pb13-P9	Superior	5.11	5.11	13.94	2Ø20	6.28	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	5.11	5.11	9.21	2Ø20	6.28	2Ø20	6.28	3Ø20	9.42
V3.2	P9-P5	Superior	14.55	5.02	17.99	2Ø20+2Ø25	16.1	2Ø20	6.28	6Ø20	18.84
		Inferior	6.92	5.11	8.44	3Ø20	9.42	2Ø20	6.28	3Ø20	9.42
V3.3	P5-P1	Superior	13.24	5.11	22.99	6Ø20	18.84	2Ø20	6.28	8Ø20	25.12
		Inferior	8.17	5.11	10.55	3Ø20	9.42	2Ø20	6.28	4Ø20	12.56
V4.1	Pb13-P14	Superior	14.60	5.50	15.32	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20+2Ø25	16.1
		Inferior	11.62	5.44	11.51	4Ø20	12.56	2Ø20	6.28	4Ø20	12.56
V5.1	Pb14-P15	Superior	5.36	5.11	5.11	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
		Inferior	5.11	5.11	6.31	3Ø20	9.42	3Ø20	9.42	3Ø20	9.42
V6.1	Pb1-Pb7	Superior	25.27	5.11	27.15	4Ø20+4Ø25	32.23	2Ø20	6.28	4Ø20+4Ø25	32.23
		Inferior	11.48	5.11	12.22	2Ø20+2Ø25	16.1	2Ø20	6.28	2Ø20+2Ø25	16.1
V6.2	Pb7-P17	Superior	31.11	5.44	21.57	4Ø20+4Ø25	32.23	2Ø20	6.28	8Ø20	25.12
		Inferior	15.00	6.32	10.85	2Ø20+2Ø25	16.1	3Ø20	9.42	4Ø20	12.56

Anexo E.16- Armadura longitudinal nas vigas do piso 4

Viga	A _c [m ²]	Face	Armadura longitudinal adotada [cm ²]					
			Inicio		Meio vão		Fim	
			As[cm ²]	ρ	As[cm ²]	ρ	As[cm ²]	ρ
V1.1	0.15	Superior	6.28	0.0042	6.28	0.0042	16.1	0.0107
		Inferior	6.28	0.0042	6.28	0.0042	9.42	0.0063
V1.2	0.15	Superior	16.10	0.0107	6.28	0.0042	25.12	0.0167
		Inferior	9.42	0.0063	6.28	0.0042	12.56	0.0084
V1.3	0.15	Superior	25.12	0.0167	6.28	0.0042	32.23	0.0215
		Inferior	12.56	0.0084	6.28	0.0042	16.1	0.0107
V1.4	0.15	Superior	32.23	0.0215	9.42	0.0063	6.28	0.0042
		Inferior	16.10	0.0107	9.42	0.0063	6.28	0.0042
V2.1	0.15	Superior	16.10	0.0107	6.28	0.0042	12.56	0.0084
		Inferior	9.42	0.0063	6.28	0.0042	12.56	0.0084
V2.2	0.15	Superior	12.56	0.0084	6.28	0.0042	16.1	0.0107
		Inferior	12.56	0.0084	6.28	0.0042	9.42	0.0063
V2.3	0.15	Superior	16.10	0.0107	9.42	0.0063	12.56	0.0084
		Inferior	9.42	0.0063	9.42	0.0063	9.42	0.0063
V2.4	0.15	Superior	12.56	0.0084	6.28	0.0042	16.1	0.0107
		Inferior	9.42	0.0063	6.28	0.0042	9.42	0.0063
V2.5	0.15	Superior	16.10	0.0107	6.28	0.0042	12.56	0.0084
		Inferior	9.42	0.0063	6.28	0.0042	9.42	0.0063
V2.6	0.15	Superior	12.56	0.0084	6.28	0.0042	9.42	0.0063
		Inferior	9.42	0.0063	6.28	0.0042	9.42	0.0063
V3.1	0.15	Superior	6.28	0.0042	6.28	0.0042	16.1	0.0107
		Inferior	6.28	0.0042	6.28	0.0042	9.42	0.0063
V3.2	0.15	Superior	16.10	0.0107	6.28	0.0042	18.84	0.0126
		Inferior	9.42	0.0063	6.28	0.0042	9.42	0.0063
V3.3	0.15	Superior	18.84	0.0126	6.28	0.0042	25.12	0.0167
		Inferior	9.42	0.0063	6.28	0.0042	12.56	0.0084
V4.1	0.15	Superior	16.10	0.0107	6.28	0.0042	16.1	0.0107
		Inferior	12.56	0.0084	6.28	0.0042	12.56	0.0084
V5.1	0.15	Superior	6.28	0.0042	6.28	0.0042	6.28	0.0042
		Inferior	9.42	0.0063	9.42	0.0063	9.42	0.0063
V6.1	0.15	Superior	32.23	0.0215	6.28	0.0042	32.23	0.0215
		Inferior	16.10	0.0107	6.28	0.0042	16.1	0.0107
V6.2	0.15	Superior	32.23	0.0215	6.28	0.0042	25.12	0.0167
		Inferior	16.10	0.0107	9.42	0.0063	12.56	0.0084

Anexo E.17- Taxa armadura longitudinal nas vigas do piso 4

Piso 4	Armadura (Sap 2000) [cm ² /m]			Armadura transversal adotada [cm ²]				
Viga	ASinício	ASmeio Vão	ASFinal	Início		Meio vão		Fim
				Ø	As[cm ² /m]	Ø	As[cm ² /m]	Ø
V1.1	4.57	4.98	26.89	Ø10//0.125 (2r)	12.64	Ø10//0.20 (2r)	7.90	Ø10//0.10 (4r)
V1.2	15.83	19.08	19.29	Ø10//0.125 (4r)	25.28	Ø10//0.15 (4r)	21.08	Ø10//0.125 (4r)
V1.3	24.36	24.16	11.39	Ø10//0.125 (4r)	25.28	Ø10//0.125 (4r)	25.28	Ø10//0.125 (2r)
V1.4	39.18	7.77	10.98	Ø10//0.075 (4r)	42.12	Ø10//0.15 (2r)	10.54	Ø10//0.125 (2r)
V2.1	8.53	7.94	22.89	Ø8//0.10 (2r)	10.00	Ø8//0.25 (4r)	8.00	Ø8//0.075 (4r)
V2.2	21.91	7.46	16.28	Ø8//0.075 (4r)	26.68	Ø8//0.25 (4r)	8.00	Ø8//0.10 (4r)
V2.3	16.18	8.61	7.91	Ø8//0.10 (4r)	20.00	Ø8//0.20 (4r)	10.00	Ø8//0.125 (2r)
V2.4	20.27	7.98	8.46	Ø10//0.075 (2r)	21.06	Ø10//0.15 (2r)	10.54	Ø10//0.125 (2r)
V2.5	10.09	10.91	11.36	Ø10//0.125 (2r)	12.64	Ø10//0.125 (2r)	12.64	Ø10//0.125 (2r)
V2.6	7.99	7.45	12.28	Ø10//0.125 (2r)	12.64	Ø10//0.15 (2r)	10.54	Ø10//0.125 (2r)
V3.1	3.29	3.29	6.32	Ø8//0.125 (2r)	8.00	Ø8//0.25 (2r)	4.00	Ø8//0.125 (2r)
V3.2	40.5	25.01	40.5	Ø10//0.075 (4r)	42.12	Ø10//0.125 (4r)	25.28	Ø10//0.075 (4r)
V3.3	21.09	10.01	7.96	Ø10//0.125 (4r)	25.28	Ø10//0.15 (2r)	10.54	Ø10//0.125 (2r)
V4.1	12.43	9.8	14.95	Ø10//0.125 (2r)	12.64	Ø10//0.15 (2r)	10.54	Ø10//0.10 (2r)
V5.1	16.04	16.04	16.04	Ø8//0.10 (4r)	20.00	Ø8//0.10 (4r)	20.00	Ø8//0.10 (4r)
V6.1	37.15	22.6	32.9	Ø10//0.075 (4r)	42.12	Ø10//0.125 (4r)	25.28	Ø10//0.075 (4r)
V6.2	12.76	10.34	19.15	Ø8//0.075 (2r)	13.34	Ø8//0.15 (4r)	13.32	Ø8//0.10 (4r)

Anexo E.18- Armadura transversal nas vigas do piso 4

Piso 5			Armadura (Sap 2000) [cm²]			Armadura longitudinal adotada [cm²]					
Viga	Troço (início-fim)	Face	AS _{início}	AS _{meio Vão}	AS _{Final}	Início		Meio vão		Fim	
						Ø	As[cm²]	Ø	As[cm²]	Ø	As[cm²]
V2.1	Pbetão-Pb15	Superior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	8Ø20	25.12
		Inferior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	4Ø20	12.56
V2.2	Pb15-P11	Superior	20.63	5.11	5.11	8Ø20	25.12	2Ø20	6.28	2Ø20	6.28
		Inferior	9.55	5.11	5.11	4Ø20	12.56	2Ø20	6.28	2Ø20	6.28
V2.3	P11-P12	Superior	5.30	5.11	6.13	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
		Inferior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
V2.4	P12-P13	Superior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
		Inferior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
V2.5	P13-P14	Superior	5.11	5.11	10.30	2Ø20	6.28	2Ø20	6.28	4Ø20	12.56
		Inferior	5.11	5.11	6.23	2Ø20	6.28	2Ø20	6.28	3Ø20	9.42
V2.6	P14-P15	Superior	5.11	5.11	5.11	4Ø20	12.56	2Ø20	6.28	2Ø20	6.28
		Inferior	5.11	5.11	5.11	3Ø20	9.42	2Ø20	6.28	2Ø20	6.28
V2.7	P15-P17	Superior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
		Inferior	5.11	5.11	5.11	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28

Anexo E.19- Armadura longitudinal nas vigas do piso 5

Viga	A _c [m ²]	Face	Armadura longitudinal adotada [cm ²]					
			Início		Meio vão		Fim	
			As[cm ²]	ρ	As[cm ²]	ρ	As[cm ²]	ρ
V2.1	0.15	Superior	6.28	0.0042	6.28	0.0042	25.12	0.0167
		Inferior	6.28	0.0042	6.28	0.0042	12.56	0.0084
V2.2	0.15	Superior	25.12	0.0167	6.28	0.0042	6.28	0.0042
		Inferior	12.56	0.0084	6.28	0.0042	6.28	0.0042
V2.3	0.15	Superior	6.28	0.0042	6.28	0.0042	6.28	0.0042
		Inferior	6.28	0.0042	6.28	0.0042	6.28	0.0042
V2.4	0.15	Superior	6.28	0.0042	6.28	0.0042	6.28	0.0042
		Inferior	6.28	0.0042	6.28	0.0042	6.28	0.0042
V2.5	0.15	Superior	6.28	0.0042	6.28	0.0042	12.56	0.0084
		Inferior	6.28	0.0042	6.28	0.0042	9.42	0.0063
V2.6	0.15	Superior	12.56	0.0084	6.28	0.0042	6.28	0.0042
		Inferior	9.42	0.0063	6.28	0.0042	6.28	0.0042
V2.7	0.15	Superior	6.28	0.0042	6.28	0.0042	6.28	0.0042
		Inferior	6.28	0.0042	6.28	0.0042	6.28	0.0042

Anexo E.20- Taxa armadura longitudinal nas vigas do piso 5

Piso 5	Armadura (Sap 2000) [cm ² /m]			Armadura transversal adotada [cm ²]					
Viga	A _{Sinício}	A _{Smeio Vão}	A _{SFinal}	Início		Meio vão		Fim	
				Ø	As[cm ² /m]	Ø	As[cm ² /m]	Ø	As[cm ² /m]
V2.1	3.29	3.29	3.29	Ø8//0.125 (2r)	8.00	Ø8//0.25 (2r)	4.00	Ø8//0.125 (2r)	8.00
V2.2	10.02	10.94	38.9	Ø10//0.125 (2r)	12.64	Ø10//0.25 (4r)	12.64	Ø10//0.075 (4r)	42.12
V2.3	14.53	3.29	10.1	Ø10//0.10 (2r)	15.80	Ø10//0.25 (2r)	6.32	Ø10//0.125 (2r)	12.64
V2.4	7.32	3.92	3.92	Ø8//0.125 (2r)	8.00	Ø8//0.25 (2r)	4.00	Ø8//0.125 (2r)	8.00
V2.5	19.28	3.29	3.29	Ø8//0.10 (4r)	20.00	Ø8//0.25 (2r)	4.00	Ø8//0.125 (2r)	8.00
V2.6	5.36	5.03	8.6	Ø8//0.125 (2r)	8.00	Ø8//0.15 (2r)	6.66	Ø8//0.10 (2r)	10.00
V2.7	5.21	3.92	4.37	Ø8//0.125 (2r)	8.00	Ø8//0.25 (2r)	4.00	Ø8//0.125 (2r)	8.00

Anexo E.21- Armadura transversal nas vigas do piso 5

Anexo F – Comprimentos críticos e espaçamentos máximos de armadura transversal em pilares sísmicos primários

Pilar	Piso	Dim X [m]	Dim Y [m]	h_c [m]	l_{cl} [m]	0.45 [m]	l_{cl}/h_c	l_{cr} [m]	$(l_{cl}/h_c) < 3$
P1	Piso 0	0.30	1.00	1.00	2.38	0.45	2.38	1.00	lcr total
	Piso Inter	0.30	1.00	1.00	2.70	0.45	2.70	1.00	lcr total
	Piso 1	0.30	1.00	1.00	3.86	0.45	3.86	1.00	lcr parcial
	Piso 2	0.30	1.00	1.00	3.93	0.45	3.93	1.00	lcr parcial
	Piso 3	0.30	1.00	1.00	3.57	0.45	3.57	1.00	lcr parcial
P2	Piso 0	0.80	0.30	0.80	2.38	0.45	2.98	0.80	lcr total
	Piso Inter	0.80	0.30	0.80	2.70	0.45	3.38	0.80	lcr parcial
	Piso 1	0.80	0.30	0.80	3.86	0.45	4.83	0.80	lcr parcial
	Piso 2	0.80	0.30	0.80	3.93	0.45	4.91	0.80	lcr parcial
	Piso 3	0.80	0.30	0.80	3.57	0.45	4.46	0.80	lcr parcial
P3	Piso 0	1.10	0.30	1.10	2.38	0.45	2.16	1.10	lcr total
	Piso Inter	1.10	0.30	1.10	2.70	0.45	2.45	1.10	lcr total
	Piso 1	1.10	0.30	1.10	3.86	0.45	3.51	1.10	lcr parcial
	Piso 2	1.10	0.30	1.10	3.93	0.45	3.57	1.10	lcr parcial
	Piso 3	1.10	0.30	1.10	3.57	0.45	3.25	1.10	lcr parcial
P4	Piso 0	1.10	0.30	1.10	2.38	0.45	2.16	1.10	lcr total
	Piso Inter	1.10	0.30	1.10	2.70	0.45	2.45	1.10	lcr total
	Piso 1	1.10	0.30	1.10	3.86	0.45	3.51	1.10	lcr parcial
	Piso 2	1.10	0.30	1.10	3.93	0.45	3.57	1.10	lcr parcial
	Piso 3	1.10	0.30	1.10	3.57	0.45	3.25	1.10	lcr parcial
P5	Piso 0	0.30	0.80	0.80	2.38	0.45	2.98	0.80	lcr total
	Piso Inter	0.30	0.80	0.80	2.70	0.45	3.38	0.80	lcr parcial
	Piso 1	0.30	0.80	0.80	3.86	0.45	4.83	0.80	lcr parcial
	Piso 2	0.30	0.80	0.80	3.93	0.45	4.91	0.80	lcr parcial
	Piso 3	0.30	0.80	0.80	3.57	0.45	4.46	0.80	lcr parcial
P8	Piso 0	0.60	0.60	0.60	3.59	0.45	5.98	0.60	lcr total
	Piso Inter	0.60	0.60	0.60	2.70	0.45	4.50	0.60	lcr parcial
	Piso 1	0.60	0.60	0.60	3.86	0.45	6.43	0.64	lcr parcial
	Piso 2	0.60	0.60	0.60	3.93	0.45	6.55	0.66	lcr parcial
	Piso 3	0.60	0.60	0.60	3.57	0.45	5.95	0.60	lcr parcial
	Piso 4	0.60	0.60	0.60	3.10	0.45	5.17	0.60	lcr parcial
	Piso 5	0.60	0.60	0.60	2.60	0.45	4.33	0.60	lcr parcial
P9	Piso 0	0.30	0.80	0.80	2.38	0.45	2.98	0.80	lcr total
	Piso Inter	0.30	0.80	0.80	2.70	0.45	3.38	0.80	lcr parcial
	Piso 1	0.30	0.80	0.80	3.86	0.45	4.83	0.80	lcr parcial
	Piso 2	0.30	0.80	0.80	3.93	0.45	4.91	0.80	lcr parcial
	Piso 3	0.30	0.80	0.80	3.57	0.45	4.46	0.80	lcr parcial

Anexo F. 1 - Comprimento das zonas críticas dos pilares primários [P1 a P9]

Pilar	Piso	Dim X [m]	Dim Y [m]	h _c [m]	l _{cl} [m]	0.45 [m]	l _{cl} /h _c	l _{cr} [m]	(l _{cl} /h _c)<3
P11	Piso 0	0.60	0.40	0.60	3.59	0.45	5.98	0.60	lcr total
	Piso Inter	0.60	0.40	0.60	2.70	0.45	4.50	0.60	lcr parcial
	Piso 1	0.60	0.40	0.60	3.86	0.45	6.43	0.64	lcr parcial
	Piso 2	0.60	0.40	0.60	3.93	0.45	6.55	0.66	lcr parcial
	Piso 3	0.60	0.40	0.60	3.57	0.45	5.95	0.60	lcr parcial
	Piso 4	0.60	0.40	0.60	3.10	0.45	5.17	0.60	lcr parcial
P12	Piso 0	0.55	0.40	0.55	3.59	0.45	6.53	0.60	lcr total
	Piso Inter	0.55	0.40	0.55	2.70	0.45	4.91	0.55	lcr parcial
	Piso 1	0.55	0.40	0.55	3.86	0.45	7.02	0.64	lcr parcial
	Piso 2	0.55	0.40	0.55	3.93	0.45	7.15	0.66	lcr parcial
	Piso 3	0.55	0.40	0.55	3.57	0.45	6.49	0.60	lcr parcial
	Piso 4	0.55	0.40	0.55	3.10	0.45	5.64	0.55	lcr parcial
P13	Piso 0	0.55	0.40	0.55	3.59	0.45	6.53	0.60	lcr total
	Piso Inter	0.55	0.40	0.55	2.70	0.45	4.91	0.55	lcr parcial
	Piso 1	0.55	0.40	0.55	3.86	0.45	7.02	0.64	lcr parcial
	Piso 2	0.55	0.40	0.55	3.93	0.45	7.15	0.66	lcr parcial
	Piso 3	0.55	0.40	0.55	3.57	0.45	6.49	0.60	lcr parcial
	Piso 4	0.55	0.40	0.55	3.10	0.45	5.64	0.55	lcr parcial
P14	Piso 0	0.90	0.40	0.90	3.59	0.45	3.99	0.90	lcr total
	Piso Inter	0.90	0.40	0.90	2.70	0.45	3.00	0.90	lcr total
	Piso 1	0.90	0.40	0.90	3.86	0.45	4.29	0.90	lcr parcial
	Piso 2	0.90	0.40	0.90	3.93	0.45	4.37	0.90	lcr parcial
	Piso 3	0.90	0.40	0.90	3.57	0.45	3.97	0.90	lcr parcial
	Piso 4	0.90	0.40	0.90	3.10	0.45	3.44	0.90	lcr parcial
P15	Piso 0	0.55	0.40	0.55	3.59	0.45	6.53	0.60	lcr total
	Piso Inter	0.55	0.40	0.55	2.70	0.45	4.91	0.55	lcr parcial
	Piso 1	0.55	0.40	0.55	3.86	0.45	7.02	0.64	lcr parcial
	Piso 2	0.55	0.40	0.55	3.93	0.45	7.15	0.66	lcr parcial
	Piso 3	0.55	0.40	0.55	3.57	0.45	6.49	0.60	lcr parcial
	Piso 4	0.55	0.40	0.55	3.10	0.45	5.64	0.55	lcr parcial
P17	Piso 0	0.30	1.00	1.00	2.38	0.45	2.38	1.00	lcr total
	Piso Inter	0.30	1.00	1.00	2.70	0.45	2.70	1.00	lcr total
	Piso 1	0.30	1.00	1.00	3.86	0.45	3.86	1.00	lcr parcial
	Piso 2	0.30	1.00	1.00	3.93	0.45	3.93	1.00	lcr parcial
	Piso 3	0.30	1.00	1.00	3.57	0.45	3.57	1.00	lcr parcial
	Piso 4	0.30	1.00	1.00	3.10	0.45	3.10	1.00	lcr parcial
P18	Piso 0	0.50	0.40	0.50	3.59	0.45	7.18	0.60	lcr total
P19	Piso 0	0.50	0.40	0.50	3.59	0.45	7.18	0.60	lcr total
P20	Piso 0	0.50	0.50	0.50	2.38	0.45	4.76	0.50	lcr total
P21	Piso 0	0.50	0.40	0.50	3.59	0.45	7.18	0.60	lcr total

Anexo F. 2 - Comprimento das zonas críticas dos pilares primários [P11 a P21]

Pilar	b [m]	dbl [mm]	EC2	b _o [m]	EC8
			S _{cl,tmáx} [m]		S _{máx} [m]
P1	0.3	20	300	0.23	115
P2	0.3	20	300	0.23	115
P3	0.3	20	300	0.23	115
P4	0.3	20	300	0.23	115
P5	0.3	20	300	0.23	115
P8	0.6	20	400	0.53	160
P9	0.3	20	300	0.23	115
P11	0.4	20	400	0.33	160
P12	0.4	20	400	0.33	160
P13	0.4	20	400	0.33	160
P14	0.4	20	400	0.33	160
P15	0.4	20	400	0.33	160
P17	0.3	20	300	0.23	115
P18	0.4	20	400	0.33	160
P19	0.4	20	400	0.33	160
P20	0.5	20	400	0.43	160
P21	0.4	20	400	0.33	160

Anexo F. 3 - Espaçamento máximo da armadura transversal nas zonas correntes e críticas dos pilares primários

Anexo G – Armadura longitudinal, armadura transversal em pilares sísmicos primários

P1	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As _{s,eff} [cm ²]
Piso 0	78.48	12Ø25+8Ø20	84.04
P. Inter	30.00	4Ø25+10Ø20	51.04
Piso 1	44.81	4Ø25+10Ø20	51.04
Piso 2	40.28	4Ø25+10Ø20	51.04
Piso 3	52.57	4Ø25+12Ø20	57.32

Anexo G. 1 – Armadura Longitudinal do pilar P1

P1		b [m]	h [m]	d ₁ [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.30	1.00	0.048	0.952	12.96	572.88	0.119	666.80	400.67	357.13
	Dir. y	1.00	0.30	0.048	0.252	38.88	572.88	0.036	353.74	810.96	344.01
P. Inter	Dir. x	0.30	1.00	0.048	0.952	12.96	1621.13	0.338	999.27	25.20	300.66
	Dir. y	1.00	0.30	0.048	0.252	22.38	1621.13	0.101	336.35	30.09	296.66
Piso 1	Dir. x	0.30	1.00	0.048	0.952	12.96	330.44	0.069	563.83	221.11	322.04
	Dir. y	1.00	0.30	0.048	0.252	22.38	330.44	0.021	205.72	709.56	314.59
Piso 2	Dir. x	0.30	1.00	0.048	0.952	12.96	282.04	0.059	542.10	199.23	316.09
	Dir. y	1.00	0.30	0.048	0.252	22.38	282.04	0.018	199.20	646.44	309.60
Piso 3	Dir. x	0.30	1.00	0.048	0.952	12.96	174.33	0.036	492.34	241.85	331.39
	Dir. y	1.00	0.30	0.048	0.252	25.52	174.33	0.011	206.56	784.84	322.43

Anexo G. 2 – Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P1

				Zona crítica _ As adotado (cm²/m)					Zona corrente _ As adotado (cm²/m)				
P1		Ved [KN]	As [cm²/m]	C.Exteriores	As [cm²/m]	C.Interiores	As [cm²/m]	Vrd [KN]	C.Exteriores	As [cm²/m]	C. Interiores	As [cm²/m]	
Piso 0	Dir. x	400.67	47.38	Ø10//0.10 (2r)	15.80	Ø10//0.10 (7r)	55.30	601.25	Ø10//0.10 (2r)	15.80	Ø10//0.10 (7r)	55.30	Crítico
	Dir. y	810.96	26.69	Ø10//0.10 (3r)	23.70	Ø10//0.10 (1r)	7.90	960.02	Ø10//0.10 (3r)	23.70	Ø10//0.10 (1r)	7.90	
P. Inter	Dir. x	25.20	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	253.69	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	
	Dir. y	30.09	0.00	Ø8//0.10 (2r)	10.00	---	0.00	303.80	Ø8//0.10 (2r)	10.00	---	0.00	
Piso 1	Dir. x	221.11	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (4r)	31.60	400.83	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
	Dir. y	709.56	23.36	Ø10//0.10 (2r)	15.80	Ø10//0.10 (1r)	7.90	720.02	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
Piso 2	Dir. x	199.23	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (4r)	31.60	400.83	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
	Dir. y	646.44	21.28	Ø10//0.10 (2r)	15.90	Ø10//0.10 (1r)	7.90	723.05	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
Piso 3	Dir. x	241.85	0.00	Ø10//0.075 (2r)	21.06	Ø10//0.075 (4r)	42.12	534.28	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
	Dir. y	784.84	25.83	Ø10//0.075 (2r)	21.06	Ø10//0.075 (1r)	10.53	959.72	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	

Anexo G. 3 - Armadura transversal do pilar P1

P2	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As _{eff} [cm ²]
Piso 0	72.51	10Ø25+8Ø20	74.22
P. Inter	24.00	14Ø16	28.14
Piso 1	47.69	4Ø25+10Ø20	51.04
Piso 2	41.96	4Ø25+10Ø20	51.04
Piso 3	73.10	10Ø25+8Ø20	74.22

Anexo G. 4 - Armadura longitudinal do pilar P2

P2		b [m]	h [m]	d ₁ [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.80	0.30	0.048	0.252	25.52	2530.28	0.198	360.64	875.890	284.70
	Dir. y	0.30	0.80	0.048	0.752	19.64	2530.28	0.527	959.75	367.00	293.81
P. Inter	Dir. x	0.80	0.30	0.048	0.252	12.06	2093.83	0.164	262.69	5.01	238.67
	Dir. y	0.30	0.80	0.048	0.752	6.03	2093.83	0.436	619.92	32.29	240.53
Piso 1	Dir. x	0.80	0.30	0.048	0.252	22.38	863.87	0.067	265.14	527.58	265.24
	Dir. y	0.30	0.80	0.048	0.752	12.96	863.87	0.180	600.87	206.45	271.28
Piso 2	Dir. x	0.80	0.30	0.048	0.252	22.38	498.79	0.039	225.92	474.34	259.82
	Dir. y	0.30	0.80	0.048	0.752	12.96	498.79	0.104	496.29	183.06	183.06
Piso 3	Dir. x	0.80	0.30	0.048	0.252	32.2	137.36	0.011	248.61	668.53	285.11
	Dir. y	0.30	0.80	0.048	0.752	14.73	137.36	0.029	414.25	205.87	190.62

Anexo G. 5 - Posição da linha neutra, momento resistente e esforço transverso de dimensionamento no pilar P2

P2		V _{ed} [KN]	As [cm ² /m]	Zona crítica _ As adotado (cm ² /m)				V _{rd} [KN]	Zona corrente _ As adotado (cm ² /m)				
				C.Exteriores	As [cm ² /m]	C.Interiores	As [cm ² /m]		C.Exteriores	As [cm ² /m]	C. Interiores	As [cm ² /m]	
Piso 0	Dir. x	970.89	40.26	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	1015.78	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	Crítico
	Dir. y	367.00	43.40	Ø10//0.075 (2r)	21.06	Ø10//0.075 (5r)	52.65	623.32	Ø10//0.075 (2r)	21.06	Ø10//0.075 (5r)	52.65	
P. Inter	Dir. x	5.01	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (1r)	5.00	361.75	Ø8//0.20 (2r)	5.00	Ø8//0.20 (1r)	2.50	
	Dir. y	32.29	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (1r)	5.00	126.85	Ø8//0.20 (2r)	5.00	Ø8//0.20 (1r)	2.50	
Piso 1	Dir. x	527.58	21.88	Ø10//0.10 (2r)	15.80	Ø10//0.10 (1r)	7.90	571.56	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
	Dir. y	206.45	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (4r)	31.60	400.83	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
Piso 2	Dir. x	474.34	19.67	Ø10//0.10 (2r)	15.80	Ø10//0.10 (1r)	7.90	571.56	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
	Dir. y	183.06	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (4r)	31.60	400.83	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
Piso 3	Dir. x	668.53	27.72	Ø10//0.075 (2r)	21.06	Ø10//0.075 (1r)	10.53	761.84	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
	Dir. y	205.87	24.34	Ø10//0.075 (2r)	21.06	Ø10//0.075 (8r)	84.24	890.46	Ø10//0.20 (2r)	7.90	Ø10//0.20 (8r)	31.60	

Anexo G. 6 - Armadura transversal do pilar P2

P3	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	60.98	4Ø25+14Ø20	63.6
P. Inter	33.00	12Ø20+2Ø16	41.7
Piso 1	63.14	4Ø25+14Ø20	63.6
Piso 2	58.44	4Ø25+14Ø20	63.6
Piso 3	86.51	16Ø25+4Ø20	91.12

Anexo G. 7 - Armadura longitudinal do pilar P3

P3		b [m]	h [m]	d ₁ [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	1.10	0.30	0.048	0.252	25.52	3184.76	0.181	428.37	1441.33	356.42
	Dir. y	0.30	1.10	0.048	1.052	16.10	3184.76	0.663	1468.91	410.21	368.07
P. Inter	Dir. x	1.10	0.30	0.048	0.252	18.84	2303.87	0.131	358.70	9.91	325.50
	Dir. y	0.30	1.10	0.048	1.052	8.29	2303.87	0.480	1114.46	31.42	330.72
Piso 1	Dir. x	1.10	0.30	0.048	0.252	28.66	563.02	0.032	280.71	970.13	358.37
	Dir. y	0.30	1.10	0.048	1.052	12.96	563.02	0.117	736.06	280.81	370.42
Piso 2	Dir. x	1.10	0.30	0.048	0.252	28.66	279.70	0.016	243.64	886.99	354.07
	Dir. y	0.30	1.10	0.048	1.052	12.96	279.70	0.058	600.13	254.45	365.23
Piso 3	Dir. x	1.10	0.30	0.048	0.252	39.28	7.78	0.000	280.02	1150.59	377.07
	Dir. y	0.30	1.10	0.048	1.052	16.10	7.78	0.002	566.79	235.11	225.71

Anexo G. 8 - Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P3

				Zona crítica _ As adotado (cm²/m)					Zona corrente _ As adotado (cm²/m)				
P3		Ved [KN]	As [cm²/m]	C.Exteriores	As [cm²/m]	C.Interiores	As [cm²/m]	Vrd [KN]	C.Exteriores	As [cm²/m]	C. Interiores	As [cm²/m]	
Piso 0	Dir. x	1441.33	43.01	Ø10//0.075 (3r)	31.59	Ø10//0.075 (2r)	21.06	1764.43	Ø10//0.075 (3r)	31.59	Ø10//0.075 (2r)	21.06	Crítico
	Dir. y	410.21	48.51	Ø10//0.075 (2r)	21.06	Ø10//0.075 (5r)	52.65	623.32	Ø10//0.075 (2r)	21.06	Ø10//0.075 (5r)	52.65	
P. Inter	Dir. x	9.91	0.00	Ø8//0.10 (2r)	10.00	---	0.00	335.12	Ø8//0.10 (2r)	10.00	---	0.00	Crítico
	Dir. y	31.42	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	253.69	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	
Piso 1	Dir. x	970.13	28.95	Ø10//0.075 (2r)	21.06	Ø10//0.075 (1r)	10.53	1058.66	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
	Dir. y	280.81	0.00	Ø10//0.075 (2r)	10.53	Ø10//0.075 (1r)	10.53	178.09	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
Piso 2	Dir. x	886.99	26.47	Ø10//0.075 (2r)	21.06	Ø10//0.075 (1r)	10.53	1058.66	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
	Dir. y	254.45	0.00	Ø10//0.075 (2r)	10.53	Ø10//0.075 (1r)	10.53	178.09	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
Piso 3	Dir. x	1150.59	34.33	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	1411.54	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	235.11	27.80	Ø10//0.075 (2r)	21.06	Ø10//0.075 (6r)	63.18	712.37	Ø10//0.20 (2r)	7.90	Ø10//0.20 (6r)	27.65	

Anexo G. 9 - Armadura transversal do pilar P3

P4	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	33.00	12Ø20+2Ø16	41.7
P. Inter	53.29	4Ø25+14Ø20	63.6
Piso 1	63.60	4Ø25+14Ø20	63.6
Piso 2	71.30	16Ø25+6Ø20	97.4
Piso 3	91.72	16Ø25+6Ø20	97.4

Anexo G. 10 - Armadura longitudinal do pilar P4

P4		b [m]	h [m]	d _l [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	1.10	0.30	0.048	0.252	18.84	1895.61	0.108	336.42	818.73	386.18
	Dir. y	0.30	1.10	0.048	1.052	8.29	1895.61	0.395	1032.79	450.30	404.01
P. Inter	Dir. x	1.10	0.30	0.048	0.252	25.52	1043.53	0.059	312.95	1332.45	349.08
	Dir. y	0.30	1.10	0.048	1.052	16.10	1043.53	0.217	1045.72	368.17	359.20
Piso 1	Dir. x	1.10	0.30	0.048	0.252	28.66	633.29	0.036	289.34	972.99	358.78
	Dir. y	0.30	1.10	0.048	1.052	12.96	633.29	0.132	767.70	285.72	370.92
Piso 2	Dir. x	1.10	0.30	0.048	0.252	42.42	224.99	0.013	333.75	984.31	365.35
	Dir. y	0.30	1.10	0.048	1.052	16.1	224.99	0.047	682.05	285.05	378.85
Piso 3	Dir. x	1.10	0.30	0.048	0.252	38.88	184.32	0.010	302.89	1196.85	380.76
	Dir. y	0.30	1.10	0.048	1.052	19.64	184.32	0.038	784.75	235.23	207.92

Anexo G. 11 - Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P4

				Zona crítica _ As adotado (cm²/m)					Zona corrente _ As adotado (cm²/m)				
P4		Ved [KN]	As [cm²/m]	C.Exteriores	As [cm²/m]	C.Interiores	As [cm²/m]	Vrd [KN]	C.Exteriores	As [cm²/m]	C. Interiores	As [cm²/m]	
Piso 0	Dir. x	818.73	24.43	Ø10//0.075 (2r)	21.06	Ø10//0.075 (1r)	10.53	1058.66	Ø10//0.075 (2r)	21.06	Ø10//0.075 (1r)	10.53	Crítico
	Dir. y	450.30	53.25	Ø10//0.075 (2r)	21.06	Ø10//0.075 (6r)	63.18	712.37	Ø10//0.075 (2r)	21.06	Ø10//0.075 (6r)	63.18	
P. Inter	Dir. x	1332.45	39.76	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	1411.54	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	Crítico
	Dir. y	368.17	43.54	Ø10//0.075 (2r)	21.06	Ø10//0.075 (5r)	52.65	623.32	Ø10//0.075 (2r)	21.06	Ø10//0.075 (5r)	52.65	
Piso 1	Dir. x	972.99	29.03	Ø10//0.075 (2r)	21.06	Ø10//0.075 (1r)	10.53	1058.66	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
	Dir. y	285.72	0.00	Ø10//0.075 (2r)	21.06	Ø10//0.075 (8r)	84.24	890.46	Ø10//0.20 (2r)	7.90	Ø10//0.20 (8r)	31.60	
Piso 2	Dir. x	984.31	29.37	Ø10//0.075 (2r)	21.06	Ø10//0.075 (1r)	10.53	1058.66	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95	
	Dir. y	285.05	0.00	Ø10//0.075 (2r)	21.06	Ø10//0.075 (9r)	94.77	979.50	Ø10//0.20 (2r)	7.90	Ø10//0.20 (9r)	35.55	
Piso 3	Dir. x	1196.85	35.71	Ø10//0.075 (3r)	31.59	Ø10//0.075 (2r)	21.06	1764.43	Ø10//0.20 (3r)	11.85	Ø10//0.20 (2r)	7.90	
	Dir. y	235.23	27.82	Ø10//0.075 (2r)	21.06	Ø10//0.075 (7r)	73.71	801.41	Ø10//0.20 (2r)	7.90	Ø10//0.20 (7r)	27.65	

Anexo G. 12 - Armadura transversal do pilar P4

P5	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	79.16	16Ø25+2Ø20	84.84
P. Inter	24.00	4Ø25+10Ø20	51.04
Piso 1	50.05	4Ø25+10Ø20	51.04
Piso 2	46.47	4Ø25+10Ø20	51.04
Piso 3	60.82	16Ø25+2Ø20	84.84

Anexo G. 13 - Armadura Longitudinal do pilar P5

P5		b [m]	h [m]	d ₁ [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.30	0.80	0.048	0.752	19.64	1836.86	0.383	934.74	402.43	298.94
	Dir. y	0.80	0.30	0.048	0.252	62.06	1836.86	0.144	610.67	940.30	289.14
P. Inter	Dir. x	0.30	0.80	0.048	0.752	12.96	1630.17	0.340	748.12	21.47	240.53
	Dir. y	0.80	0.30	0.048	0.252	12.96	1630.17	0.127	253.49	40.86	238.67
Piso 1	Dir. x	0.30	0.80	0.048	0.752	12.96	1596.48	0.333	743.71	204.65	273.72
	Dir. y	0.80	0.30	0.048	0.252	12.96	1596.48	0.125	251.83	530.04	267.34
Piso 2	Dir. x	0.30	0.80	0.048	0.752	12.96	593.72	0.124	525.62	187.13	269.98
	Dir. y	0.80	0.30	0.048	0.252	22.38	593.72	0.046	236.92	485.93	264.12
Piso 3	Dir. x	0.30	0.80	0.048	0.752	19.64	366.34	0.076	616.52	233.31	283.97
	Dir. y	0.80	0.30	0.048	0.252	62.06	366.34	0.029	491.33	604.57	276.21

Anexo G. 14 - Posição da linha neutra, momento resistente e esforço transverso de dimensionamento no pilar P5

				Zona crítica _ As adotado (cm²/m)					Zona corrente _ As adotado (cm²/m)			
P5		Ved [KN]	As [cm²/m]	C.Exteriores	As [cm²/m]	C.Interiores	As [cm²/m]	Vrd [KN]	C.Exteriores	As [cm²/m]	C. Interiores	As [cm²/m]
Piso 0	Dir. x	402.43	47.59	Ø10//0.10 (2r)	15.80	Ø10//0.10 (5r)	39.50	467.64	Ø10//0.10 (2r)	15.80	Ø10//0.10 (5r)	39.50
	Dir. y	940.30	38.99	Ø10//0.10 (2r)	15.80	Ø10//0.10 (3r)	23.70	952.60	Ø10//0.10 (2r)	15.80	Ø10//0.10 (3r)	23.70
P. Inter	Dir. x	21.47	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	253.69	Ø8//0.20 (2r)	5.00	Ø8//0.25 (4r)	10.00
	Dir. y	40.86	0.00	Ø8//0.10 (2r)	10.00	---	0.00	241.16	Ø8//0.20 (2r)	5.00	---	0.00
Piso 1	Dir. x	204.65	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	267.22	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90
	Dir. y	530.04	21.98	Ø10//0.10 (2r)	15.80	Ø10//0.10 (1r)	7.90	571.56	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95
Piso 2	Dir. x	187.13	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	267.22	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90
	Dir. y	485.93	20.15	Ø10//0.10 (2r)	15.80	Ø10//0.10 (1r)	7.90	571.56	Ø10//0.20 (2r)	7.90	Ø10//0.20 (1r)	3.95
Piso 3	Dir. x	233.31	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (5r)	39.50	467.64	Ø10//0.20 (2r)	7.90	Ø10//0.10 (5r)	19.75
	Dir. y	604.57	25.07	Ø10//0.10 (3r)	23.70	Ø10//0.10 (2r)	15.80	952.60	Ø10//0.20 (3r)	11.85	Ø10//0.10 (2r)	7.90

Anexo G. 15 - Armadura transversal do pilar P5

P8	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	36.00	12Ø20	37.68
P. Inter	39.22	12Ø25	58.92
Piso 1	54.28	12Ø25	58.92
Piso 2	47.05	12Ø25	58.92
Piso 3	49.61	12Ø25	58.92
Piso 4	36.00	12Ø20	37.68
Piso 5	36.00	12Ø20	37.68

Anexo G. 16 - Armadura longitudinal do pilar P8

P8		b [m]	h [m]	d _l [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.60	0.60	0.048	0.552	12.56	1956.10	0.204	647.69	18.94	360.16
	Dir. y	0.60	0.60	0.048	0.552	12.56	1956.10	0.204	647.69	6.65	360.16
P. Inter	Dir. x	0.60	0.60	0.048	0.552	19.64	1128.64	0.118	629.99	582.35	364.84
	Dir. y	0.60	0.60	0.048	0.552	19.64	1128.64	0.118	629.99	582.35	364.84
Piso 1	Dir. x	0.60	0.60	0.048	0.552	19.64	1181.34	0.123	640.72	443.47	383.84
	Dir. y	0.60	0.60	0.048	0.552	19.64	1181.34	0.123	640.72	443.47	383.84
Piso 2	Dir. x	0.60	0.60	0.048	0.552	19.64	881.96	0.092	576.65	379.55	357.35
	Dir. y	0.60	0.60	0.048	0.552	19.64	881.96	0.092	576.65	379.55	357.35
Piso 3	Dir. x	0.60	0.60	0.048	0.552	19.64	321.49	0.033	436.61	418.27	347.74
	Dir. y	0.60	0.60	0.048	0.552	19.64	321.49	0.033	436.61	418.27	347.74
Piso 4	Dir. x	0.60	0.60	0.048	0.552	12.56	511.29	0.053	362.79	46.12	232.00
	Dir. y	0.60	0.60	0.048	0.552	12.56	511.29	0.053	362.79	6.46	232.00
Piso 5	Dir. x	0.60	0.60	0.048	0.552	12.56	128.80	0.013	258.24	14.24	179.22
	Dir. y	0.60	0.60	0.048	0.552	12.56	128.80	0.013	258.24	16.65	179.22

Anexo G. 17 - Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P8

P8		V _{ed} [KN]	As [cm ² /m]	Zona crítica _ As adotado (cm ² /m)				V _{rd} [KN]	Zona corrente _ As adotado (cm ² /m)				
				C.Exteriores	As [cm ² /m]	C.Interiores	As [cm ² /m]		C.Exteriores	As [cm ² /m]	C. Interiores	As [cm ² /m]	
Piso 0	Dir. x	18.94	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	357.05	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	Crítico
	Dir. y	6.65	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	357.05	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	
P. Inter	Dir. x	582.35	32.62	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	751.94	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	582.35	32.62	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	751.94	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
Piso 1	Dir. x	443.47	24.84	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	564.14	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	443.47	24.84	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	564.14	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
Piso 2	Dir. x	379.55	21.26	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	564.14	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	379.55	21.26	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	564.14	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
Piso 3	Dir. x	418.27	23.43	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	564.14	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	418.27	23.43	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	564.14	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
Piso 4	Dir. x	46.12	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	357.05	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	6.46	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	357.05	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
Piso 5	Dir. x	14.24	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	357.05	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	16.65	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	357.05	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	

Anexo G. 18 -Armadura transversal do pilar P8

P9	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	79.34	14Ø25+4Ø20	81.3
P. Inter	24.00	16Ø20	50.24
Piso 1	48.37	16Ø20	50.24
Piso 2	41.73	16Ø20	50.24
Piso 3	64.03	14Ø25+4Ø20	81.3

Anexo G. 19 - Armadura longitudinal do pilar P9

P9		b [m]	h [m]	d ₁ [m]	d [m]	A _{s1} =A _{s2} [cm ²]	N _{ed} [kN]	x [m]	M _{Rd} [kN/m]	V _{Ed} [kN]	V _{Rd,c} [kN]
Piso 0	Dir. x	0.30	0.80	0.048	0.752	16.10	1985.70	0.414	860.13	406.46	299.08
	Dir. y	0.80	0.30	0.048	0.252	34.37	1985.70	0.155	418.64	1030.07	289.25
P. Inter	Dir. x	0.30	0.80	0.048	0.752	12.56	1713.96	0.357	748.49	34.60	240.53
	Dir. y	0.80	0.30	0.048	0.252	18.84	1713.96	0.134	299.04	5.11	238.67
Piso 1	Dir. x	0.30	0.80	0.048	0.752	12.56	852.48	0.178	588.14	196.99	271.99
	Dir. y	0.80	0.30	0.048	0.252	18.84	852.48	0.067	238.91	510.20	265.85
Piso 2	Dir. x	0.30	0.80	0.048	0.752	12.56	638.07	0.133	529.01	172.44	264.73
	Dir. y	0.80	0.30	0.048	0.252	18.84	638.07	0.050	216.74	450.91	259.58
Piso 3	Dir. x	0.30	0.80	0.048	0.752	16.10	300.67	0.063	507.17	232.13	273.90
	Dir. y	0.80	0.30	0.048	0.252	34.37	300.67	0.023	286.28	605.14	264.22

Anexo G. 20 - Posição da linha neutra, momento resistente e esforço transverso de dimensionamento no pilar P9

P9		V _{Ed} [kN]	As [cm ² /m]	Zona crítica _ As adotado (cm ² /m)				V _{Rd} [kN]	Zona corrente _ As adotado (cm ² /m)				
				C.Exteriores	As [cm ² /m]	C.Interiores	As [cm ² /m]		C.Exteriores	As [cm ² /m]	C. Interiores	As [cm ² /m]	
Piso 0	Dir. x	406.46	48.07	Ø10//0.075 (2r)	21.06	Ø10//0.075 (5r)	52.65	623.32	Ø10//0.075 (2r)	21.06	Ø10//0.075 (5r)	52.65	Crítico
	Dir. y	1030.07	42.71	Ø10//0.075 (3r)	31.59	Ø10//0.075 (2r)	21.06	1269.73	Ø10//0.075 (3r)	31.59	Ø10//0.075 (2r)	21.06	
P. Inter	Dir. x	34.60	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (4r)	20.00	302.74	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
	Dir. y	5.11	0.00	Ø10//0.10 (2r)	15.80	---	0.00	381.04	Ø10//0.20 (2r)	7.90	---	0.00	
Piso 1	Dir. x	196.99	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (4r)	31.60	400.83	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
	Dir. y	510.20	21.16	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	762.08	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
Piso 2	Dir. x	172.44	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (4r)	31.60	400.83	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
	Dir. y	450.91	18.70	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	762.08	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
Piso 3	Dir. x	232.13	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (4r)	31.60	400.83	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
	Dir. y	605.14	25.09	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	762.08	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	

Anexo G. 21 - Armadura transversal do pilar P9

P11	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	24.00	8Ø25+4Ø20	51.84
P. Inter	48.28	8Ø25+4Ø20	52.84
Piso 1	36.28	8Ø25+4Ø20	53.84
Piso 2	38.12	8Ø25+4Ø20	54.84
Piso 3	37.09	8Ø25+4Ø20	55.84
Piso 4	42.70	8Ø25+4Ø20	56.84

Anexo G. 22-Armadura longitudinal do pilar P11

P11		b [m]	h [m]	d ₁ [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.60	0.40	0.048	0.352	19.64	2231.04	0.232	446.59	16.44	240.11
	Dir. y	0.40	0.60	0.048	0.552	18.84	2231.04	0.349	688.65	41.05	241.11
P. Inter	Dir. x	0.60	0.40	0.048	0.352	19.64	1405.99	0.146	406.61	357.43	268.35
	Dir. y	0.40	0.60	0.048	0.552	18.84	1405.99	0.220	628.68	412.27	271.12
Piso 1	Dir. x	0.60	0.40	0.048	0.352	19.64	1075.50	0.112	374.68	340.34	256.01
	Dir. y	0.40	0.60	0.048	0.552	18.84	1075.50	0.168	580.80	232.71	258.01
Piso 2	Dir. x	0.60	0.40	0.048	0.352	19.64	800.81	0.083	341.22	313.25	250.18
	Dir. y	0.40	0.60	0.048	0.552	18.84	800.81	0.125	530.60	214.72	252.65
Piso 3	Dir. x	0.60	0.40	0.048	0.352	19.64	386.42	0.040	278.84	307.50	199.35
	Dir. y	0.40	0.60	0.048	0.552	18.84	386.42	0.060	437.03	305.08	203.91
Piso 4	Dir. x	0.60	0.40	0.048	0.352	19.64	28.51	0.003	213.44	361.24	169.10
	Dir. y	0.40	0.60	0.048	0.552	18.84	28.51	0.004	338.94	230.55	175.61

Anexo G. 23 -Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P11

				Zona crítica _ As adotado (cm²/m)					Zona corrente _ As adotado (cm²/m)			
P11		Ved [KN]	As [cm²/m]	C.Exteriores	As [cm²/m]	C.Interiores	As [cm²/m]	Vrd [KN]	C.Exteriores	As [cm²/m]	C. Interiores	As [cm²/m]
Piso 0	Dir. x	16.44	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	357.05	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00
	Dir. y	41.05	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00
P. Inter	Dir. x	357.43	20.02	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	564.14	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90
	Dir. y	412.27	35.58	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	366.19	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90
Piso 1	Dir. x	340.34	19.06	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	357.05	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00
	Dir. y	232.71	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00
Piso 2	Dir. x	313.25	17.55	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	357.05	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00
	Dir. y	214.72	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00
Piso 3	Dir. x	307.50	17.22	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	564.14	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90
	Dir. y	305.08	26.33	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	366.19	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90
Piso 4	Dir. x	361.24	20.23	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	564.14	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90
	Dir. y	230.55	19.90	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	366.19	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90

Crítico

Anexo G. 24 - Armadura transversal do pilar P11

P12	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	23.76	8Ø25+4Ø20	52.84
P. Inter	62.41	14Ø25	68.74
Piso 1	45.14	8Ø25+4Ø20	52.84
Piso 2	46.92	8Ø25+4Ø20	52.84
Piso 3	38.30	8Ø25+4Ø20	52.84
Piso 4	44.28	8Ø25+4Ø20	52.84

Anexo G. 25 - Armadura longitudinal do pilar P12

P12		b [m]	h [m]	d ₁ [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.55	0.40	0.048	0.352	19.64	2378.57	0.270	426.33	175.92	223.00
	Dir. y	0.40	0.55	0.048	0.502	16.10	2378.57	0.372	554.87	200.00	223.73
P. Inter	Dir. x	0.55	0.40	0.048	0.352	24.55	1078.98	0.123	422.60	353.79	261.94
	Dir. y	0.40	0.55	0.048	0.502	19.64	1078.98	0.169	534.25	455.83	264.60
Piso 1	Dir. x	0.55	0.40	0.048	0.352	19.64	872.32	0.099	347.65	338.88	247.47
	Dir. y	0.40	0.55	0.048	0.502	16.10	872.32	0.136	446.70	254.85	249.41
Piso 2	Dir. x	0.55	0.40	0.048	0.352	19.64	644.47	0.073	317.79	320.12	249.11
	Dir. y	0.40	0.55	0.048	0.502	16.10	644.47	0.101	405.64	221.75	220.04
Piso 3	Dir. x	0.55	0.40	0.048	0.352	19.64	390.34	0.044	278.92	293.14	215.96
	Dir. y	0.40	0.55	0.048	0.502	16.10	390.34	0.061	352.19	219.60	218.45
Piso 4	Dir. x	0.55	0.40	0.048	0.352	19.64	71.83	0.008	221.91	336.37	174.14
	Dir. y	0.40	0.55	0.048	0.502	16.10	71.83	0.011	273.80	244.56	178.64

Anexo G. 26 -Posição da linha neutra, momento resistente e esforço transverso de dimensionamento no pilar P12

		Zona crítica _ As adotado (cm ² /m)							Zona corrente _ As adotado (cm ² /m)				Crítico
P12		V _{ed} [KN]	As [cm ² /m]	C.Exteriores	As [cm ² /m]	C.Interiores	As [cm ² /m]	V _{rd} [KN]	C.Exteriores	As [cm ² /m]	C. Interiores	As [cm ² /m]	
Piso 0	Dir. x	175.92	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	325.73	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	
	Dir. y	200.00	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	
P. Inter	Dir. x	353.79	21.72	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	514.65	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	455.83	39.34	Ø10//0.10 (2r)	15.80	Ø10//0.10 (3r)	23.70	457.74	Ø10//0.20 (2r)	7.90	Ø10//0.20 (3r)	11.85	
Piso 1	Dir. x	338.88	20.81	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	514.65	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	254.85	21.99	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	366.19	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
Piso 2	Dir. x	320.12	19.66	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	325.73	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	221.75	19.14	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
Piso 3	Dir. x	293.14	18.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	325.73	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	219.60	18.95	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
Piso 4	Dir. x	336.37	20.65	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	514.65	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	244.56	21.10	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	366.19	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	

Anexo G. 27 - Armadura transversal do pilar P12

P13	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	22.00	8Ø25+4Ø20	52.84
P. Inter	62.10	14Ø25	68.74
Piso 1	46.42	8Ø25+4Ø20	52.84
Piso 2	47.27	8Ø25+4Ø20	52.84
Piso 3	37.80	8Ø25+4Ø20	52.84
Piso 4	49.42	8Ø25+4Ø20	52.84

Anexo G. 28 - Armadura longitudinal do pilar P13

P13		b [m]	h [m]	d ₁ [m]	d [m]	As1 = As2 [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.55	0.40	0.048	0.352	19.64	1921.16	0.218	424.24	18.73	220.41
	Dir. y	0.40	0.55	0.048	0.502	16.10	1921.16	0.300	552.01	22.63	221.02
P. Inter	Dir. x	0.55	0.40	0.048	0.352	24.55	948.85	0.108	408.57	590.51	261.71
	Dir. y	0.40	0.55	0.048	0.502	19.64	948.85	0.148	514.96	451.94	264.35
Piso 1	Dir. x	0.55	0.40	0.048	0.352	19.64	748.23	0.085	331.97	340.52	248.66
	Dir. y	0.40	0.55	0.048	0.502	16.10	748.23	0.117	425.14	256.63	250.65
Piso 2	Dir. x	0.55	0.40	0.048	0.352	19.64	534.27	0.061	301.65	319.65	249.43
	Dir. y	0.40	0.55	0.048	0.502	16.10	534.27	0.083	383.45	214.85	205.83
Piso 3	Dir. x	0.55	0.40	0.048	0.352	19.64	301.96	0.034	264.02	288.89	212.20
	Dir. y	0.40	0.55	0.048	0.502	16.10	301.96	0.047	331.71	215.94	214.78
Piso 4	Dir. x	0.55	0.40	0.048	0.352	19.64	36.19	0.004	214.95	364.72	180.63
	Dir. y	0.40	0.55	0.048	0.502	16.10	36.19	0.006	264.24	268.87	185.29

Anexo G. 29 - Posição da linha neutra, momento resistente e esforço transverso de dimensionamento no pilar P13

			Zona crítica _ As adotado (cm ² /m)						Zona corrente _ As adotado (cm ² /m)				Crítico
P13		V _{ed} [KN]	As [cm ² /m]	C.Exteriores	As [cm ² /m]	C.Interiores	As [cm ² /m]	V _{rd} [KN]	C.Exteriores	As [cm ² /m]	C. Interiores	As [cm ² /m]	
Piso 0	Dir. x	18.73	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	325.73	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	
	Dir. y	22.63	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	
P. Inter	Dir. x	590.51	36.26	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	685.98	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	451.94	39.00	Ø10//0.075 (2r)	21.06	Ø10//0.075 (3r)	31.59	610.13	Ø10//0.20 (2r)	7.90	Ø10//0.20 (3r)	11.85	
Piso 1	Dir. x	340.52	20.91	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	514.65	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	256.63	22.15	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	366.19	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
Piso 2	Dir. x	319.65	19.63	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	325.73	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	214.85	18.54	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
Piso 3	Dir. x	288.89	17.74	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	325.73	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	215.94	18.63	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
Piso 4	Dir. x	364.72	22.39	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	514.65	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	268.87	23.20	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	366.19	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	

Anexo G. 30 - Armadura transversal do pilar P13

P14	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	91.30	16Ø25+6Ø20	97.4
P. Inter	69.54	12Ø25+4Ø20	71.48
Piso 1	36.00	16Ø20	50.24
Piso 2	48.52	16Ø20	50.24
Piso 3	39.34	16Ø20	50.24
Piso 4	63.59	12Ø25+4Ø20	71.48

Anexo G. 31 - Armadura longitudinal do pilar P14

P14		b [m]	h [m]	d _l [m]	d [m]	A _{s1} =A _{s2} [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.90	0.40	0.048	0.352	38.88	2724.14	0.189	750.01	178.43	442.15
	Dir. y	0.40	0.90	0.048	0.852	19.64	2724.14	0.426	1311.57	113.10	151.09
P. Inter	Dir. x	0.90	0.40	0.048	0.352	29.46	896.86	0.062	468.69	424.85	294.39
	Dir. y	0.40	0.90	0.048	0.852	16.10	896.86	0.140	803.78	337.80	403.78
Piso 1	Dir. x	0.90	0.40	0.048	0.352	18.84	1419.67	0.099	427.26	42.82	354.08
	Dir. y	0.40	0.90	0.048	0.852	12.56	1419.67	0.222	864.30	37.64	358.98
Piso 2	Dir. x	0.90	0.40	0.048	0.352	18.84	526.26	0.037	296.87	218.50	251.10
	Dir. y	0.40	0.90	0.048	0.852	12.56	526.26	0.082	570.93	291.14	359.34
Piso 3	Dir. x	0.90	0.40	0.048	0.352	18.84	302.50	0.021	257.27	166.52	283.03
	Dir. y	0.40	0.90	0.048	0.852	12.56	302.50	0.047	481.82	253.26	293.83
Piso 4	Dir. x	0.90	0.40	0.048	0.352	29.46	10.23	0.001	313.71	194.30	182.87
	Dir. y	0.40	0.90	0.048	0.852	16.10	10.23	0.002	455.06	349.50	268.80

Anexo G. 32 -Posição da linha neutra, momento resistente e esforço transverso de dimensionamento no pilar P14

				Zona crítica _ As adotado (cm²/m)					Zona corrente _ As adotado (cm²/m)				
P14		Ved [KN]	As [cm²/m]	C.Exteriores	As [cm²/m]	C.Interiores	As [cm²/m]	Vrd [KN]	C.Exteriores	As [cm²/m]	C. Interiores	As [cm²/m]	
Piso 0	Dir. x	178.43	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	544.97	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	Crítico
	Dir. y	113.10	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	347.65	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	
P. Inter	Dir. x	424.85	15.59	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	544.97	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	Crítico
	Dir. y	337.80	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	347.65	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	
Piso 1	Dir. x	42.82	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	544.97	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	37.64	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	347.65	Ø8//0.20 (2r)	5.00	Ø8//0.20 (4r)	10.00	
Piso 2	Dir. x	218.50	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	544.97	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	291.14	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	347.65	Ø8//0.20 (2r)	5.00	Ø8//0.20 (4r)	10.00	
Piso 3	Dir. x	166.52	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	544.97	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	253.26	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	347.65	Ø8//0.20 (2r)	5.00	Ø8//0.20 (4r)	10.00	
Piso 4	Dir. x	194.30	7.13	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	861.05	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	349.50	30.16	Ø10//0.10 (2r)	15.80	Ø10//0.10 (4r)	31.60	549.29	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	

Anexo G. 33 - Armadura transversal do pilar P14

P15	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	36.86	8Ø25+4Ø20	51.84
P. Inter	80.00	12Ø25+8Ø20	84.04
Piso 1	47.63	8Ø25+4Ø20	51.84
Piso 2	48.62	8Ø25+4Ø20	51.84
Piso 3	36.94	8Ø25+4Ø20	51.84
Piso 4	45.13	8Ø25+4Ø20	51.84

Anexo G. 34 - Armadura longitudinal do pilar P15

P15		b [m]	h [m]	d _l [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.55	0.40	0.048	0.352	19.64	2233.59	0.254	427.72	109.66	239.17
	Dir. y	0.40	0.55	0.048	0.502	16.10	2233.59	0.349	556.80	239.37	240.70
P. Inter	Dir. x	0.55	0.40	0.048	0.352	29.46	779.03	0.089	439.88	291.86	274.36
	Dir. y	0.40	0.55	0.048	0.502	22.38	779.03	0.122	529.89	561.96	275.67
Piso 1	Dir. x	0.55	0.40	0.048	0.352	19.64	654.43	0.074	319.19	143.54	249.75
	Dir. y	0.40	0.55	0.048	0.502	16.10	654.43	0.102	407.57	258.58	251.80
Piso 2	Dir. x	0.55	0.40	0.048	0.352	19.64	515.46	0.059	298.79	126.43	250.65
	Dir. y	0.40	0.55	0.048	0.502	16.10	515.46	0.081	379.51	217.85	204.63
Piso 3	Dir. x	0.55	0.40	0.048	0.352	19.64	362.19	0.041	274.25	98.46	204.24
	Dir. y	0.40	0.55	0.048	0.502	16.10	362.19	0.057	345.77	208.70	207.03
Piso 4	Dir. x	0.55	0.40	0.048	0.352	19.64	166.79	0.019	239.87	89.24	172.46
	Dir. y	0.40	0.55	0.048	0.502	16.10	166.79	0.026	298.50	246.03	177.09

Anexo G. 35 -Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P15

			Zona crítica _ As adotado (cm ² /m)						Zona corrente _ As adotado (cm ² /m)				Crítico
P15		Ved [KN]	As [cm ² /m]	C.Exteriores	As [cm ² /m]	C.Interiores	As [cm ² /m]	Vrd [KN]	C.Exteriores	As [cm ² /m]	C. Interiores	As [cm ² /m]	
Piso 0	Dir. x	109.66	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	325.73	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	
	Dir. y	239.37	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	
P. Inter	Dir. x	291.86	17.92	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	685.98	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	561.96	48.49	Ø10//0.075 (2r)	21.06	Ø10//0.075 (4r)	42.12	732.16	Ø10//0.20 (2r)	7.90	Ø10//0.20 (4r)	15.80	
Piso 1	Dir. x	143.54	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	514.65	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	258.58	22.31	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	366.19	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
Piso 2	Dir. x	126.43	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	325.73	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	217.85	18.80	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
Piso 3	Dir. x	98.46	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	325.73	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
	Dir. y	208.70	18.01	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.20 (2r)	5.00	Ø8//0.20 (2r)	5.00	
Piso 4	Dir. x	89.24	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	514.65	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	
	Dir. y	246.03	21.23	Ø10//0.10 (2r)	15.80	Ø10//0.10 (2r)	15.80	366.19	Ø10//0.20 (2r)	7.90	Ø10//0.20 (2r)	7.90	

Anexo G. 36 -Armadura transversal do pilar P15

P17	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	64.95	4Ø25+16Ø20	69.88
P. Inter	54.30	18Ø20	56.52
Piso 1	30.00	12Ø20+2Ø16	41.7
Piso 2	30.47	12Ø20+2Ø16	41.7
Piso 3	30.00	12Ø20+2Ø16	41.7
Piso 4	49.06	18Ø20	56.52

Anexo G. 37 - Armadura longitudinal do pilar P17

P17		b [m]	h [m]	d _l [m]	d [m]	As ₁ =As ₂ [cm ²]	N _{ed} [KN]	x [m]	M _{Rd} [KN/m]	V _{Ed} [KN]	V _{Rd,c} [KN]
Piso 0	Dir. x	0.30	1.00	0.048	0.952	16.10	2428.53	0.506	1229.28	417.17	344.54
	Dir. y	1.00	0.30	0.048	0.252	28.66	2428.53	0.152	420.30	828.38	333.45
P. Inter	Dir. x	0.30	1.00	0.048	0.952	12.56	791.32	0.165	738.61	355.08	333.34
	Dir. y	1.00	0.30	0.048	0.252	21.98	791.32	0.049	259.08	220.97	324.06
Piso 1	Dir. x	0.30	1.00	0.048	0.952	8.29	1326.83	0.276	777.51	18.51	300.66
	Dir. y	1.00	0.30	0.048	0.252	18.84	1326.83	0.083	288.76	58.53	296.66
Piso 2	Dir. x	0.30	1.00	0.048	0.952	8.29	544.14	0.113	508.19	162.47	301.44
	Dir. y	1.00	0.30	0.048	0.252	18.84	544.14	0.034	207.97	157.38	297.32
Piso 3	Dir. x	0.30	1.00	0.048	0.952	8.29	761.09	0.159	593.07	22.25	245.35
	Dir. y	1.00	0.30	0.048	0.252	18.84	761.09	0.048	233.43	59.08	233.98
Piso 4	Dir. x	0.30	1.00	0.048	0.952	12.56	236.21	0.049	508.58	196.54	254.83
	Dir. y	1.00	0.30	0.048	0.252	21.98	236.21	0.015	190.08	406.65	236.87

Anexo G. 38 - Posição da linha neutra, momento resistente e esforço transverso de dimensionamento no pilar P17

P17		Ved [KN]	As [cm ² /m]	Zona crítica _ As adotado (cm ² /m)				V _{rd} [KN]	Zona corrente _ As adotado (cm ² /m)				
				C.Exteriores	As [cm ² /m]	C.Interiores	As [cm ² /m]		C.Exteriores	As [cm ² /m]	C. Interiores	As [cm ² /m]	
Piso 0	Dir. x	417.17	49.33	Ø10//0.075 (2r)	21.06	Ø10//0.075 (6r)	63.18	712.37	Ø10//0.075 (2r)	21.06	Ø10//0.075 (6r)	63.18	Crítico
	Dir. y	828.38	27.27	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	1279.62	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	
P. Inter	Dir. x	355.08	41.99	Ø10//0.10 (2r)	15.80	Ø10//0.10 (5r)	39.50	467.64	Ø10//0.10 (2r)	15.80	Ø10//0.10 (5r)	39.50	Crítico
	Dir. y	220.97	0.00	Ø10//0.10 (2r)	15.80	---	0.00	480.01	Ø10//0.10 (2r)	15.80	---	0.00	
Piso 1	Dir. x	18.51	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	253.69	Ø8//0.20 (2r)	5.00	Ø8//0.20 (4r)	10.00	
	Dir. y	58.53	0.00	Ø8//0.10 (2r)	10.00	---	0.00	303.80	Ø8//0.20 (2r)	5.00	---	0.00	
Piso 2	Dir. x	162.47	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	253.69	Ø8//0.20 (2r)	5.00	Ø8//0.20 (4r)	10.00	
	Dir. y	157.38	0.00	Ø8//0.10 (2r)	10.00	---	0.00	303.80	Ø8//0.20 (2r)	5.00	---	0.00	
Piso 3	Dir. x	22.25	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (4r)	20.00	253.69	Ø8//0.20 (2r)	5.00	Ø8//0.20 (4r)	10.00	
	Dir. y	59.08	0.00	Ø8//0.10 (2r)	10.00	---	0.00	303.80	Ø8//0.20 (2r)	5.00	---	0.00	
Piso 4	Dir. x	196.54	0.00	Ø10//0.10 (2r)	15.80	Ø10//0.10 (5r)	39.50	467.64	Ø10//0.20 (2r)	7.90	Ø10//0.20 (5r)	19.75	
	Dir. y	406.65	13.39	Ø10//0.10 (2r)	15.80	---	0.00	480.01	Ø10//0.20 (2r)	7.90	---	0.00	

Anexo G. 39 - Armadura transversal do pilar P17

P18	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	28.63	10Ø20	31.4

Anexo G. 40 - Armadura longitudinal do pilar P18

P18		b [m]	h [m]	d ₁ [m]	d [m]	A _{s1} =A _{s2} [cm ²]	N _{ed} [kN]	x [m]	M _{Rd} [kN/m]	V _{Ed} [kN]	V _{Rd,c} [kN]
Piso 0	Dir. x	0.50	0.40	0.05	0.35	12.56	191.62	0.024	169.36	203.51	140.74
	Dir. y	0.40	0.50	0.05	0.45	9.42	191.62	0.030	178.05	89.07	144.00

Anexo G. 41 -Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P18

			Zona crítica _ As adotado (cm ² /m)					Zona corrente _ As adotado (cm ² /m)					Crítico
P18		V _{Ed} [kN]	As [cm ² /m]	C.Exteriores	As [cm ² /m]	C.Interiores	As [cm ² /m]	V _{Rd} [kN]	C.Exteriores	As [cm ² /m]	C. Interiores	As [cm ² /m]	
Piso 0	Dir. x	203.51	13.83	Ø8//0.10 (2r)	10.00	Ø8//0.10 (1r)	5.00	220.81	Ø8//0.10 (2r)	10.00	Ø8//0.10 (1r)	5.00	
	Dir. y	89.07	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	

Anexo G. 42 - Armadura transversal do pilar P18

P19	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As,eff [cm ²]
Piso 0	47.95	8Ø25+4Ø20	51.84

Anexo G. 43 - Armadura longitudinal do pilar P19

P19		b [m]	h [m]	d ₁ [m]	d [m]	A _{s1} =A _{s2} [cm ²]	N _{ed} [kN]	x [m]	M _{Rd} [kN/m]	V _{Ed} [kN]	V _{Rd,c} [kN]
Piso 0	Dir. x	0.50	0.40	0.048	0.352	19.64	192.539	0.024	244.43	130.16	169.69
	Dir. y	0.40	0.50	0.048	0.452	16.1	192.539	0.030	272.17	121.22	172.71

Anexo G. 44 -Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P19

			Zona crítica _ As adotado (cm ² /m)					Zona corrente _ As adotado (cm ² /m)					Crítico
P19		V _{Ed} [kN]	As [cm ² /m]	C.Exteriores	As [cm ² /m]	C.Interiores	As [cm ² /m]	V _{Rd} [kN]	C.Exteriores	As [cm ² /m]	C. Interiores	As [cm ² /m]	
Piso 0	Dir. x	130.16	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	294.41	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	
	Dir. y	121.22	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	231.77	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	

Anexo G. 45 - Armadura transversal do pilar P19

P20	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As _{eff} [cm ²]
Piso 0	24.32	8Ø20+4Ø16	33.16

Anexo G. 46 - Armadura longitudinal do pilar P20

P20		b [m]	h [m]	d ₁ [m]	d [m]	A _{s1} = A _{s2} [cm ²]	N _{ed} [kN]	x [m]	M _{Rd} [kN/m]	V _{Ed} [kN]	V _{Rd,c} [kN]
Piso 0	Dir. x	0.50	0.50	0.048	0.452	12.56	24.99	0.003	182.80	611.80	215.38
	Dir. y	0.50	0.50	0.048	0.452	10.30	24.99	0.003	151.03	514.90	215.38

Anexo G. 47 -Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P20

				Zona crítica _ As adotado (cm²/m)					Zona corrente _ As adotado (cm²/m)			
P20		Ved [kN]	As [cm²/m]	C.Exteriores	As [cm²/m]	C.Interiores	As [cm²/m]	Vrd [kN]	C.Exteriores	As [cm²/m]	C. Interiores	As [cm²/m]
Piso 0	Dir. x	611.80	41.56	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	620.02	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06
	Dir. y	514.90	34.98	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06	620.02	Ø10//0.075 (2r)	21.06	Ø10//0.075 (2r)	21.06

Crítico

Anexo G. 48 - Armadura transversal do pilar P20

P21	Armadura (Sap 2000)	Armadura longitudinal [cm ²]	
Piso	As [cm ²]	Ø	As _{eff} [cm ²]
Piso 0	48.73	8Ø25+4Ø20	51.84

Anexo G. 49 -Armadura longitudinal do pilar P21

P21		b [m]	h [m]	d ₁ [m]	d [m]	A _{s1} = A _{s2} [cm ²]	N _{ed} [kN]	x [m]	M _{Rd} [kN/m]	V _{Ed} [kN]	V _{Rd,c} [kN]
Piso 0	Dir. x	0.50	0.40	0.05	0.35	19.64	185.21	0.023	243.10	70.92	152.41
	Dir. y	0.50	0.40	0.05	0.35	16.10	185.21	0.023	205.65	90.79	156.13

Anexo G. 50 - Posição da linha neutra, momento resistente e esforço transversal de dimensionamento no pilar P21

				Zona crítica _As adotado (cm²/m)					Zona corrente _As adotado (cm²/m)			
P21		Ved [kN]	As [cm²/m]	C.Exteriores	As [cm²/m]	C.Interiores	As [cm²/m]	Vrd [kN]	C.Exteriores	As [cm²/m]	C. Interiores	As [cm²/m]
Piso 0	Dir. _x	70.92	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	294.41	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00
	Dir. _y	90.79	0.00	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00	294.41	Ø8//0.10 (2r)	10.00	Ø8//0.10 (2r)	10.00
Crítico												

Anexo G. 51 -Armadura transversal do pilar P21

Anexo H - Características e disposições construtivas das paredes estruturais

Paredes	b_w [m]	l_w [m]	$0.15 \cdot l_w$	$1.50 \cdot b_w$	$l_{c,min}$	$l_{c,max}$	$l_{c,adoptado}$ [m]	l_{alma} [m]	Z [m]
Pb1	0.3	1.500	0.225	0.450	0.450	0.600	0.500	0.500	1.000
Pb2	0.2	3.190	0.4785	0.300	0.479	0.638	0.500	2.190	2.690
Pb4-a (NU1)	0.2	2.030	0.3045	0.300	0.305	0.406	0.400	1.230	1.630
Pb4-b (NU1)	0.2	2.030	0.3045	0.300	0.305	0.406	0.400	1.230	1.630
Pb5	0.2	3.200	0.48	0.300	0.480	0.640	0.600	2.000	2.600
Pb6-a (NU2)	0.2	1.770	0.2655	0.300	0.300	0.400	0.400	0.970	1.370
Pb6-b (NU2)	0.2	1.770	0.2655	0.300	0.300	0.400	0.400	0.970	1.370
Pb7	0.2	3.370	0.5055	0.300	0.506	0.674	0.600	2.170	2.770
Pb9 (NU1)	0.2	3.365	0.50475	0.300	0.505	0.673	0.600	2.165	2.765
Pb10 (NU2)	0.2	2.370	0.3555	0.300	0.356	0.474	0.450	1.470	1.920
Pb11	0.2	2.250	0.3375	0.300	0.338	0.450	0.400	1.450	1.850
Pb12	0.2	3.944	0.5916	0.300	0.592	0.789	0.700	2.544	3.244
Pb13	0.3	1.500	0.225	0.450	0.450	0.600	0.500	0.500	1.000
Pb14	0.3	1.500	0.225	0.450	0.450	0.600	0.500	0.500	1.000
Pb15	0.3	1.500	0.225	0.450	0.450	0.600	0.500	0.500	1.000

Anexo H. 1 - Características das paredes estruturais

Paredes	h_w [m]	l_w [m]	$h_w/6$ [m]	h_s [m]	$2l_w$ [m]	h_{cr} [m]
Pb1	17.940	1.500	2.990	2.680	3.000	2.990
Pb2	25.430	3.190	4.238	3.890	6.380	4.238
Pb4-a	25.430	2.030	4.238	3.890	4.060	4.060
Pb4-b	25.430	2.030	4.238	3.890	4.060	4.060
Pb5	25.430	3.200	4.238	3.890	6.400	4.238
Pb6-a	25.430	1.770	4.238	3.890	3.540	3.540
Pb6-b	25.430	1.770	4.238	3.890	3.540	3.540
Pb7	21.340	3.370	3.557	3.890	6.740	3.557
Pb9	25.430	3.365	4.238	3.890	6.730	4.238
Pb10	25.430	2.370	4.238	3.890	4.740	4.238
Pb11	25.430	2.250	4.238	3.890	4.500	4.238
Pb12	25.430	3.944	4.238	3.890	7.888	4.238
Pb13	17.940	1.500	2.990	2.680	3.000	2.990
Pb14	17.940	1.500	2.990	2.680	3.000	2.990
Pb15	22.530	1.500	3.755	3.890	3.000	3.000

Anexo H. 2 - Valores dos comprimentos críticos das paredes dúcteis

Paredes	$A_{s,v,min}$ [cm ² /m]	$A_{s,v,max}$ [cm ² /m]	$A_{s,v,adotado}$ [cm ² /m]	Ø
Pb1	6.00	120.00	10.540	Ø10//0.15
Pb2	4.00	80.00	10.540	Ø10//0.15
PbN4-a	4.00	80.00	10.540	Ø10//0.15
PbN4-b	4.00	80.00	10.540	Ø10//0.15
Pb5	4.00	80.00	10.540	Ø10//0.15
PbN6-a	4.00	80.00	10.540	Ø10//0.15
PbN6-b	4.00	80.00	10.540	Ø10//0.15
Pb7	4.00	80.00	10.540	Ø10//0.15
PbN9	4.00	80.00	10.540	Ø10//0.15
PbN10	4.00	80.00	10.540	Ø10//0.15
Pb11	4.00	80.00	10.540	Ø10//0.15
Pb12	4.00	80.00	10.540	Ø10//0.15
Pb13	6.00	120.00	10.540	Ø10//0.15
Pb14	6.00	120.00	10.540	Ø10//0.15
Pb15	6.00	120.00	10.540	Ø10//0.15

Anexo H. 3 - Armaduras regulamentares nas paredes estruturais e armadura adotada nas almas das paredes

Paredes	$A_{s,h,min}$ [cm ² /m]	Pormenorização	A_{seff} [cm ² /m]
Pb1	2.635	Ø8//0.20	5.00
Pb2	2.635	Ø8//0.20	5.00
PbN4-a	2.635	Ø8//0.20	5.00
PbN4-b	2.635	Ø8//0.20	5.00
Pb5	2.635	Ø8//0.20	5.00
PbN6-a	2.635	Ø8//0.20	5.00
PbN6-b	2.635	Ø8//0.20	5.00
Pb7	2.635	Ø8//0.20	5.00
PbN9	2.635	Ø8//0.20	5.00
PbN10	2.635	Ø8//0.20	5.00
Pb11	2.635	Ø8//0.20	5.00
Pb12	2.635	Ø8//0.20	5.00
Pb13	2.635	Ø8//0.20	5.00
Pb14	2.635	Ø8//0.20	5.00
Pb15	2.635	Ø8//0.20	5.00

Anexo H. 4 - Armaduras horizontal adotada nas almas das paredes

Anexo I - Armadura longitudinal e transversal nos pilares fictícios das paredes

Parede	Piso	Envolvente	Med _x [kNm]	Ned [kN]	Ft [kN]	Ft _{max} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb1	3	Máx	335.32	-251.07	209.78	209.783	6.03	6Ø16	12.06	0.80
		Min	-564.96	-1746.28	-308.18					
	2	Máx	629.40	-439.84	409.48	409.477	11.77	6Ø16	12.06	0.80
		Min	-589.99	-2157.55	-488.79					
	1	Máx	640.17	-761.43	259.46	259.455	7.46	6Ø16	12.06	0.80
		Min	-817.05	-2760.00	-562.95					
	Inter.	Máx	353.31	-826.95	-60.16	---	---	6Ø16	12.06	0.80
		Min	-358.46	-3246.21	-1264.65					
	0	Máx	974.91	-870.02	539.90	539.902	15.51	6Ø20	18.84	1.26
		Min	-877.99	-3415.74	-829.88					

Anexo I. 1 – Esforços, armadura longitudinal, taxa de armadura longitudinal nos pilares fictícios da parede Pb1

Parede	Piso	Ved _y , modelo [kN]	Ved _y , cálculo [kN]	z [m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,y} [kN]	
Pb1	3	145.79	218.69	1.32	4.75	Ø10//0.20 (4r)	15.8	727.44	Restante zona
	2	329.71	494.56	1.32	10.74	Ø10//0.20 (4r)	15.8	727.44	
	1	363.94	545.91	1.32	11.86	Ø10//0.20 (4r)	15.8	727.44	
	Inter.	176.41	264.61	1.32	5.75	Ø10//0.075 (4r)	42.12	1939.22	Zona crítica
	0	1175.66	1763.49	1.32	38.30	Ø10//0.075 (4r)	42.12	1939.22	

Anexo I. 2 - Armadura transversal nos pilares fictícios da parede Pb 1

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	f _{cd} [Mpa]	v	θ(°)	V _{Rd,max,y} [kN]
Pb1	1	0.3	1.5	1.47	1.323	20	0.528	45	2095.63

Anexo I. 3 - Esforço transversal resistente máximo na parede Pb1

Parede	Piso	Envolvente	Med _y [kNm]	Ned [kN]	Ft [kN]	Ft _{max} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb2	5	Máx	1401.63	-376.16	332.97	345.06	9.92	8Ø20	25.12	2.51
		Mín	-1884.74	-711.17	345.06					
	4	Máx	3300.60	-708.20	872.89	872.89	25.08	8Ø20	25.12	2.51
		Mín	-3510.44	-1162.95	723.52					
	3	Máx	3851.29	-1168.92	847.25	847.25	24.35	8Ø20	25.12	2.51
		Mín	-3939.41	-1578.49	675.22					
	2	Máx	2596.29	-1764.75	82.79	82.79	2.38	6Ø16	12.06	1.21
		Mín	-2642.33	-2052.92	-44.18					
	1	Máx	1910.91	-2310.83	-445.04	---	---	6Ø16	12.06	1.21
		Mín	-1855.14	-2738.53	-679.62					
	Inter	Máx	3005.74	-2691.51	-228.38	---	---	6Ø16	12.06	1.21
		Mín	-2809.21	-3427.18	-669.28					
	0	Máx	3795.40	-2695.33	63.27	63.27	1.82	6Ø16	12.06	1.21
		Mín	-3588.81	-3693.79	-512.76					
	-1	Máx	3779.12	-2721.54	44.11	44.11	1.27	6Ø12	6.78	0.68
		Mín	-3456.80	-3820.86	-625.37					
	-2	Máx	1151.16	-3134.73	-1139.42	---	---	6Ø12	6.78	0.68
		Mín	-981.05	-4158.60	-1714.60					
	-3	Máx	120.56	-3329.43	-1619.90	---	---	6Ø12	6.78	0.68
		Mín	-195.36	-4311.84	-2083.30					

Anexo I. 4 – Esforços, armadura longitudinal, taxa de armadura longitudinal nos pilares fictícios da parede Pb2

Parede	Piso	Ved _x , modelo [kN]	Ved _x , cálculo [kN]	z [m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb2	5	635.56	953.34	2.84	9.63	Ø10//0.15 (2r)	10.54	1043.16	Restante zona
	4	646.51	969.76	2.84	9.80	Ø10//0.15 (2r)	10.54	1043.16	
	3	627.77	941.66	2.84	9.51	Ø10//0.15 (2r)	10.54	1043.16	
	2	663.73	995.60	2.84	10.06	Ø10//0.15 (2r)	10.54	1043.16	
	1	693.93	1040.89	2.84	10.52	Ø10//0.15 (2r)	10.54	1043.16	
	Inter	829.92	1244.88	2.84	12.58	Ø10//0.10 (2r)	15.80	1563.74	Zona crítica
	0	1002.45	1503.68	2.84	15.19	Ø10//0.10 (2r)	15.80	1563.74	
	-1	512.17	768.26	2.84	7.76	Ø10//0.20 (2r)	7.90	781.87	Restante zona
	-2	333.51	500.27	2.84	5.05	Ø10//0.20 (2r)	7.90	781.87	
	-3	59.20	88.80	2.84	0.90	Ø10//0.20 (2r)	7.90	781.87	

Anexo I. 5 - Armadura transversal nos pilares fictícios da parede Pb2

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	f _{cd} [Mpa]	v	θ(°)	V _{Rd,max,x} [kN]
Pb2	1	0.2	3.19	3.16	2.844	20	0.528	45	3003.26

Anexo I. 6 - Esforço transversal resistente máximo na parede Pb2

Parede	Piso	Envolvente	Med _y [kNm]	Ned [kN]	Ft [kN]	Ft _{max} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb5	5	Máx	1439.69	-187.85	459.80	459.80	13.21	10Ø20	31.400	2.62
		Min	-1822.87	-1134.35	133.93					
	4	Máx	3325.13	-406.03	1075.88	1075.88	30.92	10Ø20	31.400	2.62
		Min	-3411.88	-1491.27	566.63					
	3	Máx	3949.61	-906.01	1066.08	1066.08	30.63	10Ø20	31.400	2.62
		Min	-4113.01	-1604.06	779.90					
		Máx	2775.89	-1480.85	327.23	327.23	9.40	10Ø20	31.400	2.62
		Min	-2859.13	-1850.31	174.51					
	1	Máx	2121.33	-1696.58	-32.39	---	---	12Ø20	37.68	3.14
		Min	-2025.23	-2619.88	-531.00					
	Inter	Máx	2848.11	-1733.14	228.86	228.86	6.58	12Ø20	37.68	3.14
		Min	-2631.12	-3397.99	-687.02					
	0	Máx	5283.17	-1707.00	1178.49	1178.49	33.86	12Ø20	37.68	3.14
		Min	-5007.61	-3970.81	-59.40					
	-1	Máx	3287.63	-1905.75	311.60	311.60	8.95	6Ø16	12.06	1.01
		Min	-3083.29	-4262.72	-945.48					
	-2	Máx	907.43	-2226.28	-764.13	---	---	6Ø16	12.06	1.01
		Min	-826.53	-4638.48	-2001.34					
	-3	Máx	160.14	-2599.10	-1237.95	---	---	6Ø16	12.06	1.01
		Min	-146.00	-4861.52	-2374.61					

Anexo I. 7 - Esforços, armadura longitudinal, taxa de armadura longitudinal nos pilares fictícios da parede Pb5

Parede	Piso	Ved _{x, modelo} [kN]	Ved _{x, cálculo} [kN]	z [m]	As,h [cm ² /m]	Ø	As,h _{ef} [cm ² /m]	V _{Rds,x} [kN]	
Pb5	5	596.86	895.29	2.85	9.02	Ø10//0.10 (2r)	15.80	1568.69352	Restante zona
	4	632.39	948.58	2.85	9.55	Ø10//0.10 (2r)	15.80	1568.69352	
	3	713.83	1070.74	2.85	10.78	Ø10//0.10 (2r)	15.80	1568.69	
	2	769.47	1154.21	2.85	11.63	Ø10//0.10 (2r)	15.80	1568.69	
	1	810.77	1216.16	2.85	12.25	Ø10//0.10 (2r)	15.80	1568.69	
	Inter	852.32	1278.48	2.85	12.88	Ø10//0.125 (4r)	25.28	2509.91	Zona crítica
	0	1452.21	2178.32	2.85	21.94	Ø10//0.125 (4r)	25.28	2509.91	
	-1	803.63	1205.45	2.85	12.14	Ø10//0.10 (2r)	15.80	1568.69	Restante zona
	-2	267.37	401.06	2.85	4.04	Ø10//0.10 (2r)	15.80	1568.69	
	-3	53.95	80.93	2.85	0.82	Ø10//0.10 (2r)	15.80	1568.69	

Anexo I. 8 - Armadura transversal nos pilares fictícios da parede Pb 5

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	f _{cd} [Mpa]	v	θ(°)	V _{Rd,max,x} [kN]
Pb5	1	0.2	3.2	3.17	2.853	20	0.528	45	3012.77

Anexo I. 9 - Esforço transversal resistente máximo na parede Pb5

Parede	Piso	Envolvente	Med _x [kNm]	Ned [kN]	Ft [kN]	Ft _{max} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb7	5	Máx	3930.422	-567.421	1135.21	1135.215	32.621	12Ø20	37.68	3.14
		Min	-3605.839	-1297.694	652.90					
	4	Máx	4742.183	-916.976	1253.49	1253.491	36.020	12Ø20	37.68	3.14
		Min	-4561.820	-1831.907	730.91					
	3	Máx	3442.321	-1299.436	593.00	592.997	17.040	12Ø20	37.68	3.14
		Min	-3493.245	-2487.431	17.38					
	2	Máx	3109.680	-1848.928	198.16	198.164	5.694	8Ø20	25.12	2.09
		Min	-2850.822	-3131.599	-536.62					
	1	Máx	3104.191	-2236.550	2.37	2.372	0.068	8Ø20	25.12	2.09
		Min	-2896.984	-3785.299	-846.81					
	0	Máx	5740.834	-2539.445	802.78	802.781	23.068	8Ø20	25.12	2.09
		Min	-4841.351	-4278.234	-391.34					

Anexo I. 10 - Esforços, armadura longitudinal, taxa de armadura longitudinal nos pilares fictícios da parede Pb7

Parede	Piso	Ved _y , modelo [kN]	Ved _y , cálculo [kN]	z [m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,y} [kN]	
Pb7	5	1129.64	1694.46	3.01	16.20	Ø10//0.15 (4r)	21.08	2205.15	Restante zona
	4	940.19	1410.28	3.01	13.48	Ø10//0.15 (4r)	21.08	2205.15	
	3	905.50	1358.25	3.01	12.98	Ø10//0.15 (4r)	21.08	2205.15	
	2	1095.60	1643.40	3.01	15.71	Ø10//0.15 (4r)	21.08	2205.15	
	1	729.40	1094.10	3.01	10.46	Ø10//0.15 (4r)	21.08	2205.15	
	0	1465.96	2198.94	3.01	21.02	Ø10//0.10 (4r)	31.60	3305.64	Zona crítica

Anexo I. 11 - Armadura transversal nos pilares fictícios da parede Pb 7

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	fcd [Mpa]	v	θ(°)	V _{Rd,max,x} [kN]
Pb7	1	0.2	3.37	3.34	3.006	20	0.528	45	3174.34

Anexo I. 12 - Esforço transversal resistente máximo na parede Pb7

Parede	Piso	Envolvente	Med _y [kNm]	Ned [kN]	Ft [kN]	F _{Smax} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb11	5	Máx	683.62	52.55	395.80	395.80	11.37	6Ø20	18.84	2.36
		Min	-883.20	-189.02	382.90					
	4	Máx	1108.00	-299.29	449.27	449.27	12.91	6Ø20	18.84	2.36
		Min	-1118.33	-830.48	189.26					
	3	Máx	1350.50	-682.18	388.91	388.91	11.18	6Ø20	18.84	2.36
		Min	-1373.26	-1193.01	145.80					
	2	Máx	960.92	-1197.79	-79.48	---	---	6Ø12	6.78	0.85
		Min	-990.50	-1522.73	-225.96					
	1	Máx	786.56	-1676.33	-412.99	---	---	6Ø12	6.78	0.85
		Min	-753.43	-2023.99	-604.74					
	Inter	Máx	1050.55	-1814.95	-339.61	---	---	6Ø12	6.78	0.85
		Min	-1110.79	-2694.80	-746.97					
	0	Máx	1648.82	-2396.63	-307.06	---	---	6Ø12	6.78	0.85
		Min	-1606.44	-3326.78	-795.04					
	-1	Máx	1542.93	-2861.60	-596.78	---	---	6Ø12	6.78	0.85
		Min	-1397.04	-3880.38	-1185.03					
	-2	Máx	250.83	-3227.51	-1478.17	---	---	6Ø12	6.78	0.85
		Min	-168.62	-4380.75	-2099.23					
	-3	Máx	2.46	-3697.44	-1847.39	---	---	6Ø12	6.78	0.85
		Min	-65.30	-6284.57	-3106.99					

Anexo I. 13 - Esforços, armadura longitudinal, taxa de armadura longitudinal nos pilares fictícios da parede Pb11

Parede	Piso	Ved _x , modelo [kN]	Ved _x , cálculo [kN]	z [m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb11	5	307.31	460.97	2.00	6.63	Ø10//0.10 (2r)	15.80	1098.58	Restante zona
	4	293.26	439.89	2.00	6.33	Ø10//0.10 (2r)	15.80	1098.58	
	3	243.32	364.98	2.00	5.25	Ø10//0.10 (2r)	15.80	1098.58	
	2	269.43	404.15	2.00	5.81	Ø10//0.10 (2r)	15.80	1098.58	
	1	314.45	471.68	2.00	6.78	Ø10//0.10 (2r)	15.80	1098.58	
	Inter	382.17	573.26	2.00	8.24	Ø10//0.10 (2r)	15.80	1098.58	Zona crítica
	0	274.76	412.14	2.00	5.93	Ø10//0.10 (2r)	15.80	1098.58	
	-1	483.11	724.67	2.00	10.42	Ø10//0.15 (2r)	10.54	732.85	Restante zona
	-2	75.07	112.61	2.00	1.62	Ø10//0.15 (2r)	10.54	732.85	
	-3	19.30	28.95	2.00	0.42	Ø10//0.15 (2r)	10.54	732.85	

Anexo I. 14 - Armadura transversal nos pilares fictícios da parede Pb11

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	f _{cd} [Mpa]	v	θ(°)	V _{Rd,max,x} [kN]
Pb11	1	0.2	2.25	2.22	1.998	20	0.528	45	2109.89

Anexo I. 15 - Esforço transversal resistente máximo na parede Pb11

Parede	Piso	Envolvente	Med _y [kNm]	Ned [kN]	Ft [kN]	Ft _{max} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb12	5	Máx	3187.917	-431.188	767.12	767.118	22.044	12Ø20	37.68	2.69
		Min	-3718.24	-1139.84	576.27					
	4	Máx	5126.62	-809.80	1175.44	1175.439	33.777	12Ø20	37.68	2.69
		Min	-5208.81	-1628.38	791.48					
	3	Máx	5571.93	-1113.02	1161.10	1161.100	33.365	12Ø20	37.68	2.69
		Min	-5884.12	-1934.05	846.82					
	2	Máx	4186.29	-1369.45	605.75	605.747	17.407	8Ø20	25.12	1.79
		Min	-4429.62	-2428.11	151.43					
	1	Máx	3261.45	-1492.17	259.29	259.295	7.451	8Ø20	25.12	1.79
		Min	-2944.09	-3228.67	-706.79					
	Inter	Máx	5444.15	-1442.30	957.07	957.072	27.502	12Ø20	37.68	2.69
		Min	-4990.47	-3972.64	-447.95					
	0	Máx	6311.26	-1482.08	1204.48	1204.481	34.612	12Ø20	37.68	2.69
		Min	-5902.17	-4713.86	-537.52					
	-1	Máx	5826.53	-1676.00	958.10	958.097	27.532	12Ø20	37.68	2.69
		Min	-5527.10	-5202.69	-897.55					
	-2	Máx	2292.87	-2105.12	-345.76	---	---	8Ø20	25.12	1.79
		Min	-2207.32	-5608.90	-2124.02					
	-3	Máx	540.93	-2458.90	-1062.70	---	---	8Ø20	25.12	1.79
		Min	-591.10	-5937.20	-2786.39					

Anexo I. 16 - Esforços, armadura longitudinal, taxa de armadura longitudinal nos pilares fictícios da parede Pb12

Parede	Piso	Ved _x , modelo [kN]	Ved _x , cálculo [kN]	z [m]	As _h [cm ² /m]	Ø	As _{hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb12	5	1241.49	1862.24	3.52	15.19	Ø10//0.10 (2r)	15.80	1936.87	Restante zona
	4	1018.73	1528.10	3.52	12.47	Ø10//0.10 (2r)	15.80	1936.87	
	3	786.10	1179.14	3.52	9.62	Ø10//0.10 (2r)	15.80	1936.87	
	2	1005.71	1508.56	3.52	12.31	Ø10//0.10 (2r)	15.80	1936.87	
	1	1069.23	1603.85	3.52	13.08	Ø10//0.10 (2r)	15.80	1936.87	
	Inter	1424.56	2136.85	3.52	17.43	Ø10//0.075 (2r)	21.06	2581.67	Zona crítica
	0	1120.93	1681.39	3.52	13.72	Ø10//0.075 (2r)	21.06	2581.67	
	-1	625.41	938.12	3.52	7.65	Ø10//0.20 (2r)	7.90	968.43	Restante zona
	-2	599.35	899.03	3.52	7.33	Ø10//0.20 (2r)	7.90	968.43	
	-3	177.71	266.57	3.52	2.17	Ø10//0.20 (2r)	7.90	968.43	

Anexo I. 17 - Armadura transversal nos pilares fictícios da parede Pb 12

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	fcd [Mpa]	v	θ(°)	V _{Rd,max,x} [kN]
Pb12	1	0.2	3.944	3.914	3.5226	20	0.528	45	3719.87

Anexo I. 18 - Esforço transversal resistente máximo na parede Pb12

Parede	Piso	Envolvente	Med _y [kNm]	Ned [kN]	Ft [kN]	Ft _{max} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb13	3	Máx	338.47	-320.85	178.04	178.044	5.116	6Ø20	18.84	1.26
		Min	-573.68	-1144.38	1.49					
	2	Máx	855.92	-431.00	640.42	640.420	18.403	6Ø20	18.84	1.26
		Min	-749.45	-1365.84	66.53					
	1	Máx	691.85	-472.18	455.76	455.760	13.097	6Ø20	18.84	1.26
		Min	-683.18	-1729.85	-181.74					
	Inter	Máx	414.75	-449.60	189.96	189.956	5.458	6Ø20	18.84	1.26
		Min	-451.45	-2101.44	-599.27					
	0	Máx	1032.58	-350.59	857.29	857.288	24.635	8Ø20	25.12	1.67
		Min	-1244.00	-2326.73	80.64					

Anexo I. 19 - Esforços, armadura longitudinal, taxa de armadura longitudinal nos pilares fictícios da parede Pb13

Parede	Piso	Ved _x , modelo [kN]	Ved _x , cálculo [kN]	z [m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb13	3	116.57	174.86	1.32	3.80	Ø10//0.10 (2r)	15.80	727.44	Restante zona
	2	272.15	408.23	1.32	8.87	Ø10//0.10 (2r)	15.80	727.44	
	1	354.11	531.16	1.32	11.54	Ø10//0.10 (2r)	15.80	727.44	
	Inter.	441.32	661.98	1.32	14.38	Ø10//0.075 (4r)	42.12	969.61	Zona crítica
	0	993.31	1489.97	1.32	32.36	Ø10//0.075 (4r)	42.12	1939.22	

Anexo I. 20 - Armadura transversal nos pilares fictícios da parede Pb 13

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	f _{cd} [Mpa]	v	θ(°)	V _{Rd,max,x} [kN]
Pb13	1	0.3	1.5	1.47	1.323	20	0.528	45	2095.63

Anexo I. 21 - Esforço transversal resistente máximo na parede Pb13

Parede	Piso	Envolvente	Med _y [kNm]	Ned [kN]	Ft [kN]	F _{tmax} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb14	3	Máx	442.23	-163.95	360.26	360.259	10.352	8Ø20	25.12	1.67
		Min	-429.82	-343.30	258.17					
	2	Máx	720.09	-74.50	682.84	682.840	19.622	8Ø20	25.12	1.67
		Min	-756.12	-892.43	309.91					
	1	Máx	581.29	-173.84	494.38	494.375	14.206	6Ø20	18.84	1.26
		Min	-568.14	-1522.91	-193.31					
	Inter	Máx	522.53	-59.74	492.66	492.663	14.157	6Ø20	18.84	1.26
		Min	-552.38	-1829.96	-362.60					
	0	Máx	1231.18	-398.37	1032.00	1031.999	29.655	10Ø20	31.40	2.09
		Min	-1653.07	-2639.91	333.12					

Anexo I. 22 - Esforços, armadura longitudinal, taxa de armadura longitudinal nos pilares fictícios da parede Pb14

Parede	Piso	Ved _x , modelo [kN]	Ved _x , cálculo [kN]	z [m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb14	3	96.97	145.46	1.323	3.16	Ø8//0.10 (2r)	10.00	460.40	Restante zona
	2	193.78	290.67	1.323	6.31	Ø8//0.10 (2r)	10.00	460.40	
	1	260.04	390.06	1.323	8.47	Ø8//0.10 (2r)	10.00	460.40	
	Inter.	221.40	332.10	1.323	7.21	Ø10//0.075 (4r)	42.12	1939.22	Zona crítica
	0	950.56	1425.84	1.323	30.97	Ø10//0.075 (4r)	42.12	1939.22	

Anexo I. 23 - Armadura transversal nos pilares fictícios da parede Pb 14

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	f _{cd} [Mpa]	v	θ(°)	V _{Rd,max,x} [kN]
Pb14	1	0.3	1.5	1.47	1.323	20	0.528	45	2095.63

Anexo I. 24 - Esforço transversal resistente máximo na parede Pb14

Parede	Piso	Envolvente	Med _y [kNm]	Ned [kN]	Ft [kN]	Ft _{max} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb15	4	Máx	914.48	-279.18	774.89	774.888	22.267	8Ø20	25.12	1.67
		Mín	-591.51	-1184.41	-0.70					
	3	Máx	803.09	-396.96	604.61	604.613	17.374	8Ø20	25.12	1.67
		Mín	-749.88	-1376.25	61.75					
	2	Máx	785.31	-708.73	430.95	430.949	12.384	8Ø20	25.12	1.67
		Mín	-697.69	-1451.31	-27.97					
	1	Máx	665.36	-1008.06	161.33	161.326	4.636	6Ø20	18.84	1.26
		Mín	-649.00	-1669.30	-185.65					
	Inter	Máx	779.35	-1007.79	275.46	275.455	7.915	6Ø20	18.84	1.26
		Mín	-795.39	-2225.99	-317.61					
	0	Máx	1102.97	-387.68	909.13	909.132	26.124	10Ø20	31.40	2.09
		Mín	-1251.69	-3220.67	-358.65					
	-1	Máx	1016.89	-648.23	692.78	692.775	19.907	10Ø20	31.40	2.09
		Mín	-717.33	-2959.61	-762.47					
	-2	Máx	119.15	-1059.01	-410.35	---	---	6Ø20	18.84	1.26
		Mín	-94.83	-2877.84	-1344.09					
	-3	Máx	73.18	-1333.91	-593.78	---	---	6Ø20	18.84	1.26
		Mín	-2.60	-3079.59	-1537.20					

Anexo I. 25 - Esforços, armadura longitudinal, taxa de armadura longitudinal nos pilares fictícios da parede Pb15

Parede	Piso	Ved _x , modelo [kN]	Ved _x , cálculo [kN]	z[m]	As _h [cm ² /m]	Ø	As _{hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb15	4	388.92	583.38	1.32	12.67	Ø10//0.10 (2r)	15.80	727.44	Restante zona
	3	224.08	336.12	1.32	7.30	Ø10//0.10 (2r)	15.80	727.44	
	2	276.24	414.36	1.32	9.00	Ø10//0.10 (2r)	15.80	727.44	
	1	344.70	517.05	1.32	11.23	Ø10//0.10 (2r)	15.80	727.44	
	Inter	424.91	637.37	1.32	13.84	Ø10//0.10 (2r)	15.80	727.44	
	0	424.91	637.37	1.32	13.84	Ø10//0.10 (2r)	15.80	727.44	Zona crítica
	-1	253.00	379.50	1.32	8.24	Ø8//0.10 (2r)	10.00	460.40	Restante zona
	-2	73.83	110.75	1.32	2.41	Ø8//0.10 (2r)	10.00	460.40	
	-3	22.35	33.53	1.32	0.73	Ø8//0.10 (2r)	10.00	460.40	

Anexo I. 26 - Armadura transversal nos pilares fictícios da parede Pb 15

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	fcd [Mpa]	v	θ(°)	V _{Rd,max,x} [kN]
Pb15	1	0.3	1.5	1.47	1.323	20	0.528	45	2095.63

Anexo I. 27 - Esforço transversal resistente máximo na parede Pb15

Anexo J - Pilares de extremidade das paredes que constituem os núcleos dos elevadores (NU)

Pilar fictício 1 [NU1]									
Parede	Piso	Med _y [kNm]	Ned [kN]	Ft [kN]	F _{tmax} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb4a	5	-1045.1647	-1374.691	-1328.55	---	---	6Ø16	12.06	1.51
	4	-863.2094	-3997.39	-2528.27	---	---	6Ø16	12.06	1.51
	3	-1723.5158	-3816.917	-2965.83	---	---	6Ø16	12.06	1.51
	2	-2028.2228	-2738.449	-2613.53	---	---	6Ø16	12.06	1.51
	1	-1817.6324	-2793.163	-2511.69	---	---	6Ø16	12.06	1.51
	Inter	-1700.5934	-5009.924	-3548.27	---	---	6Ø16	12.06	1.51
	0	-2133.3134	-6940.18	-4778.87	---	---	6Ø16	12.06	1.51
	-1	-1444.89	-6416.147	-4094.51	---	---	6Ø16	12.06	1.51
	-2	-446.99	-5150.84	-2849.65	---	---	6Ø16	12.06	1.51
	-3	-67.4	-4722.78	-2402.74	---	---	6Ø16	12.06	1.51

Anexo J. 1 - Armadura longitudinal do pilar fictício 1 da parede Pb4a do NU1

Parede	Piso	Ved _x , modelo [kN]	Ved _x , cálculo [kN]	z[m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb4a	5	365.11	547.67	1.8	8.74	Ø10//0.075 (2r)	21.06	1319.20	Restante zona
	4	323.02	484.53	1.8	7.74	Ø10//0.075 (2r)	21.06	1319.20	
	3	650.02	975.03	1.8	15.57	Ø10//0.075 (2r)	21.06	1319.20	
	2	743.66	1115.49	1.8	17.81	Ø10//0.075 (2r)	21.06	1319.20	
	1	835.54	1253.31	1.8	20.01	Ø10//0.075 (2r)	21.06	1319.20	
	Inter	863.29	1294.94	1.8	20.67	Ø10//0.075 (2r)	21.06	1319.20	Zona crítica
	0	551.62	827.43	1.8	13.21	Ø10//0.075 (2r)	21.06	1319.20	
	-1	600.84	901.26	1.8	14.39	Ø10//0.10 (2r)	15.80	989.71	Restante zona
	-2	259.40	389.10	1.8	6.21	Ø8//0.15 (2r)	6.66	417.18	
	-3	57.38	86.07	1.8	1.37	Ø8//0.15 (2r)	6.66	417.18	

Anexo J. 2 - Armadura transversal do pilar fictício 1 da parede Pb4a do NU1

Pilar fictício 4 [NU1]									
Parede	Piso	Med _y [kNm]	Ned [kN]	Ft [kN]	Ft _{max} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb4b	5	-1037.0732	-1293.253	-1282.87	---	---	6Ø16	12.06	1.51
	4	-943.6494	-4216.308	-2687.08	---	---	6Ø16	12.06	1.51
	3	-1464.1665	-4263.446	-3029.98	---	---	6Ø16	12.06	1.51
	2	-1745.9898	-3066.519	-2604.42	---	---	6Ø16	12.06	1.51
	1	-1662.3077	-2910.876	-2475.26	---	---	6Ø16	12.06	1.51
	Inter	-1648.9241	-5044.128	-3533.67	---	---	6Ø16	12.06	1.51
	0	-1404.1947	-7240.418	-4481.68	---	---	6Ø16	12.06	1.51
	-1	-1083.6	-6823.05	-4076.31	---	---	6Ø16	12.06	1.51
	-2	-440.93	-5446.96	-2993.99	---	---	6Ø16	12.06	1.51
	-3	-71.42	-4998.24	-2542.94	---	---	6Ø16	12.06	1.51

Anexo J. 3 - Armadura longitudinal do pilar fictício 4 da parede Pb4b do NU1

Parede	Piso	Ved _{x, modelo} [kN]	Ved _{x, cálculo} [kN]	z[m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb4b	5	362.83	544.25	1.8	8.69	Ø10//0.075 (2r)	21.06	1319.20	Restante zona
	4	434.89	652.34	1.8	10.41	Ø10//0.075 (2r)	21.06	1319.20	
	3	538.49	807.74	1.8	12.89	Ø10//0.075 (2r)	21.06	1319.20	
	2	723.74	1085.61	1.8	17.33	Ø10//0.075 (2r)	21.06	1319.20	
	1	818.65	1227.98	1.8	19.60	Ø10//0.075 (2r)	21.06	1319.20	
	Inter	850.45	1275.68	1.8	20.37	Ø10//0.075 (2r)	21.06	1319.20	Zona crítica
	0	446.014	669.02	1.8	10.68	Ø10//0.075 (2r)	21.06	1319.20	
	-1	442.18	663.27	1.8	10.59	Ø10//0.10 (2r)	15.80	989.71	Restante zona
	-2	255.42	383.13	1.8	6.12	Ø8//0.15 (2r)	6.66	417.18	
	-3	59.45	89.18	1.8	1.42	Ø8//0.15 (2r)	6.66	417.18	

Anexo J. 4 - Armadura transversal do pilar fictício 4 da parede Pb4b do NU1

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z[m]	f _{cd} [Mpa]	v	θ(°)	V _{Rd,max,y} [kN]
Pb4a=Pb4b	1	0.2	2.03	2	1.80	20	0.528	45	1900.80

Anexo J. 5 - Esforço transversal resistente máximo nas paredes Pb4a e Pb4b do NU1

Parede	Piso	Ved _y , modelo [kN]	Ved _y , cálculo [kN]	z [m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,y} [kN]	
Pb9	5	662.06	993.09	3.00	9.51	Ø10//0.125 (4r)	25.28	2640.55	Restante zona
	4	843.54	1265.31	3.00	12.11	Ø10//0.125 (4r)	25.28	2640.55	
	3	1008.52	1512.78	3.00	14.48	Ø10//0.125 (4r)	25.28	2640.55	
	2	912.33	1368.495	3.00	13.10	Ø10//0.125 (4r)	25.28	2640.55	
	1	1139.99	1709.985	3.00	16.37	Ø10//0.125 (4r)	25.28	2640.55	
	Inter	1718.7	2578.05	3.00	24.68	Ø8//0.075 (4r)	26.68	2786.78	Zona crítica
	0	1185.02	1777.53	3.00	17.02	Ø8//0.075 (4r)	26.68	2786.78	
	-1	668.3	1002.45	3.00	9.60	Ø10//0.15 (2r)	10.54	1100.93	Restante zona
	-2	349.91	524.865	3.00	5.02	Ø10//0.15 (2r)	10.54	1100.93	
	-3	126.03	189.045	3.00	1.81	Ø10//0.15 (2r)	10.54	1100.93	

Anexo J. 6 - Armadura transversal dos pilares fictícios 2 e 3 (Pilares comuns) da parede Pb9 do NU1

Parede	α_{cw}	b _w [m]	h _w [m]	d [m]	z [m]	fcd [Mpa]	v	$\theta(^{\circ})$	V _{Rd,max,y} [kN]
Pb9	1	0.2	3.37	3.34	3.00	20	0.528	45	3169.58

Anexo J. 7 - Esforço transversal resistente máximo na parede Pb9

Parede	Piso	Envolvente	Med _y [Pb4b] [kNm]	Ned [Pb4b] [kN]	Med _x [Pb9] [kNm]	Ned [Pb9] [kN]	F _s [kN]	F _{smax} [kN]	A _s [cm ²]	Ø	A _s [cm ²]	ρ_v [%]
Pilar fictício de canto do NU1 (Pf3)	5	Máx	831.20	330.65	7185.30	59.82	3303.832	3303.832	94.938	8Ø25+20Ø20	102.08	5.10
		Mín	-1037.07	-1293.25	-7598.83	-420.70	-4241.437					
	4	Máx	930.23	2036.23	2869.20	1457.89	3355.438	3355.438	96.421	8Ø25+20Ø20	102.08	5.10
		Mín	-943.65	-4216.31	-2970.53	-3360.99	-5441.903					
	3	Máx	1123.56	1596.32	3589.20	1235.63	3403.359	3403.359	97.798	8Ø25+20Ø20	102.08	5.10
		Mín	-1464.17	-4263.45	-4832.17	-4038.34	-6796.775					
	2	Máx	1608.09	677.09	6504.99	-423.79	3465.822	3465.822	99.593	8Ø25+20Ø20	102.08	5.10
		Mín	-1745.99	-3066.52	-6071.50	-3308.93	-6454.726					
	1	Máx	1756.77	-83.96	6596.31	-1376.66	2733.110	2733.110	78.538	8Ø25+20Ø20	102.08	5.10
		Mín	-1662.31	-2910.88	-6923.01	-3458.33	-6708.224					
	Inter	Máx	1025.89	1519.20	6397.72	-620.65	3392.473	3392.473	97.485	8Ø25+20Ø20	102.08	5.10
		Mín	-1648.92	-5044.13	-7101.00	-5108.07	-8655.884					
	0	Máx	1156.90	2359.20	3259.82	752.68	3444.653	3444.653	98.984	8Ø25+20Ø20	102.08	5.10
		Mín	-1278.93	-2147.89	-3356.89	-7244.41	-6694.835					
	-1	Máx	1125.34	2197.27	4940.18	-571.23	3290.095	3290.095	94.543	32Ø20	100.48	5.02
		Mín	-1083.60	-6823.05	-4934.75	-7028.64	-9375.350					
	-2	Máx	507.52	338.57	3154.44	-2872.28	185.354	185.354	5.326	32Ø20	100.48	5.02
		Mín	-440.93	-5446.96	-3015.41	-5878.49	-7023.797					
	-3	Máx	192.69	-735.40	1794.01	-3545.21	-1373.263	---	---	32Ø20	100.48	5.02
		Mín	-71.42	-4998.24	-1671.01	-5323.95	-5809.255					

Anexo J. 8 - Armadura longitudinal do pilar fictício 3 do NU1 (Interseção entre Pb9 e Pb4b)

Parede	Piso	Envolvente	Med _y [Pb4a] [kNm]	Ned [Pb4a] [kN]	Med _x [Pb9] [kNm]	Ned [Pb9] [kN]	F _s [KN]	F _{smax} [KN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pilar fictício de canto do NU1 (Pf2) (baixo)	5	Máx	837.34	763.51	7185.30	59.82	-2063.113	---	---	8Ø25+20Ø20	102.08	5.10
		Min	-1045.16	-1374.69	-7598.83	-420.70						
	4	Máx	943.28	3211.46	2869.20	1457.89	-570.395	---	---	8Ø25+20Ø20	102.08	5.10
		Min	-863.21	-3997.39	-2970.53	-3360.99						
	3	Máx	1565.98	2510.06	3589.20	1235.63	-1551.032	---	---	8Ø25+20Ø20	102.08	5.10
		Min	-1723.52	-3816.92	-4832.17	-4038.34						
	2	Máx	1849.00	654.95	6504.99	-423.79	-2388.477	---	---	8Ø25+20Ø20	102.08	5.10
		Min	-2028.22	-2738.45	-6071.50	-3308.93						
	1	Máx	1879.72	-74.95	6596.31	-1376.66	-3117.234	---	---	8Ø25+20Ø20	102.08	5.10
		Min	-1817.63	-2793.16	-6923.01	-3458.33						
	Inter	Máx	1900.01	1231.65	6397.72	-620.65	-3340.735	---	---	8Ø25+20Ø20	102.08	5.10
		Min	-1700.59	-5009.92	-7101.00	-5108.07						
	0	Máx	2551.58	2728.88	3259.82	752.68	-1906.446	---	---	8Ø25+20Ø20	102.08	5.10
		Min	-2133.31	-6940.18	-3356.89	-7244.41						
	-1	Máx	1497.13	1620.80	4940.18	-571.23	-3570.155	---	---	32Ø20	100.48	5.02
		Min	-1444.89	-6416.15	-4934.75	-7028.64						
	-2	Máx	513.15	111.49	3154.44	-2872.28	-3659.249	---	---	32Ø20	100.48	5.02
		Min	-446.99	-5150.84	-3015.41	-5878.49						
	-3	Máx	188.21	-864.41	1794.01	-3545.21	-3583.057	---	---	32Ø20	100.48	5.02
		Min	-67.40	-4722.78	-1671.01	-5323.95						

Anexo J. 9 - Armadura longitudinal do pilar fictício 2 do NU1 (Interseção entre Pb9 e Pb4a)

Pilar fictício 1 [NU2]									
Parede	Piso	Med _y [kNm]	Ned [kN]	F _t [KN]	F _{tmax} [KN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb6a	5	-4331.23	-294.75	-3308.86	---	---	6Ø16	12.06	1.51
	4	-1785.66	-1971.85	-2289.32	---	---	6Ø16	12.06	1.51
	3	-2736.77	-2607.22	-3301.25	---	---	6Ø16	12.06	1.51
	2	-3194.46	-2297.12	-3480.28	---	---	6Ø16	12.06	1.51
	1	-3674.00	-2040.56	-3702.03	---	---	6Ø16	12.06	1.51
	Inter	-4038.65	-2515.88	-4205.86	---	---	6Ø16	12.06	1.51
	0	-2322.58	-3627.38	-3509.00	---	---	6Ø16	12.06	1.51
	-1	-2580.74	-3218.57	-3493.04	---	---	6Ø16	12.06	1.51
	-2	-1411.97	-3014.93	-2538.10	---	---	6Ø16	12.06	1.51
	-3	-666.05	-3501.06	-2236.70	---	---	6Ø16	12.06	1.51

Anexo J. 10 - Armadura longitudinal do pilar fictício 1 da parede Pb6a do NU2

Parede	Piso	Ved _x , modelo [kN]	Ved _x , cálculo [kN]	z[m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb6a	5	313.79	470.69	1.57	8.64	Ø10//0.075 (2r)	21.06	1147.70	Restante zona
	4	270.05	405.08	1.57	7.43	Ø10//0.075 (2r)	21.06	1147.70	
	3	542.15	813.23	1.57	14.92	Ø10//0.075 (2r)	21.06	1147.70	
	2	671.69	1007.54	1.57	18.49	Ø10//0.075 (2r)	21.06	1147.70	
	1	722.05	1083.08	1.57	19.87	Ø10//0.075 (2r)	21.06	1147.70	
	Inter	923.29	1384.94	1.57	25.41	Ø10//0.075 (4r)	42.12	2295.41	
	0	937.55	1406.33	1.57	25.81	Ø10//0.075 (4r)	42.12	2295.41	Zona Crít.
	-1	284.33	426.50	1.57	7.83	Ø10//0.20 (2r)	7.90	430.52	Restante zona
	-2	142.60	213.90	1.57	3.93	Ø10//0.20 (2r)	7.90	430.52	
	-3	24.68	37.02	1.57	0.68	Ø10//0.20 (2r)	7.90	430.52	

Anexo J. 11 - Armadura transversal do pilar fictício 1 da parede Pb6a do NU2

Pilar fictício 4 [NU2]									
Parede	Piso	Med _y [kNm]	Ned [kN]	Ft [kN]	Ft _{max} [kN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pb6b	5	-815.23	-1149.51	-1169.81	---	---	6Ø16	12.06	1.51
	4	-785.46	-2845.17	-1995.91	---	---	6Ø16	12.06	1.51
	3	-873.94	-3349.82	-2312.82	---	---	6Ø16	12.06	1.51
	2	-1175.42	-2106.74	-1911.34	---	---	6Ø16	12.06	1.51
	1	-1461.51	-2390.13	-2261.86	---	---	6Ø16	12.06	1.51
	Inter	-1521.40	-4380.63	-3300.83	---	---	6Ø16	12.06	1.51
	0	-1120.76	-5934.64	-3785.40	---	---	6Ø16	12.06	1.51
	-1	-601.89	-4823.35	-2851.01	---	---	6Ø16	12.06	1.51
	-2	-289.71	-3701.00	-2061.96	---	---	6Ø16	12.06	1.51
	-3	-76.19	-3255.52	-1683.37	---	---	6Ø16	12.06	1.51

Anexo J. 12 - Armadura longitudinal do pilar fictício 4 da parede Pb6b do NU2

Parede	Piso	Ved _x , modelo [kN]	Ved _x , cálculo [kN]	z[m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,x} [kN]	
Pb6b	5	293.12	439.67	1.57	8.07	Ø10//0.075 (2r)	21.06	1147.70	Restante zona
	4	356.41	534.62	1.57	9.81	Ø10//0.075 (2r)	21.06	1147.70	
	3	495.98	743.97	1.57	13.65	Ø10//0.075 (2r)	21.06	1147.70	
	2	617.75	926.63	1.57	17.00	Ø10//0.075 (2r)	21.06	1147.70	
	1	693.01	1039.52	1.57	19.07	Ø10//0.075 (2r)	21.06	1147.70	
	Inter	795.81	1193.71	1.57	21.90	Ø10//0.075 (4r)	42.12	2295.41	
	0	895.81	1343.71	1.57	24.66	Ø10//0.075 (4r)	42.12	2295.41	Zona Crít.
	-1	267.14	400.71	1.57	7.35	Ø10//0.20 (2r)	7.90	430.52	Restante zona
	-2	142.66	213.99	1.57	3.93	Ø10//0.20 (2r)	7.90	430.52	
	-3	30.08	45.12	1.57	0.83	Ø10//0.20 (2r)	7.90	430.52	

Anexo J. 13 - Armadura transversal do pilar fictício 4 da parede Pb6b do NU2

Parede	α _{cw}	b _w [m]	h _w [m]	d [m]	z [m]	f _{cd} [Mpa]	v	θ(°)	V _{Rd,max,y} [kN]
Pb6a=Pb6b	1	0.2	1.77	1.74	1.57	20	0.528	45	1653.70

Anexo J. 14 - Esforço transversal resistente máximo nas paredes Pb6a e Pb6b

Parede	Piso	Ved _y , modelo [kN]	Ved _y , cálculo [kN]	z [m]	A _{s,h} [cm ² /m]	Ø	A _{s,hef} [cm ² /m]	V _{Rds,y} [kN]	
Pb10	5	531.14	796.71	2.106	10.87	Ø10//0.125 (4r)	25.28	1852.74	Restante zona
	4	700.88	1051.32	2.106	14.34	Ø10//0.125 (4r)	25.28	1852.74	
	3	922.67	1384.01	2.106	18.88	Ø10//0.125 (4r)	25.28	1852.74	
	2	974.25	1461.38	2.106	19.94	Ø10//0.125 (4r)	25.28	1852.74	
	1	1025.30	1537.95	2.106	20.98	Ø10//0.125 (4r)	25.28	1852.74	
	Inter	1176.16	1764.24	2.106	24.07	Ø10//0.10 (4r)	31.60	2315.93	Zona crítica
	0	1277.55	1916.33	2.106	26.15	Ø10//0.10 (4r)	31.60	2315.93	
	-1	1197.19	1795.79	2.106	24.50	Ø10//0.10 (4r)	31.60	2315.93	Restante zona
	-2	706.50	1059.75	2.106	14.46	Ø10//0.10 (2r)	15.80	1157.96	
	-3	236.25	354.38	2.106	4.84	Ø10//0.15 (2r)	10.54	772.46	

Anexo J. 15 - Armadura transversal dos pilares fictícios 2 e 3 (Pilares comuns) da parede Pb10 do NU1

Parede	α_{cw}	b _w [m]	h _w [m]	d [m]	z [m]	f _{cd} [Mpa]	v	θ(°)	V _{Rd,max,y} [kN]
Pb10	1	0.2	2.37	2.34	2.11	20	0.528	45	2223.94

Anexo J. 16 - Esforço transversal resistente máximo na parede Pb10

Parede	Piso	Envolvente	Med _y [Pb6b] [kNm]	Ned [Pb6b] [kN]	Med _x [Pb10] [kNm]	Ned [Pb10] [kN]	F _s [kN]	F _{smax} [kN]	A _s [cm ²]	Ø	A _s [cm ²]	ρ _v [%]
Pilar fictício de canto do NU2 (Pf3)	5	Máx	366.05	880.89	4083.05	-40.79	2813.830	2813.830	80.857	12Ø25+10Ø20	90.32	4.52
		Min	-815.23	-1149.51	-4331.23	-294.75	-3573.037					
	4	Máx	605.20	2070.00	1789.10	902.10	2859.628	2859.628	82.173	12Ø25+10Ø20	90.32	4.52
		Min	-785.46	-2845.17	-1785.66	-1971.85	-3911.865					
	3	Máx	795.30	1376.80	2531.25	901.70	3038.121	3038.121	87.302	12Ø25+10Ø20	90.32	4.52
		Min	-873.94	-3349.82	-2736.77	-2607.22	-5041.832					
	2	Máx	1446.04	484.42	3320.51	-57.86	2998.221	2998.221	86.156	12Ø25+10Ø20	90.32	4.52
		Min	-1175.42	-2106.74	-3194.46	-2297.12	-4723.680					
	1	Máx	1428.93	-183.80	3588.90	-1039.73	2300.468	2300.468	66.105	12Ø25+10Ø20	90.32	4.52
		Min	-1461.51	-2390.13	-3674.00	-2040.56	-5195.682					
	Inter	Máx	1249.82	1325.97	3810.41	-1085.29	3017.204	3017.204	86.701	12Ø25+10Ø20	90.32	4.52
		Min	-1521.40	-4380.63	-4038.65	-2515.88	-6662.232					
	0	Máx	1041.97	2296.30	2110.96	-416.53	2799.905	2799.905	80.457	12Ø25+10Ø20	90.32	4.52
		Min	-1120.76	-5934.64	-2322.58	-3627.38	-6808.759					
	-1	Máx	707.56	1051.02	2638.80	-1381.43	1725.638	1725.638	49.587	16Ø20	50.24	2.51
		Min	-601.89	-4823.35	-2580.74	-3218.57	-5804.436					
	-2	Máx	303.13	-210.49	1512.22	-2146.30	-169.518	---	---	16Ø20	50.24	2.51
		Min	-289.71	-3701.00	-1411.97	-3014.93	-4304.829					
	-3	Máx	80.88	-914.82	758.78	-1965.20	-985.776	---	---	16Ø20	50.24	2.51
		Min	-76.19	-3255.52	-666.05	-3501.06	-3780.804					

Anexo J. 17 - Armadura longitudinal do pilar fictício 3 do NU2 (Interseção entre Pb10 e Pb6b)

Parede	Piso	Envolvente	Med _y [Pb6a] [kNm]	Ned [Pb6a] [kN]	Med _x [kNm]	Ned [kN]	F _s [KN]	F _{smax} [KN]	As [cm ²]	Ø	As [cm ²]	ρ _v [%]
Pilar fictício de canto do NU2 (Pf2)	5	Máx	375.05	885.92	4083.05	-40.79	-1686.502	---	---	12Ø25+10Ø20	90.32	4.52
		Mín	-827.70	-1086.77	-4331.23	-294.75						
	4	Máx	360.80	2277.02	1789.10	902.10	-514.086	---	---	12Ø25+10Ø20	90.32	4.52
		Mín	-727.73	-3251.90	-1785.66	-1971.85						
	3	Máx	1343.79	1814.96	2531.25	901.70	-840.659	---	---	12Ø25+10Ø20	90.32	4.52
		Mín	-1006.00	-2786.68	-2736.77	-2607.22						
	2	Máx	1574.97	403.85	3320.51	-57.86	-1460.801	---	---	12Ø25+10Ø20	90.32	4.52
		Mín	-1273.77	-1933.52	-3194.46	-2297.12						
	1	Máx	1497.88	-123.16	3588.90	-1039.73	-1902.055	---	---	12Ø25+10Ø20	90.32	4.52
		Mín	-1513.33	-2368.38	-3674.00	-2040.56						
	Inter	Máx	1317.28	1335.48	3810.41	-1085.29	-1732.142	---	---	12Ø25+10Ø20	90.32	4.52
		Mín	-1564.75	-4420.14	-4038.65	-2515.88						
	0	Máx	1343.54	2157.83	2110.96	-416.53	-963.763	---	---	12Ø25+10Ø20	90.32	4.52
		Mín	-1359.26	-6096.35	-2322.58	-3627.38						
	-1	Máx	732.48	1677.45	2638.80	-1381.43	-1580.040	---	---	16Ø20	50.24	2.51
		Mín	-626.95	-5566.01	-2580.74	-3218.57						
	-2	Máx	303.03	194.59	1512.22	-2146.30	-1924.378	---	---	16Ø20	50.24	2.51
		Mín	-289.40	-4063.91	-1411.97	-3014.93						
	-3	Máx	75.13	-531.48	758.78	-1965.20	-2308.330	---	---	16Ø20	50.24	2.51
		Mín	-77.47	-3452.12	-666.05	-3501.06						

Anexo J. 18 - Armadura longitudinal do pilar fictício 3 do NU2 (Interseção entre Pb10 e Pb6a)

Anexo K – Vigas de escadas, vigas e lajes das rampas de acesso ao estacionamento, pilares e paredes nas caves

Vigas	b [m]	h [m]	d[m]	z[m]
Vigas de escadas	0.20	0.40	0.36	0.324

Anexo K. 1 – Características das vigas de escadas

Vigas Escadas	$h_w = l_{cr}$ [m]	d_{bw} [mm]	225 [mm]	d_{bL} [mm]	$s_{t,max}$ [m]	
					Zona corrente	Zona crítica
VE.1=VE.2	0.40	8	225	12	0.264	0.100

Anexo K. 2 - Comprimento crítico e espaçamento máximo da armadura transversal nas vigas de escadas

Viga	Secção	M_{ed} [KN.m]	μ	ω	A_s [cm ²]	$\emptyset$	A_s [cm ²]	A_{smin} [cm ²]
VE.1=VE.2	Superior	0.00	0.00	0.00	0.00	2Ø12	2.26	1.36
	Inferior	19.30	0.04	0.04	1.37	2Ø12	2.26	1.36

Anexo K. 3 - Esforços utilizados para determinar as armaduras de flexão nas vigas de escadas, resultante da aplicação das cargas nos patins numa viga simplesmente apoiada (modelo simplificado)

	V_{Ed} [KN]	A_s [cm ² /m]	$\emptyset$	$A_{s,eff}$ [cm ² /m]	V_{Rd} [KN]
Zona crítica	22.05	1.96	Ø8//0.10 (2r)	10.0	112.75
Zona corrente	17.01	1.51	Ø8//0.25 (2r)	4.0	45.10

Anexo K. 4 - Armadura transversal adotada nas vigas de escadas

Vigas	Largura [m]	Altura [m]	Comprimento [m]
VR.1	0.20	0.65	3.69
VR.2	0.20	0.65	7.71
VR.3	0.20	0.65	7.43
VR.4	0.20	0.65	3.47
VR.5	0.20	0.65	4.01
VR.6	0.20	0.65	3.69
VR.7	0.20	0.65	7.71
VR.8	0.20	0.65	7.43
VR.9	0.20	0.65	3.47
VR.10	0.20	0.65	4.01
VR.11	0.20	0.65	3.69
VR.12	0.20	0.65	7.71
VR.13	0.20	0.65	7.43
VR.14	0.20	0.65	3.47
VR.15	0.20	0.65	4.01

Anexo K. 5 - Características das vigas das rampas de acesso ao estacionamento

Vigas Piso	h_w [m]	d [m]	$S_{t,max}$ [m]
VR.1	0.65	0.60	0.4515
VR.2	0.65	0.60	0.4515
VR.3	0.65	0.60	0.4515
VR.4	0.65	0.60	0.4515
VR.5	0.65	0.60	0.4515
VR.6	0.65	0.60	0.4515
VR.7	0.65	0.60	0.4515
VR.8	0.65	0.60	0.4515
VR.9	0.65	0.60	0.4515
VR.10	0.65	0.60	0.4515
VR.11	0.65	0.60	0.4515
VR.12	0.65	0.60	0.4515
VR.13	0.65	0.60	0.4515
VR.14	0.65	0.60	0.4515
VR.15	0.65	0.60	0.4515

Anexo K. 6 - Espaçamento máximo da armadura transversal

Piso -3 ao piso 0			Armadura (Sap 2000) [cm²]			Armadura longitudinal adotada [cm²]					
Viga	Troço (início-fim)	Face	AS _{início}	AS _{meio Vão}	AS _{Final}	Início		Meio vão		Fim	
						Ø	As[cm²]	Ø	As[cm²]	Ø	As[cm²]
VR.1	P16-10	Superior	2.34	0.00	2.34	3Ø12	3.39	2Ø12	2.26	3Ø12	3.39
		Inferior	0.00	2.34	0.00	2Ø12	2.26	3Ø12	3.39	2Ø12	2.26
VR.2	P10-P6	Superior	7.75	0.00	7.00	4Ø16	8.04	2Ø16	4.02	4Ø16	8.04
		Inferior	0.00	3.66	0.00	2Ø12	2.26	4Ø12	4.52	2Ø12	2.26
VR.3	P6-P10	Superior	3.30	2.34	2.34	4Ø16	8.04	4Ø16	8.04	4Ø16	8.04
		Inferior	2.34	2.34	2.34	3Ø16	6.03	4Ø16	8.04	3Ø16	6.03
VR.4	P10-P16	Superior	2.34	2.34	2.34	3Ø12	3.39	3Ø12	3.39	3Ø12	3.39
		Inferior	2.34	2.34	2.34	3Ø12	3.39	3Ø12	3.39	3Ø12	3.39
VR.5	P16-P19	Superior	2.34	2.34	2.34	4Ø16	8.04	2Ø16	4.02	3Ø16	6.03
		Inferior	2.34	2.34	2.34	3Ø16	6.03	2Ø16	4.02	4Ø16	8.04
VR.6	P16-10	Superior	2.34	0.00	2.51	3Ø12	3.39	2Ø12	2.26	3Ø12	3.39
		Inferior	0.00	2.34	0.00	2Ø12	2.26	3Ø12	3.39	2Ø12	2.26
VR.7	P10-P6	Superior	7.09	0.00	7.34	4Ø16	8.04	2Ø16	4.02	4Ø16	8.04
		Inferior	0.00	3.64	0.00	2Ø12	2.26	4Ø12	4.52	2Ø12	2.26
VR.8	P6-P10	Superior	5.15	2.34	5.21	4Ø16	8.04	4Ø16	8.04	4Ø16	8.04
		Inferior	2.34	2.94	2.34	3Ø16	6.03	4Ø16	8.04	3Ø16	6.03
VR.9	P10-P16	Superior	2.34	2.34	2.34	3Ø12	3.39	3Ø12	3.39	3Ø12	3.39
		Inferior	2.34	2.34	2.34	3Ø12	3.39	3Ø12	3.39	3Ø12	3.39
VR.10	P16-P19	Superior	3.75	2.34	2.79	4Ø16	8.04	2Ø16	4.02	3Ø16	6.03
		Inferior	2.34	2.34	3.04	3Ø16	6.03	2Ø16	4.02	4Ø16	8.04
VR.11	P16-10	Superior	2.34	0.00	3.30	3Ø12	3.39	2Ø12	2.26	3Ø12	3.39
		Inferior	2.34	2.34	2.34	3Ø12	3.39	3Ø12	3.39	3Ø12	3.39
VR.12	P10-P6	Superior	7.62	0.00	6.60	4Ø16	8.04	2Ø16	4.02	4Ø16	8.04
		Inferior	0.00	3.92	0.00	2Ø12	2.26	4Ø12	4.52	2Ø12	2.26
VR.13	P6-P10	Superior	7.85	6.06	6.93	4Ø16	8.04	4Ø16	8.04	4Ø16	8.04
		Inferior	4.42	8.00	5.80	3Ø16	6.03	4Ø16	8.04	3Ø16	6.03
VR.14	P10-P16	Superior	2.34	2.34	2.34	3Ø12	3.39	3Ø12	3.39	3Ø12	3.39
		Inferior	2.34	2.34	2.34	3Ø12	3.39	3Ø12	3.39	3Ø12	3.39
VR.15	P16-P19	Superior	7.99	2.34	4.53	4Ø16	8.04	2Ø16	4.02	3Ø16	6.03
		Inferior	5.35	2.34	6.38	3Ø16	6.03	2Ø16	4.02	4Ø16	8.04

Anexo K. 7 - Armadura longitudinal nas vigas das rampas de acesso ao estacionamento

Piso -3 ao piso 0	Sap 2000	Armadura adotada	
Viga	As [cm ² /m]	Ø	As [cm ² /m]
VR.1	2.20	Ø8//0.25 (2r)	4.00
VR.2	6.20	Ø8//0.15 (2r)	6.66
VR.3	3.10	Ø8//0.25 (2r)	4.00
VR.4	2.22	Ø8//0.25 (2r)	4.00
VR.5	2.22	Ø8//0.25 (2r)	4.00
VR.6	3.33	Ø8//0.25 (2r)	4.00
VR.7	6.10	Ø8//0.15 (2r)	6.66
VR.8	10.00	Ø10//0.15 (2r)	10.54
VR.9	2.40	Ø8//0.25 (2r)	4.00
VR.10	3.60	Ø8//0.25 (2r)	4.00
VR.11	3.20	Ø8//0.25 (2r)	4.00
VR.12	6.30	Ø8//0.15 (2r)	6.66
VR.13	6.50	Ø8//0.15 (2r)	6.66
VR.14	5.10	Ø8//0.15 (2r)	6.66
VR.15	6.00	Ø8//0.15 (2r)	6.66

Anexo K. 8 - Armadura longitudinal nas vigas das rampas de acesso ao estacionamento

SC [KN/m ²]	RCP [KN/m ²]	Espessura [m]	P _P [KN/m ²]	P _{sd} [KN/m ²]	vão [m]	M _{máx} [KNm/m]
2.50	1.00	0.25	6.25	13.538	5.00	42.30

Anexo K. 9 – Cargas e esforços utilizados no cálculo das armaduras das lajes das rampas de acesso ao estacionamento

M _{Ed} [KN.m/m]	μ	ω	As [cm ² /m]	As _{min} [cm ² /m]	As adotado [cm ² /m]	Ø	As,d [cm ² /m]	Ø	As,d _{eff} [cm ² /m]
42.30	0.081	0.085	6.882	4.15	7.85	Ø10//0.10	1.57	Ø8//0.20	2.50

Anexo K. 10 – Armaduras adotadas nas lajes das rampas de acesso ao estacionamento

P6	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [KN]	V _{Rd,c} ^{min} [KN]
Piso -3	3.20	4Ø16+6Ø12	14.82	0.00	6Ø//0.20	6Ø//0.20	5.60	3.22	138.89
Piso -2	6.26	4Ø16+6Ø12	14.82	0.00	6Ø//0.20	6Ø//0.20	5.60	23.14	129.44
Piso -1	14.73	4Ø16+6Ø12	14.82	3.70	6Ø//0.20	6Ø//0.20	5.60	87.24	86.43

P7	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [KN]	V _{Rd,c} ^{min} [KN]
Piso -3	19.12	10Ø16	20.10	0.00	6Ø//0.30	6Ø//0.30	3.72	16.37	362.65
Piso -2	17.25	10Ø16	20.10	0.00	6Ø//0.30	6Ø//0.30	3.72	42.78	362.65
Piso -1	15.60	10Ø16	20.10	0.00	6Ø//0.30	6Ø//0.30	3.72	99.65	362.65

P8	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [KN]	V _{Rd,c} ^{min} [KN]
Piso -3	10.98	4Ø16+4Ø12	12.56	0.00	6Ø//0.30	6Ø//0.30	3.72	18.84	327.45
Piso -2	9.93	4Ø16+4Ø12	12.56	0.00	6Ø//0.30	6Ø//0.30	3.72	52.64	327.45
Piso -1	8.99	4Ø16+4Ø12	12.56	0.00	6Ø//0.30	6Ø//0.30	3.72	271.65	327.45

P10	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [KN]	V _{Rd,c} ^{min} [KN]
Piso -3	3.20	4Ø20+6Ø16	24.62	0.00	8Ø//0.20	8Ø//0.20	10.00	0.60	61.33
Piso -2	3.20	4Ø20+6Ø16	24.62	0.00	8Ø//0.20	8Ø//0.20	10.00	32.64	112.27
Piso -1	21.68	4Ø20+6Ø16	24.62	4.80	8Ø//0.20	8Ø//0.20	10.00	112.31	102.13

P11	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [KN]	V _{Rd,c} ^{min} [KN]
Piso -3	14.14	8Ø16	16.08	0.00	6Ø//0.30	6Ø//0.30	3.72	38.51	362.65
Piso -2	12.30	8Ø16	16.08	0.00	6Ø//0.30	6Ø//0.30	3.72	116.23	362.65
Piso -1	10.58	8Ø16	16.08	0.00	6Ø//0.30	6Ø//0.30	3.72	153.05	362.65

Anexo K. 11 - Pilares caves (P6 a P11)

P12	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [kN]	V _{Rd,c} ^{min} [kN]
Piso -3	13.36	8Ø16	16.08	0.00	6Ø//0.30	6Ø//0.30	3.72	19.42	362.65
Piso -2	11.69	8Ø16	16.08	0.00	6Ø//0.30	6Ø//0.30	3.72	62.81	362.65
Piso -1	9.97	8Ø16	16.08	0.00	6Ø//0.30	6Ø//0.30	3.72	101.88	362.65

P13	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [kN]	V _{Rd,c} ^{min} [kN]
Piso -3	13.94	8Ø16	16.08	0.00	6Ø//0.30	6Ø//0.30	3.72	22.61	362.65
Piso -2	11.88	8Ø16	16.08	0.00	6Ø//0.30	6Ø//0.30	3.72	63.24	362.65
Piso -1	9.79	8Ø16	16.08	0.00	6Ø//0.30	6Ø//0.30	3.72	72.10	362.65

P14	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [kN]	V _{Rd,c} ^{min} [kN]
Piso -3	13.86	16Ø12	18.08	0	6Ø//0.30	6Ø//0.30	3.72	25.33	322.65
Piso -2	12.06	16Ø12	18.08	0	6Ø//0.30	6Ø//0.30	3.72	68.06	322.65
Piso -1	10.34	16Ø12	18.08	0	6Ø//0.30	6Ø//0.30	3.72	69.64	322.65

P15	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [kN]	V _{Rd,c} [kN]
Piso -3	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	11.25	362.65
Piso -2	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	29.76	363.65
Piso -1	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	69.52	364.65

P16	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [kN]	V _{Rd,c} [kN]
Piso -3	3.20	10Ø12	11.30	0.00	6Ø//0.20	6Ø//0.20	5.60	6.38	138.89
Piso -2	3.20	10Ø12	11.30	0.00	6Ø//0.20	6Ø//0.20	5.60	5.28	132.49
Piso -1	6.33	10Ø12	11.30	0.00	6Ø//0.20	6Ø//0.20	5.60	38.28	116.25

Anexo K. 12 - Pilares caves (P12 a P16)

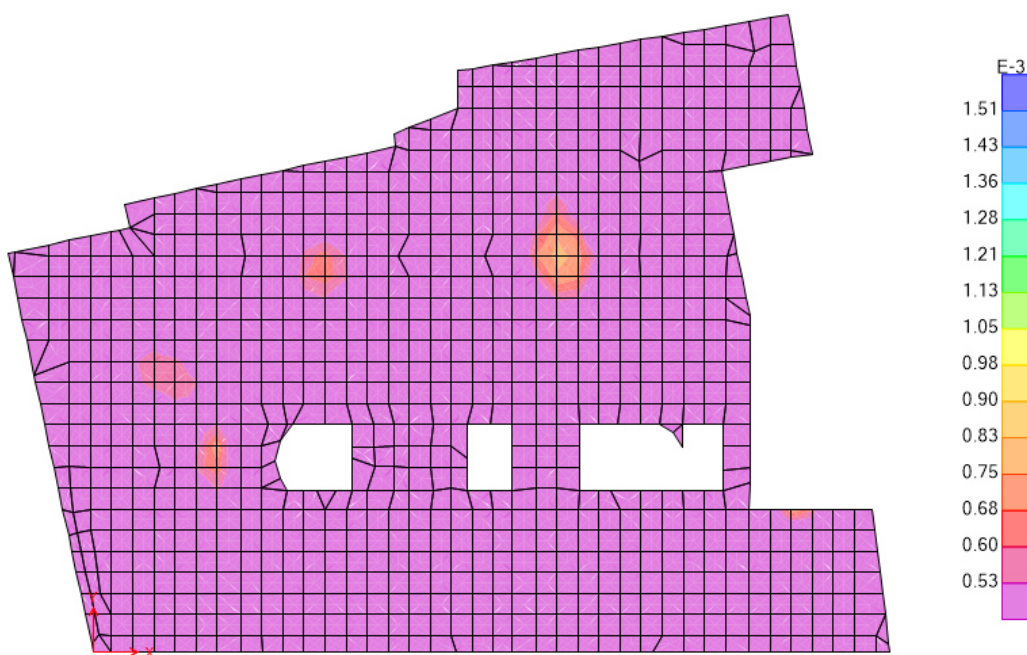
P18	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [KN]	V _{Rd,c} [KN]
Piso -3	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	9.02	330.89
Piso -2	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	36.70	2.74
Piso -1	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	44.95	217.86

P19	Armadura (Sap 2000)	Armadura longitudinal[cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As[cm ²]	Ø	As _{eff} [cm ²]	As[cm ² /m]	C.Exteriores	C. Interiores	As[cm ² /m]	V _{Ed} ^{máx} [KN]	V _{Rd,c} [KN]
Piso -3	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	5.53	270.25
Piso -2	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	11.51	243.63
Piso -1	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	14.60	215.33

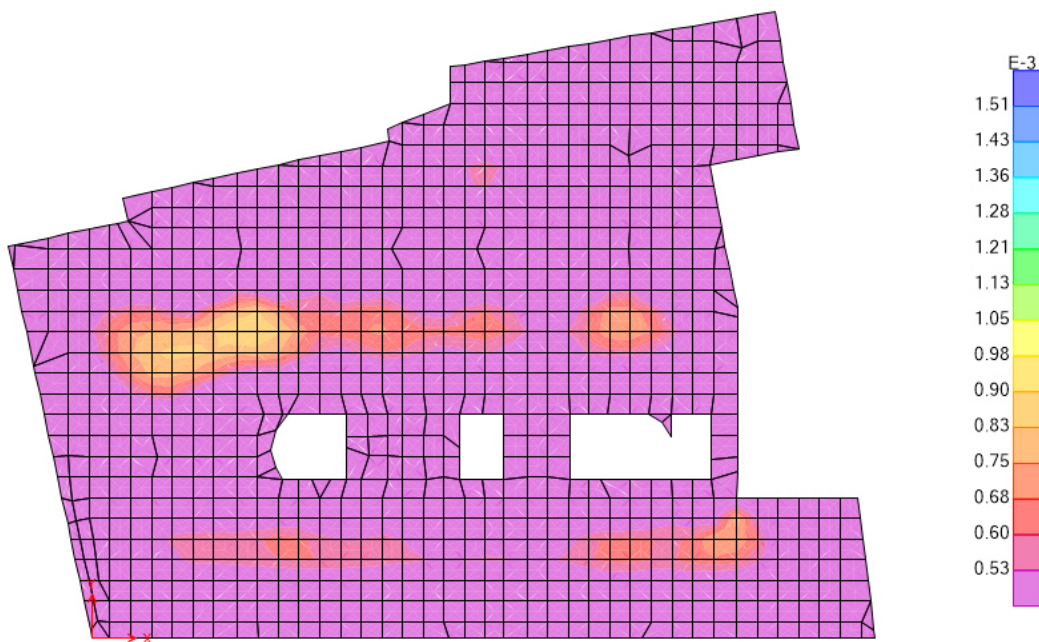
P21	Armadura (Sap 2000)	Armadura longitudinal [cm ²]		Armadura (Sap 2000)	Armadura transversal [cm ² /m]				
Piso	As [cm ²]	Ø	As _{eff} [cm ²]	As [cm ² /m]	C.Exteriores	C. Interiores	As [cm ² /m]	V _{Ed} ^{máx} [KN]	V _{Rd,c} [KN]
Piso -3	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	8.12	191.88
Piso -2	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	17.51	176.65
Piso -1	7.70	7Ø12	7.91	0.00	6Ø//0.20	6Ø//0.20	5.60	19.50	165.16

Anexo K. 13 - Pilares caves (P18 a P21)

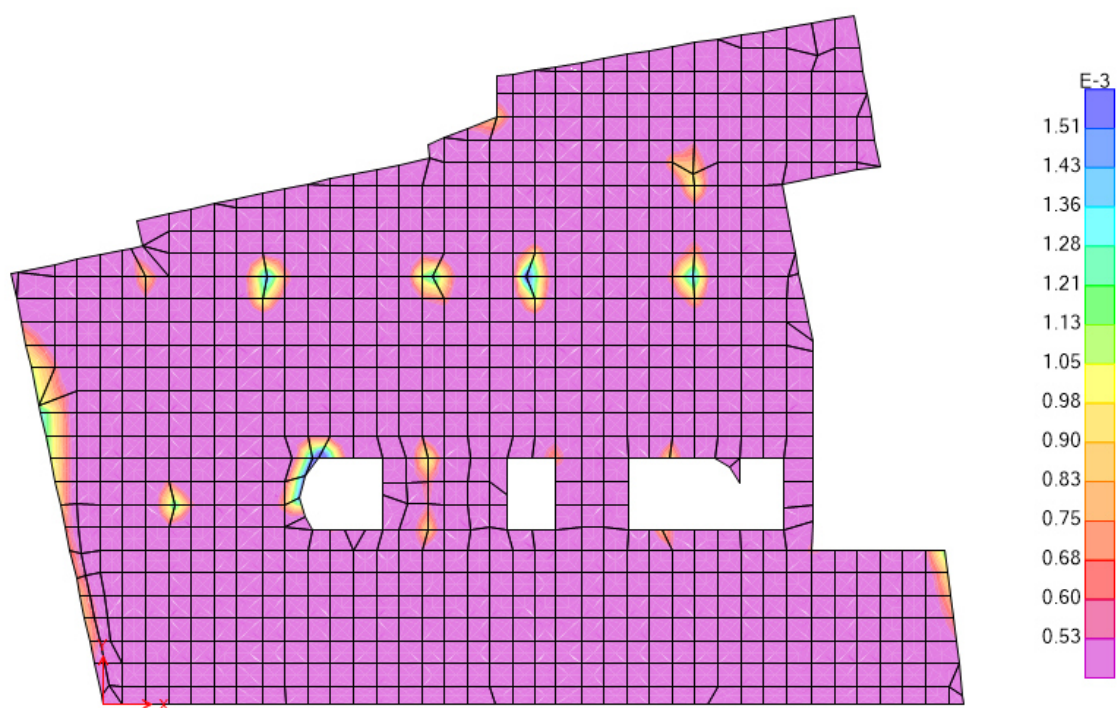
Anexo L – Armaduras de lajes



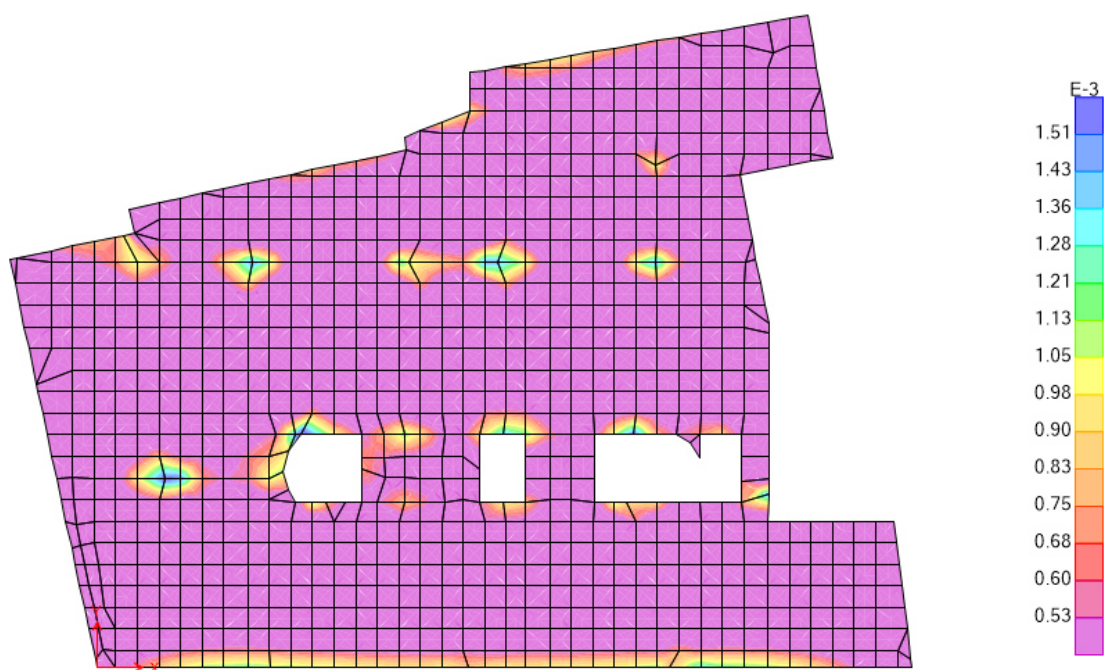
Anexo L. 1 - Área de armadura inferior na laje do piso -2 segundo a direção x em m^2/m



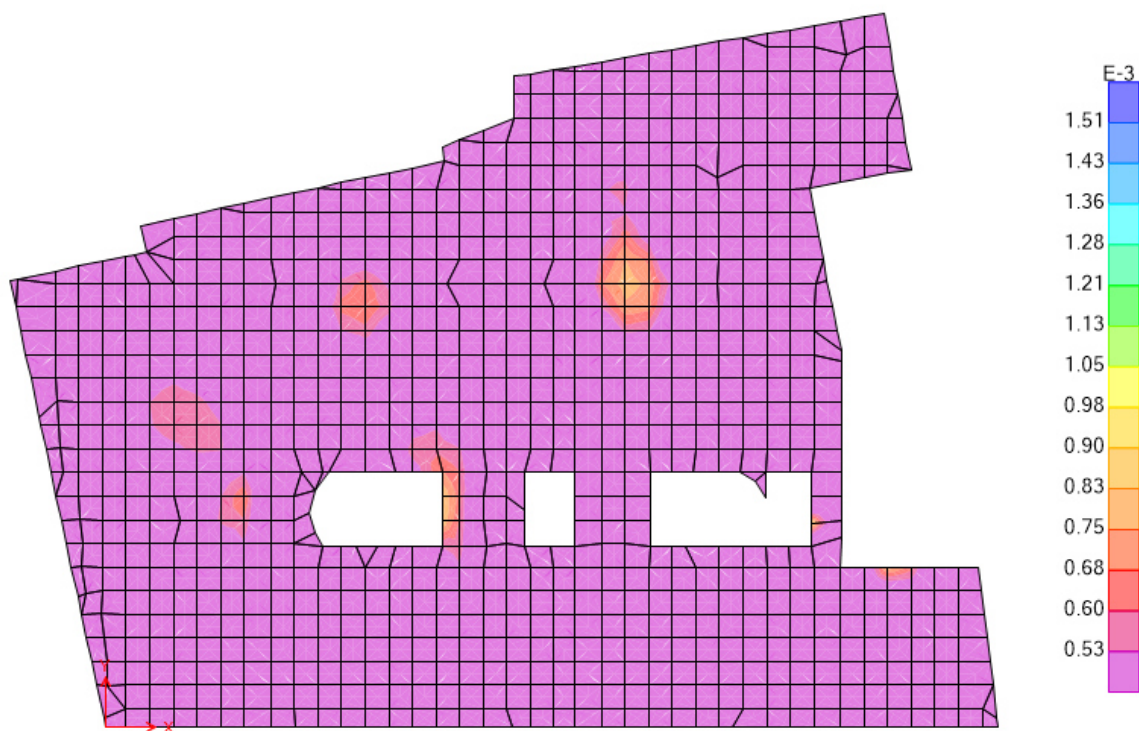
Anexo L. 2 - Área de armadura inferior na laje do piso -2 segundo a direção y em m^2/m



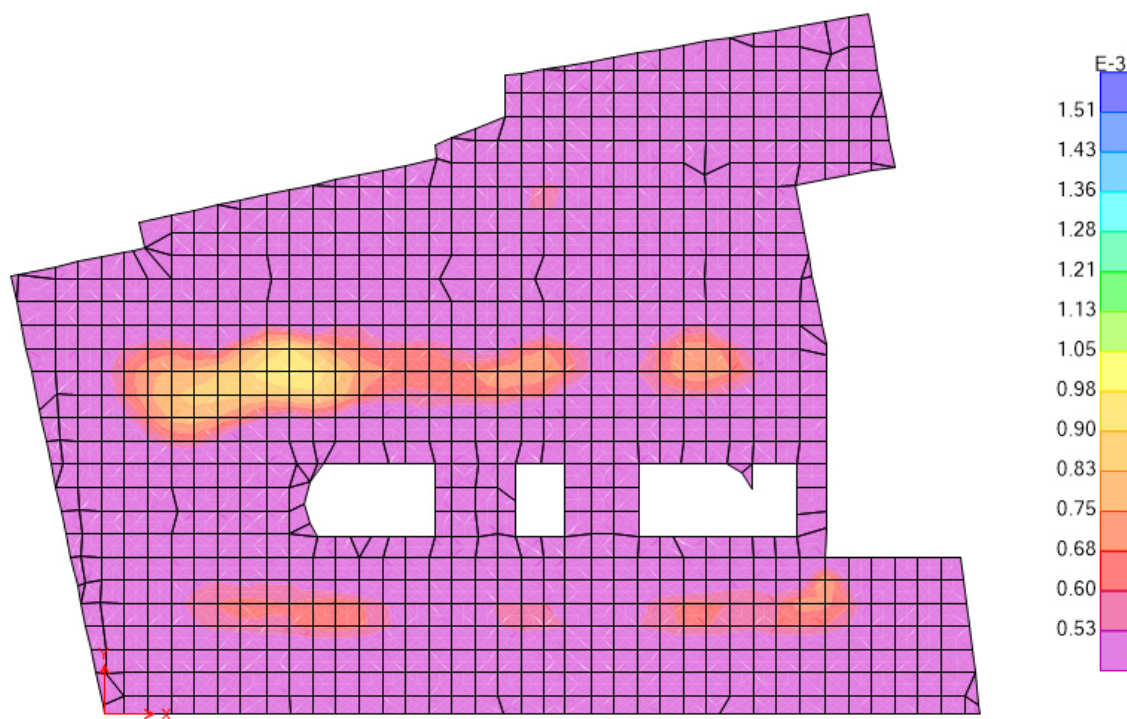
Anexo L. 3 - Área de armadura superior na laje do piso -2 segundo a direção x em m^2/m



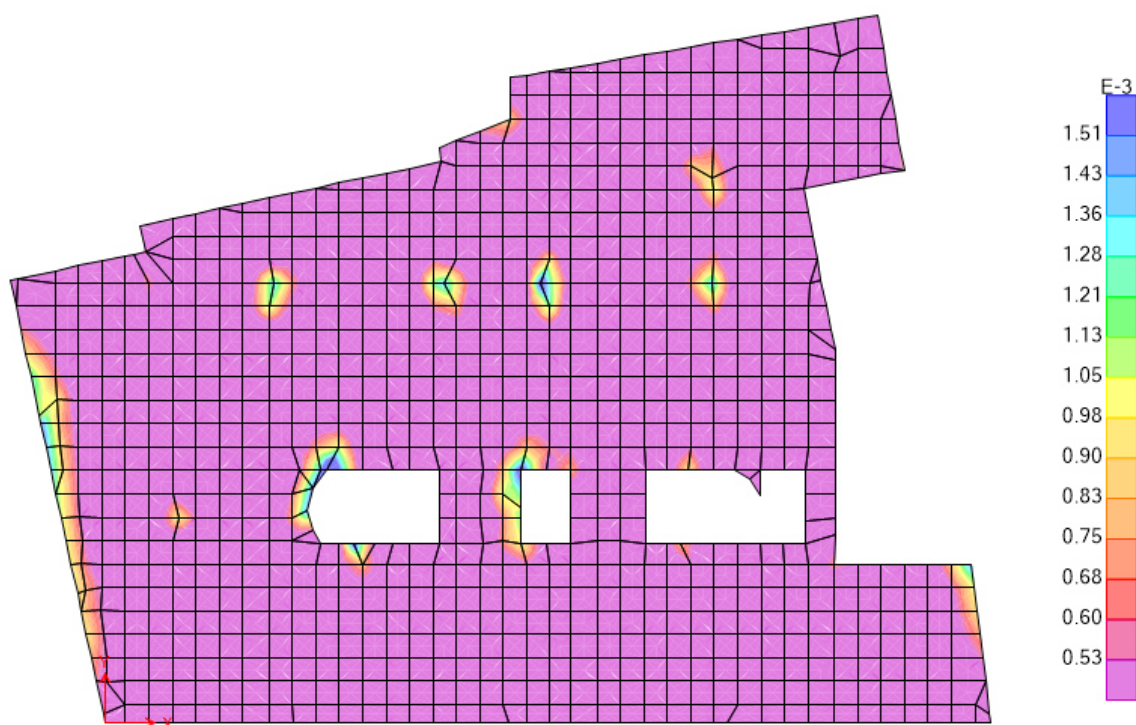
Anexo L. 4 - Área de armadura superior na laje do piso -2 segundo a direção y em m^2/m



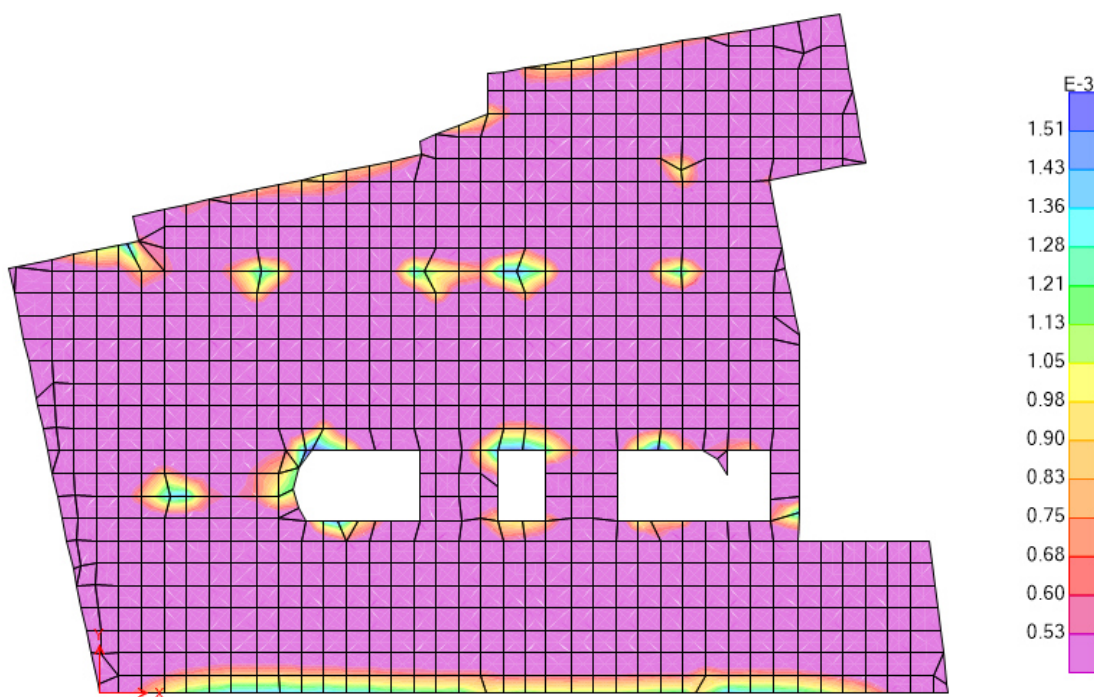
Anexo L. 5 - Área de armadura inferior na laje do piso -1 segundo a direção x em m^2/m



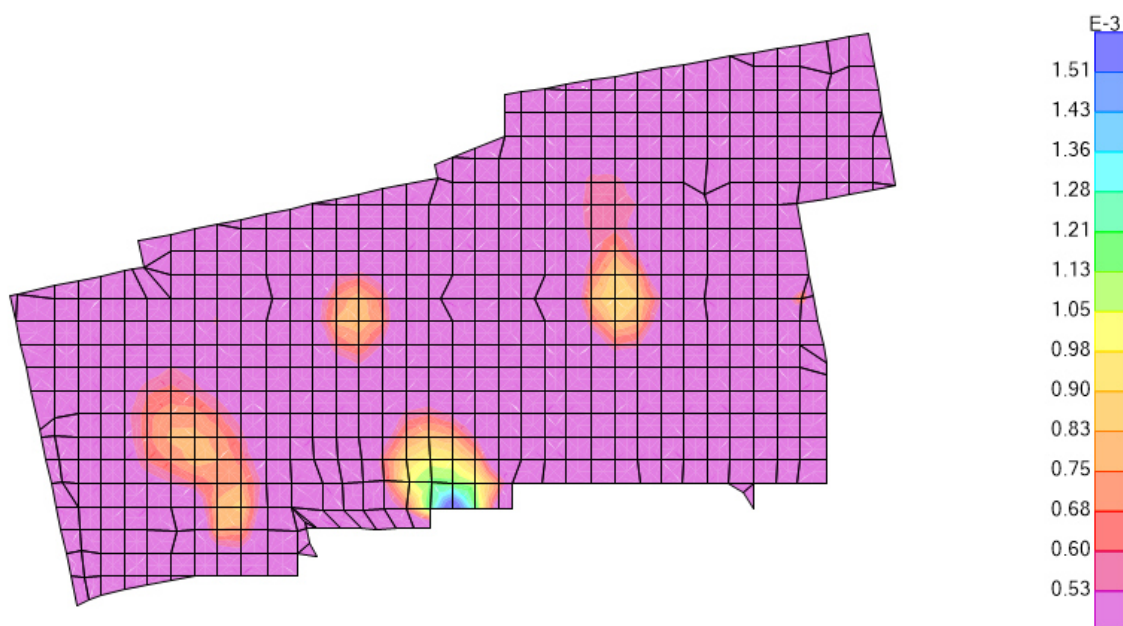
Anexo L. 6 - Área de armadura inferior na laje do piso -1 segundo a direção y em m^2/m



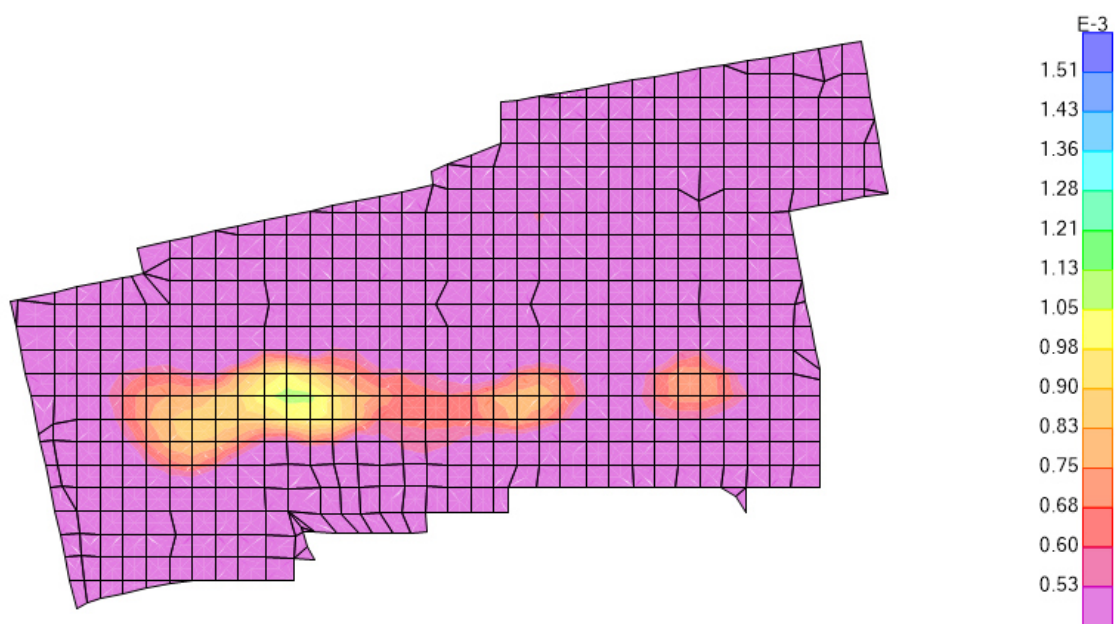
Anexo L. 7 - Área de armadura superior na laje do piso -1 segundo a direção x em m^2/m



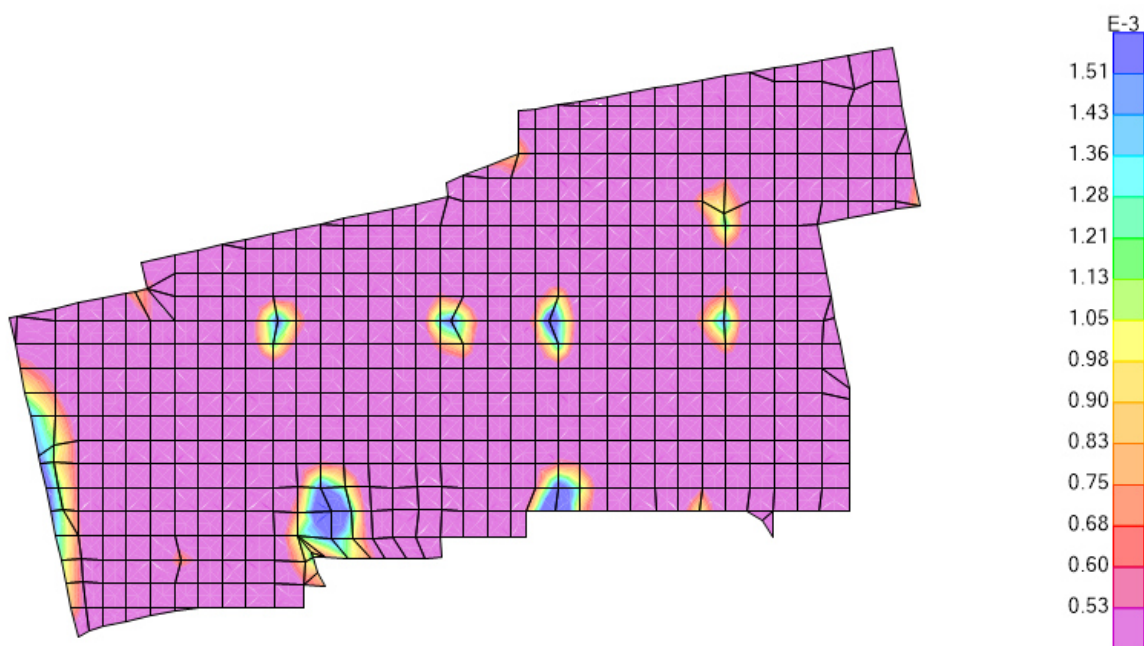
Anexo L. 8 - Área de armadura superior na laje do piso -1 segundo a direção y em m^2/m



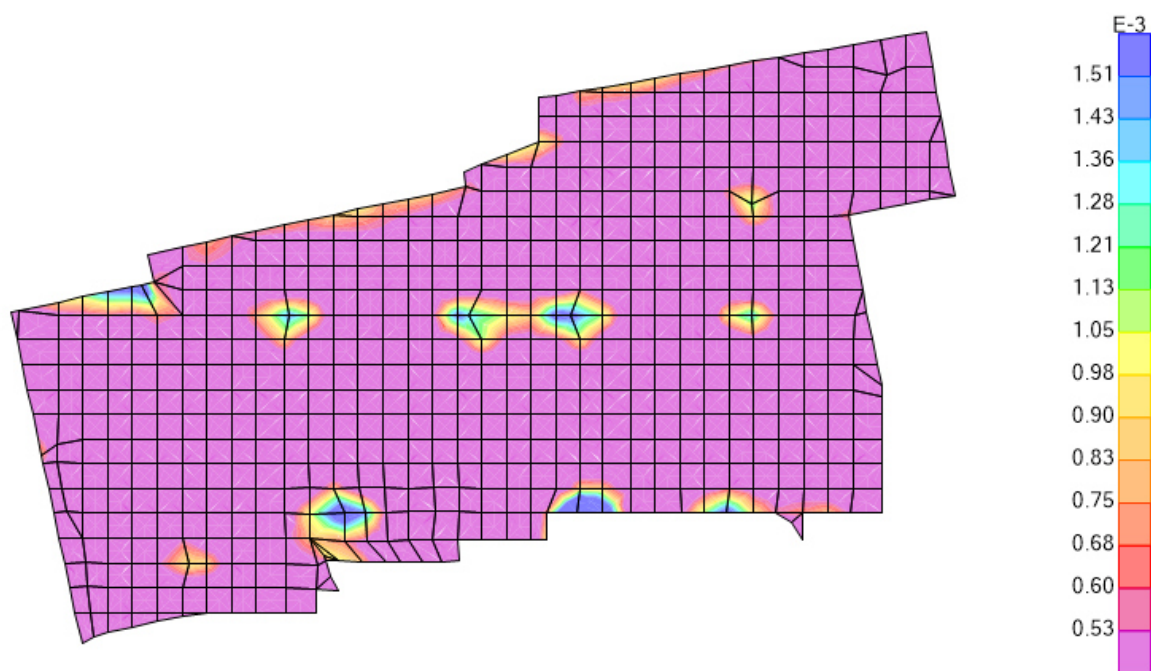
Anexo L. 9 - Área de armadura inferior na laje do piso (0 -) segundo a direção x em m^2/m



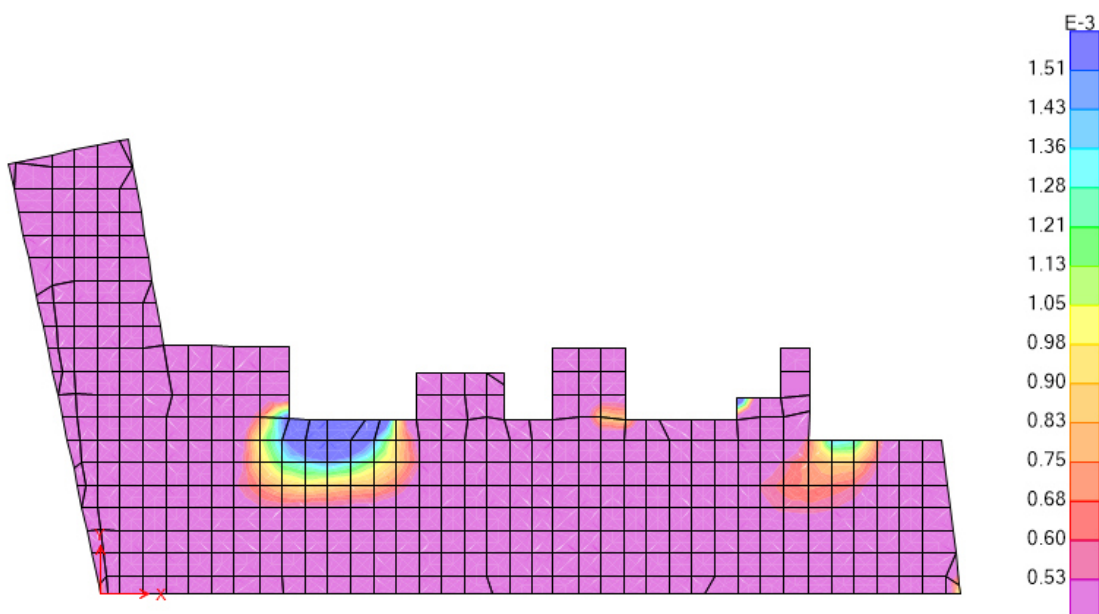
Anexo L. 10 - Área de armadura inferior na laje do piso (0 -) segundo a direção y em m^2/m



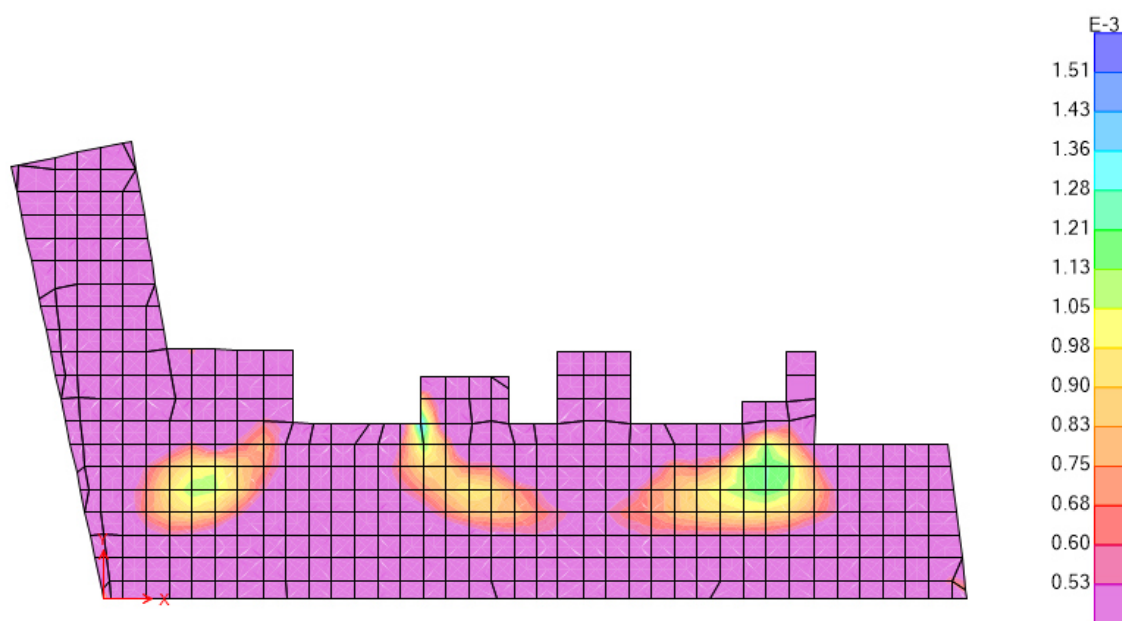
Anexo L. 11 - Área de armadura superior na laje do piso (0 -) segundo a direção x em m^2/m



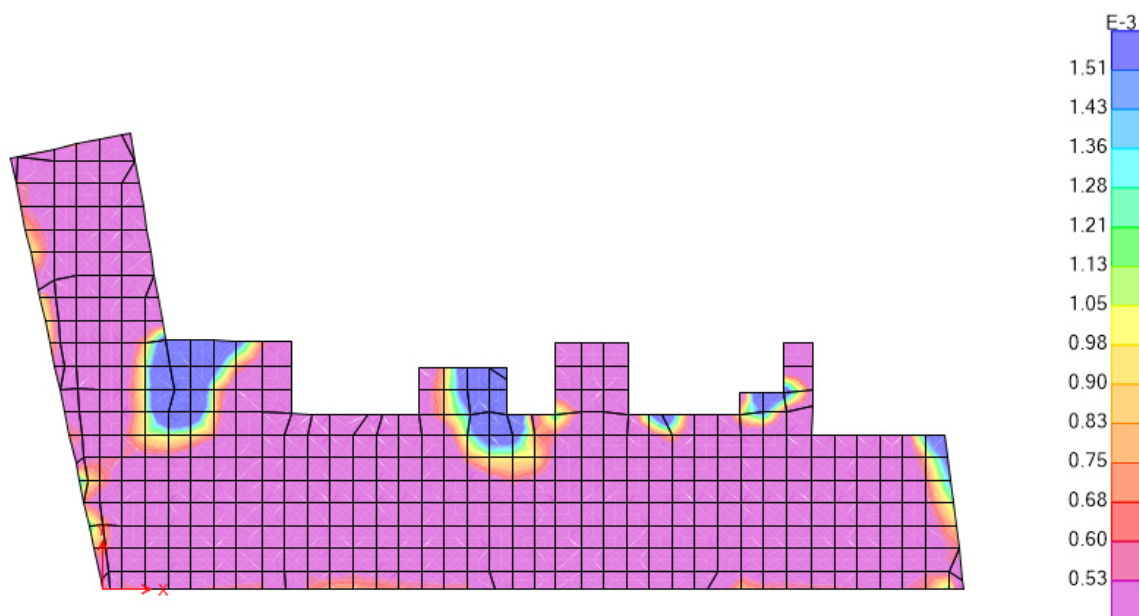
Anexo L. 12 - Área de armadura superior na laje do piso (0 -) segundo a direção y em m^2/m



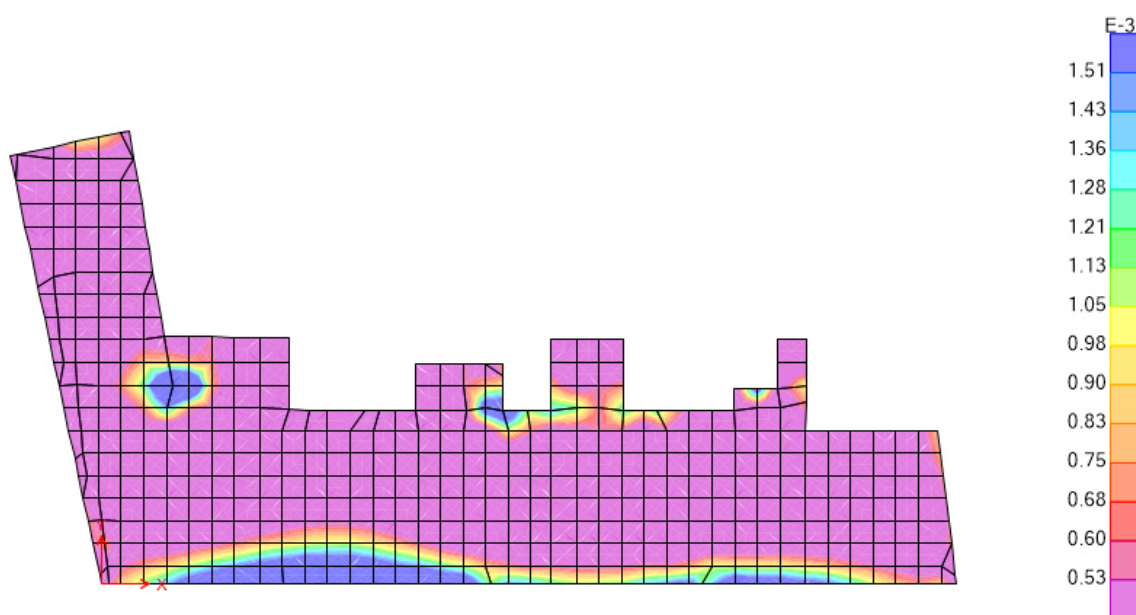
Anexo L. 13 - Área de armadura inferior na laje do piso 0+ segundo a direção x em m²/m



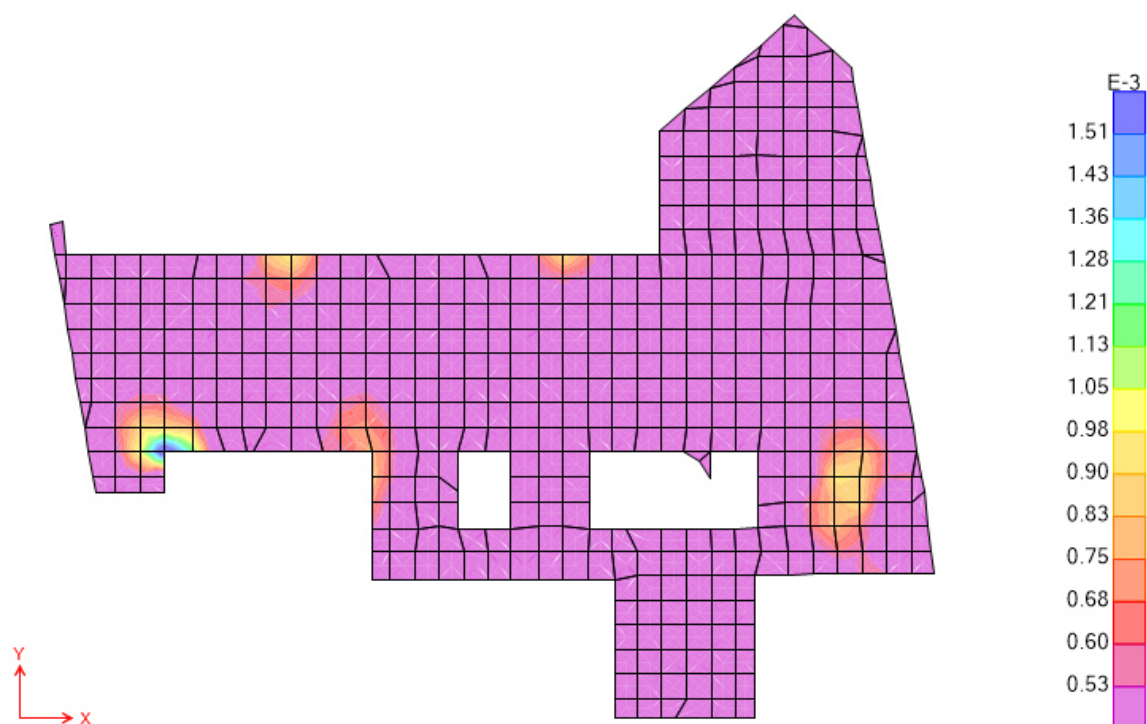
Anexo L. 14 - Anexo L. 7 - Área de armadura inferior na laje do piso 0+ segundo a direção y em m²/m



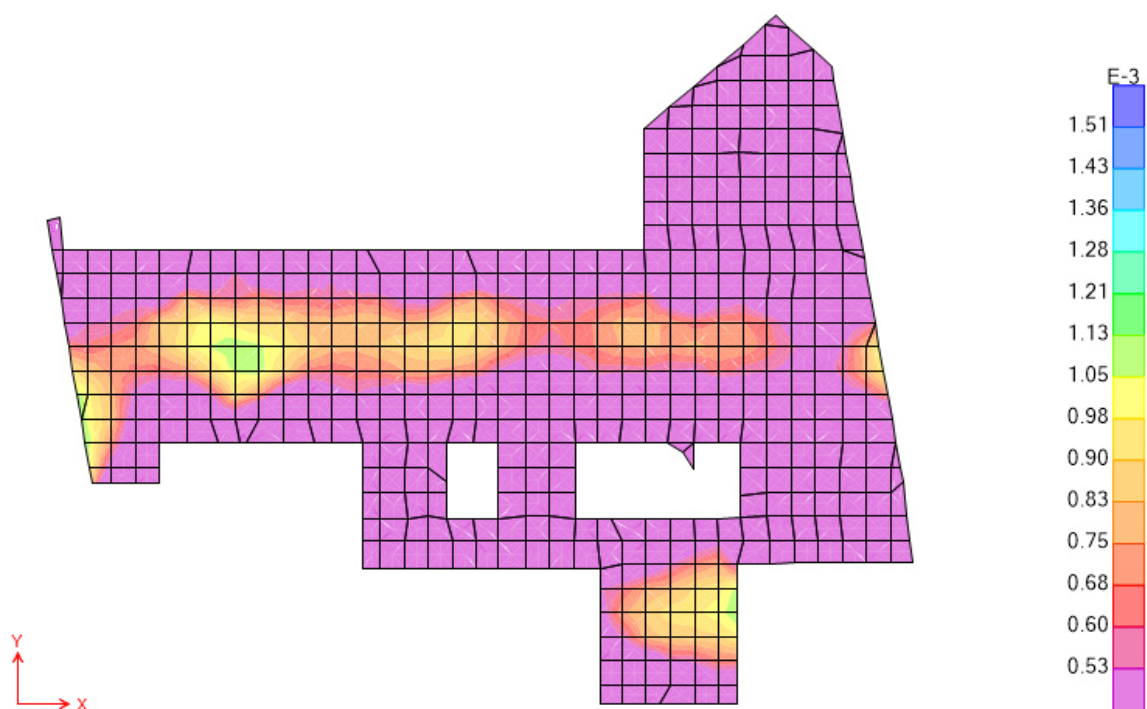
Anexo L. 15 - Área de armadura superior na laje do piso 0+ segundo a direção x em m^2/m



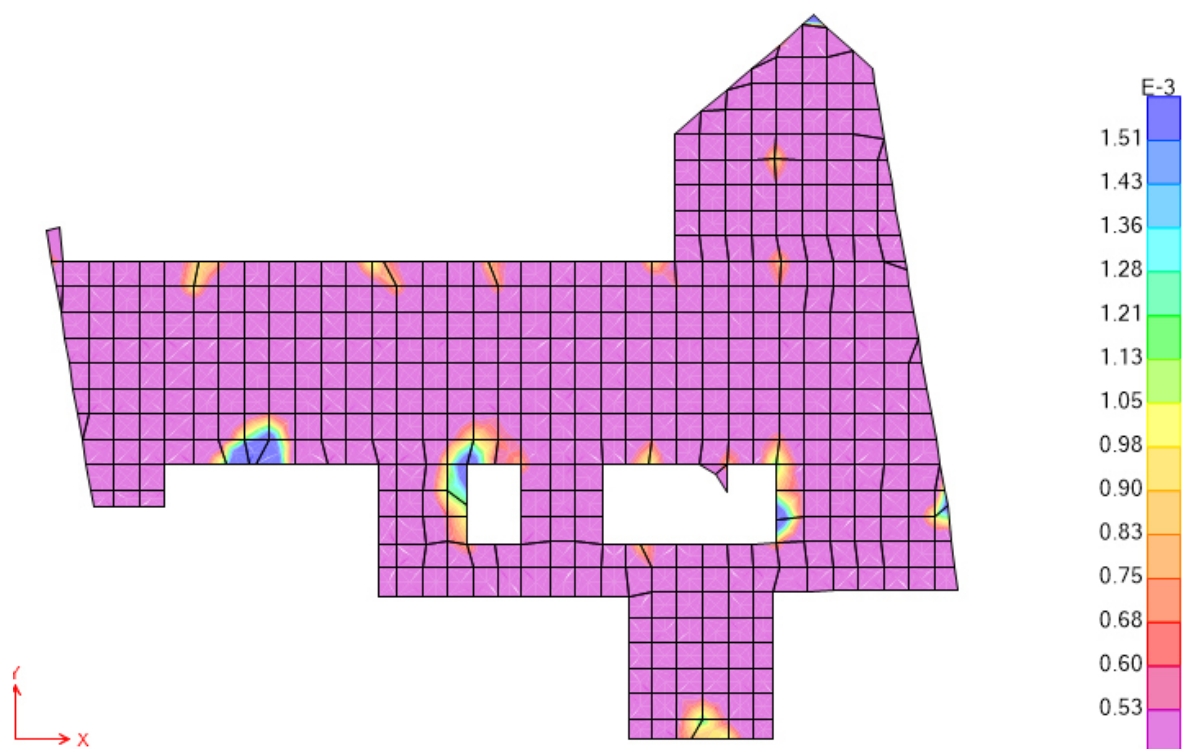
Anexo L. 16 - Área de armadura superior na laje do piso 0+ segundo a direção y em m^2/m



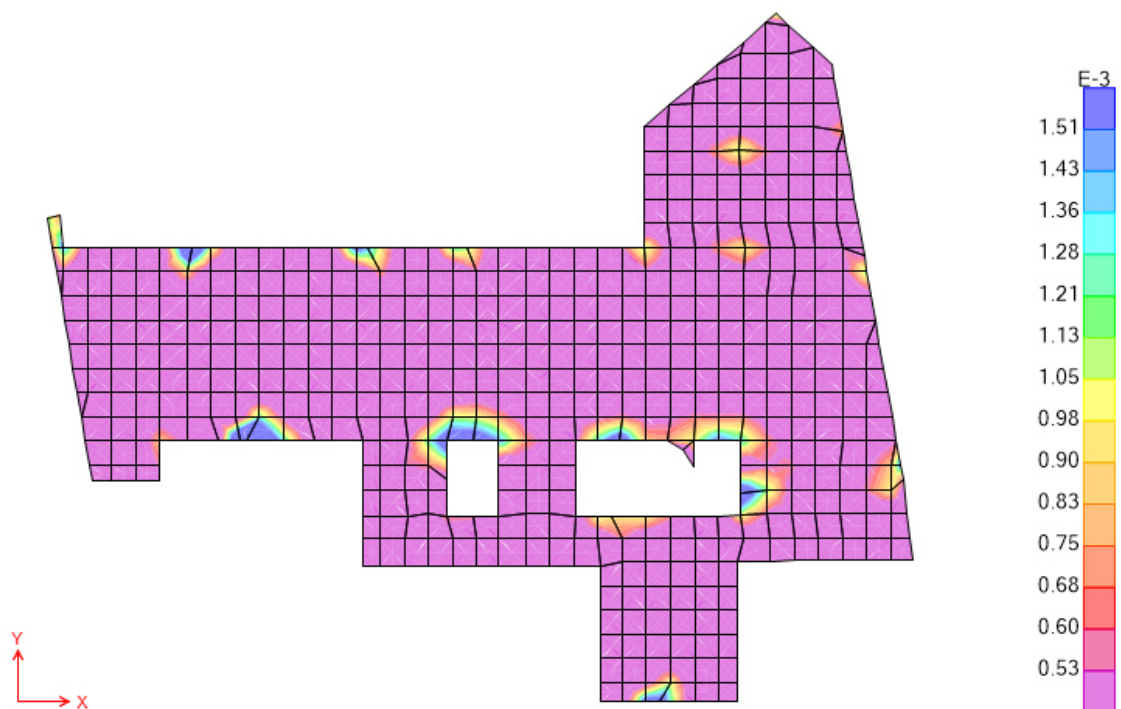
Anexo L. 17 - Área de armadura inferior na laje do piso intermédio segundo a direção x em m^2/m



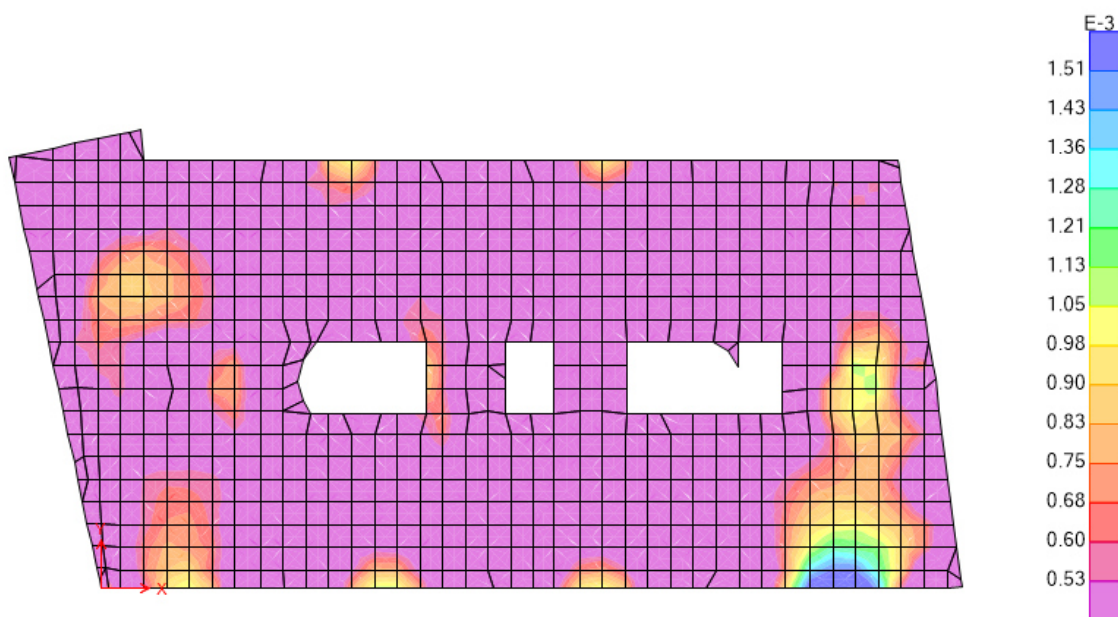
Anexo L. 18 - Área de armadura inferior na laje do piso intermédio segundo a direção y em m^2/m



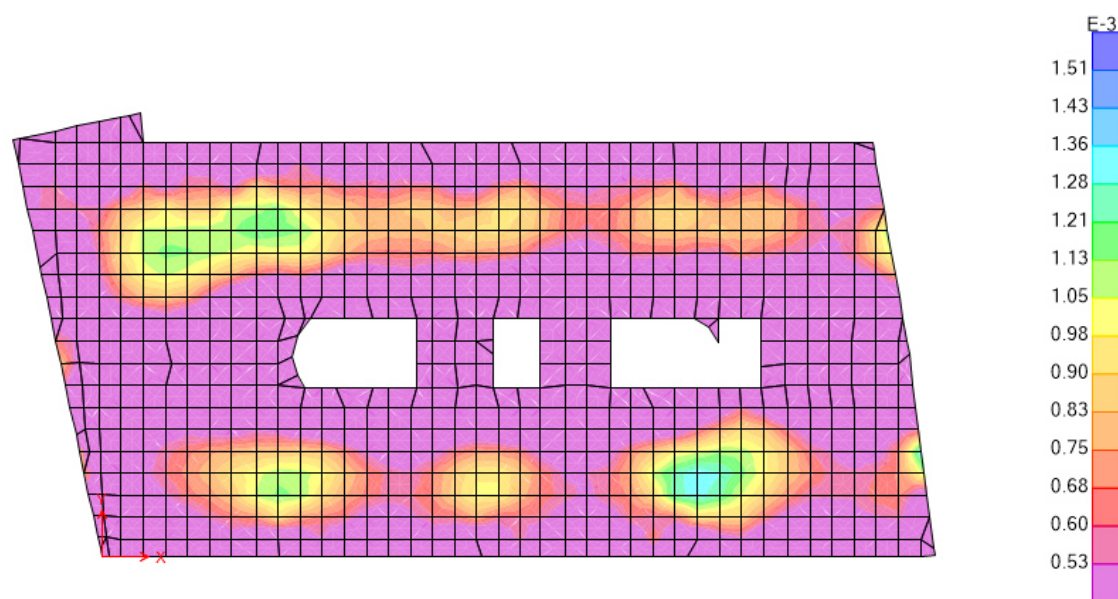
Anexo L. 19 - Área de armadura superior na laje do piso intermédio segundo a direção x em m^2/m



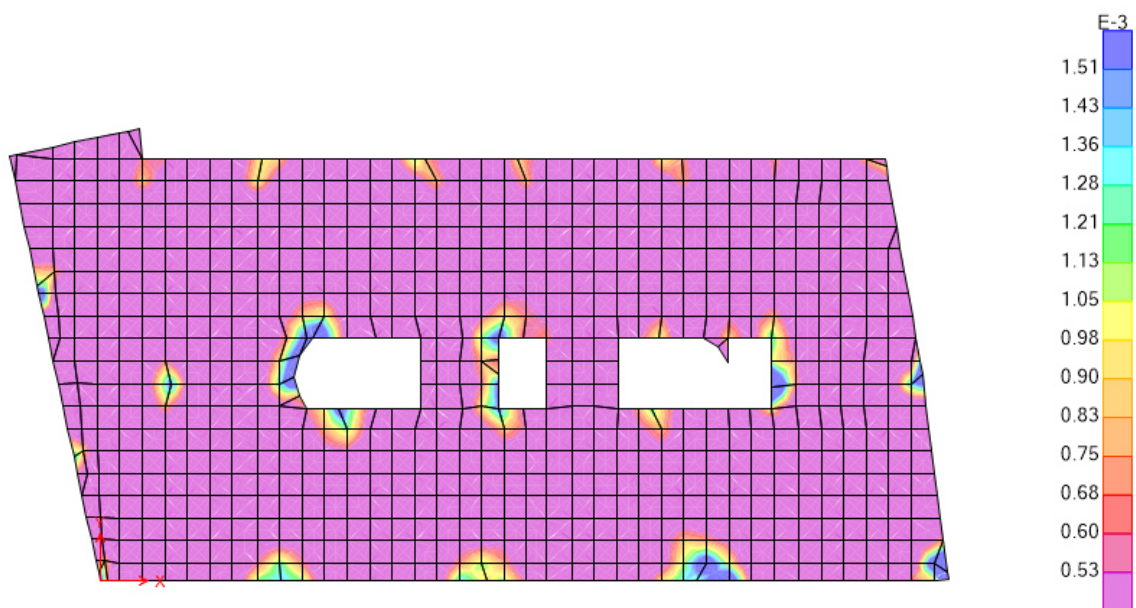
Anexo L. 20 - Área de armadura superior na laje do piso intermédio segundo a direção y em m^2/m



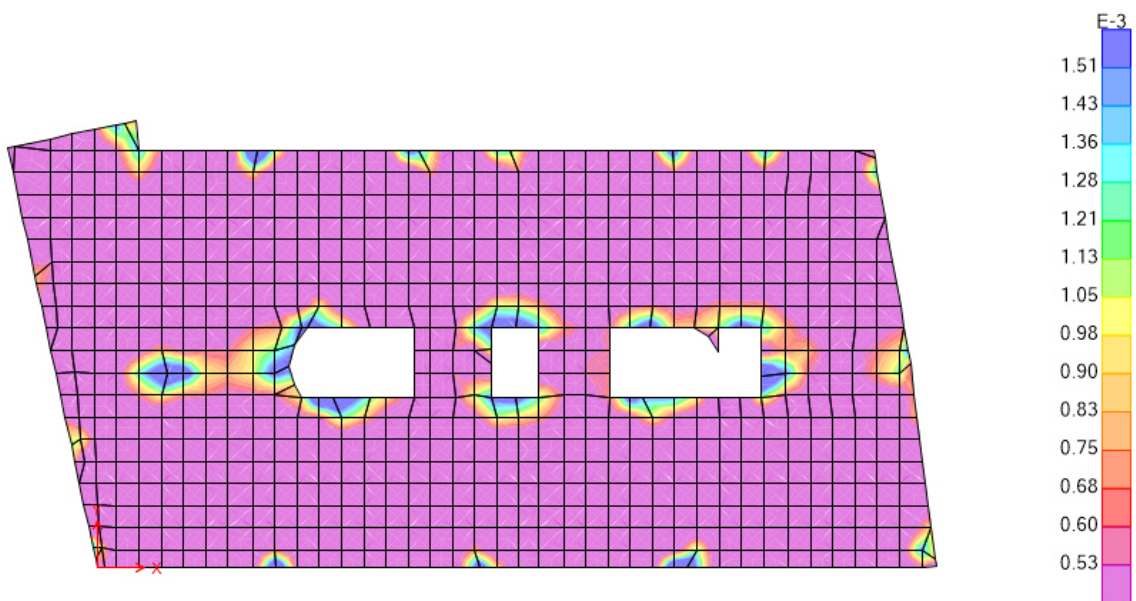
Anexo L. 21 - Área de armadura inferior na laje do piso 1 segundo a direção x em m^2/m



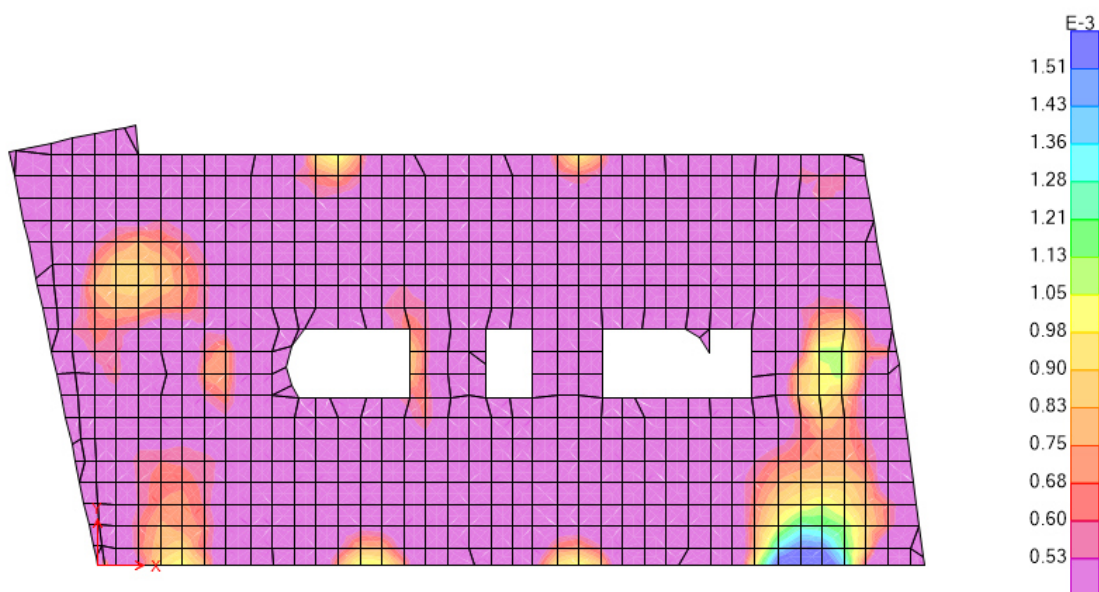
Anexo L. 22 - Área de armadura inferior na laje do piso 1 segundo a direção y em m^2/m



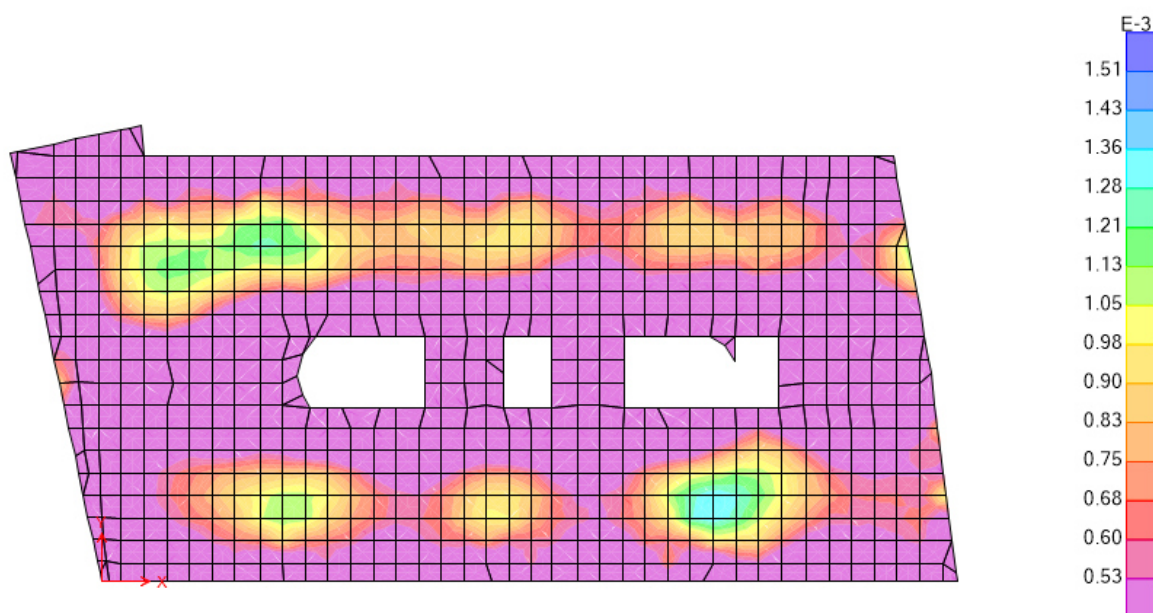
Anexo L. 23 - Área de armadura superior na laje do piso 1 segundo a direção x em m^2/m



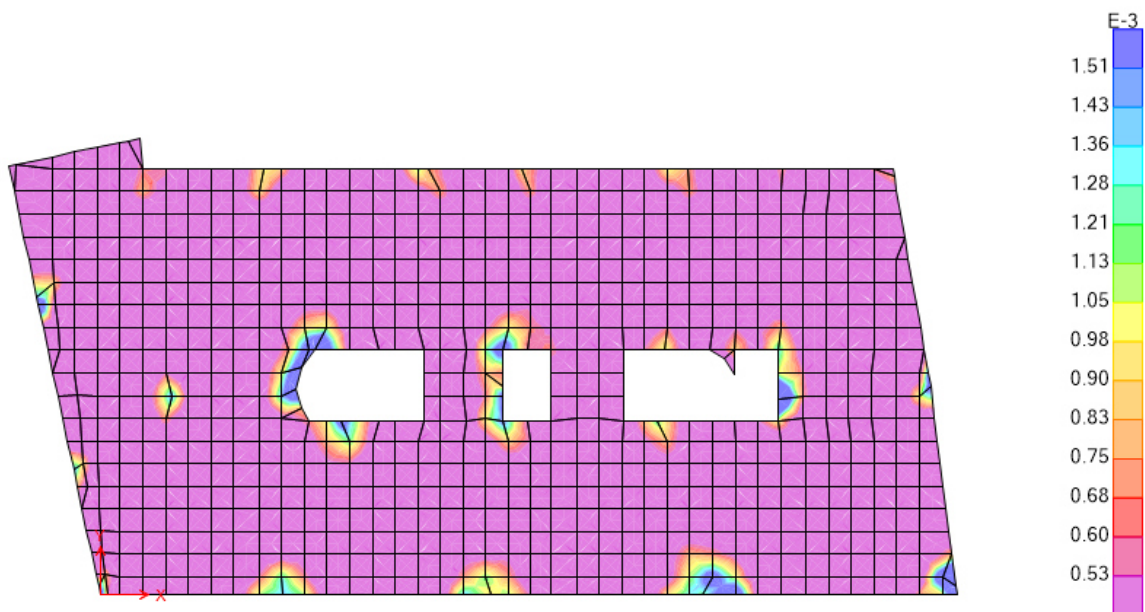
Anexo L. 24 - Área de armadura superior na laje do piso 1 segundo a direção y em m^2/m



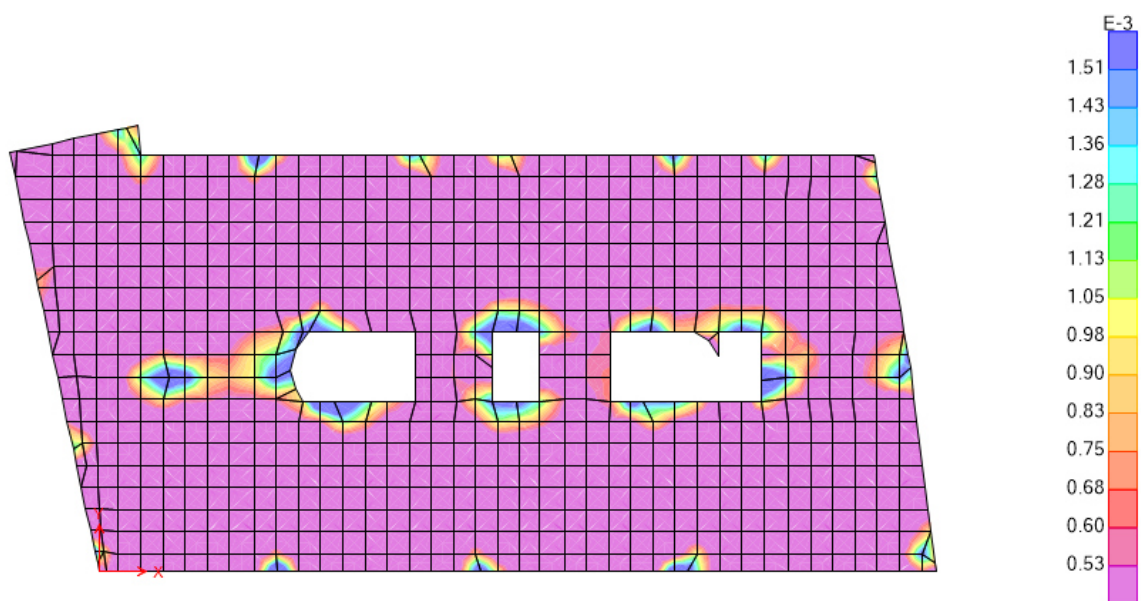
Anexo L. 25 - Área de armadura inferior na laje do piso 2 segundo a direção x em m^2/m



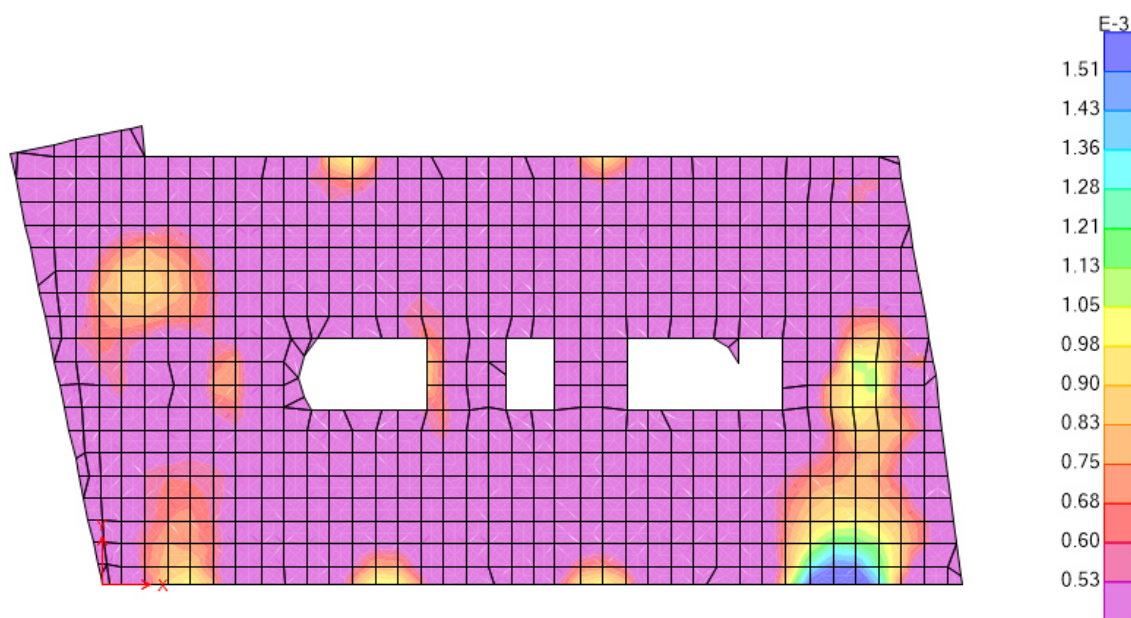
Anexo L. 26 - Área de armadura inferior na laje do piso 2 segundo a direção y em m^2/m



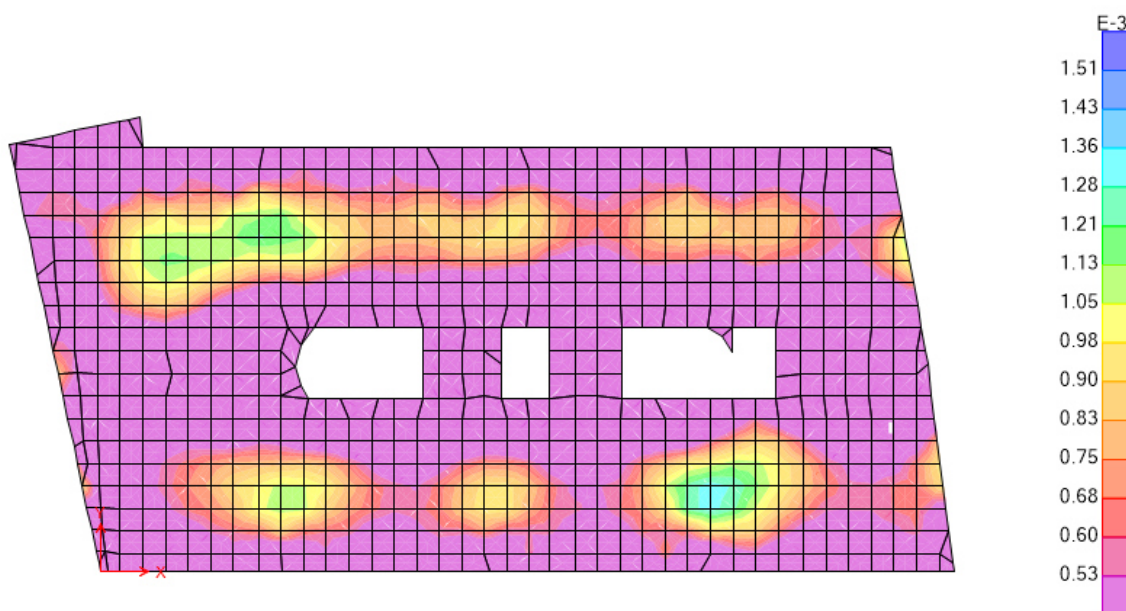
Anexo L. 27- Área de armadura inferior na laje do piso 2 segundo a direção x em m²/m



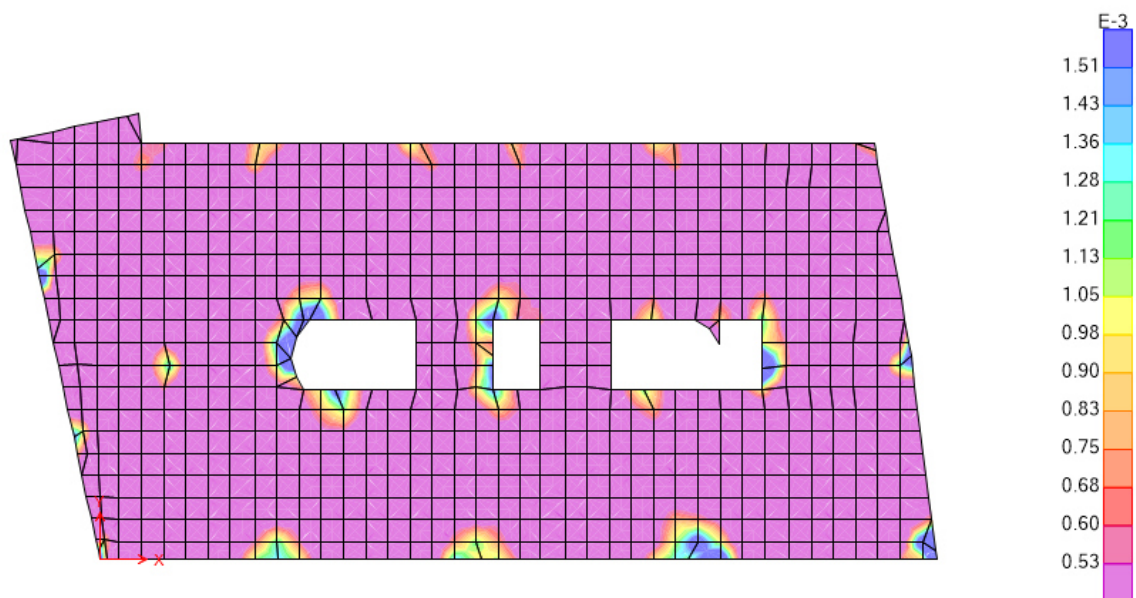
Anexo L. 28 - Área de armadura inferior na laje do piso 2 segundo a direção y em m²/m



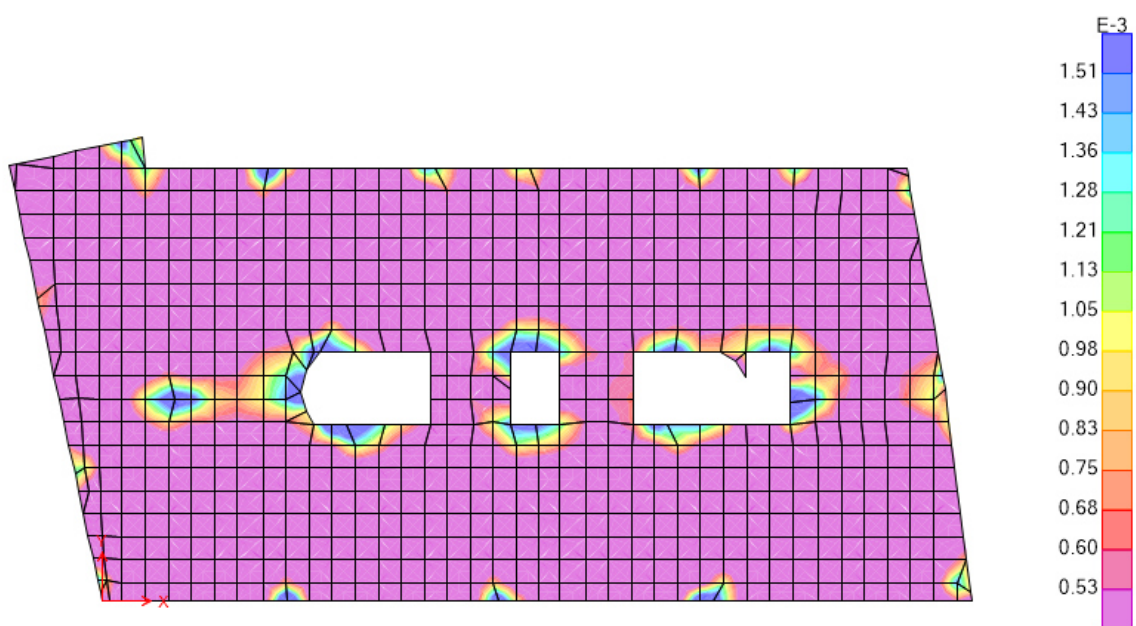
Anexo L. 29 - Área de armadura inferior na laje do piso 3 segundo a direção x em m^2/m



Anexo L. 30 - Área de armadura inferior na laje do piso 3 segundo a direção y em m^2/m



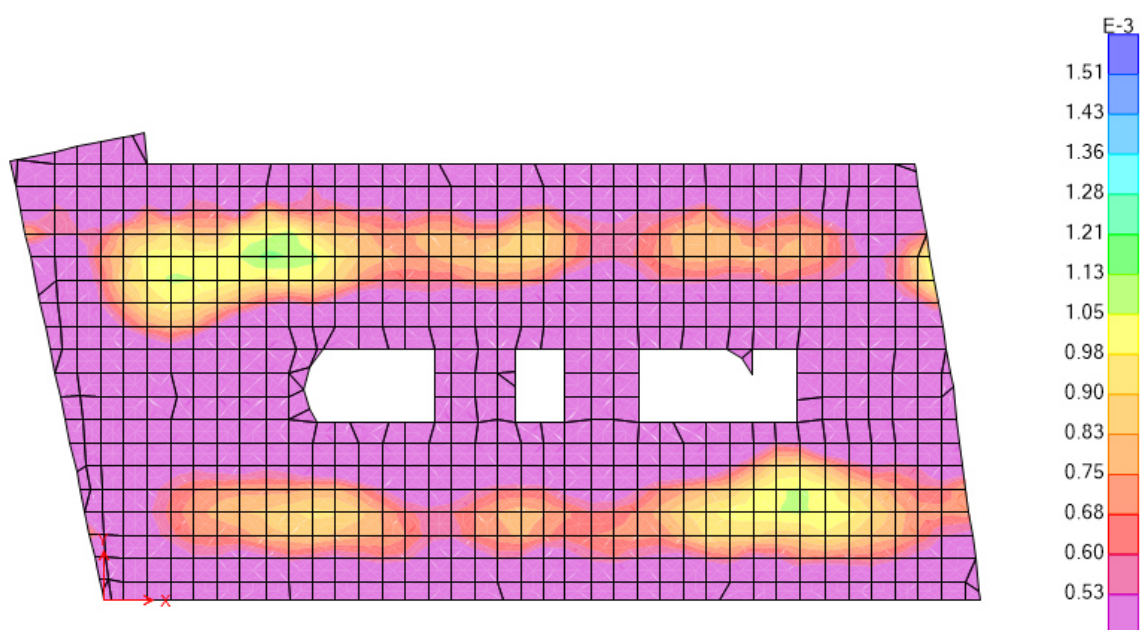
Anexo L. 31 - Área de armadura superior na laje do piso 3 segundo a direção x em m^2/m



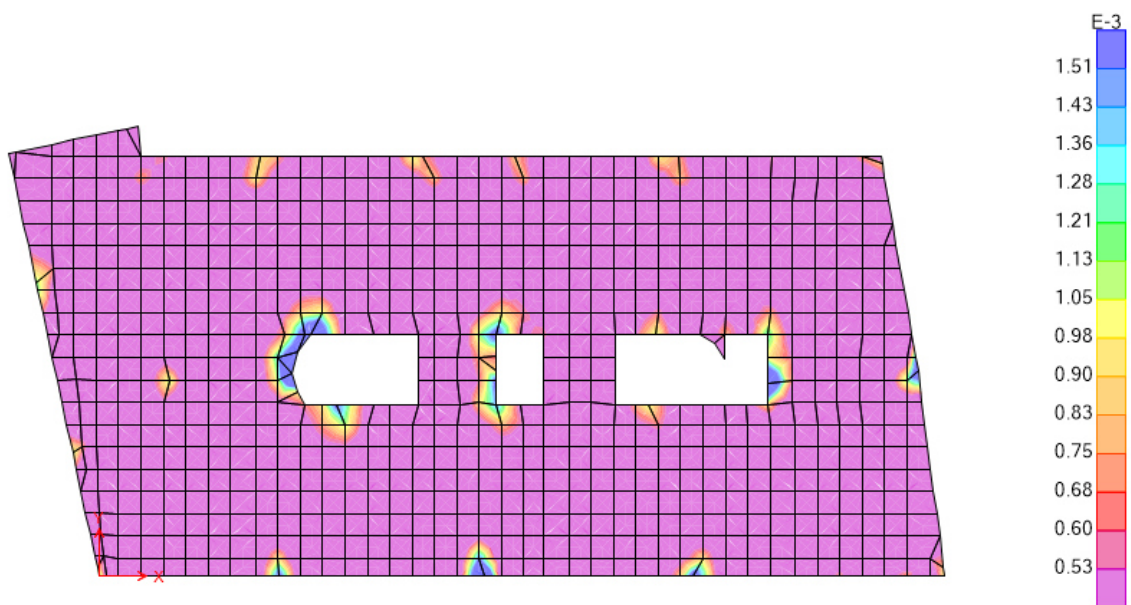
Anexo L. 32 - Área de armadura superior na laje do piso 3 segundo a direção y em m^2/m



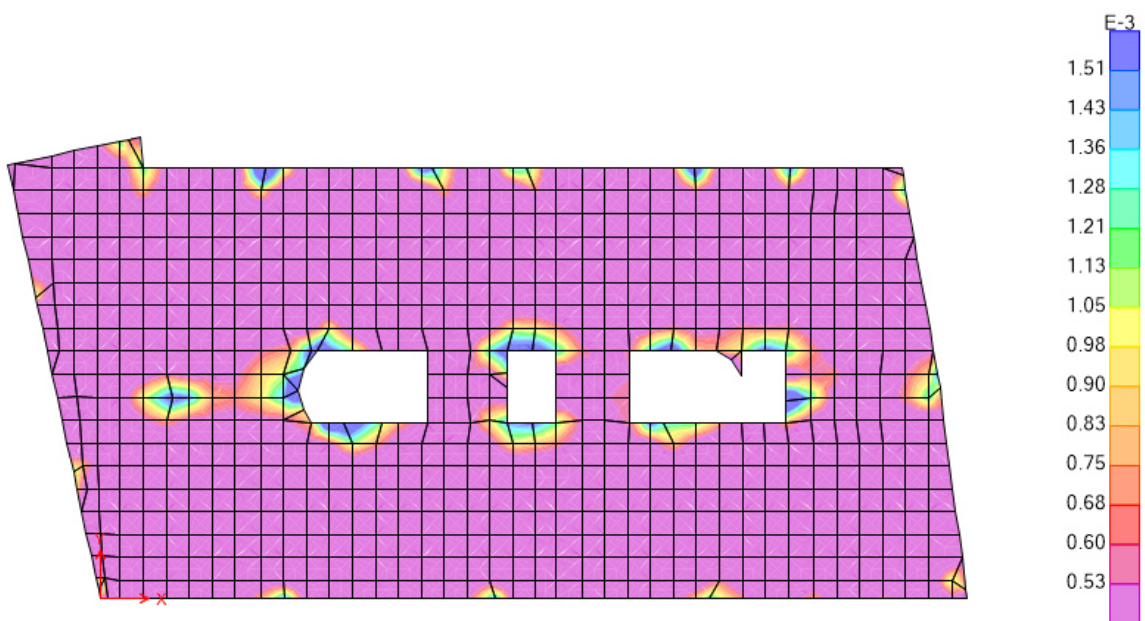
Anexo L. 33 - Área de armadura inferior na laje do piso 4 segundo a direção x em m^2/m



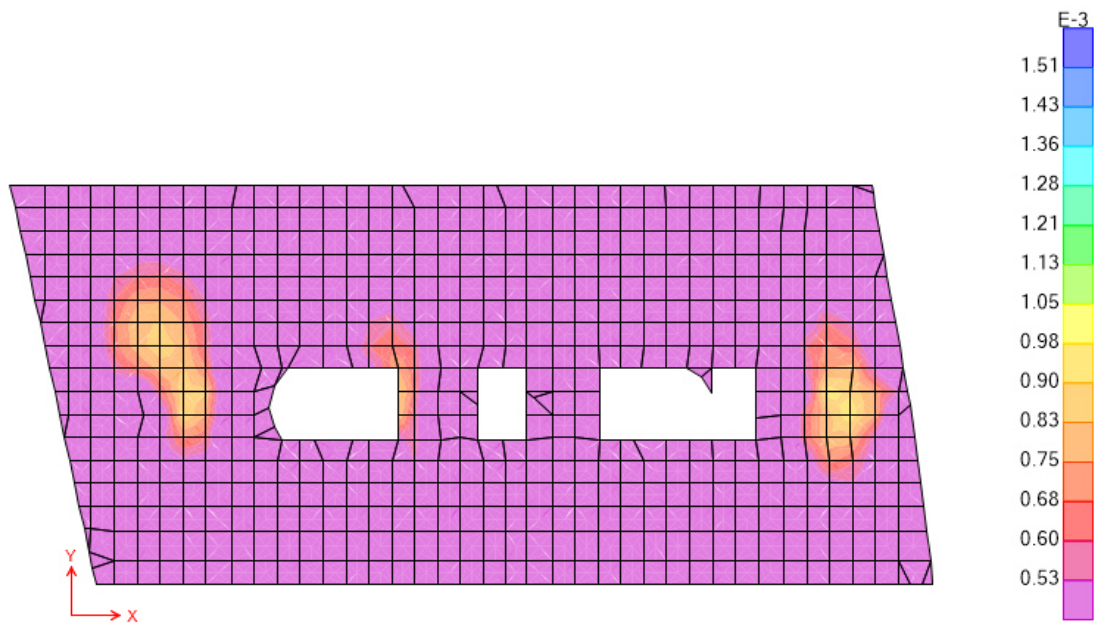
Anexo L. 34 - Área de armadura inferior na laje do piso 4 segundo a direção y em m^2/m



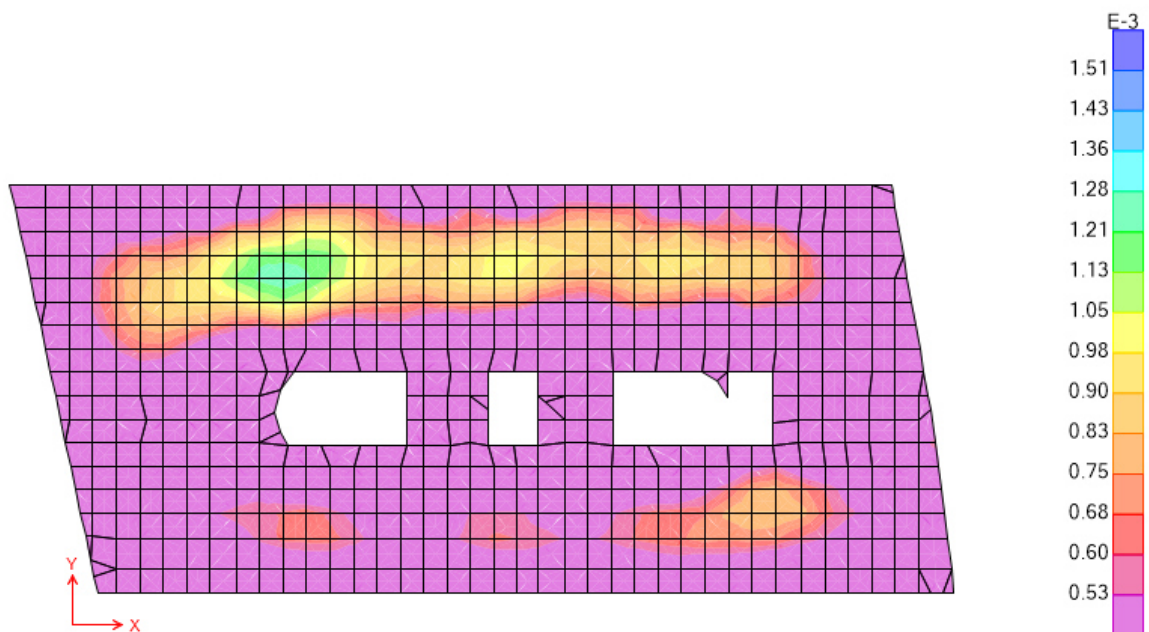
Anexo L. 35 - Área de armadura superior na laje do piso 4 segundo a direção x em m^2/m



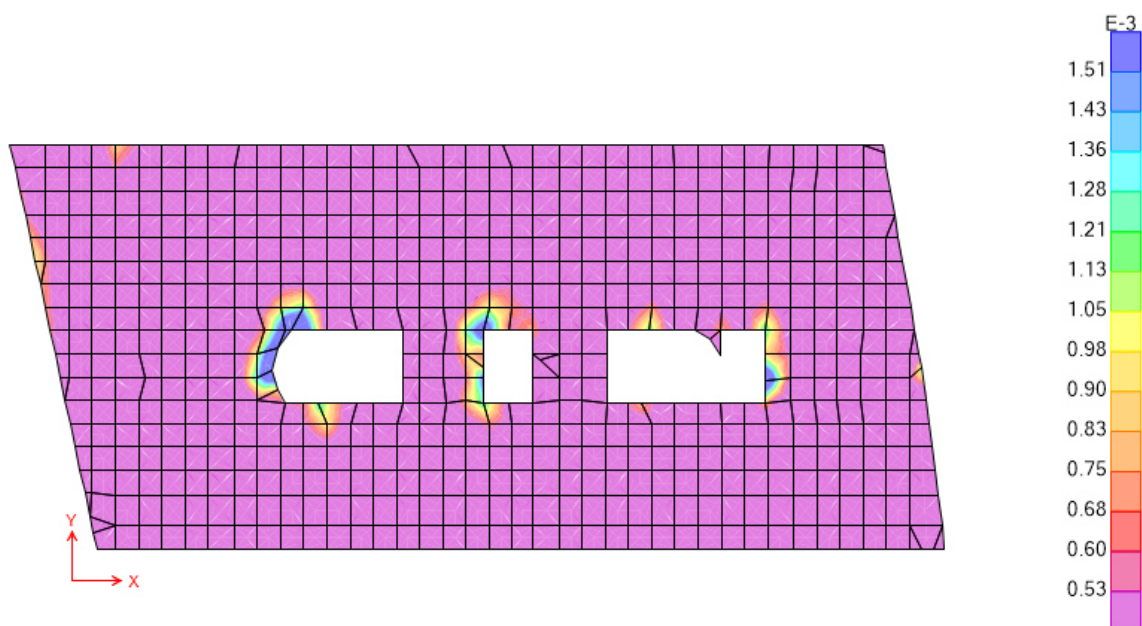
Anexo L. 36 - Área de armadura superior na laje do piso 4 segundo a direção y em m^2/m



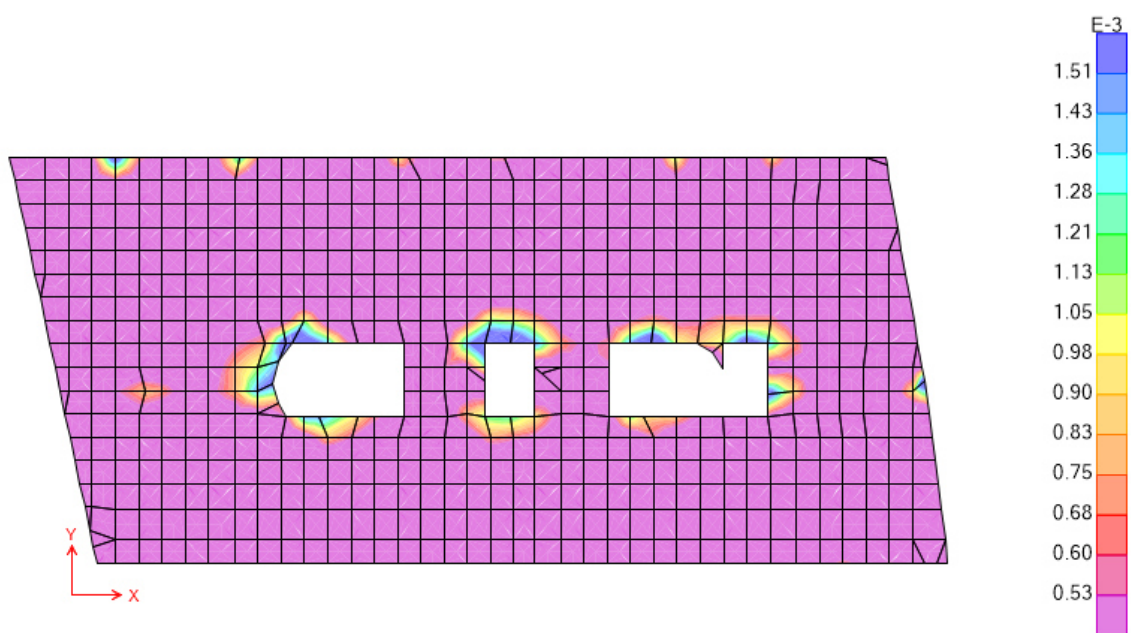
Anexo L. 37 - Área de armadura inferior na laje do piso 5 segundo a direção x em m^2/m



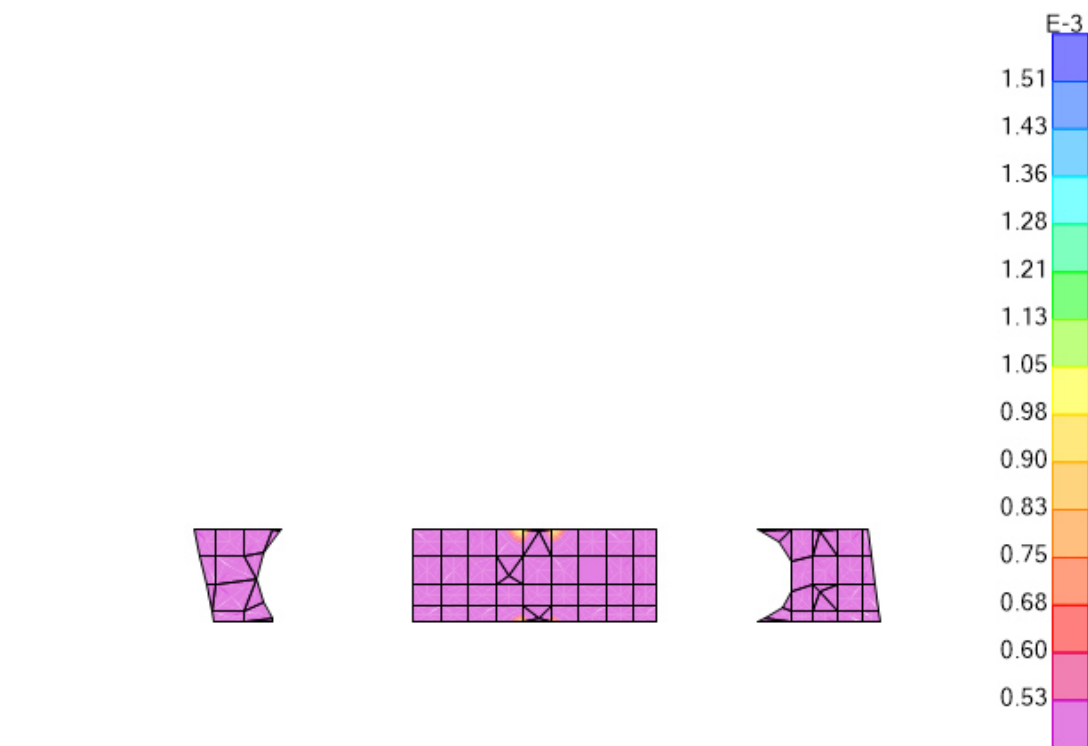
Anexo L. 38- Área de armadura inferior na laje do piso 5 segundo a direção y em m^2/m



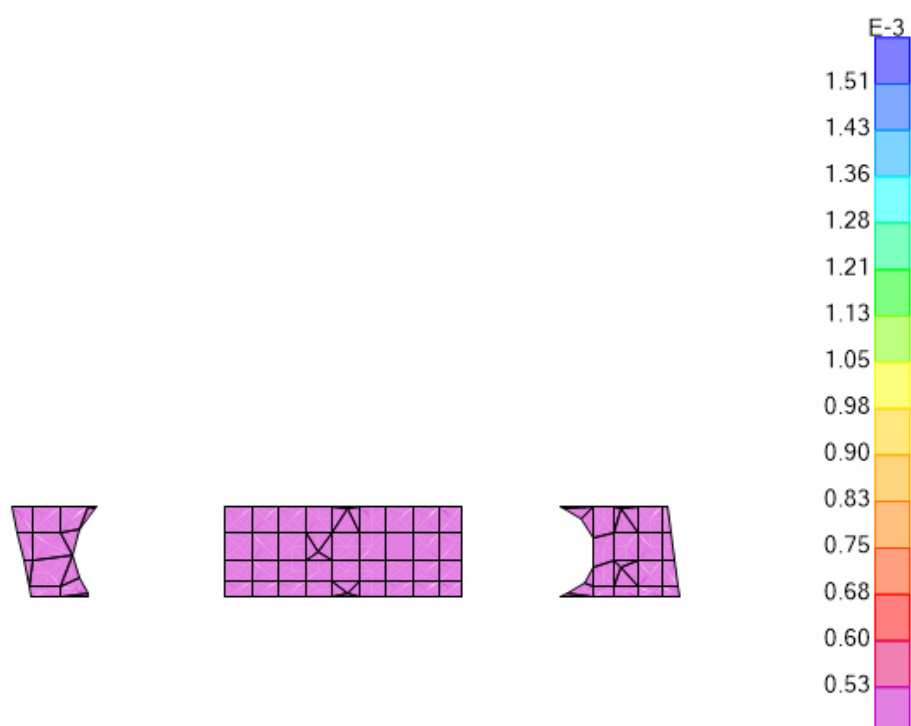
Anexo L. 39 - Área de armadura superior na laje do piso 5 segundo a direção x em m^2/m



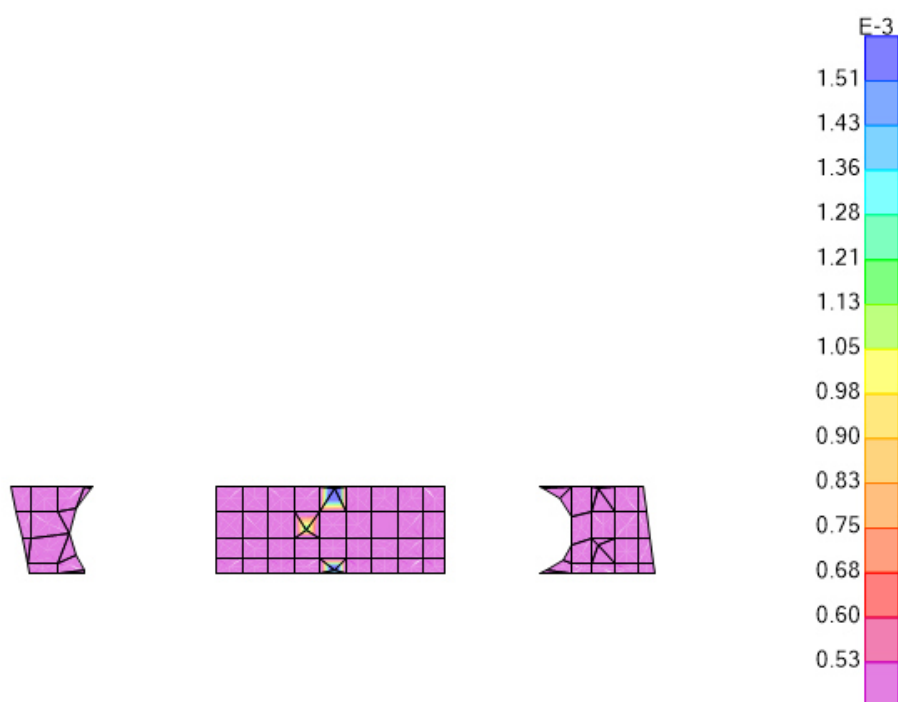
Anexo L. 40 - Área de armadura superior na laje do piso 5 segundo a direção y em m^2/m



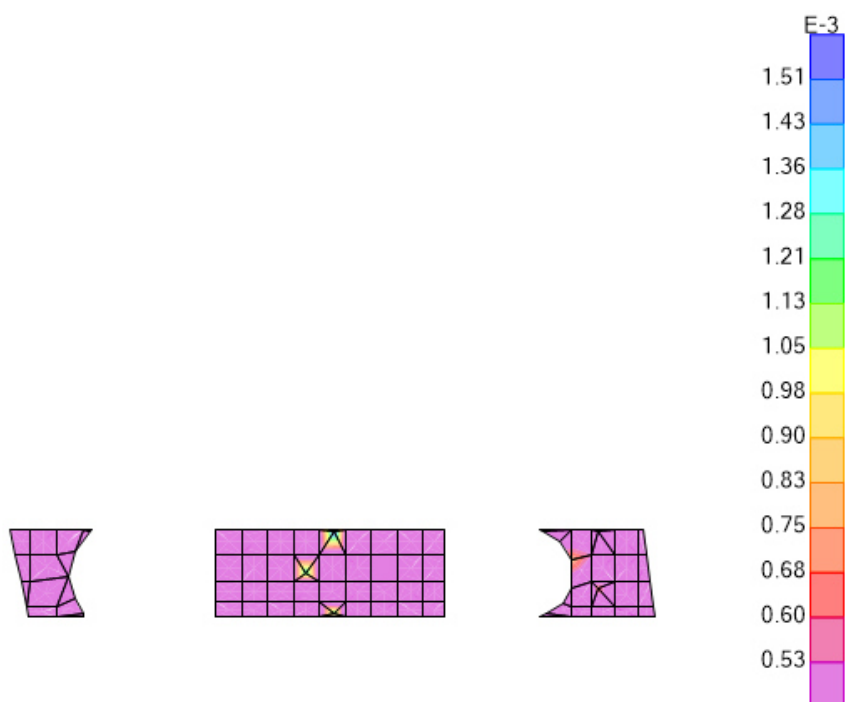
Anexo L. 41 - Área de armadura inferior na laje do piso técnico segundo a direção x em m^2/m



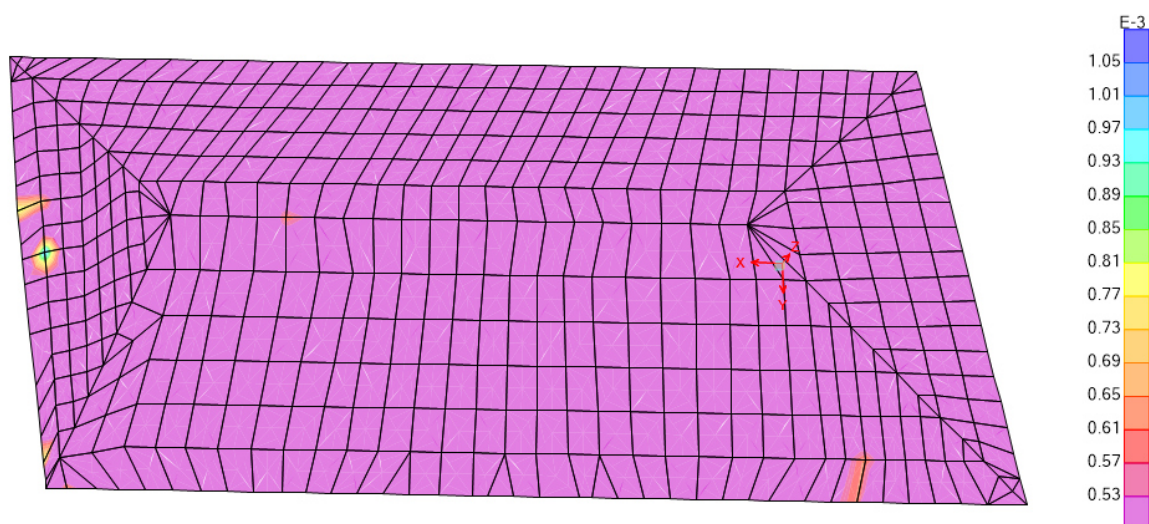
Anexo L. 42 - Área de armadura inferior na laje do piso técnico segundo a direção y em m^2/m



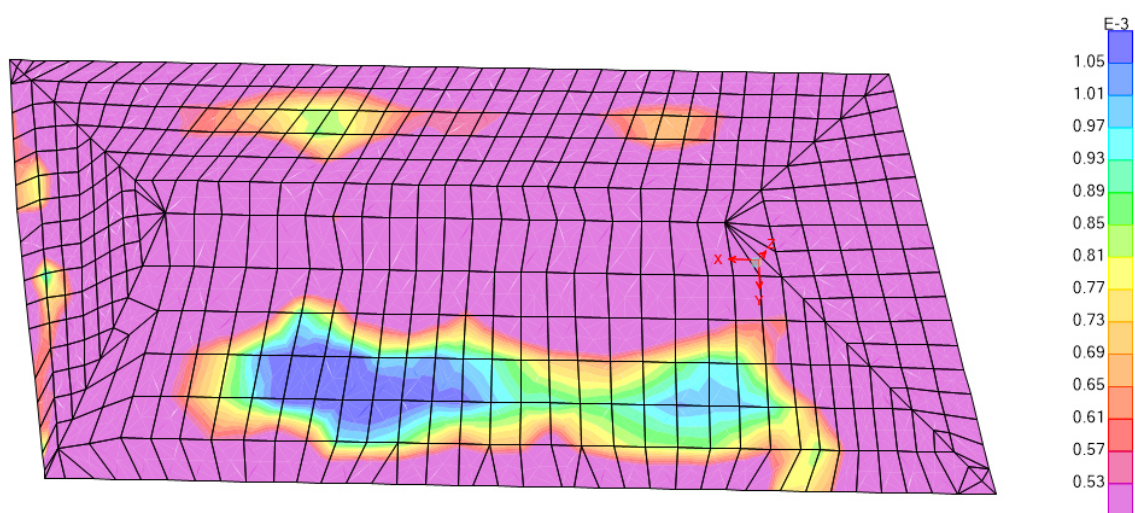
Anexo L. 43 - Área de armadura superior na laje do piso técnico segundo a direção x em m^2/m



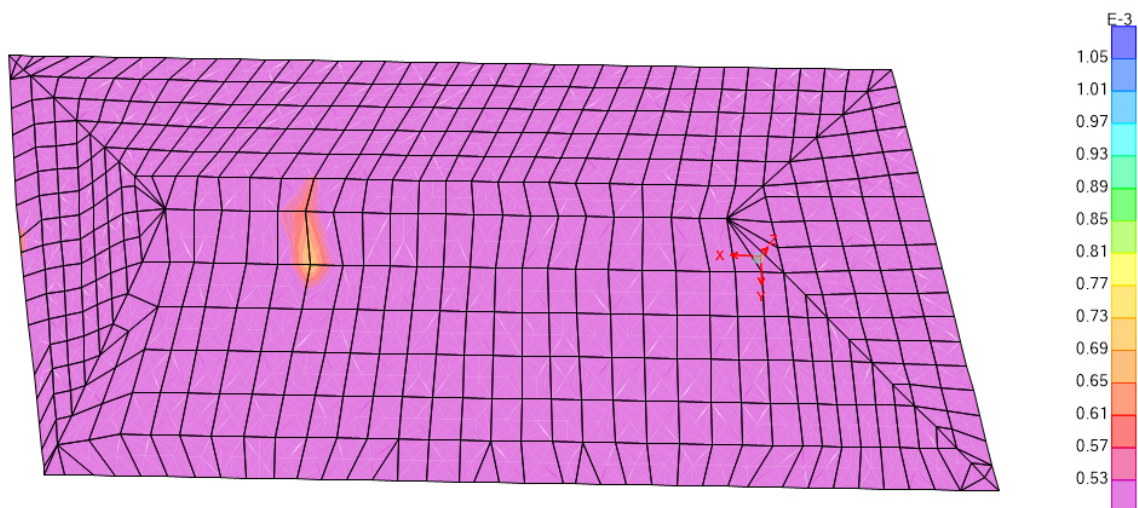
Anexo L. 44 - Área de armadura superior na laje do piso técnico segundo a direção y em m^2/m



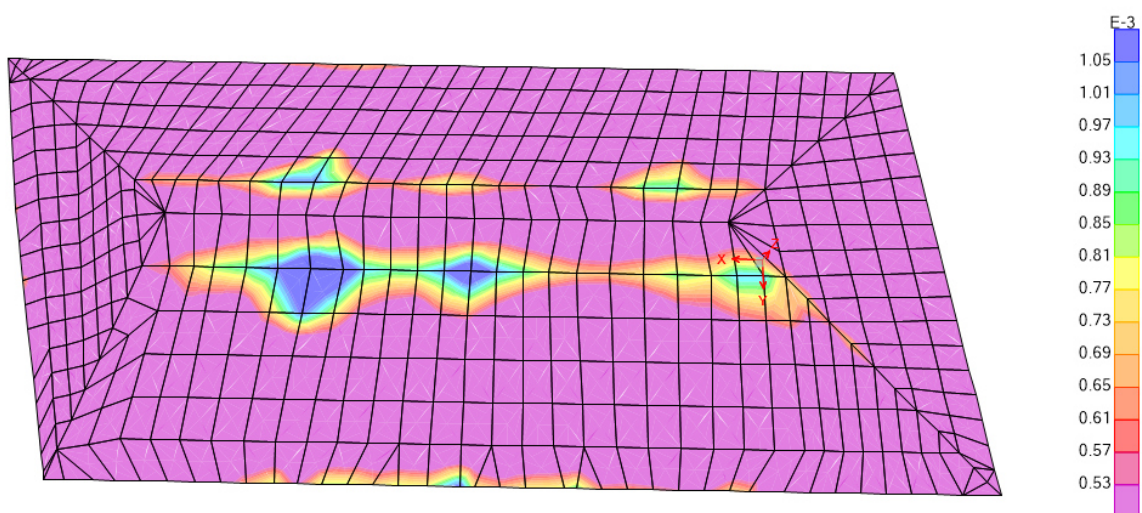
Anexo L. 45 - Área de armadura inferior na laje de cobertura segundo a direção x em m²/m



Anexo L. 46- Área de armadura inferior na laje de cobertura segundo a direção y em m²/m



Anexo L. 46- Área de armadura superior na laje de cobertura segundo a direção x em m²/m



Anexo M – Verificação ao estado limite último de punçoamento nas lajes

Laje do piso -2																		
Pilar	N _{pilar,Acima} [KN]	M _{ed,x,Acima} [KNm]	M _{ed,y,Acima} [KNm]	N _{pilar,baixo} [KN]	M _{ed,x,baixo} [KNm]	M _{ed,y,baixo} [KNm]	V _{ed} [KN]	M _{ed,x} [KNm]	M _{ed,y} [KNm]	e _x [m]	e _y [m]	d [m]	D [m]	b _x [m]	b _y [m]	u ₀ [m]	β	V _{ed} [MPa]
P7	5862.252	-206.555	-199.452	6209.845	196.378	187.378	347.593	402.93	386.830	1.159	1.113	0.27	0.700	---	---	2.199	2.702	1.582
P11	4241.468	264.303	135.827	4679.569	-209.901	413.184	438.101	474.20	277.357	1.082	0.633	0.27	0.700	---	---	2.199	2.328	1.718
P12	4029.925	-184.202	150.765	4508.638	-155.363	-402.393	478.713	28.84	553.158	0.060	1.156	0.27	0.700	---	---	2.199	2.225	1.794
P13	4097.082	-123.910	-189.923	4408.571	-122.148	439.017	311.489	1.76	628.940	0.006	2.019	0.27	0.700	---	---	2.199	3.138	1.646
P14	4061.137	1019.152	224.641	4483.644	1341.700	-207.943	422.507	322.55	432.584	0.763	1.024	0.27	---	1.98	1.48	2.600	2.315	1.393
P15	2200.012	-91.331	-108.946	2341.961	-72.670	-84.558	141.949	18.66	24.388	0.131	0.172	0.27	0.700	---	---	2.199	1.229	0.294
P18	1224.231	-171.949	99.935	1720.115	45.182	-77.747	495.884	217.13	177.682	0.438	0.358	0.27	0.700	---	---	2.199	1.599	1.336
P19	944.259	-29.658	28.250	1183.421	32.318	-31.836	239.162	61.98	60.086	0.259	0.251	0.27	0.700	---	---	2.199	1.382	0.557
P21	339.950	-40.481	27.868	478.918	-33.439	-23.122	138.968	7.04	50.990	0.051	0.367	0.27	0.700	---	---	2.199	1.392	0.326

Anexo M. 1 – Esforços utilizados no cálculo e na verificação do punçoamento na laje do piso -2

Laje piso -2									
Pilar	$C_{Rd,c}$	k	$A_{sx}[cm^2/m]$	$A_{sy}[cm^2/m]$	ρ_x	ρ_y	ρ_l	$v_{Rdc}[Mpa]$	$v_{Rd,max}[Mpa]$
P7	0.12	1.861	12.800	18.670	0.0047	0.0069	0.0057	0.576	5.280
P11	0.12	1.861	12.800	18.670	0.0047	0.0069	0.0057	0.576	5.280
P12	0.12	1.861	12.800	12.800	0.0047	0.0047	0.0047	0.541	5.280
P13	0.12	1.861	18.670	12.800	0.0069	0.0047	0.0057	0.576	5.280
P14	0.12	1.861	18.670	10.540	0.0069	0.0039	0.0052	0.558	5.280
P15	0.12	1.861	10.540	5.270	0.0039	0.0020	0.0028	0.452	5.280
P18	0.12	1.861	10.540	10.540	0.0039	0.0039	0.0039	0.507	5.280
P19	0.12	1.861	5.270	0.001	0.0020	0.0000	0.0000	0.087	5.280
P21	0.12	1.861	5.270	5.270	0.0020	0.0020	0.0020	0.402	5.280

Anexo M. 2 – Valor da tensão resistente ao punçoamento sem armadura específica e valor da tensão resistente máxima na laje do piso -2

Laje piso -2								
Pilar	u_l	$v_{ed}[Mpa]$	$v_{Rdc}[Mpa]$	$v_{ed} < v_{Rd,c}$	$f_{ywd,ef}[Mpa]$	d/S_r	$A_{sw}[cm^2]$	Pormenorização
P7	5.592	0.622	0.576	Não Verifica	317.50	1.80	3.345	Ø8 (4r//0.15)
P11	5.592	0.675	0.576	Não Verifica			4.287	Ø8 (4r//0.15)
P12	5.592	0.706	0.541	Não Verifica			5.281	Ø8 (4r//0.15)
P13	5.592	0.647	0.576	Não Verifica			3.793	Ø8 (4r//0.15)
P14	5.993	0.604	0.558	Não Verifica			3.513	Ø8 (3r//0.15)
P15	5.592	0.116	0.452	Verifica			---	---
P18	5.592	0.525	0.507	Não Verifica			2.553	Ø8 (4r//0.15)
P19	5.592	0.219	0.087	Não Verifica			2.711	Ø8 (4r//0.15)
P21	5.592	0.128	0.402	Verifica			---	---

Anexo M. 3 – Armaduras de punçoamento nos pilares da laje do piso -2

Laje do piso -1																		
Pilar	N _{pilar,Acima} [KN]	M _{ed,x,Acima} [KNm]	M _{ed,y,Acima} [KNm]	N _{pilar,baixo} [KN]	M _{ed,x,baixo} [KNm]	M _{ed,y,baixo} [KNm]	V _{ed} [KN]	M _{ed,x} [KNm]	M _{ed,y} [KNm]	e _x [m]	e _y [m]	d [m]	D [m]	b _x [m]	b _y [m]	u ₀ [m]	β	V _{ed} [MPa]
P7	5489.469	210.226	207.980	5862.252	-206.555	-199.452	372.783	416.781	407.432	1.118	1.093	0.27	0.700	---	---	2.199	2.656	1.667
P11	3943.420	-328.834	144.318	4241.468	264.303	135.827	298.048	593.137	8.491	1.990	0.028	0.27	0.700	---	---	2.199	3.108	1.560
P12	3431.911	-246.194	-152.380	4029.925	-184.202	150.765	598.014	61.992	303.145	0.104	0.507	0.27	0.700	---	---	2.199	1.548	1.559
P13	3367.344	-141.398	193.295	4097.082	-123.910	-189.923	729.738	17.488	383.218	0.024	0.525	0.27	0.700	---	---	2.199	1.557	1.913
P14	3562.631	889.631	-209.042	4061.137	1019.152	224.641	498.506	129.521	433.683	0.260	0.870	0.27	---	1.98	1.48	2.600	1.852	1.315
P15	2234.943	-115.959	-205.665	2200.012	-91.331	-108.946	34.931	24.628	96.719	0.705	2.769	0.27	0.700	---	---	2.199	4.026	0.237
P18	708.528	-31.962	-111.906	1224.231	-171.949	99.935	515.703	139.987	211.841	0.271	0.411	0.27	0.700	---	---	2.199	1.521	1.321
P19	689.746	-19.559	-25.431	944.259	-29.658	28.250	254.513	10.099	53.681	0.040	0.211	0.27	0.700	---	---	2.199	1.227	0.526
P21	238.177	-44.801	-28.888	339.950	-40.481	27.868	101.773	4.320	56.756	0.042	0.558	0.27	0.700	---	---	2.199	1.592	0.273

Anexo M. 4 – Esforços utilizados no cálculo e na verificação do punçoamento na laje do piso -1

Laje piso -1									
Pilar	$C_{Rd,c}$	k	$A_{sx}[\text{cm}^2/\text{m}]$	$A_{sy}[\text{cm}^2/\text{m}]$	ρ_x	ρ_y	ρ_l	$v_{Rdc}[\text{Mpa}]$	$v_{Rds,max}[\text{Mpa}]$
P7	0.12	1.861	12.800	18.670	0.0047	0.0069	0.0057	0.576	5.280
P11	0.12	1.861	12.800	18.670	0.0047	0.0069	0.0057	0.576	5.280
P12	0.12	1.861	12.800	12.800	0.0047	0.0047	0.0047	0.541	5.280
P13	0.12	1.861	18.670	12.800	0.0069	0.0047	0.0057	0.576	5.280
P14	0.12	1.861	18.670	10.540	0.0069	0.0039	0.0052	0.558	5.280
P15	0.12	1.861	10.540	5.270	0.0039	0.0020	0.0028	0.452	5.280
P18	0.12	1.861	10.540	10.540	0.0039	0.0039	0.0039	0.507	5.280
P19	0.12	1.861	5.270	0.001	0.0020	0.0000	0.0000	0.087	5.280
P21	0.12	1.861	5.270	5.270	0.0020	0.0020	0.0020	0.402	5.280

Anexo M. 5 – Valor da tensão resistente ao punção sem armadura específica e valor da tensão resistente máxima na laje do piso -1

Laje piso -1								
Pilar	u_l	$v_{ed}[\text{Mpa}]$	$v_{Rdc}[\text{Mpa}]$	$v_{ed} < v_{Rdc}$	$f_{ywd,ef}[\text{Mpa}]$	d/S_r	$A_{sw}[\text{cm}^2]$	Pormenorização
P7	5.592	0.656	0.576	Não Verifica	317.50	1.80	3.939	Ø8 (4r//0.15)
P11	5.592	0.613	0.576	Não Verifica			3.195	Ø8 (4r//0.15)
P12	5.592	0.613	0.541	Não Verifica			3.652	Ø8 (4r//0.15)
P13	5.592	0.752	0.576	Não Verifica			5.641	Ø8 (4r//0.15)
P14	5.993	0.570	0.558	Não Verifica			2.872	Ø8 (3r//0.15)
P15	5.592	0.093	0.452	Verifica			---	---
P18	5.592	0.520	0.507	Não Verifica			2.455	Ø8 (4r//0.15)
P19	5.592	0.207	0.087	Não Verifica			2.498	Ø8 (4r//0.15)
P21	5.592	0.107	0.402	Verifica			---	---

Anexo M. 6 – Armaduras de punção nos pilares da laje do piso -1

Laje do piso 0																		
Pilar	N _{pilar,Acima} [KN]	M _{ed,x,Acima} [KNm]	M _{ed,y,Acima} [KNm]	N _{pilar,baixo} [KN]	M _{ed,x,baixo} [KNm]	M _{ed,y,baixo} [KNm]	V _{ed} [KN]	M _{ed,x} [KNm]	M _{ed,y} [KNm]	e _x [m]	e _y [m]	d [m]	D [m]	b _x [m]	b _y [m]	u ₀ [m]	β	V _{ed} [Mpa]
P7	4995.430	-99.909	99.909	5489.469	210.226	207.980	494.039	310.135	108.071	0.628	0.219	0.27	0.700	---	---	2.199	1.704	1.418
P11	3040.294	-204.799	76.008	3943.420	-328.834	144.318	903.126	124.035	68.310	0.137	0.076	0.27	0.700	---	---	2.199	1.166	1.774
P12	2731.739	-87.632	-73.200	3431.911	-246.194	-152.380	700.172	158.562	79.180	0.226	0.113	0.27	0.700	---	---	2.199	1.268	1.495
P13	2532.486	-76.464	-68.649	3367.344	-141.398	193.295	834.858	64.934	261.944	0.078	0.314	0.27	0.700	---	---	2.199	1.342	1.887
P14	2909.691	-698.518	128.906	3562.631	889.631	-209.042	652.940	191.113	337.948	0.293	0.518	0.27	---	1.98	1.48	2.600	1.590	1.479
P15	2460.297	-64.750	73.698	2234.943	-115.959	-205.665	225.354	51.209	279.363	0.227	1.240	0.27	0.700	---	---	2.199	2.335	0.886
P18	141.156	-28.426	22.305	708.528	-31.962	-111.906	567.372	3.536	134.211	0.006	0.237	0.27	0.700	---	---	2.199	1.251	1.195
P19	431.038	17.770	20.105	689.746	-19.559	-25.431	258.708	37.329	45.536	0.144	0.176	0.27	0.700	---	---	2.199	1.241	0.541
P21	135.833	-45.416	-21.579	238.177	-44.801	-28.888	102.344	0.615	7.309	0.006	0.071	0.27	0.700	---	---	2.199	1.076	0.185

Anexo M. 7 – Esforços utilizados no cálculo e na verificação do punçoamento na laje do piso 0

Laje piso 0									
Pilar	$C_{Rd,c}$	k	$As_x[cm^2/m]$	$As_y[cm^2/m]$	ρ_x	ρ_y	ρ_l	$v_{Rdc}[Mpa]$	$v_{Rd,max}[Mpa]$
P7	0.12	1.861	12.800	18.670	0.0047	0.0069	0.0057	0.576	5.280
P11	0.12	1.861	10.540	18.670	0.0039	0.0069	0.0052	0.558	5.280
P12	0.12	1.861	12.800	12.800	0.0047	0.0047	0.0047	0.541	5.280
P13	0.12	1.861	12.800	12.800	0.0047	0.0047	0.0047	0.541	5.280
P14	0.12	1.861	12.800	12.800	0.0047	0.0047	0.0047	0.541	5.280
P15	0.12	1.861	5.270	5.270	0.0020	0.0020	0.0020	0.402	5.280
P18	0.12	1.861	12.800	10.540	0.0047	0.0039	0.0043	0.524	5.280
P19	0.12	1.861	5.270	5.270	0.0020	0.0020	0.0020	0.402	5.280
P21	0.12	1.861	5.270	5.270	0.0020	0.0020	0.0020	0.402	5.280

Anexo M. 8 – Valor da tensão resistente ao punçoamento sem armadura especifica e valor da tensão resistente máxima na laje do piso 0

Laje piso 0									
Pilar	u_l	$v_{ed}[Mpa]$	$v_{Rdc}[Mpa]$	$v_{ed} < v_{Rd,c}$	$f_{ywd,ef}[Mpa]$	d/S_r	$A_{sw}[cm^2]$	Pormenorização	
P7	5.592	0.558	0.576	Verifica	317.50	1.80	---	---	
P11	5.592	0.697	0.558	Não Verifica			4.917	Ø8 (4r//0.15)	
P12	5.592	0.588	0.541	Não Verifica			3.211	Ø8 (4r//0.15)	
P13	5.592	0.742	0.541	Não Verifica			5.927	Ø8 (4r//0.15)	
P14	5.993	0.642	0.541	Não Verifica			4.452	Ø8 (3r//0.15)	
P15	5.592	0.348	0.402	Verifica			---	---	
P18	5.592	0.470	0.524	Verifica			---	---	
P19	5.592	0.213	0.402	Verifica			---	---	
P21	5.592	0.073	0.402	Verifica			---	---	

Anexo M. 9 – Armaduras de punçoamento nos pilares da laje do piso 0

Laje do piso 1																		
Pilar	N _{pilar,Acima} [KN]	M _{ed,x,Acima} [KNm]	M _{ed,y,Acima} [KNm]	N _{pilar,baixo} [KN]	M _{ed,x,baixo} [KNm]	M _{ed,y,baixo} [KNm]	V _{ed} [KN]	M _{ed,x} [KNm]	M _{ed,y} [KNm]	e _x [m]	e _y [m]	d [m]	D [m]	b _x [m]	b _y [m]	u ₀ [m]	β	V _{ed} [Mpa]
P7	2675.390	102.992	102.992	3508.599	93.875	93.875	833.209	9.117	9.117	0.011	0.011	0.27	---	1.58	1.58	2.000	1.018	1.570

Laje do piso 2																		
Pilar	N _{pilar,Acima} [KN]	M _{ed,x,Acima} [KNm]	M _{ed,y,Acima} [KNm]	N _{pilar,baixo} [kN]	M _{ed,x,baixo} [KNm]	M _{ed,y,baixo} [KNm]	V _{ed} [KN]	M _{ed,x} [KNm]	M _{ed,y} [KNm]	e _x [m]	e _y [m]	d [m]	D [m]	b _x [m]	b _y [m]	u ₀ [m]	β	V _{ed} [Mpa]
P7	1864.804	72.958	72.958	2675.390	102.992	102.992	810.586	30.034	30.034	0.037	0.037	0.27	---	1.58	1.58	2.000	1.060	1.591

Laje do piso 3																		
Pilar	N _{pilar,Acima} [KN]	Med,x,Acima [KNm]	Med,y,Acima [KNm]	N _{pilar,baixo} [KN]	Med,x,baixo [KNm]	Med,y,baixo [KNm]	V _{ed} [KN]	Med,x [KNm]	Med,y [KNm]	e _x [m]	e _y [m]	d [m]	D [m]	b _x [m]	b _y [m]	u ₀ [m]	β	V _{ed} [Mpa]
P7	1089.652	39.235	39.235	1864.804	72.958	72.958	775.152	33.723	33.723	0.044	0.044	0.27	---	1.58	1.58	2.000	1.070	1.536

Laje do piso 4																		
Pilar	N _{pilar,Acima} [KN]	M _{ed,x,Acima} [KNm]	M _{ed,y,Acima} [KNm]	N _{pilar,baixo} [KN]	M _{ed,x,baixo} [KNm]	M _{ed,y,baixo} [KNm]	V _{ed} [KN]	M _{ed,x} [KNm]	M _{ed,y} [KNm]	e _x [m]	e _y [m]	d [m]	D [m]	b _x [m]	b _y [m]	u ₀ [m]	β	V _{ed} [Mpa]
P7	391.603	7.832	-7.832	1089.652	39.235	39.235	698.049	31.403	47.067	0.045	0.067	0.27	---	1.58	1.58	2.000	1.092	1.412

Anexo M. 10 – Esforços utilizados no cálculo e na verificação do punção do pilar P7, nas lajes dos pisos 1, 2, 3 e 4

Laje piso 1									
Pilar	$C_{Rd,c}$	k	$A_{sx}[cm^2/m]$	$A_{sy}[cm^2/m]$	ρ_x	ρ_y	ρ_l	$v_{Rdc}[Mpa]$	$v_{Rd,max}[Mpa]$
P7	0.12	1.861	10.540	12.800	0.0039	0.0047	0.0043	0.524	5.280

Laje piso 2									
Pilar	$C_{Rd,c}$	k	$A_{sx}[cm^2/m]$	$A_{sy}[cm^2/m]$	ρ_x	ρ_y	ρ_l	$v_{Rdc}[Mpa]$	$v_{Rd,max}[Mpa]$
P7	0.12	1.861	10.540	12.800	0.0039	0.0047	0.0043	0.524	5.280

Laje piso 3									
Pilar	$C_{Rd,c}$	k	$A_{sx}[cm^2/m]$	$A_{sy}[cm^2/m]$	ρ_x	ρ_y	ρ_l	$v_{Rdc}[Mpa]$	$v_{Rd,max}[Mpa]$
P7	0.12	1.861	10.540	12.800	0.0039	0.0047	0.0043	0.524	5.280

Laje piso 4									
Pilar	$C_{Rd,c}$	k	$A_{sx}[cm^2/m]$	$A_{sy}[cm^2/m]$	ρ_x	ρ_y	ρ_l	$v_{Rdc}[Mpa]$	$v_{Rd,max}[Mpa]$
P7	0.12	1.861	10.540	12.800	0.0039	0.0047	0.0043	0.524	5.280

Anexo M. 11 – Valor da tensão resistente ao punçoamento sem armadura específica e valor da tensão resistente máxima do pilar P7 nas lajes dos pisos 1, 2, 3 e 4

Laje piso 1								
Pilar	u_1	v_{ed} [Mpa]	v_{Rdc} [Mpa]	$v_{ed} < v_{rd,c}$	$f_{ywd,ef}$ [Mpa]	d/S_r	A_{sw} [cm ²]	Pormenorização
P7	5.393	0.582	0.524	Não Verifica	317.50	1.80	3.219	Ø8 (3r//0.15)

Laje piso 2								
Pilar	u_1	v_{ed} [Mpa]	v_{Rdc} [Mpa]	$v_{ed} < v_{rd,c}$	$f_{ywd,ef}$ [Mpa]	d/S_r	A_{sw} [cm ²]	Pormenorização
P7	5.393	0.590	0.524	Não Verifica	317.50	1.80	3.348	Ø8 (3r//0.15)

Laje piso 3								
Pilar	u_1	v_{ed} [Mpa]	v_{Rdc} [Mpa]	$v_{ed} < v_{rd,c}$	$f_{ywd,ef}$ [Mpa]	d/S_r	A_{sw} [cm ²]	Pormenorização
P7	5.393	0.570	0.524	Não Verifica	317.50	1.80	3.004	Ø8 (3r//0.15)

Laje piso 4								
Pilar	u_1	v_{ed} [Mpa]	v_{Rdc} [Mpa]	$v_{ed} < v_{rd,c}$	$f_{ywd,ef}$ [Mpa]	d/S_r	A_{sw} [m ²]	Pormenorização
P7	5.393	0.524	0.524	Verifica	317.50	1.80	---	---

Anexo M. 12 – Armaduras de punção do pilar P7 das lajes dos pisos 1, 2, 3 e 4

Anexo N – Fundações

Vigas	Largura [m]	Altura[m]	Comprimento [m]
VF1	0.25	0.50	6.64
VF2	0.25	0.50	5.20
VF3	0.25	0.50	8.91
VF4	0.25	0.50	5.76
VF5	0.25	0.50	5.82
VF6	0.25	0.50	3.97
VF7	0.25	0.50	4.42
VF8	0.25	0.50	4.49
VF9	0.25	0.50	4.01
VF10	0.25	0.50	5.35
VF11	0.25	0.50	7.26
VF12	0.25	0.50	7.33
VF13	0.25	0.50	4.18
VF14	0.25	0.50	4.46
VF15	0.25	0.50	10.13
VF16	0.25	0.50	8.28
VF17	0.25	0.50	7.99
VF18	0.25	0.50	7.99
VF19	0.25	0.50	8.05
VF20	0.25	0.50	3.47
VF21	0.25	0.50	4.33
VF22	0.25	0.50	5.15
VF23	0.25	0.50	5.02
VF24	0.25	0.50	5.50
VF25	0.25	0.50	7.36
VF26	0.25	0.50	8.75
VF27	0.25	0.50	9.07
VF28	0.25	0.50	7.63
VF29	0.25	0.50	7.62
VF30	0.25	0.50	7.63
VF31	0.25	0.50	8.02
VF32	0.25	0.50	5.72

Anexo N. 1 – Características das vigas de fundações

Vigas de Fundação		Armadura (Sap 2000) [cm²]			Armadura longitudinal adotada [cm²]					
Viga	Face	As _{início}	As _{meio Vão}	As _{Final}	Início		Meio vão		Fim	
					Ø	As[cm²]	Ø	As[cm²]	Ø	As[cm²]
VF1	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF2	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF3	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF4	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF5	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF6	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF7	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF8	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF9	Superior	0.00	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF10	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF11	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF12	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF13	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF14	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF15	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03

Anexo N.2 - Armadura longitudinal adotada nas vigas de fundação (VF1 aVF15)

Vigas de Fundação		Armadura (Sap 2000) [cm²]			Armadura longitudinal adotada [cm²]					
Viga	Face	ASinício	ASmeio Vão	ASFinal	Início		Meio vão		Fim	
					Ø	As[cm²]	Ø	As[cm²]	Ø	As[cm²]
VF16	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF17	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF18	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF19	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF20	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF21	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF22	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF23	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF24	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF25	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF26	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF27	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF28	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF29	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF30	Superior	4.25	0.00	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF31	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
VF32	Superior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03
	Inferior	4.25	4.25	4.25	3Ø16	6.03	3Ø16	6.03	3Ø16	6.03

Anexo N. 3 - Armadura longitudinal adotada nas vigas de fundação (VF16 aVF32)

Vigas de fundação	Armadura (Sap 2000) [cm ²]			Armadura transversal adotada [cm ²]					
	AS _{início}	AS _{meio Vão}	AS _{Final}	Início		Meio vão		Fim	
				Ø	As[cm ² /m]	Ø	As[cm ² /m]	Ø	As[cm ² /m]
VF1	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF2	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF3	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF4	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF5	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF6	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF7	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF8	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF9	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF10	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF11	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF12	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF13	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF14	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF15	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF16	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF17	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF18	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF19	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF20	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF21	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF22	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF23	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF24	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF25	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF26	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF27	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF28	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF29	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF30	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF31	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00
VF32	2.74	2.74	2.74	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00	Ø8//0.25 (2r)	4.00

Anexo N.4 - Armadura transversal adotada nas vigas de fundação

Sapata	Áreapilares [m ²]	NedGeo[KN]	NedFundamental[KN]	NedSismica[KN]	ÁreaminSapata[m ²]
S(P6)	0.160	833.118	1088.073	978.836	1.398
S(P7)	0.385	5663.117	7386.771	5099.229	16.180
S(P8)	0.360	3239.181	4241.951	3518.505	5.026
S(P10)	0.160	683.320	891.340	701.100	1.002
S(P11)	0.385	4173.893	5468.217	4091.419	11.925
S(P12)	0.385	3950.422	5176.129	4005.147	5.722
S(P13)	0.385	4125.811	5403.058	4257.718	6.082
S(P14)	0.360	4088.246	5360.565	4432.557	6.332
S(P15)	0.385	1972.977	2593.947	2215.388	---
S(P16)	0.160	835.520	1098.155	966.177	---
S(P15 e P16)	---	2808.497	3692.103	3181.565	4.545
S(P18)	0.385	1511.019	1970.123	1425.349	4.317
S(P19)	0.385	1058.874	1388.140	1055.282	3.025
S(P21)	0.385	451.793	593.710	424.300	1.291

Anexo N.5 - Valores dos esforços atuantes utilizados no cálculo das sapatas dos pilares

Sapata	A _x [m]	B _y [m]	Area[m ²]	H[m]	a[m]	b[m]	σ _{solo} [Kpa]
S(P6)	1.50	2.20	3.30	0.50	0.65	0.70	316.620
S(P7)	4.90	4.90	24.01	1.10	2.10	2.10	316.810
S(P8)	3.60	3.60	12.96	0.80	1.50	1.50	324.555
S(P10)	1.40	2.00	2.80	0.50	0.60	0.60	306.271
S(P11)	4.20	4.20	17.64	0.90	1.75	1.75	312.184
S(P12)	4.00	4.00	16.00	0.90	1.65	1.65	324.473
S(P13)	4.10	4.10	16.81	0.90	1.70	1.70	322.574
S(P14)	4.30	3.90	16.77	0.90	1.70	1.75	320.968
S(P15)	---	---	---	---	---	---	---
S(P16)	---	---	---	---	---	---	---
S(P15 e P16)	3.20	3.20	10.24	0.60	1.20	1.20	348.029
S(P18)	2.50	2.50	6.25	0.50	0.90	0.90	303.438
S(P19)	2.10	2.10	4.41	0.50	0.70	0.70	303.030
S(P21)	1.40	1.30	1.82	0.50	0.35	0.30	313.433

Anexo N.6 - Dimensões das sapatas dos pilares

Sapata	d=0.9H [m]	F _{tsdx} [KN]	F _{tsdy} [KN]	A _{sx} [cm ² /m]	Pormenorização	A _{sxeff} [cm ² /m]	A _{sy} [cm ² /m]	Pormenorização	A _{syeff} [cm ² /m]
S(P6)	0.45	377.305	406.328	4.928	Ø10//0.15	5.270	7.784	Ø10//0.10	7.900
S(P7)	0.99	4033.812	4033.812	23.656	Ø20//0.125	25.120	23.656	Ø20//0.125	25.120
S(P8)	0.72	2190.749	2190.749	17.487	Ø16//0.10	20.100	17.487	Ø16//0.10	20.100
S(P10)	0.45	285.853	285.853	4.107	Ø10//0.15	5.270	5.867	Ø10//0.125	6.320
S(P11)	0.81	2974.417	2974.417	20.350	Ø20//0.15	20.930	20.350	Ø20//0.15	20.930
S(P12)	0.81	2643.856	2643.856	18.993	Ø20//0.15	20.930	18.993	Ø20//0.15	20.930
S(P13)	0.81	2845.126	2845.126	19.941	Ø20//0.15	20.930	19.941	Ø20//0.15	20.930
S(P14)	0.81	2824.219	2907.285	20.809	Ø20//0.15	20.930	19.429	Ø20//0.15	20.930
S(P15)	---	---	---	---	---	---	---	---	---
S(P16)	---	---	---	---	---	---	---	---	---
S(P15 e P16)	0.54	1814.907	1814.907	16.298	Ø16//0.10	20.100	16.298	Ø16//0.10	20.100
S(P18)	0.45	948.245	948.245	10.899	Ø12//0.10	11.300	10.899	Ø12//0.10	11.300
S(P19)	0.45	519.697	519.697	7.111	Ø10//0.10	7.900	7.111	Ø10//0.10	7.900
S(P21)	0.45	110.921	95.075	2.452	Ø10//0.20	3.950	1.951	Ø10//0.20	3.950

Anexo N.7- Armadura adotada nas sapatas dos pilares

Sapata	Áreaparede [m ²]	NedGeo[KN]	NedFundamental[KN]	NedSismica[KN]	ÁreaminSapata[m ²]	N _{pilar} +PP _{sapata} [KN]
S(Pb2)	0.638	4942.9138	6478.910	4957.363	7.082	6424.734
S(Pb3a)	0.742	390.9345	513.717	391.304	0.559	491.983
S(Pb3b)	0.742	461.098	604.674	457.125	1.317	574.672
S(Pb5)	0.640	4887.3143	6403.924	5546.082	7.923	6374.709
S(Pb8)	0.673	182.7683	242.0396	175.3697	0.522	242.908
S(Pb11)	0.450	5353.7968	7002.9344	5208.419	15.297	7041.540
S(Pb12)	0.789	5467.6765	7169.061	6650.826	9.501	7117.290
S(Pb15)	0.450	2734.0885	3590.311	3429.412	4.899	3560.919

Anexo N.8 - Valores dos esforços atuantes utilizados no cálculo das sapatas das paredes

Sapata	Ax[m]	By[m]	Area[m ²]	H[m]	a0[m]	b0[m]	σ _{solo} [Kpa]
S(Pb2)	6.19	3.20	19.81	0.80	1.50	1.50	324.350
S(Pb3a)	4.11	0.60	2.47	0.30	0.20	0.20	199.507
S(Pb3b)	4.11	0.60	2.47	0.30	0.20	0.20	233.038
S(Pb5)	6.40	3.20	20.48	0.80	1.60	1.50	311.265
S(Pb8)	0.60	3.77	2.26	0.30	0.20	0.20	107.529
S(Pb11)	5.85	3.80	22.23	0.90	1.80	1.80	316.758
S(Pb12)	6.94	3.20	22.22	0.80	1.50	1.50	320.299
S(Pb15)	4.40	2.50	11.00	0.80	1.45	1.10	323.720

Anexo N.9 - Dimensões das sapatas das paredes

Sapata	d=0.9H [m]	F _{tsdx} [m]	F _{tsdy} [KN]	A _{sx} [cm ² /m]	Pormenorização	A _{sxeff} [cm ² /m]	A _{sy} [cm ² /m]	Pormenorização	A _{syeff} [cm ² /m]
S(Pb2)	0.72	3346.216	3346.216	30.049	Ø20//0.10	31.400	15.534	Ø20//0.20	15.700
S(Pb3a)	0.27	91.108	91.108	4.363	Ø10//0.15	5.270	0.637	Ø10//0.20	3.950
S(Pb3b)	0.27	159.631	106.421	7.645	Ø10//0.10	7.9	0.744	Ø10//0.20	3.950
S(Pb5)	0.72	3541.505	3320.161	31.802	Ø20//0.075	41.870	14.907	Ø20//0.20	15.700
S(Pb8)	0.27	44.983	44.983	0.343	Ø10//0.20	3.950	2.154	Ø10//0.20	3.950
S(Pb11)	0.81	3911.967	3911.967	29.582	Ø20//0.10	31.400	19.216	Ø20//0.15	20.930
S(Pb12)	0.72	3706.922	3706.922	33.288	Ø20//0.075	41.870	15.340	Ø20//0.15	20.930
S(Pb15)	0.72	1792.824	1360.073	20.607	Ø20//0.15	20.930	8.882	Ø20//0.25	12.560

Anexo N.10 - Armaduras adotadas nas sapatas das paredes

Sapata	Dimensões			Armaduras				
	A _x [m]	B _y [m]	H [m]	A _{sx,inf} [cm ² /m]	A _{sx,sup} [cm ² /m]	A _{sy,inf} [cm ² /m]	A _{sy,sup} [cm ² /m]	A _{slateral}
S(P6)	1.50	2.20	0.50	Ø10//0.15	Ø10//0.15	Ø10//0.10	Ø10//0.10	3Ø10
S(P7)	4.90	4.90	1.10	Ø20//0.125	Ø20//0.125	Ø20//0.125	Ø20//0.125	4Ø20
S(P8)	3.60	3.60	0.80	Ø16//0.10	Ø16//0.10	Ø16//0.10	Ø16//0.10	3Ø16
S(P10)	1.40	2.00	0.50	Ø10//0.15	Ø10//0.15	Ø10//0.125	Ø10//0.125	3Ø10
S(P11)	4.20	4.20	0.90	Ø20//0.15	Ø20//0.15	Ø20//0.15	Ø20//0.15	3Ø20
S(P12)	4.00	4.00	0.90	Ø20//0.15	Ø20//0.15	Ø20//0.15	Ø20//0.15	3Ø20
S(P13)	4.10	4.10	0.90	Ø20//0.15	Ø20//0.15	Ø20//0.15	Ø20//0.15	3Ø20
S(P14)	4.30	3.90	0.90	Ø20//0.15	Ø20//0.15	Ø20//0.15	Ø20//0.15	3Ø20
S(P15 e P16)	3.20	3.20	0.60	Ø16//0.10	Ø16//0.10	Ø16//0.10	Ø16//0.10	3Ø16
S(P18)	2.50	2.50	0.50	Ø12//0.10	Ø12//0.10	Ø12//0.10	Ø12//0.10	3Ø12
S(P19)	2.10	2.10	0.50	Ø10//0.10	Ø10//0.10	Ø10//0.10	Ø10//0.10	3Ø10
S(P21)	1.40	1.30	0.50	Ø10//0.20	Ø10//0.20	Ø10//0.20	Ø10//0.20	3Ø10

Anexo N.11 – Armaduras adotadas nas sapatas dos pilares

Sapata	Dimensões			Armaduras				
	A _x [m]	B _y [m]	H [m]	A _{sx,inf} [cm ² /m]	A _{sx,sup} [cm ² /m]	A _{sy,inf} [cm ² /m]	A _{sy,sup} [cm ² /m]	A _{slateral}
S(Pb2)	6.19	3.20	0.80	Ø20//0.10	Ø20//0.10	Ø20//0.20	Ø20//0.20	3Ø20
S(Pb5)	6.40	3.20	0.80	Ø20//0.075	Ø20//0.075	Ø20//0.20	Ø20//0.20	3Ø20
S(Pb11)	5.85	3.80	0.90	Ø20//0.10	Ø20//0.10	Ø20//0.15	Ø20//0.15	3Ø20
S(Pb12)	6.94	3.20	0.80	Ø20//0.075	Ø20//0.075	Ø20//0.15	Ø20//0.15	3Ø20
S(Pb15)	4.40	2.50	0.80	Ø20//0.15	Ø20//0.15	Ø20//0.25	Ø20//0.25	3Ø20

Anexo N.12 – Armaduras adotadas nas sapatas das paredes

Parede	Área _{parede} [m ²]	Ned _{Geo} [KN]	Ned _{Fundamental} [KN]	Ned _{Sismica} [KN]	Condicionante
Pb4b	0.406	3320.615	4346.79	5018.994	Comb.Geo
Pb9	0.673	5199.723	6806.65	5372.651	Comb.Geo
Pb4b	0.406	3394.497	4443.94	5086.900	Comb.Geo

Anexo N.13 - Valores dos esforços atuantes utilizados no cálculo da sapata do NU1

NU1	$\sum$ Ned _{Geo} [KN]	PP _{Sapata} [KN]	A _x [m]	B _y [m]	H[m]	Área _{Sapata} NU[m ²]	σ_{solo} [Kpa]
	15597.380	3402.000	7.00	8.00	1.800	56.000	339.275

Anexo N.14 - Dimensões da sapata do NU1

Paredes	Ned[KN]	A _x [m]	B _y [m]	d=0.9H[m]	A _{sx} [cm ² /m]	Pormenorização	A _{sx_{eff}} [cm ² /m]
N _{total}	18999.380	7.000	8.000	1.62	26.171	Ø20//0.10	31.40

Anexo N.15 - Armaduras na sapata do NU1 segundo x

Paredes	largura[m]	Ned[KN/m]	Face	Med _{max} [KNm/m]	A _{sy} [cm ² /m]	Pormenorização	A _{sy_{eff}} [cm ² /m]
R1_Pb4a	2.030	2141.276	Extremidade	866.935	15.38	Ø20//0.20	15.70
R2_Pb4b		2189.133	Meio Vão	-1100.450	19.52	Ø20//0.15	20.90

Anexo N.16 - Armaduras na sapata do NU1 segundo y

Parede	Área _{parede} [m ²]	Ned _{Geo} [KN]	Ned _{Fundamental} [KN]	Ned _{Sismica} [KN]	Condicionante
Pb6a	0.354	2472.368	3067.3	3472.428	Comb.Geo
Pb10	0.474	3216.273	4216.77	3550.498	Comb.Geo
Pb6b	0.354	2338.976	3242.75	3305.993	Comb.Geo

Anexo N.17 - Valores dos esforços atuantes utilizados no cálculo da sapata do NU2

NU2	$\sum$ Ned _{Geo} [KN]	PP _{Sapata} [KN]	A _x [m]	B _y [m]	H[m]	Área _{Sapata} NU[m ²]	σ_{solo} [Kpa]
	10526.82	1336.50	6.00	6.00	1.10	36.00	329.54

Anexo N.18 - Dimensões da sapata do NU2

Paredes	Ned[KN]	A _x [m]	B _y [m]	d=0.9H[m]	A _{sx} [cm ² /m]	Pormenorização	A _{sx_{eff}} [cm ² /m]
N _{total}	11863.320	6.000	6.000	0.99	30.345	Ø20//0.10	31.40

Anexo N.19 - Armaduras na sapata do NU2 segundo x

Paredes	largura [m]	Ned[KN/m]	Face	Med _{max} [KNm/m]	As _y [cm ² /m]	Pormenorização	As _{yeff} [cm ² /m]
R1_Pb6a	1.77	1510.985	Extremidade	526.928	15.295	Ø20//0.20	15.70
R2_Pb6b		1597.414	Meio Vão	-453.341	13.159	Ø16//0.15	13.40

Anexo N.20 - Armaduras na sapata do NU2 segundo y

Sapatas Muros de Suporte	Extensão [m]	Espessura[m]	b[m]	σ_{adm} [Kpa]	Ned [KN]	Ned+PP _{Sapata} [KN]	Ned _b [KN/m]
M1	37.790	0.400	1	350.000	26105.290	26150.290	691.990
M2	19.300	0.400	1	350.000	12520.58	12563.330	650.950
M3	20.395	0.400	1	350.000	8659.955	8689.205	426.046
M4	21.520	0.400	1	350.000	5894.671	5912.671	274.752
M5	30.580	0.400	1	350.000	16096.26	16132.260	527.543

Anexo N.21 - Esforços atuantes utilizados no cálculo da sapata contínua do muro de suporte

Sapatas Muros de Suporte	Ax [m]	H[m]	σ_{solo} [kPa]	F _{tsd} [KN/m]	As[cm ² /m]	Pormenorização	As _{eff} [cm ² /m]
M1	2.000	0.9	345.995	1025.170	29.459	20//0.10	31.40
M2	1.900	0.9	342.605	904.097	25.980	20//0.10	31.40
M3	1.300	0.9	327.728	355.038	10.202	Ø12//0.10	11.30
M4	0.800	0.9	343.440	101.760	2.924	Ø10//0.20	3.95
M5	1.600	0.9	329.714	586.159	16.844	Ø20//0.15	20.93

Anexo N.22 - Dimensões e armadura adotada na sapata do muro

Anexo O – Espessura equivalente das escadas, cargas equivalentes utilizadas no processo de modelação e vigas de cobertura

Espessura equivalente devido as CP nas Escadas no SAP2000				
d[m]	h[m]	CP=P _{planço} +P _{prevest} +P _{pdegrau} [KN/m ²]	e[m]	SC[KN/m ²]
0.17	0.20	9.19	0.37	3.00

Anexo O. 1 – Espessuras equivalentes das escadas utilizadas no processo de modelação

Cargas equivalentes consideradas nas vigas das rampas						
d[m]	h[m]	CP=P _{planço} +P _{prevest}	SC[KN/m ²]	vão [m]	R _{1cp} =R _{2cp} [KN/m]	R _{1sc} =R _{2sc} [KN/m]
0.18	0.21	6.25	2.50	4.50	14.06	5.63

Anexo O. 2 – Cargas equivalentes utilizadas nas vigas das rampas no processo de modelação

Vigas	Largura [m]	Altura[m]	Comprimento [m]
VC.1	0.20	0.50	12.05
VC.2	0.20	0.50	15.30
VC.3	0.20	0.50	11.50
VC.4	0.20	0.50	21.10
VC.5	0.20	0.50	11.38
VC.6	0.20	0.50	10.85

Anexo O. 3 – Características das vigas de cobertura

Vigas de Cobertura		Armadura longitudinal adotada [cm ²]					
Viga	Face	Inicio		Meio vão		Fim	
		Ø	As[cm ²]	Ø	As[cm ²]	Ø	As[cm ²]
VC.1	Superior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
	Inferior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
VC.2	Superior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
	Inferior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
VC.3	Superior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
	Inferior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
VC.4	Superior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
	Inferior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
VC.5	Superior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
	Inferior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
VC.6	Superior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28
	Inferior	2Ø20	6.28	2Ø20	6.28	2Ø20	6.28

Anexo O. 4 – Armaduras longitudinais adotadas nas vigas de cobertura

Vigas	Largura [m]	Altura [m]	Comprimento [m]
VC.1	0.20	0.50	12.05
VC.2	0.20	0.50	15.30
VC.3	0.20	0.50	11.50
VC.4	0.20	0.50	21.10
VC.5	0.20	0.50	11.38
VC.6	0.20	0.50	10.85

Anexo O. 5 – Armaduras transversais adotadas nas vigas de cobertura

Anexo P – Controlo das deformações

d/h= 0.90										
β	0.00		0.25		0.50		0.75		1.00	
$\alpha\rho$	I_I/I_c	I_{II}/I_c	I_I/I_c	I_{II}/I_c	I_I/I_c	I_{II}/I_c	I_I/I_c	I_{II}/I_c	I_I/I_c	I_{II}/I_c
0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
0.02	1.04	0.13	1.05	0.13	1.06	0.14	1.07	0.14	1.08	0.14
0.05	1.09	0.29	1.12	0.29	1.14	0.30	1.17	0.30	1.19	0.30
0.10	1.17	0.49	1.23	0.51	1.28	0.52	1.33	0.53	1.38	0.54
0.15	1.25	0.66	1.34	0.69	1.42	0.71	1.50	0.73	1.58	0.75
0.20	1.32	0.79	1.45	0.84	1.56	0.89	1.67	0.93	1.77	0.96
0.25	1.38	0.91	1.55	0.99	1.70	1.05	1.83	1.11	1.96	1.16
0.30	1.44	1.01	1.65	1.12	1.83	1.21	2.00	1.28	2.15	1.35
0.35	1.50	1.10	1.75	1.24	1.97	1.36	2.17	1.46	2.34	1.54
0.40	1.55	1.19	1.85	1.36	2.10	1.50	2.33	1.62	2.54	1.72
0.45	1.60	1.26	1.94	1.47	2.24	1.65	2.50	1.79	2.73	1.91
0.50	1.64	1.33	2.03	1.58	2.37	1.78	2.66	1.95	2.92	2.09

Anexo P. 2 – Tabela utilizada no controlo das deformações