

Memória de Cálculo

OBJETO: Infraestrutura Urbana

OBRA: Recapeamento Asfáltico C.B.U.Q. e Sarjetões.

LOCAL: Avenida Heitor Lucatto, Rua Lodovico Buosi, Rua Avelino Parro, Rua Antonio de Oliveira Jordão, Rua Cabo Verde, Rua das Aroeiras, Rua das Figueiras, Rua Pau Brasil, Rua dos Ipês e Rua José Dalmiglio, Varios Bairros do Municipio de Cedral, Cedral-SP..

PROPONENTE: Prefeitura Municipal de Cedral

ART: 28027230191112644

CALCULO DO RECAPEAMENTO ASFALTICO EM CBUQ.:

AVENIDA HEITOR LUCATTO

AREA 1

Legenda:

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{8,85 \times 8,50}{2} - \frac{75,22}{2} = 37,61 \text{m}^2$$

AREA 2

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x comp} - 8,50 \times 65,05 = 552,92 \text{ m}^2$$

AREA 3

Legenda:

R: Raio

Tang: Tangente

PI: 3,1416

Ac: Angulo

$$(R \times \text{Tang} - \frac{R^2 \times \text{PI} \times \text{Ac}}{360}) = (9,00 \times 2,89 - \frac{81,00 \times 3,1416 \times 39,071}{360}) = 26,01 - \frac{9.942,38}{360} =$$

$$= 26,01 - 27,61 = \mathbf{1,60m^2}$$

AREA 4

Legenda:

P: Perimetro

a: Comprimento de um lado

b: Comprimento de um lado

c: Comprimento de um lado

$$P = \frac{a+b+c}{2} = \frac{15,09+10,10+11,19}{2} = \frac{36,38}{2} = \mathbf{P = 18,19}$$

$$[P \times (P-a) \times (P-b) \times (P-c)]^{1/2} = [18,19 \times (18,19-15,09) \times (18,19-10,10) \times (18,19-11,19)]^{1/2} =$$

$$= [18,19 \times (3,10) \times (8,09) \times (7,00)]^{1/2} = [3.193,30]^{1/2} = \mathbf{56,50m^2}$$

AREA 5

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{comp} - 10,10 \times 19,95 = \mathbf{201,49 m^2}$$

AREA 6

Legenda:

R: Raio

Tang: Tangente

PI: 3,1416

Ac: Angulo

$$(R \times \text{Tang} - \frac{R^2 \times \text{PI} \times \text{Ac}}{360}) = (8,50 \times 21,72 - \frac{72,25 \times 3,1416 \times 140,426}{360}) = 184,62 - \frac{31873,98}{360} =$$

$$= 184,62 - 88,53 = \mathbf{96,09m^2}$$

AREA 7

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{Comp} - 7,50 \times 584,40 = \mathbf{4.383,00 m^2}$$

AREA 8

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{comp} - 1,00 \times 32,00 = \mathbf{32,00 m^2}$$

AREA 9

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{comp} - 1,00 \times 16,50 = \mathbf{16,50 m^2}$$

AREA 10

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x comp} - 1,00 \times 32,00 = \mathbf{32,00 \text{ m}^2}$$

AREA 11

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x comp} - 1,00 \times 28,00 = \mathbf{28,00 \text{ m}^2}$$

AREA 12

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x comp} - 1,00 \times 51,75 = \mathbf{51,75 \text{ m}^2}$$

AREA 13

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x comp} - 1,00 \times 11,20 = \mathbf{11,20 \text{ m}^2}$$

AREA 14

Legenda:

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{36,40 \times 8,50}{2} - \frac{309,40}{2} = \mathbf{154,70 \text{ m}^2}$$

SOMATORIA DE TODAS AS ÁREAS

Area 1 + Area 2 + Area 3 + Area 4 + Area 5 + Area 6 + Area 7 + Area 8 + Area 9 + Area 10 + Area 11 + Area 12 + Area 13 + Area 14.

$$37,61 + 552,92 + 1,60 + 56,50 + 201,49 + 96,09 + 4.383,00 + 32,00 + 16,50 + 32,00 + 28,00 + 51,75 + 11,20 + 154,70 = 5.655,36\text{m}^2$$

$$\text{AREA TOTAL} = 5.655,36 \text{ m}^2$$

RUA LODOVICO BUOSI

AREA 1

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{Comp} = 8,40 \times 206,59 = 1.735,36\text{m}^2$$

ÁREA 2

Legenda:

L= lado

PI= 3,1416

R= raio

$$L^2 - \frac{\text{PI} \times R^2}{4} = 11,50^2 - \frac{3,1416 \times 11,50^2}{4} = 132,25 - \frac{3,1416 \times 132,25}{4} = 132,25 - \frac{415,48}{4} =$$

$$132,25 - 103,87 = 28,38\text{m}^2$$

ÁREA 3

Legenda:

L= lado

PI= 3,1416

R= raio

$$L^2 - \frac{\text{PI} \times R^2}{4} = 9,42^2 - \frac{3,1416 \times 11,50^2}{4} = 88,74 - \frac{3,1416 \times 132,25}{4} = 88,74 - \frac{415,48}{4} =$$

$$88,74 - 103,87 = 15,13\text{m}^2$$

ÁREA 4

Legenda:

L= lado

PI= 3,1416

R= raio

$$\frac{L^2 - PI \times R^2}{4} = \frac{13,01^2 - 3,1416 \times 11,50^2}{4} = \frac{169,26 - 3,1416 \times 132,25}{4} = \frac{169,26 - 415,48}{4} =$$

$$169,26 - 103,87 = \mathbf{65,39m^2}$$

ÁREA 5

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{1,60 \times 8,40}{2} - \frac{13,44}{2} = \mathbf{6,72m^2}$$

SOMATORIA TOTAL DAS ÁREAS DA RUA LODOVICO BUOSI

Area 1 + Area 2 + Area 3 + Area 4 + Area 5

$$1.735,36 + 28,38 + 15,13 + 65,39 + 6,72 = \mathbf{1.850,98m^2}$$

ÁREA TOTAL DA RUA LODOVICO BUOSI = 1.850,98m²

RUA AVELINO PARRO

ÁREA 1

Legenda:

L= lado

PI= 3,1416

R= raio

$$\frac{L^2 - PI \times R^2}{4} = \frac{11,92^2 - 3,1416 \times 11,50^2}{4} = \frac{142,09 - 3,1416 \times 132,25}{4} = \frac{142,09 - 415,48}{4} =$$

$$142,09 - 103,87 = \mathbf{38,22m^2}$$

ÁREA 2

Legenda:

L= lado

PI= 3,1416

R= raio

$$L^2 - \frac{PI \times R^2}{4} = 11,06^2 - \frac{3,1416 \times 11,50^2}{4} = 122,32 - \frac{3,1416 \times 132,25}{4} = 122,32 - \frac{415,48}{4} =$$

$$122,32 - 103,87 = \mathbf{18,45m^2}$$

AREA 3

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{Comp} = 8,60 \times 42,58 = \mathbf{366,18m^2}$$

AREA 4

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{2,71 \times 8,60}{2} - \frac{23,30}{2} = \mathbf{11,65m^2}$$

AREA 5

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{Comp} = 8,60 \times 30,98 = \mathbf{266,43m^2}$$

AREA 6

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{Comp} = 8,60 \times 45,00 = \mathbf{387,00m^2}$$

AREA 7

b- Base

H- Altura

$$\frac{bxH}{2} - \frac{2,34 \times 8,60}{2} - \frac{20,12}{2} = 10,06m^2$$

SOMATORIA TOTAL DAS ÁREAS DA RUA AVELINO PARRO

$$\text{Area 1} + \text{Area 2} + \text{Area 3} + \text{Area 4} + \text{Area 5} + \text{Area 6} + \text{Area 7} \\ 38,22 + 18,45 + 366,18 + 11,65 + 266,43 + 387,00 + 10,06 = 1.097,99m^2$$

$$\text{AREA TOTAL DA RUA AVELINO PARRO} = 1.097,99m^2$$

RUA ANTONIO DE OLIVEIRA JORDÃO

AREA 1

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{Comp} = 6,80 \times 56,45 = 383,86m^2$$

AREA 2

b- Base

H- Altura

$$\frac{bxH}{2} - \frac{3,29 \times 6,80}{2} - \frac{22,37}{2} = 11,19m^2$$

AREA 3

b- Base

H- Altura

$$\frac{bxH}{2} - \frac{0,91 \times 8,00}{2} - \frac{7,28}{2} = 3,64m^2$$

AREA 4

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x Comp} = 8,00 \times 34,00 = 272,00\text{m}^2$$

SOMATORIA TOTAL DAS ÁREAS DA RUA ANTONIO DE OLIVEIRA JORDÃO

Area 1 + Area 2 + Area 3 + Area 4

$$383,86 + 11,19 + 3,64 + 272,00 = 670,69\text{m}^2$$

AREA TOTAL DA RUA ANTONIO DE OLIVEIRA JORDÃO = 670,69 m²

RUA CABO VERDE

AREA 1

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x Comp} = 8,50 \times 153,90 = 1.308,15\text{m}^2$$

AREA 2

b- Base

H- Altura

$$\frac{b \times H}{2} = \frac{8,50 \times 11,46}{2} - \frac{97,41}{2} = 48,70\text{m}^2$$

AREA 3

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$R \times \text{Tang} - \frac{(R^2 \times \text{PI} \times \text{Ac})}{360} = 4,73 \times 12,22 - \frac{(4,73^2 \times 3,1416 \times 136,03)}{360} = 57,80 - \frac{9.559,86}{360} =$$

$$= 57,80 - 26,56 = 31,24\text{m}^2$$

SOMATORIA TOTAL DAS ÁREAS DA RUA CABO VERDE

Area 1 + Area 2 + Area 3

$$1.308,15 + 48,70 + 31,24 = \mathbf{1.388,09m^2}$$

AREA TOTAL DA RUA CABO VERDE = 1.388,09 m²

RUA DAS AROEIRAS - PI

AREA 1

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x Comp} = 8,60 \times 41,57 = \mathbf{357,50m^2}$$

ÁREA 2

Legenda:

L= lado

PI= 3,1416

R= raio

$$\frac{L^2 - PI \times R^2}{4} = \frac{11,50^2 - 3,1416 \times 11,50^2}{4} = \frac{132,25 - 3,1416 \times 132,25}{4} = \frac{132,25 - 415,47}{4} =$$

$$132,25 - 103,86 = \mathbf{28,39m^2}$$

ÁREA 3

Legenda:

L= lado

PI= 3,1416

R= raio

$$\frac{L^2 - PI \times R^2}{4} = \frac{11,50^2 - 3,1416 \times 11,50^2}{4} = \frac{132,25 - 3,1416 \times 132,25}{4} = \frac{132,25 - 415,47}{4} =$$

$$132,25 - 103,86 = \mathbf{28,39m^2}$$

AREA 4

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{2,32 \times 8,60}{2} - \frac{54,95}{2} = \mathbf{9,98m^2}$$

AREA 5

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{1,69 \times 6,00}{2} - \frac{10,14}{2} = \mathbf{5,07m^2}$$

AREA 6

Legenda:

H- Altura

B- base maior

b- base menor

$$H = \frac{H_1 + H_2}{2} = \frac{15,00 + 15,73}{2} = \frac{30,73}{2} = \mathbf{H = 15,36}$$

$$\frac{(B+b) \times H}{2} = \frac{(5,59 + 1,69) \times 15,36}{2} = \frac{7,28 \times 15,36}{2} = \frac{111,82}{2} = \mathbf{55,91m^2}$$

AREA 7

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$R \times \text{Tang} - \frac{(R^2 \times \text{PI} \times \text{Ac})}{360} = 11,50 \times 9,87 - \frac{(11,50^2 \times 3,1416 \times 90,00)}{360} = 113,50 - \frac{(132,25 \times 3,1416 \times 90,00)}{360} =$$

$$= 113,50 - \frac{37.392,89}{360} = 113,50 - 103,86 = \mathbf{9,64m^2}$$

AREA 8

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{2,42 \times 6,39}{2} - \frac{15,46}{2} = 7,73\text{m}^2$$

SOMATORIA TOTAL DAS ÁREAS DA RUA DAS AROEIRAS - P1

Area 1 + Area 2 + Area 3 + Area 4 + Area 5 + Area 6 + Area 7 + Area 8

$$357,50 + 28,39 + 28,39 + 9,98 + 5,07 + 55,91 + 9,64 + 7,73 = 502,61\text{m}^2$$

AREA TOTAL DA RUA DAS AROEIRAS - P1 = 502,61 m²

RUA DAS AROEIRAS - P2

AREA 1

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{Comp} = 8,60 \times 98,47 = 846,84\text{m}^2$$

AREA 2

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$R \times \text{Tang} - \frac{(R^2 \times \text{PI} \times \text{Ac})}{360} = 8,71 \times 15,99 - \frac{(8,71^2 \times 3,1416 \times 121,13)}{360} = 139,27 - \frac{(75,86 \times 3,1416 \times 121,13)}{360} =$$

$$= 139,27 - \frac{28.867,91}{360} = 139,27 - 80,18 = 59,09\text{m}^2$$

AREA 3

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{8,60 \times 5,71}{2} - \frac{49,10}{2} = 24,55\text{m}^2$$

ÁREA 4

Legenda:

L= lado

PI= 3,1416

R= raio

$$L^2 - \frac{PI \times R^2}{4} = 11,50^2 - \frac{3,1416 \times 11,50^2}{4} = 132,25 - \frac{3,1416 \times 132,25}{4} = 132,25 - \frac{415,47}{4} =$$

$$132,25 - 103,86 = \mathbf{28,39m^2}$$

ÁREA 5

Legenda:

L= lado

PI= 3,1416

R= raio

$$L^2 - \frac{PI \times R^2}{4} = 11,50^2 - \frac{3,1416 \times 11,50^2}{4} = 132,25 - \frac{3,1416 \times 132,25}{4} = 132,25 - \frac{415,47}{4} =$$

$$132,25 - 103,86 = \mathbf{28,39m^2}$$

SOMATORIA TOTAL DAS ÁREAS DA RUA DAS AROEIRAS - P2

Area 1 + Area 2 + Area 3 + Area 4 + Area 5

$$846,84 + 59,09 + 24,55 + 28,39 + 28,39 = \mathbf{987,26m^2}$$

AREA TOTAL DA RUA DAS AROEIRAS - P2 = 987,26 m²

RUA DAS FIGUEIRAS

AREA 1

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg} \times \text{Comp} = 8,50 \times 187,05 = \mathbf{1.589,92m^2}$$

AREA 2

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$R \times \text{Tang} - \frac{(R^2 \times \text{PI} \times \text{Ac})}{360} = 11,50 \times 10,80 - \frac{(11,50^2 \times 3,1416 \times 90,00)}{360} = 124,20 - \frac{(132,25 \times 3,1416 \times 90,00)}{360}$$

$$= 124,20 - \frac{37.392,89}{360} = 124,20 - 103,86 = \mathbf{20,34m^2}$$

AREA 3

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$R \times \text{Tang} - \frac{(R^2 \times \text{PI} \times \text{Ac})}{360} = 11,50 \times 10,80 - \frac{(11,50^2 \times 3,1416 \times 90,00)}{360} = 124,20 - \frac{(132,25 \times 3,1416 \times 90,00)}{360}$$

$$= 124,20 - \frac{37.392,89}{360} = 124,20 - 103,86 = \mathbf{20,34m^2}$$

AREA 4

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$R \times \text{Tang} - \frac{(R^2 \times \text{PI} \times \text{Ac})}{360} = 11,75 \times 20,07 - \frac{(11,75^2 \times 3,1416 \times 118,27)}{360} = 235,82 - \frac{(138,06 \times 3,1416 \times 118,27)}{360}$$

$$= 235,82 - \frac{51.297,16}{360} = 235,82 - 142,49 = \mathbf{93,33m^2}$$

AREA 5

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{4,85 \times 8,50}{2} - \frac{41,22}{2} = \mathbf{20,61m^2}$$

AREA 6

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$\begin{aligned} \frac{RxTang-(R^2xPIxAc)}{360} &= \frac{11,50x6,68-(11,50^2x3,1416x118,27)}{360} = \frac{76,82-(132,25X3,1416X60,32)}{360} \\ &= \frac{76,82-25.061,54}{360} = \frac{76,82-69,61}{360} = \mathbf{7,21m^2} \end{aligned}$$

SOMATORIA TOTAL DAS ÁREAS DA RUA DAS FIGUEIRAS

Area 1 + Area 2 + Area 3 + Area 4 + Area 5 + Area 6

$$1.589,92 + 20,34 + 20,34 + 93,33 + 20,61 + 7,21 = \mathbf{1.751,75m^2}$$

AREA TOTAL DA RUA DAS FIGUEIRAS = 1.751,75 m²

RUA PAU BRASIL

AREA 1

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x Comp} = 8,50 \times 137,70 = \mathbf{1.170,45m^2}$$

AREA 2

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$\begin{aligned} \frac{RxTang-(R^2xPIxAc)}{360} &= \frac{7,29x20,05-(7,29^2x3,1416x111,64)}{360} = \frac{146,16-(53,14X3,1416X111,64)}{360} \\ &= \frac{146,16-18.637,69}{360} = \frac{146,16-51,77}{360} = \mathbf{94,39m^2} \end{aligned}$$

AREA 3

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{8,50 \times 12,78}{2} - \frac{108,63}{2} = 54,31\text{m}^2$$

AREA 4

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$\begin{aligned} R \times \text{Tang} - \frac{(R^2 \times \text{PI} \times \text{Ac})}{360} &= 11,75 \times 20,07 - \frac{(11,75^2 \times 3,1416 \times 118,27)}{360} = 235,82 - \frac{(138,06 \times 3,1416 \times 118,27)}{360} \\ &= 235,82 - \frac{51.297,16}{360} = 235,82 - 142,49 = 93,33\text{m}^2 \end{aligned}$$

AREA 5

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{4,85 \times 8,50}{2} - \frac{41,22}{2} = 20,61\text{m}^2$$

AREA 6

R- Raio

PI- 3,1416

Ac- Angulo

Tang- Tangente

$$\begin{aligned} R \times \text{Tang} - \frac{(R^2 \times \text{PI} \times \text{Ac})}{360} &= 11,50 \times 6,68 - \frac{(11,50^2 \times 3,1416 \times 118,27)}{360} = 76,82 - \frac{(132,25 \times 3,1416 \times 60,32)}{360} \\ &= 76,82 - \frac{25.061,54}{360} = 76,82 - 69,61 = 7,21\text{m}^2 \end{aligned}$$

SOMATORIA TOTAL DAS ÁREAS DA RUA PAU BRASIL

Area 1 + Area 2 + Area 3 + Area 4 + Area 5 + Area 6

$$1.170,45 + 94,39 + 54,31 + 93,33 + 20,61 + 7,21 = \mathbf{1.440,30m^2}$$

AREA TOTAL DA RUA PAU BRASIL = 1.440,30 m²

RUA DOS IPÊS

AREA 1

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x Comp} = 8,50 \times 242,65 = \mathbf{2.062,52m^2}$$

AREA TOTAL DA RUA DOS IPÊS = 2.062,52 m²

RUA JOSÉ DALMIGLIO

AREA 1

b- Base

H- Altura

$$\frac{b \times H}{2} - \frac{4,75 \times 8,50}{2} - \frac{40,38}{2} = \mathbf{20,19m^2}$$

AREA 2

Legenda:

Larg- Largura

Comp- Comprimento

$$\text{Larg x Comp} = 8,50 \times 76,80 = \mathbf{652,80m^2}$$

AREA TOTAL DA RUA JOSÉ DALMIGLIO = 672,99 m²

AREA TOTAL DOS RECAPES ALFATICOS EM CBUQ

$$5.655,36 + 1.850,98 + 1.097,99 + 670,69 + 1.388,09 + 502,61 + 987,26 + 1.751,75 + 1.440,30 + 2.062,52 + 672,99 = \mathbf{18.080,54m^2}$$

CALCULO DOS SARJETÕES

SARJETÃO RUA DAS FIGUEIRAS ESQUINA COM A RUA DAS AROEIRAS - P2

Concreto:

Larg - Largura

Comp - Comprimento

Alt - Altura

$$\text{Larg x Comp x Alt} = 1,40 \times 31,50 \times 0,15 = \mathbf{6,62m^3}$$

Armadura em Tela Soldada em Aço:

Larg - Largura

Comp - Comprimento

4,48 - Tabela Aço Q238

$$\text{Larg x Comp x 4,48} = 1,40 \times 31,50 \times 4,48 = \mathbf{197,56kg}$$

SARJETÃO RUA DAS AROEIRAS P-1 ESQUINA COM A RUA CABO VERDE

Concreto:

Larg - Largura

Comp - Comprimento

Alt - Altura

$$\text{Larg x Comp x Alt} = 2,00 \times 15,00 \times 0,15 = \mathbf{4,50m^3}$$

Armadura em Tela Soldada em Aço:

Larg - Largura

Comp - Comprimento

4,48 - Tabela Aço Q238

$$\text{Larg x Comp x 4,48} = 2,00 \times 15,00 \times 4,48 = \mathbf{134,40kg}$$

SARJETÃO RUA CABO VERDE ESQUINA COM A RUA DOS IPÊS

Concreto:

Larg - Largura

Comp - Comprimento

Alt - Altura

$$\text{Larg x Comp x Alt} = 2,00 \times 29,00 \times 0,15 = \mathbf{8,70m^3}$$

Armadura em Tela Soldada em Aço:

Larg - Largura

Comp - Comprimento

4,48 - Tabela Aço Q238

$$\text{Larg x Comp x } 4,48 = 2,00 \times 29,00 \times 4,48 = \mathbf{259,84\text{kg}}$$

TOTAL DO CALCULO DOS SARJETÕES:

CONCRETO

$$6,62 + 4,50 + 8,70 = \mathbf{19,82\text{m}^3}$$

ARMADURA EM TELA SOLDADA EM AÇO

$$197,56 + 134,40 + 259,84 = \mathbf{591,80\text{kg}}$$

Cedral-SP, 12 de setembro de 2.019, 89º ano de emancipação política administrativa.

Guido Gilberto Milanez
Engº Civil – CREA: 060154986.1