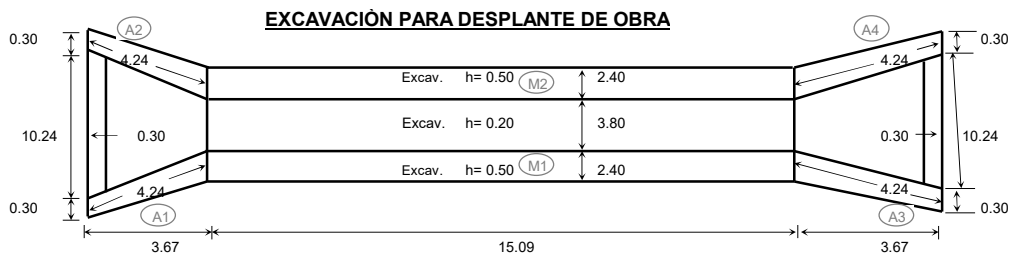


CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA
 ALCANTARILLA DE LOSA : DE 6.00 X 2.00 X 15.09
 ESTACION DE OBRA : 213+814.62 ESVIAJE NORMAL EN TANGENTE



EN MUROS = 36.22 M3

VM 1	=	15.09	X	2.40	X	0.50	=	18.11	M3
VM2	=	15.09	X	2.40	X	0.50	=	18.11	M3

EN ALEROS = 9.92 M3

VA1	=	((2.40 + 0.30) / 2.00)	X	3.67	X	0.50	=	2.48	M3
VA2	=	((2.40 + 0.30) / 2.00)	X	3.67	X	0.50	=	2.48	M3
VA3	=	((2.40 + 0.30) / 2.00)	X	3.67	X	0.50	=	2.48	M3
VA4	=	((2.40 + 0.30) / 2.00)	X	3.67	X	0.50	=	2.48	M3

EN PLANTILLA = 21.79 M3

VM	=	15.09	X	3.80	X	0.20	=	11.47	M3
VI	=	((10.24 + 3.80) / 2.00)	X	3.67	X	0.20	=	5.16	M3
VD	=	((10.24 + 3.80) / 2.00)	X	3.67	X	0.20	=	5.16	M3

EN DENTELLONES = 1.84 M3

VI	=	10.24	X	0.30	X	0.30	=	0.92	M3
VD	=	10.24	X	0.30	X	0.30	=	0.92	M3

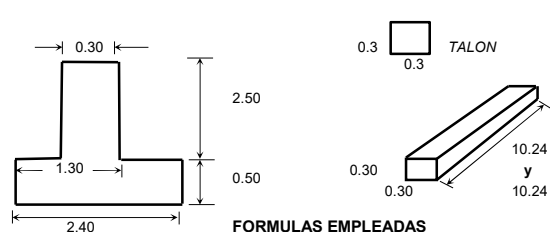
VOLUMEN TOTAL = 36.22 + 9.92 + 21.79 + 1.84

VOLUMEN TOTAL = 70 M3

CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA
 ALCANTARILLA DE LOSA : DE 6.00 X 2.00 X 15.09
 ESTACION DE OBRA : 213+814.62 ESVIAJE NORMAL EN TANGENTE

CONCRETO SIMPLE DE F'c = 200 KG/CM2

EN MUROS, ALEROS Y DENTELLONES



FORMULAS EMPLEADAS

CUBO: $V = L \times L \times L$

RECTANGULO: $V = (b \times h) \times H$

TRIANGULO: $V = (b \times h) / 2 \times H$

EN MUROS = 61.57 M3

$$\begin{aligned} VM &= ((2.40 \times 0.50) + (2.50 \times 0.30)) \times 15.09 \times 2.00 = 2.72 \text{ M3} \\ VTAL &= 0.30 \times 0.30 \times 15.09 \times 2.00 = 2.72 \text{ M3} \end{aligned}$$

EN ALEROS = 16.44 M3

$$\begin{aligned} VA1 &= (((2.40 + 0.30) / 2.00) \times 3.67) \times 0.50 + ((3.67 \times 2.95) / 2.00) \times ((0.30 + 0.30 + 0.30) / 3.00) = 4.11 \text{ M3} \\ VA2 &= (((2.40 + 0.30) / 2.00) \times 3.67) \times 0.50 + ((3.67 \times 2.95) / 2.00) \times ((0.30 + 0.30 + 0.30) / 3.00) = 4.11 \text{ M3} \\ VA3 &= (((2.40 + 0.30) / 2.00) \times 3.67) \times 0.50 + ((3.67 \times 2.95) / 2.00) \times ((0.30 + 0.30 + 0.30) / 3.00) = 4.11 \text{ M3} \\ VA4 &= (((2.40 + 0.30) / 2.00) \times 3.67) \times 0.50 + ((3.67 \times 2.95) / 2.00) \times ((0.30 + 0.30 + 0.30) / 3.00) = 4.11 \text{ M3} \end{aligned}$$

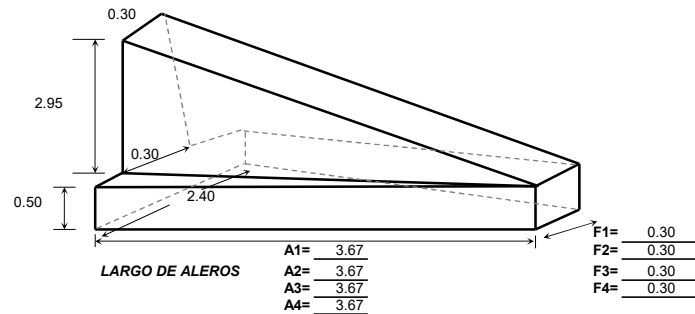
EN DENTELLONES = 1.84 M3

$$\begin{aligned} VI &= 0.30 \times 0.30 \times 10.24 = 0.92 \text{ M3} \\ VD &= 0.30 \times 0.30 \times 10.24 = 0.92 \text{ M3} \end{aligned}$$

$$\text{VOLUMEN TOTAL} = 61.57 + 16.44 + 1.84$$

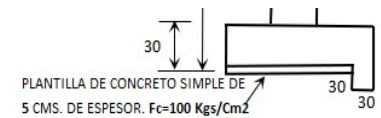
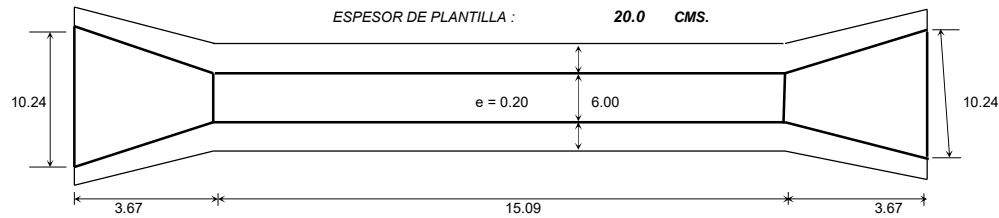
$$\text{VOLUMEN TOTAL} = 79.58 \text{ M3}$$

CON DESCUENTO DE ACERO



CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA
 ALCANTARILLA DE LOSA : DE 6.00 X 2.00 X 15.09
 ESTACION DE OBRA : 213+814.62 ESVIAJE NORMAL EN TANGENTE

CONCRETO SIMPLE DE $F_c = 100 \text{ KGS/CM}^2$

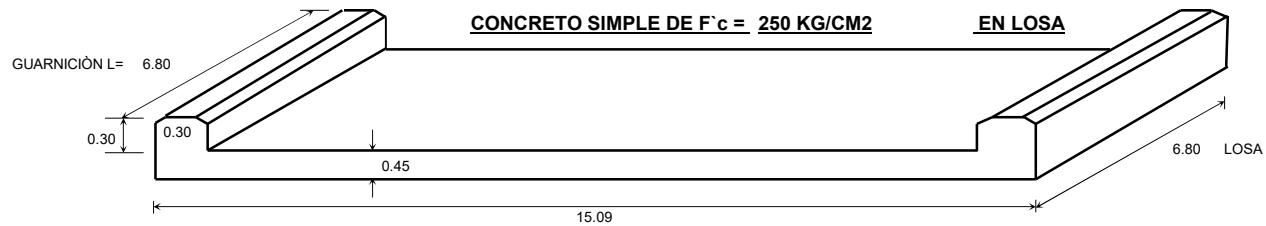


EN PLANTILLA = 35.40 M3											
VAM	=	15.09	X	6.00	X	0.20	=	18.11	M3		
VPLA	=	22.44	X	2.40	X	0.05	X	2.00	=	5.39	M3
VA1	=	((10.24	+	6.00)	/	2.00)	X	3.67)	X	0.20	= 5.97 M3
VA2	=	((10.24	+	6.00)	/	2.00)	X	3.67)	X	0.20	= 5.97 M3
VOLUMEN TOTAL = 18.11 + 5.39 + 5.97 + 5.97											
VOLUMEN TOTAL = 35.40 M3											

CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA

ALCANTARILLA DE LOSA :
 ESTACION DE OBRA : 213+814.62

DE 6.00 X 2.00 X 15.09
 ESVAJE NORMAL EN TANGENTE
 CONCRETO SIMPLE DE F'c = 250 KG/CM2 EN LOSA



EN LOSA = 46.18 M3
 V = 15.09 X 6.80 X 0.45 = 46.18 M3

EN GUARNICIONES = 1.22 M3
 V = 0.30 X 0.30 X 6.80 X 2.00 = 1.22 M3

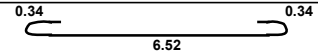
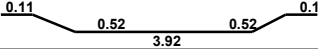
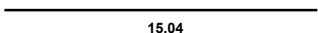
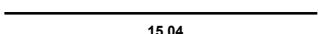
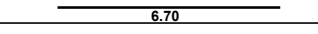
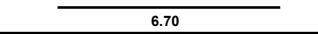
VOLUMEN TOTAL = 46.18 + 1.22

VOLUMEN TOTAL = 47.40 M3 - 0.52 = 46.88 M3

CON DESCUENTO DE ACERO

CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA : DE 6.00 X 2.00 X 15.09
ESTACION DE OBRA : 213+814.62 ES VIAJE NORMAL EN TANGENTE

ACERO DE REFUERZO PARA LOSA

LISTA DE VARILLAS Y PESOS						
DESIGNACION	NUMERO	DIAMETRO	CROQUIS	LONGITUD	ESPACIO	PESO (KG)
VARILLAS " A "	75	8		7.20	0.135 Y 0.270	2,146
VARILLAS " B "	37	8		5.18	0.405	767
VARILLAS " C "	19	6		15.04	0.360	646
VARILLAS " D "	30	3		15.04	0.230	253
VARILLAS " E "	66	3		6.70	0.230	248
VARILLAS " F "	4	4		6.70	0.100	27

VARILLAS	"A"	75	X	7.20	X	4.000	=	2,146	KGS.
VARILLAS	"B"	37	X	5.18	X	4.000	=	767	KGS.
VARILLAS	"C"	19	X	15.04	X	2.260	=	646	KGS.
VARILLAS	"D"	30	X	15.04	X	0.560	=	253	KGS.
VARILLAS	"E"	66	X	6.70	X	0.560	=	248	KGS.
VARILLAS	"F"	4	X	6.70	X	1.000	=	27	KGS.

VARILLAS	"A"	2,146	KGS.
VARILLAS	"B"	767	KGS.
VARILLAS	"C"	646	KGS.
VARILLAS	"D"	253	KGS.
VARILLAS	"E"	248	KGS.
VARILLAS	"F"	27	KGS.

PESO TOTAL	4,087	KGS.
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CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA : DE 6.00 X 2.00 X 15.09
ESTACION DE OBRA : 213+814.62 ES VIAJE NORMAL EN TANGENTE

DESCUENTO DE ACERO DE REFUERZO A CONCRETO SIMPLE EN LOSA DE 250 KG/CM2

VARILLAS	"A"	75	X	7.20	X	4.000	=	2,146	KGS.
VARILLAS	"B"	37	X	5.18	X	4.000	=	767	KGS.
VARILLAS	"C"	19	X	15.04	X	2.260	=	646	KGS.
VARILLAS	"D"	30	X	15.04	X	0.560	=	253	KGS.
VARILLAS	"E"	66	X	6.70	X	0.560	=	248	KGS.
VARILLAS	"F"	4	X	6.70	X	1.000	=	27	KGS.

VARILLAS	"A"	2,146	KGS.
VARILLAS	"B"	767	KGS.
VARILLAS	"C"	646	KGS.
VARILLAS	"D"	253	KGS.
VARILLAS	"E"	248	KGS.
VARILLAS	"F"	27	KGS.

PESO TOTAL 4,087 KGS.

Tipo de varillas	Diametro	Area de Acero en (m2)	Numero de Varillas	Longitud (m)	Volumen (m3)
A	8	0.000507	75	7.20	0.27
B	8	0.000507	37	5.18	0.10
C	6	0.000287	19	15.04	0.08
D	3	0.000071	30	15.04	0.03
E	3	0.000071	66	6.70	0.03
F	4	0.000127	4	6.70	0.00

0.52 POR LOSA

VOLUMEN DE ACERO EN MUROS 0.32 EN MUROS

VOLUMEN TOTAL DE DESCUENTO EN LOSA Y MUROS = 0.84 M3

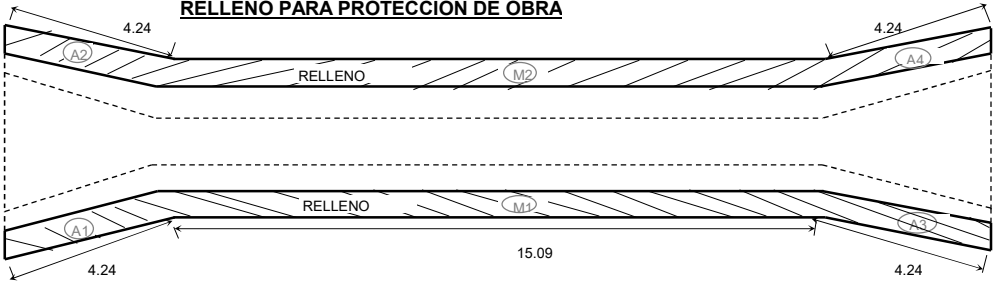
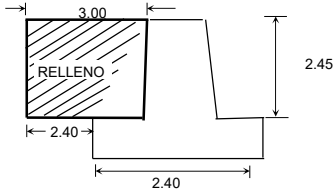
VAR. No.	DIAM.	PLGS.	AREA (CM2)	PESO (KG)
2.5	0.79	5/16"	0.49	0.384
3	0.95	3/8"	0.71	0.560
4	1.27	1/2"	1.27	1.000
5	1.59	5/8"	1.99	1.570
6	1.91	3/4"	2.87	2.260
7	2.22	7/8"	3.87	3.070
8	2.54	1"	5.07	4.000
9	2.86	1 1/8"	6.42	5.100
10	3.18	1 1/4"	7.94	6.300
11	3.49	1 3/8"	9.56	7.600
12	3.81	1 1/2"	11.40	9.000

DENSIDAD DEL ACERO
7,860 KGS/M3

CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA :
ESTACION DE OBRA :

DE 6.00 X 2.00 X 15.09
ESVIAJE NORMAL EN TANGENTE

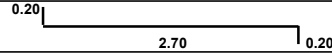
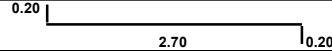
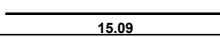
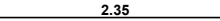
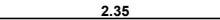
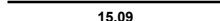
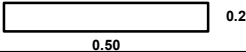
RELLENO PARA PROTECCIÓN DE OBRA



EN MUROS = 199.64 M3													
VM 1y2	=	((	(2.40	+	3.00)	/	2.00)	X	2.45)	X	(15.09)	X	(2.00) = 199.64 M3
EN ALEROS = 54.06 M3													
VA1	=	((	(4.24	X	2.45)	/	2.00)	X	(3.00	+	2.40	+	2.40) / 3.00) = 13.52 M3
VA2	=	((	(4.24	X	2.45)	/	2.00)	X	(3.00	+	2.40	+	2.40) / 3.00) = 13.52 M3
VA3	=	((	(4.24	X	2.45)	/	2.00)	X	(3.00	+	2.40	+	2.40) / 3.00) = 13.52 M3
VA4	=	((	(4.24	X	2.45)	/	2.00)	X	(3.00	+	2.40	+	2.40) / 3.00) = 13.52 M3
VOLUMEN TOTAL = 199.64 + 54.06													
VOLUMEN TOTAL = 254 M3													

CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA : DE 6.00 X 2.00 X 15.09
ESTACION DE OBRA : 213+814.62 ESVAJE NORMAL EN TANGENTE

ACERO DE REFUERZO EN MURO

LISTA DE VARILLAS Y PESOS						
DESIGNACION	NUMERO	DIAMETRO	CROQUIS	LONGITUD	ESPACIO	PESO (KG)
VARILLAS " A "	76	5		3.10	0.200	370.00
VARILLAS " B "	61	3		3.10	0.250	106.00
VARILLAS " C "	24	3		15.09	0.250	203.00
VARILLAS " D "	61	4		2.35	0.250	144.00
VARILLAS " E "	76	4		2.35	0.200	179
VARILLAS " F "	23	3		15.09	0.250	194
VARILLAS " G "	76	3		1.40	0.200	60

VARILLAS	"A"	76	X	3.10	X	1.57	=	370	KGS.
VARILLAS	"B"	61	X	3.10	X	0.56	=	106	KGS.
VARILLAS	"C"	24	X	15.09	X	0.56	=	203	KGS.
VARILLAS	"D"	61	X	2.35	X	1.00	=	144	KGS.
VARILLAS	"E"	76	X	2.35	X	1.00	=	179	KGS.
VARILLAS	"F"	23	X	15.09	X	0.56	=	194	KGS.
VARILLAS	"G"	76	X	1.40	X	0.56	=	60	KGS.

VARILLAS	"A"	370	KGS.
VARILLAS	"B"	106	KGS.
VARILLAS	"C"	203	KGS.
VARILLAS	"D"	144	KGS.
VARILLAS	"E"	179	KGS.
VARILLAS	"F"	194	KGS.
VARILLAS	"F"	60	KGS.

PESO TOTAL 1,256 X 2 = 2,512 KGS.