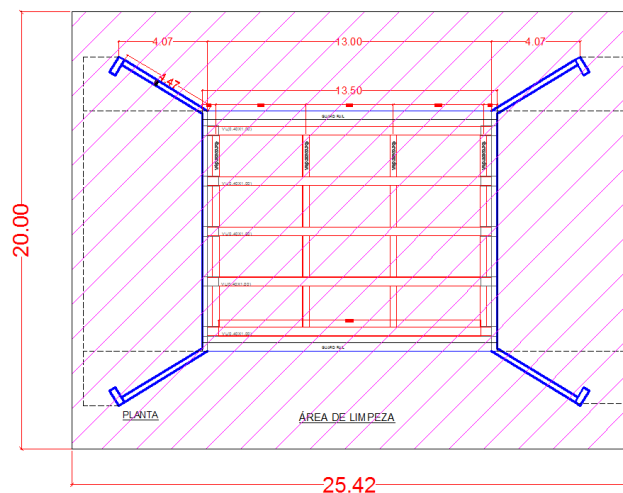


MEMORIAL DE CÁLCULO DOS QUANTITATIVOS

1 – SERVIÇOS PRELIMINARES

1.1- LIMPEZA MANUAL TERRENO AMONT. DE MATERIAL.

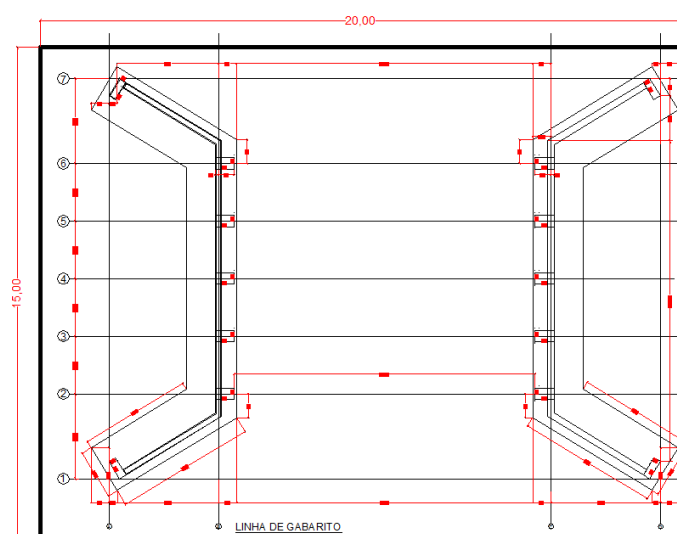


$$20 \times 25,42 = 508,40 \text{ m}^2$$

1.2 - LOCAÇÃO DE CONTAINER, TIPO DEPOSITO ÁREA MÍNIMA DE 4,60 M²
4 meses/un.

1.3- PLACA DE IDENTIFICAÇÃO OBRA
4 x 1,5 = 6 m²

1.4-- LOCAÇÃO DA OBRA.



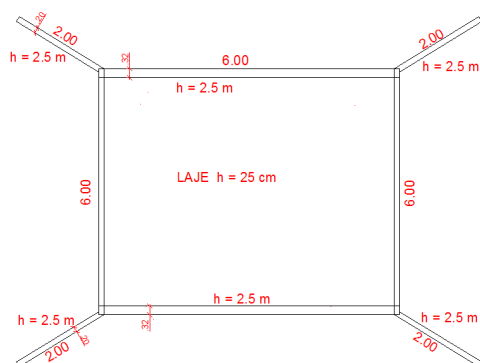
$$\text{Com folga de gabarito} = 20 \times 15 = 300 \text{ m}^2$$

1.5 – Grupo Gerador.

- 22 dias/mês x 8 horas de trabalho x 4 meses = 704 horas

2- DEMOLIÇÃO

2.1- DEMOLIÇÃO DE CONCRETO ARMADO



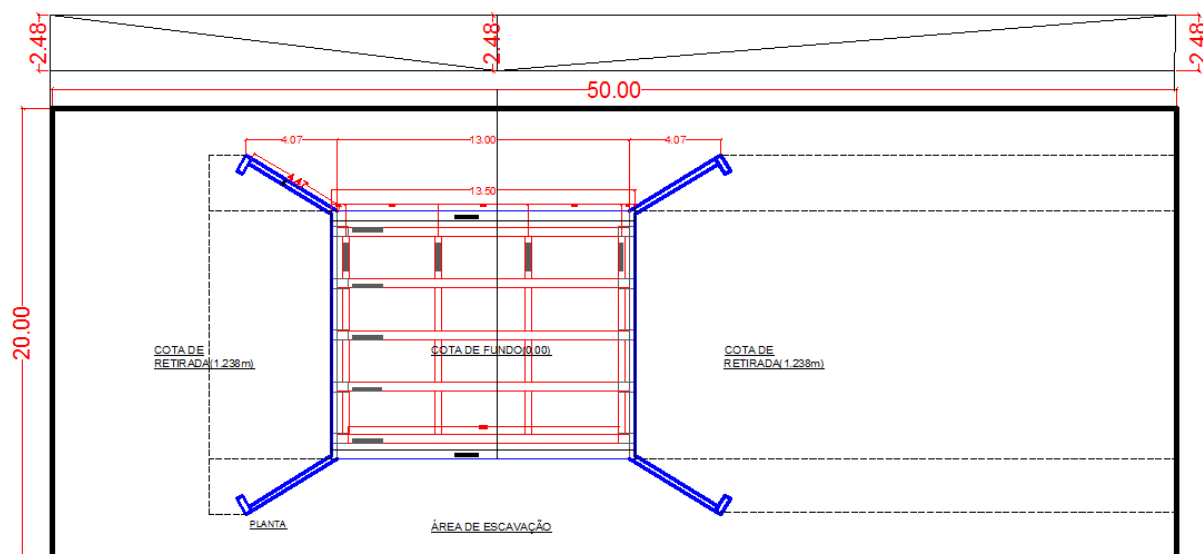
$$V. \text{ demolido} = [(4 \times 2 \times 2,5 \times 0,20) + (6 \times 2 \times 2,5 \times 0,32) + (6 \times 6 \times 0,25)] = 22,60 \text{ m}^3$$

2.2- TRANSPORTE DE MAT.DEMOLIÇÃO (BOTA FORA)

$$= 22,60 \text{ M}^3 \times 7 \text{ KM} = 158,2 \text{ M}^3 \text{ X KM}$$

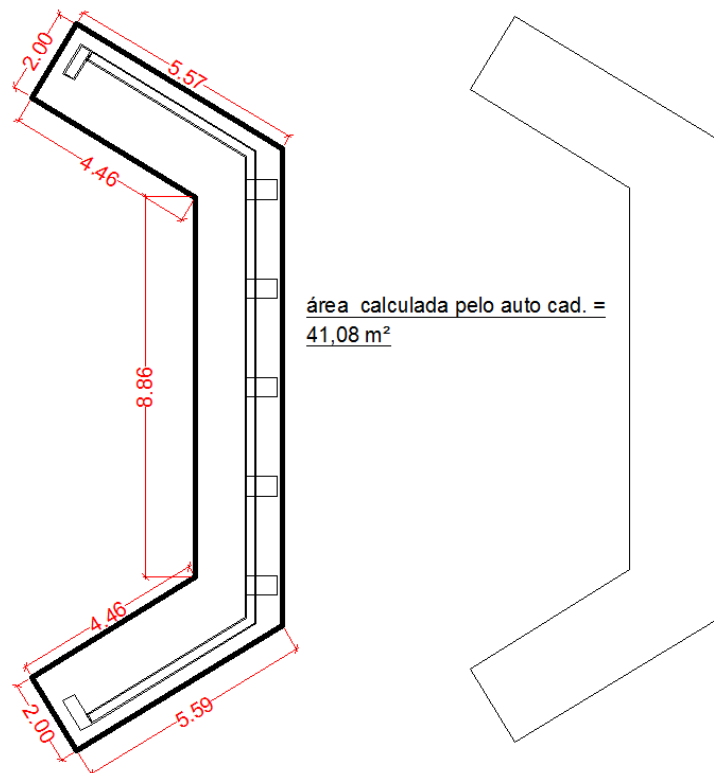
3- INFRAESTRUTURA

3.1 - ESCAVAÇÃO MECANIZADA S/ EXPLOSIVO



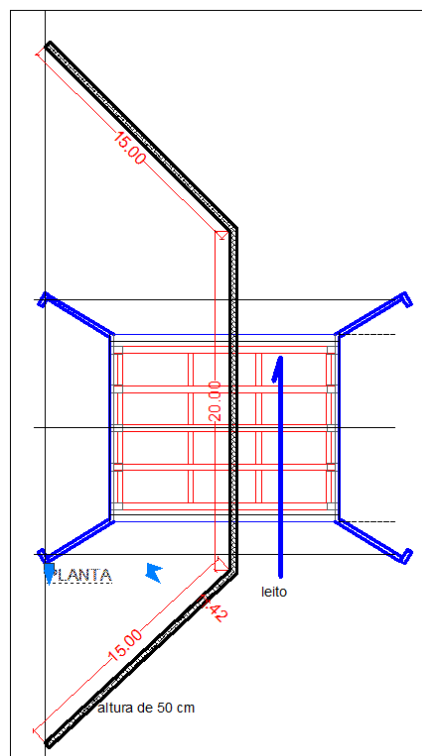
$$= 50 \times 20 \times 2,48/2 = 1.238,00 \text{ m}^3$$

3.2 – ESCAVAÇÃO MANUAL S/ EXPLOSIVO



$$= (2 \times 41.08) \times 0.94 = 76.80 \text{ m}^2$$

3.3 – ENSACADEIRA COM SACOS DE AREIA

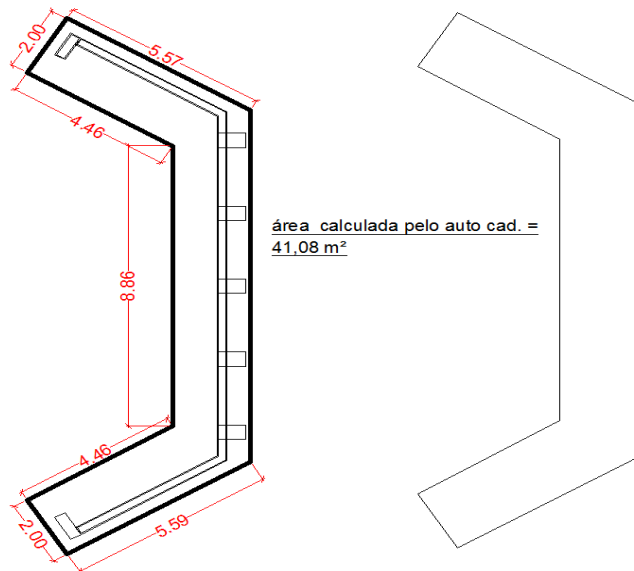


$$= 50 \times 0.50 \times 0.42 = 10.50 \text{ m}^3$$

3.4 – ESGOTAMENTO CONTÍNUO DE ÁGUA.

$$V = 8 \text{ horas} \times \text{vazão} - 4.5 \text{ m}^3 \times 60 \text{ dias} = 2.160 \text{ m}^3$$

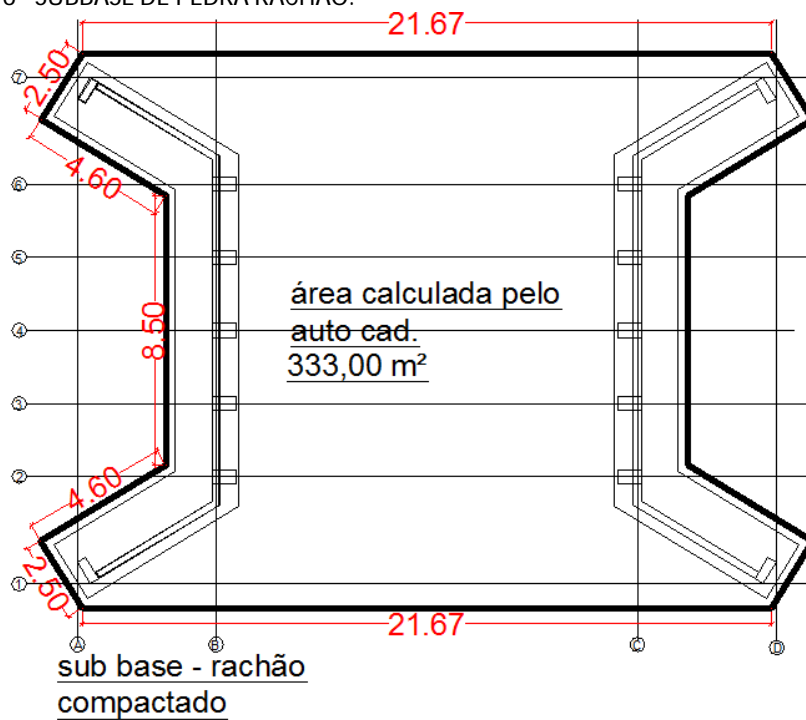
3.5- LASTRO DE CONCRETO SIMPLES 10 MPA



$$= 2 \times 41.08 \times 0.073$$

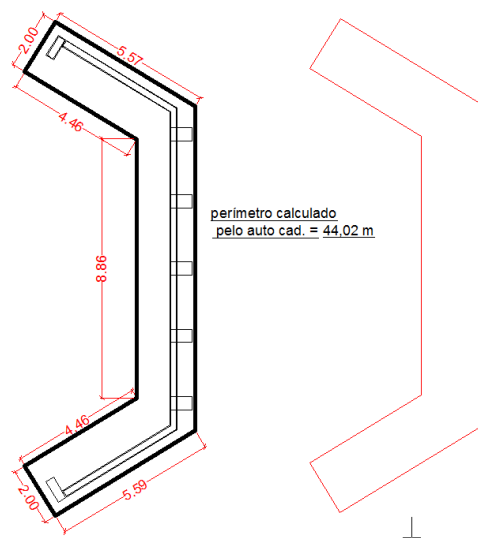
$$(4.37 \times 2 + 11) \times 2 \times 2 \times 0.08 = 6,00 \text{ m}^3$$

3.6 – SUBBASE DE PEDRA RACHÃO.



$$V = 333,00 \times e = \text{média } 0.363 = 121 \text{ m}^3$$

3.7 - FORMAS PLANA PARA CONCRETO COMUM.



$$= (44,02 \times 2) \times 0.80 = 70,00 \text{ m}^2$$

3.8- CONCRETO ESTRUTURAL 30 MPA

$$\text{Volume} = \text{área das formas do item 2.7} \times \text{altura do bloco} \times 0.80 = 70,00 \times 0.80 = 56,00 \text{ m}^3$$

3.9 – BARRA DE AÇO CA-50

TOTAL: 3.693,21 KG

POSICÃO	BITOLA	quant	CORTE(m)	total(m)	total (m) + 10%	Peso unitário	Peso real (Kg)	Peso +10% (Kg)
N0	12.5	200	5.2	1040	1144.00	1	1040.00	1144.00
N1	10	176	VARIÁVEL	976.96	1074.66	0.63	615.48	677.03
N2	16	120	3	360	396.00	1.6	576.00	633.60
N2	16	32	3	96	105.60	1.6	153.60	168.96
N3	8	70	2.2	154	169.40	0.4	61.60	67.76
N4	8	28	2	56	61.60	0.4	22.40	24.64
N4a	8	210	0.55	115.5	127.05	0.4	46.20	50.82
N5	12.5	404	2	808	888.80	1	808.00	888.80
N1a	8	4	VARIÁVEL	85.44	93.98	0.4	34.18	37.59

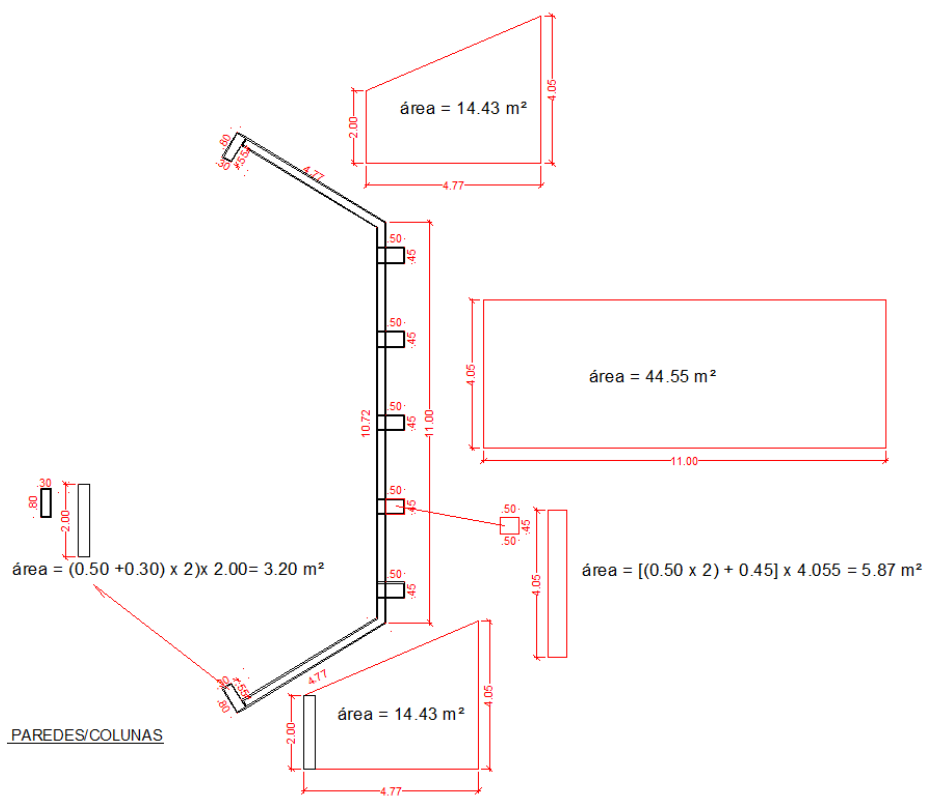
RESUMO DE AÇO CA 50

bitola (Ø)	comp. (m)	kg/m	total (kg)
8	410.94	0.40	164.37
10	976.96	0.63	615.48
12.5	1848.00	1.00	1848.00
16	456.00	1.60	729.60

total = 3.357,46 kg
+ 10% 3.693,21 kg

4- MESOESTRUTURA

4.1 – FORMAS PLANA PARA CONCRETO APARENTE.



$$\text{Área Total} = [4 \times (2 \times 14.43) + (4 \times 3.20) + 2 \times (44.55 \times 2) + 5 \times (2 \times 5.87)] = 364,74 \text{ m}^2$$

4.2 – BARRA DE AÇO CA-50

TOTAL: 2.577,23 KG

POSICÃO	BITOLA	quant	CORTE(m)	total(m)	TOTAL (m) +10%	PESO UNITÁRIO	PESO REAL (kg)	PESO +10% (kg)
N6	16	120	2.9	348	382.80	1.6	556.80	612.48
N7	8	150	2	300	330.00	0.4	120.00	132.00
N8	16	40	1.9	76	83.60	1.6	121.60	133.76
N9	8	36	2	72	79.20	0.4	28.80	31.68
N10	8	108	0.32	34.56	38.02	0.4	13.82	15.21
N11	12.5	164	3.95	647.8	712.58	1	647.80	712.58
N11	12.5	192	VARIÁVEL	538.68	592.55	1	538.68	592.55
N12	8	22	12	264	290.40	0.4	105.60	116.16
N12	8	48	VARIÁVEL	322.08	354.29	0.4	128.83	141.72
N13	8	450	0.45	202.5	222.75	0.4	81.00	89.10

RESUMO DE AÇO CA 50

bitola (Ø)	comp. (m)	kg/m	total (kg)
8	1.195,14	0.40	478,06
12.5	1.186,48	1.00	1.186,48
16	424,00	1.60	678,40

$$\text{total} = 2.342,94 \text{ kg} \\ + 10\% \quad 2.577,23 \text{ kg}$$

4.3 – CONCRETO ESTRUTURAL 30 MPA

- analisando as áreas de formas do item 3.1, tem-se:

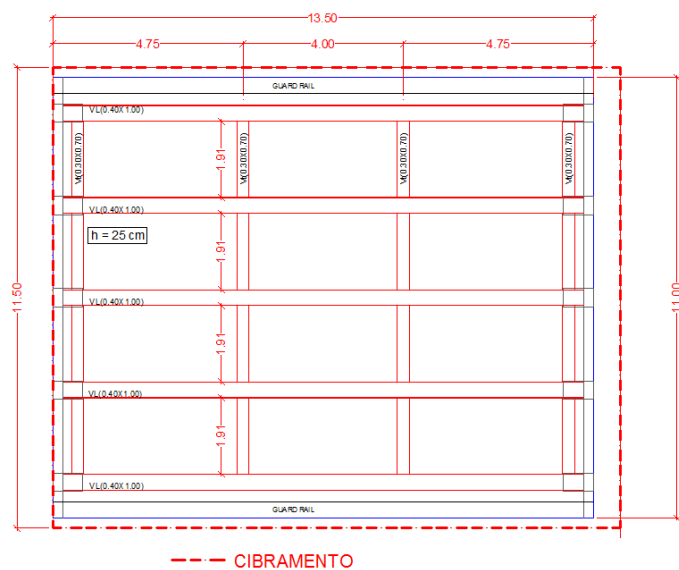
$$\text{Volume} = [(4 \times 0.30 \times 0.80 \times 2.00) + (4 \times 14.43 \times 0.20) + (2 \times 44.55 \times 0.2) + (5 \times 0.45 \times 0.50 \times 4.055)] = 36,00 \text{ m}^3$$

4.4 – BOMBEAMENTO DE CONCRETO

$$\text{Volume do item 3.3} = 36,00 \text{ m}^3$$

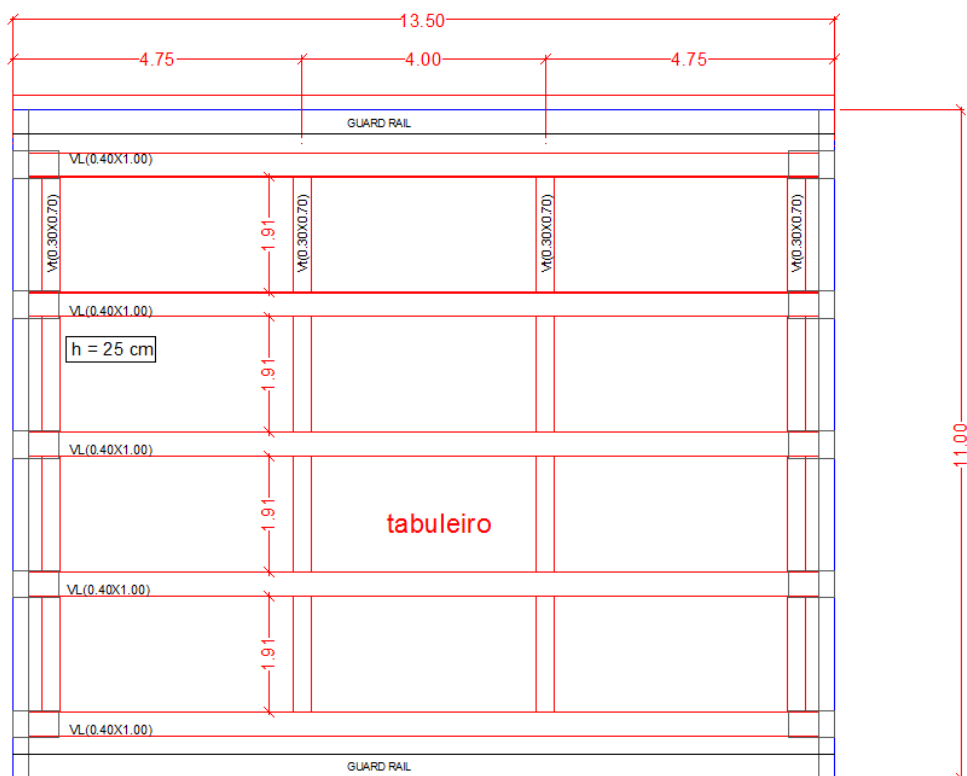
5- SUPERESTRUTURA

5.1 – CIMBRAMENTO PONTE S/ ESTACAS.



$$\text{Área} = 13.50 \times 11.50 = 155,25\text{m}^2 \times 2 \text{ vigamentos} = 310,50 \text{ m}^2$$

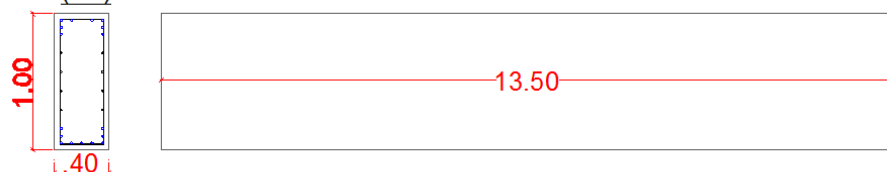
5.2 – FORMAS DE MADEIRA PARA CONCRETO.



formas tabuleiro

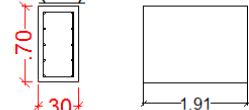
LONGARINAS(40x100)

(5X)

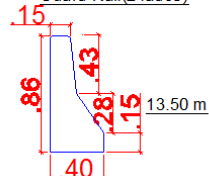


TRANSVERSINAS(30x70)

(4X)



Guard Rail(2 lados)



$$\text{Área} = (13.50 \times 11.00) + 5 \times (13.50 \times 2 \times (.40 + 1.00)) + 16 \times 1.61 \times (2 \times (.30 + 0.70)) + 13.50 \times 2 \times 0.24 = 364,00 \text{ m}^2$$

5.3- BARRA DE AÇO CA-50

TOTAL: 10.558,17 KG

POSIÇÃO	BITOLA	quant	CORTE(m)	total(m)	TOTAL +10% (m)	PESO UNITÁRIO	PESO REAL (kg)	PESO +10% (kg)
N1	25	25	12	300	330.00	4	1200.00	1320.00
N1	25	25	2.15	53.75	59.13	4	215.00	236.50
N1	25	25	2.15	53.75	59.13	4	215.00	236.50
N2	25	10	12	120	132.00	4	480.00	528.00
N2	25	10	1.75	17.5	19.25	4	70.00	77.00
N2	25	10	1.75	17.5	19.25	4	70.00	77.00
N3	25	10	12	120	132.00	4	480.00	528.00
N4	25	20	7.8	156	171.60	4	624.00	686.40
N4	25	20	7.7	154	169.40	4	616.00	677.60
N5	25	10	7.4	74	81.40	4	296.00	325.60
N5	25	10	7.3	73	80.30	4	292.00	321.20
N6	25	10	7.4	74	81.40	4	296.00	325.60
N6	25	10	7.3	73	80.30	4	292.00	321.20
N7	10	40	12	480	528.00	0.63	302.40	332.64
N7	10	40	2.35	94	103.40	0.63	59.22	65.14
N8	8	390	2.5	975	1072.50	0.4	390.00	429.00
N8	8	390	2.75	1072.5	1179.75	0.4	429.00	471.90
N9	10	40	9.5	380	418.00	0.63	239.40	263.34
N10	8	160	1.8	288	316.80	0.4	115.20	126.72
N11	10	240	11.15	2676	2943.60	0.63	1685.88	1854.47
N12	10	108	12	1296	1425.60	0.63	816.48	898.13
N12	10	108	2.65	286.2	314.82	0.63	180.31	198.34
N13	6.3	180	2.65	477	524.70	0.25	119.25	131.18
N14	8	20	12	240	264.00	0.4	96.00	105.60
N14	8	20	2.4	48	52.80	0.4	19.20	21.12

RESUMO DE AÇO CA 50

bitola (Ø)	comp. (m)	kg/m	total (kg)
6.3	477,00	0.25	119,25
8	2.623,50	0.40	1.049,40
10	5.212,20	0.63	3.283,69
25	1.286,50	4.00	5.149,00

total = 9.598,33 kg
+10% 10.558,17 kg

5.4 – CONCRETO ESTRUTURAL 30 MPA.

$$V = \{[(13.50 \times 11,00) \times 0.25] + [(5 \times 13.50) \times (0.40 \times 1.00)] + [(16 \times 1.61) \times (0.30 \times 0.70)] + [(13.50 \times 0.24)]\}$$

$$V = 76.00 \text{ m}^3$$

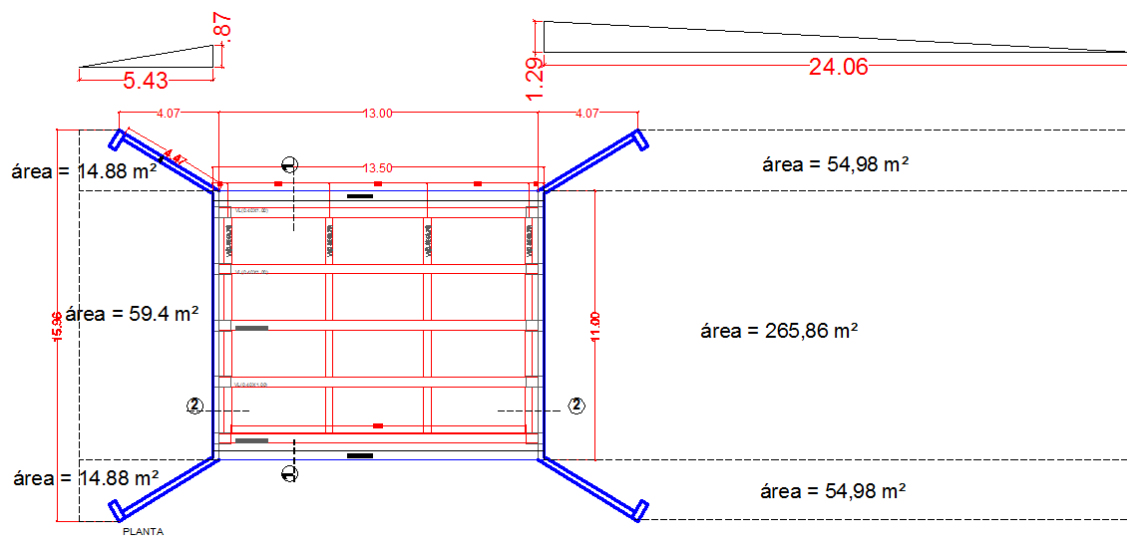
5.5 – BOMBEAMENTO DE CONCRETO.

$$V = 364,50 \text{ média de } 0.1933 \text{ m} = 76,00 \text{ m}^3$$

5.6 – AP NEOPREME FRETADO.

$$= 10 \times 3.0 \times 4.0 \times 0,50 = 60 \text{ DM}^3$$

6 – SERVIÇOS COMPLEMENTARES.



6.1 – TRANSP. MATERIAIS 1/2/CAT. ATE 5 km.

$$= [(265,86 \times 1,29/2) + (59,4 \times 0,87) + (54,28 \times 2 \times 1,29 \times 0,50) + (14,88 \times 2 \times 0,87)] \times 1,05 = 350 \text{ m}^3 \times \text{km}$$

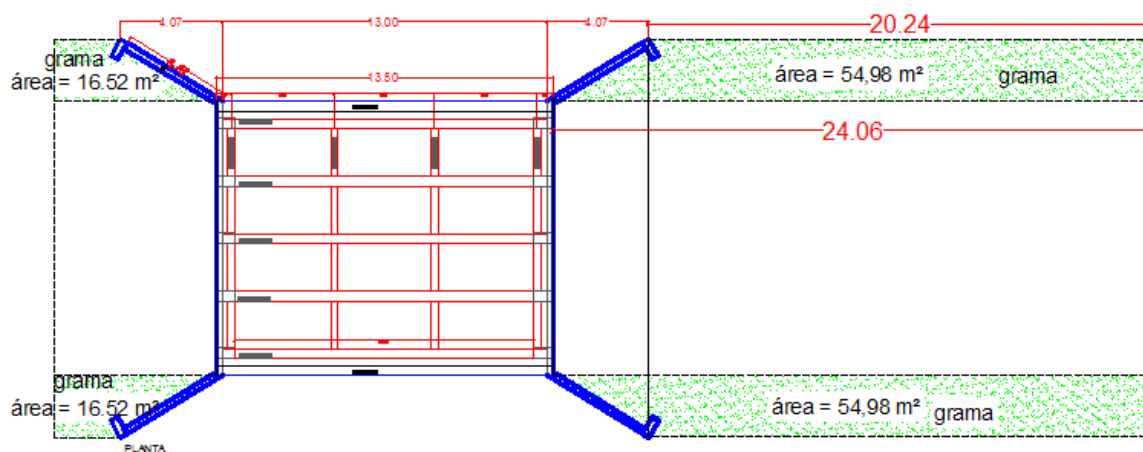
6.2 – ATERRO DE ACESSO.

$$= [(265,86 \times 1,29/2) + (59,4 \times 0,87) + (54,28 \times 2 \times 1,29 \times 0,50) + (14,88 \times 2 \times 0,87)] \times 1,05 = 350 \text{ m}^3$$

6.3 –COMP. ATERRO 95% PS.

$$= 10\% \text{ de } 350 \text{ m}^3 = 35 \text{ m}^3$$

6.4 – GRAMA EM PLACA SEM ADUBO



$$= (54,98 + 16,52) \times 2 = 143 \text{ m}^2$$

6.5- GUARDA CORPO METÁLICO

=13,50 x 2 lados x 1.20 de altura = 32.40 m

Vide Projeto

6.6 – PINTURAS TRÂNSITO, SINALIZAÇÃO DE CHÃO.

2 X 3.00 X 0,50 = 3,00 m²

Vide Projeto

6.7 – PLACAS DE SINALIZAÇÃO DE TRÂNSITO VERTICAL.

2 x 1,00 x 0.80 = 1,60 m²

Vide Projeto

Carlos João Perlatti

Responsável Técnico

CREA 060079784-4