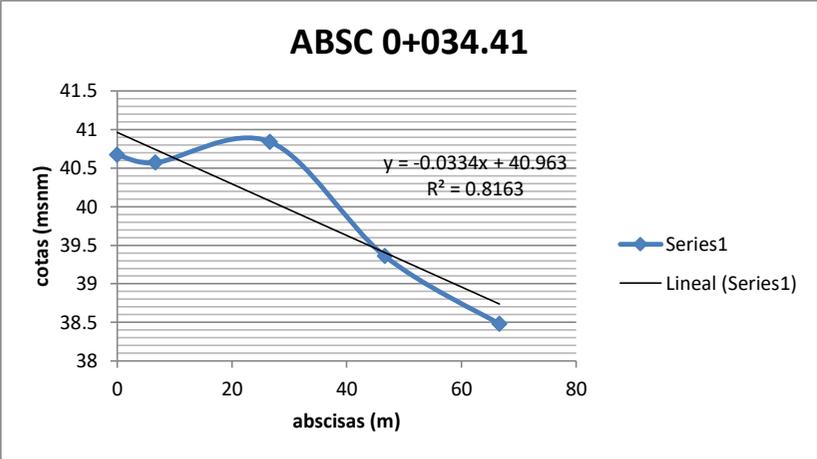


ALCANTARILLA ABSC 0+034.41

punto	distancia	distancia- m	dist. Acumulada	cota
1	0	0	0	40.67
2	6.63	6.63	6.63	40.57
3	20	20	26.63	40.84
4	20	20	46.63	39.36
5	20	20	66.63	38.48
total	66.63	66.63		



$J = h_1 - h_2 / l_1 - l_2$

J=            H            2.23  
                  L            66.63

J=            0.0334            3.34 %

ECUACION RECTA			
A	B	X	Y
40.96	- 0.0334	-	40.96
40.96	- 0.0334	66.63	38.74



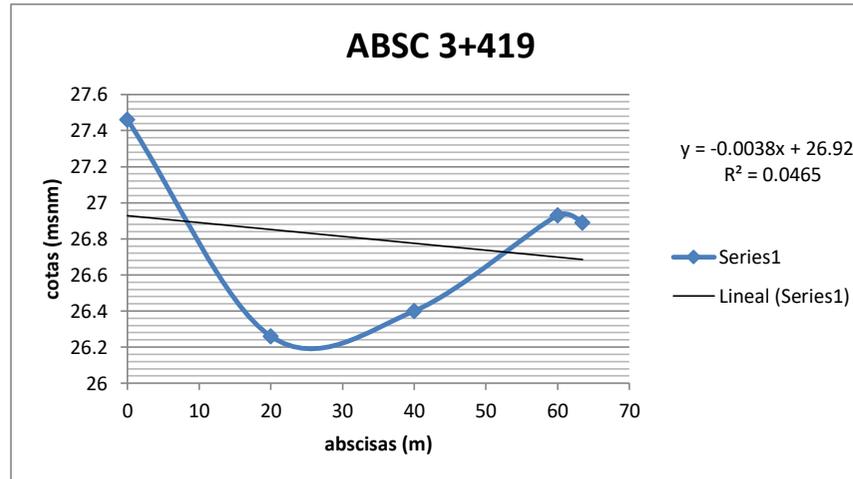
ALCANTARILLA ABSC 3+419

punto	distancia	distancia- m	dist. Acumulada	cota
1	0	0	0	27.46
2	20	20	20	26.26
3	20	20	40	26.4
4	20	20	60	26.93
5	3.48	3.48	63.48	26.89
total	63.48	63.48		

$J = h_1 - h_2 / l_1 - l_2$

J=                    H                    0.24  
                           L                    63.48

J=                    0.0038                    0.38 %



ECUACION RECTA			
A	B	X	Y
26.93	- 0.0038	-	26.93
26.93	- 0.0038	63.48	26.69



ALCANTARILLA 5+544

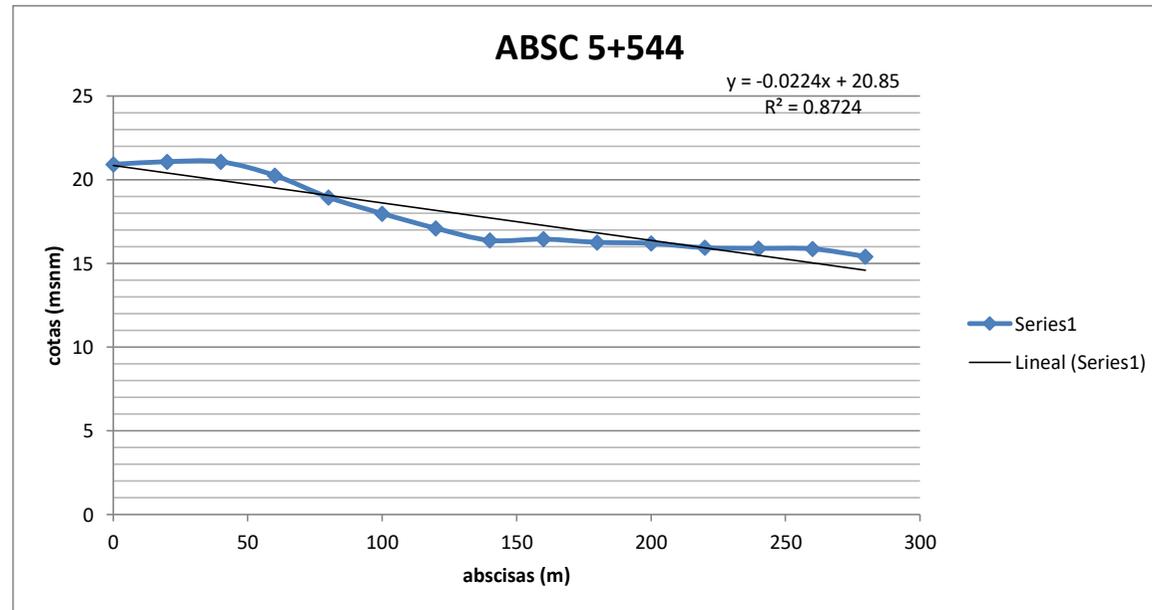
punto	distancia	distancia- m	dist. Acumulada	cota
1	0	0	0	20.92
2	20	20	20	21.08
3	20	20	40	21.07
4	20	20	60	20.26
5	20	20	80	18.95
6	20	20	100	17.98
7	20	20	120	17.1
8	20	20	140	16.38
9	20	20	160	16.45
10	20	20	180	16.26
11	20	20	200	16.2
12	20	20	220	15.94
13	20	20	240	15.9
14	20	20	260	15.87
15	19.72	19.72	279.72	15.42
total	279.72	279.72		

ECUACION RECTA			
A	B	X	Y
20.85	- 0.0224	-	20.85
20.85	- 0.0224	279.72	14.58

J= h1-h2/l1-l2

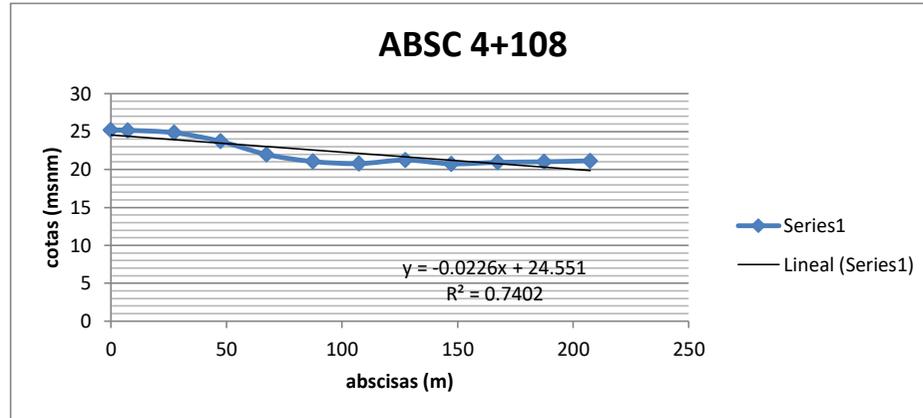
J=            H            6.27  
                   L            279.72

J=            0.0224            2.24 %



ALCANTARILLA ABSC 4+108

punto	distancia	distancia- m	dist. Acumulada	cota
1	0	0	0	25.24
2	7.39	7.39	7.39	25.17
3	20	20	27.39	24.85
4	20	20	47.39	23.72
5	20	20	67.39	21.98
6	20	20	87.39	21.06
7	20	20	107.39	20.78
8	20	20	127.39	21.25
9	20	20	147.39	20.75
10	20	20	167.39	20.95
11	20	20	187.39	21.02
12	20	20	207.39	21.15
total	207.39	207.39		



J=  $h_1-h_2/l_1-l_2$

J=            H            4.69  
                 L            207.39

J=            0.0226            2.26 %

ECUACION RECTA			
A	B	X	Y
24.55	- 0.0226	-	24.55
24.55	- 0.0226	207.39	19.86



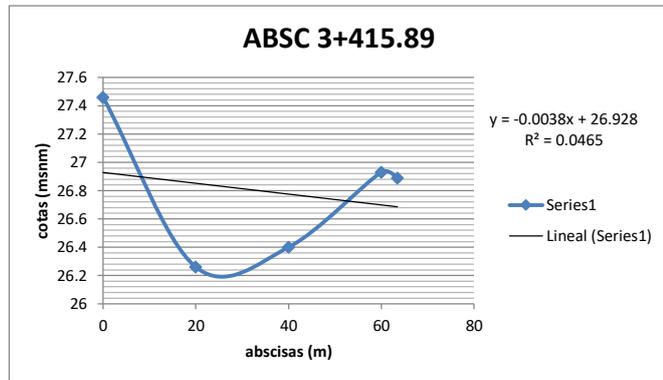
ALCANTARILLA ABSC 3+415.89

punto	distancia	distancia- m	dist. Acumula	cota
1	0	0	0	27.46
2	20	20	20	26.26
3	20	20	40	26.4
4	20	20	60	26.93
5	3.48	3.48	63.48	26.89
total	63.48	63.48		

J= h1-h2/l1-l2

J=            H            0.24  
                  L            63.48

J=            0.0038      0.38    %



ECUACION RECTA			
A	B	X	Y
26.93	- 0.0038	-	26.93
26.93	- 0.0038	63.48	26.69

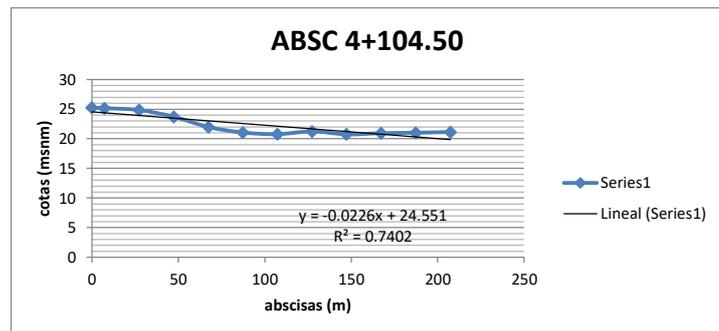
ALCANTARILLA ABSC 4+104.50

punto	distancia	distancia- m	dist. Acumula	cota
1	0	0	0	25.24
2	7.39	7.39	7.39	25.17
3	20	20	27.39	24.85
4	20	20	47.39	23.72
5	20	20	67.39	21.98
6	20	20	87.39	21.06
7	20	20	107.39	20.78
8	20	20	127.39	21.25
9	20	20	147.39	20.75
10	20	20	167.39	20.95
11	20	20	187.39	21.02
12	20	20	207.39	21.15
total	207.39	207.39		

J= h1-h2/l1-l2

J=            H            4.69  
                  L            207.39

J=            0.0226      2.26    %



ECUACION RECTA			
A	B	X	Y
24.55	- 0.0226	-	24.55
24.55	- 0.0226	207.39	19.86

ALCANTARILLA 4+385.98

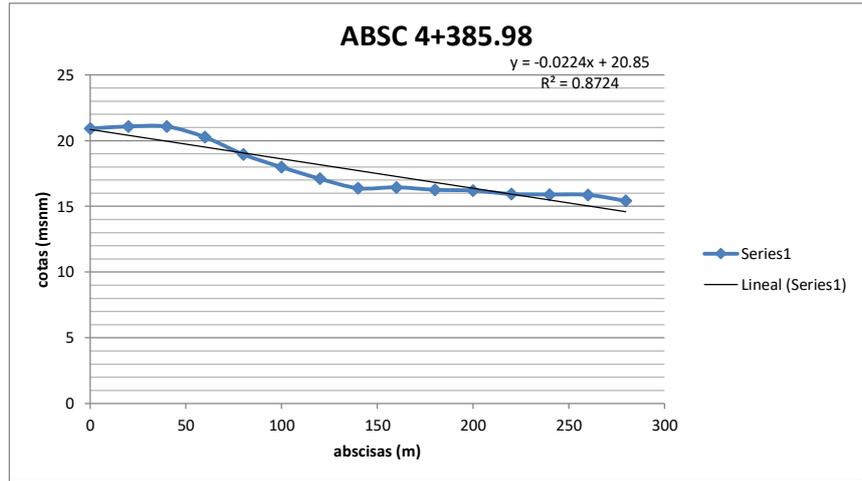
punto	distancia	distancia- m	dist. Acumula	cota
1	0	0	0	20.6
2	9.89	9.89	9.89	20.33
3	20	20	29.89	20.17
4	20	20	49.89	19.87
5	20	20	69.89	20.25
6	20	20	89.89	20.28
7	20	20	109.89	20
8	20	20	129.89	20.12
9	20	20	149.89	19.57
10	20	20	169.89	19.41
11	20	20	189.89	18.99
12	20	20	209.89	19.05
13	20	20	229.89	19.09
total	229.89	229.89		

ECUACION RECTA			
A	B	X	Y
20.54	- 0.0064	-	20.54
20.54	- 0.0064	229.89	19.07

J= h1-h2/l1-l2

J=            H            1.47  
                   L            229.89

J=            0.0064      0.64    %



ALCANTARILLA 5+133.29

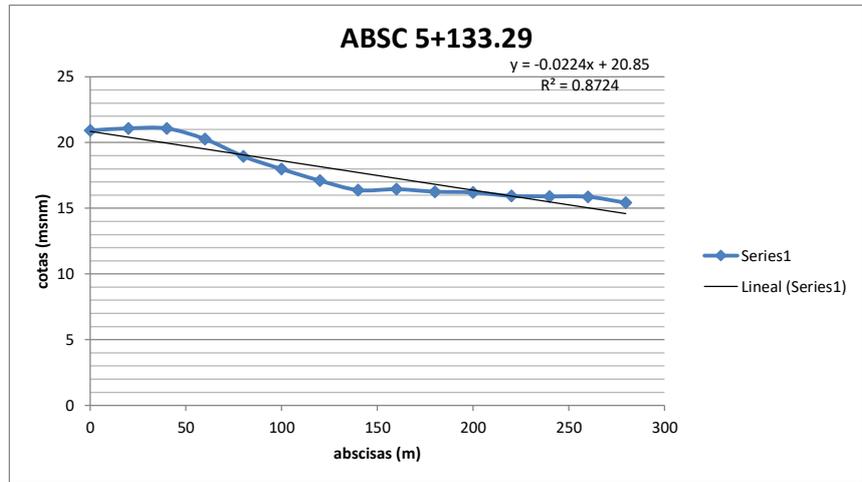
punto	distancia	distancia- m	dist. Acumula	cota
1	0	0	0	19.05
2	20	20	20	16.18
3	20	20	40	15.31
4	20	20	60	14.35
5	20	20	80	14.33
6	20	20	100	14.37
7	20	20	120	14.5
8	20	20	140	13.92
9	20	20	160	13.05
10	20	20	180	12.99
11	20	20	200	12.58
12	20	20	220	12.55
13	20	20	240	12.56
14	3.38	3.38	243.38	12.6
total	243.38	243.38		

ECUACION RECTA			
A	B	X	Y
16.68	- 0.0195	-	16.68
16.68	- 0.0195	243.38	11.93

$$J = h_1 - h_2 / l_1 - l_2$$

J=            H            4.75  
                  L            243.38

J=            0.0195        1.95 %



ALCANTARILLA 5+541.18

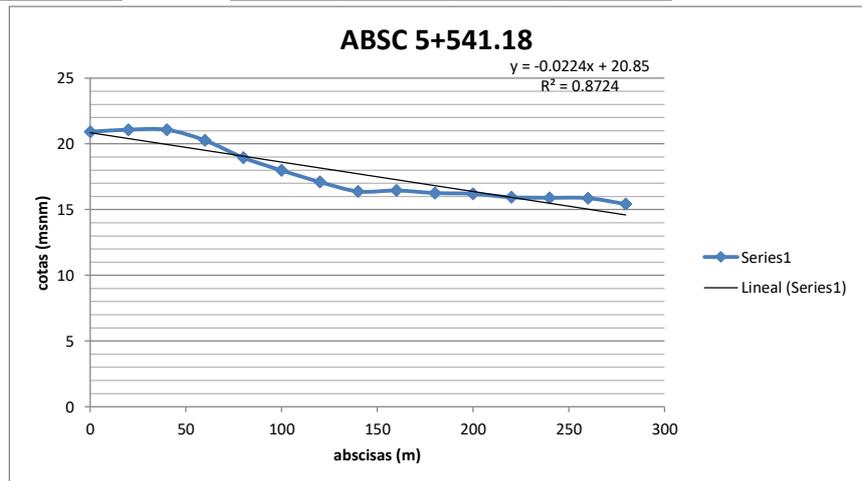
punto	distancia	distancia- m	dist. Acumula	cota
1	0	0	0	20.92
2	20	20	20	21.08
3	20	20	40	21.07
4	20	20	60	20.26
5	20	20	80	18.95
6	20	20	100	17.98
7	20	20	120	17.1
8	20	20	140	16.38
9	20	20	160	16.45
10	20	20	180	16.26
11	20	20	200	16.2
12	20	20	220	15.94
13	20	20	240	15.9
14	20	20	260	15.87
15	19.72	19.72	279.72	15.42
total	279.72	279.72		

ECUACION RECTA			
A	B	X	Y
20.85	- 0.0224	-	20.85
20.85	- 0.0224	279.72	14.58

$$J = h_1 - h_2 / l_1 - l_2$$

J=            H            6.27  
                  L            279.72

J=            0.0224        2.24 %



**PROGRAMA HY8**  
**CONDICIONES HIDRAULICAS Y TOPOGRAFICAS DE ALCANTARILLAS**

<b>CAUDALES</b>	
<b>ABSCISA</b>	<b>CAUDAL MAX - Tr = 100 años</b>
0.034.41	1.66
0+737.17	2.93
3+415.89	3.13
4+104.50	6.07
4+385.98	5.12
5+133.29	16.11
5+541.18	3.39
6+865	
7+448.76	4.66

<b>CONDICIONES DE CANAL DE SALIDA</b>							
<b>ABSCISA</b>	<b>TIPO DE SECCION</b>	<b>ANCHO SOLERA (m)</b>	<b>RUGOSIDAD TERRENO</b>	<b>COTA DE ENTRADA</b>	<b>COTA DE SALIDA</b>	<b>GRADIENTE TERRENO (m/m)</b>	<b>LONGITUD ALC (m)</b>
0.034.41	RECTANGULAR	1.60	0.033	40.38	38.85	0.0729	21.00
0+737.17	RECTANGULAR	2.00	0.033	35.20	35.02	0.0129	14.00
3+415.89	RECTANGULAR	1.80	0.033	26.42	26.10	0.0256	12.50
4+104.50	RECTANGULAR	1.40	0.033	20.60	20.43	0.0131	13.00
4+385.98	RECTANGULAR	1.45	0.033	20.20	20.06	0.0108	13.00
5+133.29	TRAPEZOIDAL	1.30	0.033	14.66	14.23	0.0281	15.30
5+541.18	TRAPEZOIDAL	1.50	0.033	17.60	17.16	0.0338	13.00
6+865	ALCANTARILLA DE ALIVIO DE AGUAS LLUVIAS EN CENTRO POBLADO DE SAN MIGUEL						
7+448.76	RECTANGULAR	1.45		5.70	5.49	0.0105	20.00

<b>CONDICIONES DE VIA</b>							
<b>ABSCISA</b>	<b>ANCHO VIA (m)</b>	<b>COTA RASANTE msnm</b>	<b>TALUD DE RELLENO</b>	<b>TIPO DE AFIRMADO</b>	<b>FORMA DE ALCANTARILLA</b>	<b>MATERIAL</b>	<b>RUGOSIDAD ALCANTARILLA</b>
0.034.41	12.00	41.95	1.50	PAVIMENTO	CIRCULAR	HORMIGON	0.016
0+737.17	12.00	38.21	1.50	PAVIMENTO	CIRCULAR	HORMIGON	0.016
3+415.89	12.00	28.71	1.50	PAVIMENTO	CIRCULAR	HORMIGON	0.016
4+104.50	12.00	23.21	1.50	PAVIMENTO	CIRCULAR	HORMIGON	0.016
4+385.98	12.00	23.01	1.50	PAVIMENTO	CIRCULAR	HORMIGON	0.016
5+133.29	12.00	17.51	1.50	PAVIMENTO	CIRCULAR	HORMIGON	0.016
5+541.18	12.00	19.86	1.50	PAVIMENTO	CIRCULAR	HORMIGON	0.016
6+865					CIRCULAR		
7+448.76	12.00	9.12	1.50	PAVIMENTO	CIRCULAR	HORMIGON	0.016

ESTUDIO HIDROLOGICO DE LA ZONA DEL RIO SAN MIGUEL  
 ING. JOSE BARRERA PINEDA  
 METODO KIRPICH           ALCANTARILLAS  
 CALCULO DE CAUDALES MAXIMOS A DIFERENTES PERIODOS DE RETORNO

No	Ubicación	Nombre	C	L (m)	H (m)	Tc (min)calc	Tc (min)asum	A. (Ha)	Itldr	I (mm)/Hora	Q (m3/s)	Tr
1	0.034.41	Via San Miguel	0.40	66.63	2.23	1.83	1.85	5.00	4.50	134.63	0.75	5 años
2	0+737.17	Via San Miguel	0.40	277.12	1.72	10.51	10.55	15.00	4.50	78.99	1.32	5 años
3	3+415.89	Via San Miguel	0.40	63.48	0.24	4.09	4.10	12.00	4.50	105.51	1.41	5 años
4	4+104.50	Via San Miguel	0.40	207.39	4.69	5.11	5.15	25.00	4.50	98.39	2.73	5 años
5	4+385.98	Via San Miguel	0.40	229.89	1.47	9.00	9.00	25.00	4.50	82.93	2.30	5 años
6	5+133.29	Via San Miguel	0.40	243.38	4.75	6.12	6.15	70.00	4.50	93.18	7.25	5 años
7	5+541.18	Via San Miguel	0.40	279.72	6.27	6.46	6.50	15.00	4.50	91.62	1.53	5 años
8	7+448.76	Via San Miguel	0.40	32.85	0.15	2.29	2.30	15.00	4.50	125.94	2.10	5 años
1	0.034.41	Via San Miguel	0.40	66.63	2.23	1.83	1.85	5.00	6.00	179.50	1.00	10 años
2	0+737.17	Via San Miguel	0.40	277.12	1.72	10.51	10.55	15.00	6.00	105.31	1.76	10 años
3	3+415.89	Via San Miguel	0.40	63.48	0.24	4.09	4.10	12.00	6.00	140.67	1.88	10 años
4	4+104.50	Via San Miguel	0.40	207.39	4.69	5.11	5.15	25.00	6.00	131.19	3.64	10 años
5	4+385.98	Via San Miguel	0.40	229.89	1.47	9.00	9.00	25.00	6.00	110.57	3.07	10 años
6	5+133.29	Via San Miguel	0.40	243.38	4.75	6.12	6.15	70.00	6.00	124.24	9.66	10 años
7	5+541.18	Via San Miguel	0.40	279.72	6.27	6.46	6.50	15.00	6.00	122.16	2.04	10 años
8	7+448.76	Via San Miguel	0.40	32.85	0.15	2.29	2.30	15.00	6.00	167.92	2.80	10 años
1	0.034.41	Via San Miguel	0.40	66.63	2.23	1.83	1.85	5.00	7.75	231.86	1.29	25 años
2	0+737.17	Via San Miguel	0.40	277.12	1.72	10.51	10.55	15.00	7.75	136.03	2.27	25 años
3	3+415.89	Via San Miguel	0.40	63.48	0.24	4.09	4.10	12.00	7.75	181.70	2.42	25 años
4	4+104.50	Via San Miguel	0.40	207.39	4.69	5.11	5.15	25.00	7.75	169.45	4.71	25 años
5	4+385.98	Via San Miguel	0.40	229.89	1.47	9.00	9.00	25.00	7.75	142.82	3.97	25 años
6	5+133.29	Via San Miguel	0.40	243.38	4.75	6.12	6.15	70.00	7.75	160.48	12.48	25 años
7	5+541.18	Via San Miguel	0.40	279.72	6.27	6.46	6.50	15.00	7.75	157.79	2.63	25 años

8	7+448.76	Via San Miguel	0.40	32.85	0.15	2.29	2.30	15.00	7.75	216.90	3.62	25 años
1	0.034.41	Via San Miguel	0.40	66.63	2.23	1.83	1.85	5.00	9.00	269.26	1.50	50 años
2	0+737.17	Via San Miguel	0.40	277.12	1.72	10.51	10.55	15.00	9.00	157.97	2.63	50 años
3	3+415.89	Via San Miguel	0.40	63.48	0.24	4.09	4.10	12.00	9.00	211.01	2.81	50 años
4	4+104.50	Via San Miguel	0.40	207.39	4.69	5.11	5.15	25.00	9.00	196.78	5.47	50 años
5	4+385.98	Via San Miguel	0.40	229.89	1.47	9.00	9.00	25.00	9.00	165.85	4.61	50 años
6	5+133.29	Via San Miguel	0.40	243.38	4.75	6.12	6.15	70.00	9.00	186.37	14.50	50 años
7	5+541.18	Via San Miguel	0.40	279.72	6.27	6.46	6.50	15.00	9.00	183.23	3.05	50 años
8	7+448.76	Via San Miguel	0.40	32.85	0.15	2.29	2.30	15.00	9.00	251.89	4.20	50 años
1	0.034.41	Via San Miguel	0.40	66.63	2.23	1.83	1.85	5.00	10.00	299.17	1.66	100 años
2	0+737.17	Via San Miguel	0.40	277.12	1.72	10.51	10.55	15.00	10.00	175.52	2.93	100 años
3	3+415.89	Via San Miguel	0.40	63.48	0.24	4.09	4.10	12.00	10.00	234.46	3.13	100 años
4	4+104.50	Via San Miguel	0.40	207.39	4.69	5.11	5.15	25.00	10.00	218.64	6.07	100 años
5	4+385.98	Via San Miguel	0.40	229.89	1.47	9.00	9.00	25.00	10.00	184.28	5.12	100 años
6	5+133.29	Via San Miguel	0.40	243.38	4.75	6.12	6.15	70.00	10.00	207.07	16.11	100 años
7	5+541.18	Via San Miguel	0.40	279.72	6.27	6.46	6.50	15.00	10.00	203.59	3.39	100 años
8	7+448.76	Via San Miguel	0.40	32.85	0.15	2.29	2.30	15.00	10.00	279.87	4.66	100 años

$$T_c = 0.0195 (L^3/H)^{0,385}$$

L= metros

H= metros

**CUADRO DE ALCANTARILLAS  
VIA SAN ANTONIO - SAN MIGUEL**

ABSCISA	CAUDAL MAX - Tr = 100 años	COTA DE ENTRADA	COTA DE SALIDA	LONGITUD ALC (m)	COTA RASANTE msnm	GRADIENTE TERRENO (m/m)	VELOCIDAD DE SALIDA (m/s)	AFIRMADO	ALCANTARILLA CIRCULAR (mm)	MATERIAL ALCANTARILLA	
0.034.41	1.66	40.38	38.85	21.00	41.88	0.0729	2.38	PAVIMENTO	1,200	HORMIGON	
0+737.17	2.93	35.20	35.02	14.00	37.99	0.0129	1.49	PAVIMENTO	1,200	HORMIGON	
3+415.89	3.13	26.42	26.10	12.50	27.9	0.0256	1.25	PAVIMENTO	1,200	HORMIGON	
4+104.50	6.07	20.60	20.43	13.00	22.97	0.0131	2.80	PAVIMENTO	1,800	HORMIGON	
4+385.98	5.12	20.20	20.06	13.00	23.08	0.0108	1.62	PAVIMENTO	1,800	HORMIGON	
5+133.29	16.11	14.66	14.23	15.30	17.58	0.0281	3.47	PAVIMENTO	2 x 1800	HORMIGON	
5+541.18	3.39	17.60	17.16	13.00	20.18	0.0338	2.41	PAVIMENTO	1,500	HORMIGON	
6+865	ALCANTARILLA DE ALIVIO DE AGUAS LLUVIAS EN CENTRO POBLADO DE SAN MIGUEL										
7+448.76	4.66	5.70	5.49	20.00	9.45	0.0105	1.32	PAVIMENTO	1,800	HORMIGON	

**PARA DIBUJAR EN LOS TRAMOS DE LA VIA  
VIA SAN ANTONIO - SAN MIGUEL  
CUADRO DE ALCANTARILLAS**

ABSCISA	COTA DE ENTRADA	COTA DE SALIDA	LONGITUD ALC (m)	COTA RASANTE msnm	ALCANTARILLA CIRCULAR (mm)	MATERIAL ALCANTARILLA
0.034.41	40.38	38.85	21.00	41.88	1,200	HORMIGON ARMADO
0+737.17	35.20	35.02	14.00	37.99	1,200	HORMIGON ARMADO
3+415.89	26.42	26.10	12.50	27.9	1,200	HORMIGON ARMADO
4+104.50	20.60	20.43	13.00	22.97	1,800	HORMIGON ARMADO
4+385.98	20.20	20.06	13.00	23.08	1,800	HORMIGON ARMADO
5+133.29	14.66	14.23	15.30	17.58	2 x 1800	HORMIGON ARMADO
5+541.18	17.60	17.16	13.00	20.18	1,500	HORMIGON ARMADO
7+448.76	5.70	5.49	20.00	9.45	1,800	HORMIGON ARMADO

**CUADRO CUNETAS Y BORDILLOS**

DE ABCSCISA	A ABCSCISA	LONGITUD (m)	OBSERVACIONES
0+037	0+280	243.00	CUNETAS Y BORDILLOS EN LOS DOS MARGENES CON DIRECCION A SAN ANTONIO -
6+380	6+660	280.00	CUNETAS Y BORDILLOS EN LOS DOS MARGENES EN POBLADO SAN MIGUEL
7+120	7+245	125.00	CUNETAS Y BORDILLOSEN LOS DOS MARGENES CON DIRECCION AL PUENTE
	TOTAL	648.00	

INTENSIDADES MAXIMAS DE LLUVIA

**PLAYAS ZONA 2**

**INAMHI**

Para 5 min < t < 75 min>>>It, Tr = 36,1212 \* t <sup>-0.3063</sup> \* IdTr

Para 75 min < t < 1440 min>>>It, Tr = 269.9406 \* t <sup>-0.7696</sup> \* Idtr

datos:

constates: 36.1212 269.9406 -0.3063 -0.7696

Id ,Tr: 5 años 10 años 25 años 50 años 100 años  
3.5 4.6 5.5 6 6.8

Tr ( años)	t (minutos)					t (horas)/ (minutos) calculado				abaco
	10	15	20	30	60	120	360	720	1440	1440
5	62.45	55.16	50.50	44.61	36.07	23.72	10.19	5.97	3.50	4.50
10	82.08	72.49	66.38	58.62	47.41	31.18	13.39	7.85	4.61	6.00
25	98.14	86.67	79.36	70.09	56.69	37.28	16.01	9.39	5.51	7.75
50	107.06	94.55	86.58	76.47	61.84	40.67	17.46	10.24	6.01	9.00
100	121.33	107.16	98.12	86.66	70.08	46.09	19.79	11.61	6.81	10.00

