no hay escurrimiento (S adopta valores muy grandes o infinito), y CN = 100 (cuando el volumen del escurrimiento es igual al de la precipitación, luego S toma el valor cero).

Conocidas las precipitaciones efectivas para cada intervalo Δt definido, se procede al cálculo de los caudales de proyecto mediante el "álgebra de los Hidrogramas", o sea, multiplicando las precipitaciones efectivas por las ordenadas del Hidrograma unitario, reiteradas a intervalos de tiempo iguales al intervalo unitario considerado.

Los valores de las descargas del Hidrograma de proyecto, por tanto, serán dados por:

$$Qi = \Delta Pe1\text{-}0.\ q1 + \Delta Pe2\text{-}1.\ q2 + \Delta Pe3\text{-}2.\ q3 + ...\Delta Pei\text{-}n.\ qi$$

El caudal de proyecto de la cuenca corresponderá al valor máximo de las combinaciones obtenidas en las descargas del Hidrograma de proyecto.

4.2. Caudales calculados

Mediante el método expuesto en el apartado anterior, se calcularon los caudales de las cuencas mencionadas. De acuerdo con estos valores y a las condiciones geométricas existentes, se decidió optar por alcantarillas o puentes. Se adjunta un resumen en la siguiente tabla. En el apartado de anexos, se encuentra el cálculo detallado por cada cuenca.

Tabla 7. IDF, valores de precipitación y caudales de las cuencas.

ID CUENCA	Método cálculo	Caudales Diseño		Caudales Verificación	
		TR	Q (m^3/s)	TR	Q (m^3/s)
1	Racional	50	3.80	100	4.36
2	Racional	50	5.64	100	6.47
3	Racional	50	6.48	100	7.43
4	Racional	50	6.32	100	7.26
5	Racional	50	7.01	100	8.04
6	HUT	100	23.80	150	26.50
7	HUT	100	89.50	150	99.80
8	Racional	25	2.53	50	2.90
9	Racional	50	6.81	100	7.82
10	Racional	25	1.88	50	2.15
11	Racional	50	12.97	100	14.88
12	Racional	50	7.03	100	8.07
13	HUT	100	21.50	150	23.90
14	Racional	25	2.48	50	2.85
15	Racional	50	3.97	100	4.56
16	Racional	25	2.00	50	2.30
17	Racional	25	1.94	50	2.23
18	Racional	50	3.40	100	3.90
19	Racional	25	1.90	50	2.19
20	HUT	100	25.60	150	28.30
21	Racional	50	8.73	100	10.02
22	Racional	25	4.21	50	4.83
23	Racional	50	8.65	100	9.93
24	Racional	25	2.30	50	2.64

25	Racional	50	9.81	100	11.26
26	Racional	25	2.03	50	2.33
27	Racional	50	5.43	100	6.24
28	Racional	50	3.90	100	4.48
29	Racional	50	3.60	100	4.13
30	Racional	50	9.85	100	11.30
31	Racional	50	6.09	100	6.99
32	Racional	25	2.15	50	2.47
33	Racional	25	2.01	50	2.31
34	Racional	25	2.20	50	2.52
35	Racional	50	14.72	100	16.89

5. MODELO HIDRÁULICO

5.1. Puentes

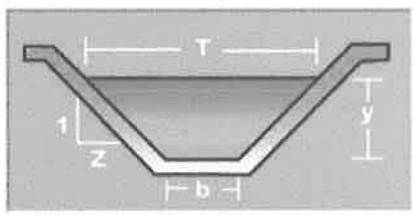
Para los puentes, se utilizó el software HCanales para determinar la máxima capacidad de los canales de los puentes existentes utilizando el método Sección-Pendiente. Con ello, se pudo verificar el nivel de agua y velocidad para cada puente, estimándose de esta forma si verifica o no.

5.1.1. Puente 3+615

Lugar:	3+615	Proyecto:	Tocsa
Tramo:	San Juan	Revestimiento:	

Datos:

Caudal (Q):	23.8	m3/s
Ancho de solera (b):	11	m
Talud (Z):	1	
Rugosidad (n):	0.04	
Pendiente (S):	0.002	m/m



Resultados:

Tirante normal (y):	1.4901	m	Perímetro (p):	15.2146	m
Area hidráulica (A):	18.6113	m2	Radio hidráulico (R):	1.2233	m
Espejo de agua (T):	13.9802	m	Velocidad (v):	1.2788	m/s
Número de Froude (F):	0.3539		Energía específica (E):	1.5734	m-Kg/Kg
Tipo de flujo:	Subcrítico				

Para las condiciones propuestas, el resultado arroja que el nivel de agua máxima estará a 1.49 metros del fondo del cauce, por lo que la cota de fondo de viga del puente deberá ubicarse por lo menos a 2.49 metros, guardando así una revancha de 1 metro, para TR 100.

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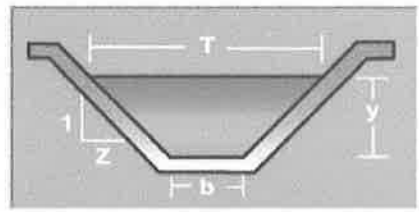
5.1.2. Puente 4+071

Lugar:	4+071	Proyecto:	Tocsa
Tramo:	San Juan	Revestimiento:	

Datos:

Caudal (Q):	89.4	m3/s
Ancho de solera (b):	55	m
Talud (Z):	2	
Rugosidad (n):	0.04	
Pendiente (S):	0.002	m/m



Resultados:

Tirante normal (y):	1,2446	m	Perímetro (p):	60,5661	m
Area hidráulica (A):	71,5519	m2	Radio hidráulico (R):	1,1814	m
Espejo de agua (T):	59,9785	m	Velocidad (v):	1,2494	m/s
Número de Froude (F):	0,3652		Energía específica (E):	1,3242	m-Kg/Kg
Tipo de flujo:	Subcrítico				

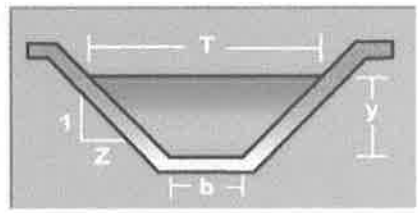
Para el caso del Puente 43, los datos de entrada fueron los que se ven en la figura adjunta. De esta forma, los resultados indican que el nivel de agua máxima estará a 1.24 metros del fondo del cauce, por lo que la cota de fondo de viga del puente tendrá que estar como mínimo a 2.24 metros, teniendo de esta manera un metro de revancha para TR 100.

5.1.3. Puente 7+620

Lugar:	7+620	Proyecto:	Tocsa
Tramo:	San Juan	Revestimiento:	

Datos:

Caudal (Q):	21.5	m3/s
Ancho de solera (b):	10	m
Talud (Z):	2	
Rugosidad (n):	0.04	
Pendiente (S):	0.002	m/m



Resultados:

Tirante normal (y):	1,4046	m	Perímetro (p):	16,2815	m
Area hidráulica (A):	17,9915	m2	Radio hidráulico (R):	1,1050	m
Espejo de agua (T):	15,6183	m	Velocidad (v):	1,1950	m/s
Número de Froude (F):	0,3555		Energía específica (E):	1,4774	m-Kg/Kg
Tipo de flujo:	Subcrítico				

En el Puente 44, se tienen estas características geométricas para el cauce. Así, los resultados indican que el nivel de agua máxima estará a 1.40 metros del fondo del cauce, por lo que la cota de fondo de viga del puente tendrá que estar como mínimo a 2.40 metros, teniendo de esta manera un metro de revancha para TR 100.

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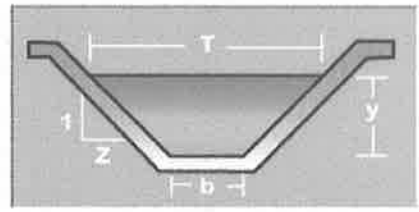
5.1.4. Puente 13+015

Lugar:	13+015	Proyecto:	Tocsa
Tramo:	San Juan	Revestimiento:	

Datos:

Caudal (Q):	25.6	m3/s
Ancho de solera (b):	21	m
Talud (Z):	2	
Rugosidad (n):	0.04	
Pendiente (S):	0.002	m/m



Resultados:

Tirante normal (y):	1,0382	m	Perímetro (p):	25,6431	m
Area hidráulica (A):	23,9585	m2	Radio hidráulico (R):	0,9343	m
Espejo de agua (T):	25,1529	m	Velocidad (v):	1,0685	m/s
Número de Froude (F):	0,3496		Energía específica (E):	1,0964	m-Kg/Kg
Tipo de flujo:	Subcrítico				

Para el Puente 45, se presentan las siguientes características geométricas en el cauce. Consecuentemente, los resultados indican que el nivel de agua máxima estará a 1.04 metros del fondo del cauce, por lo que la cota de fondo de viga del puente tendrá que estar como mínimo a 2.04 metros, teniendo de esta manera un metro de revancha para TR 100.

5.2. Alcantarillas

A continuación, se detalla la metodología de cálculo para la verificación y dimensionamiento de las alcantarillas. Como premisas de cálculo se toma en cuenta las consideraciones exigidas en el Manual de Carreteras del Paraguay, las cuales pueden resumirse en lo siguiente:

- Se analizan no solamente las macrocuencas, sino que también las microcuencas que drenan a cada alcantarilla.
- Se realiza una inspección visual del histórico de imágenes de Google Earth para determinar el recorrido del flujo de agua y ubicar las alcantarillas en la línea de flujo.
- Para la verificación de las alcantarillas, se tuvo en cuenta 3 condiciones:
  - Condición 1: El nivel de carga en la entrada (He), puede sobrepasar como máximo 30 cm por encima de la altura de la alcantarilla.
  - Condición 2: El nivel de carga en la entrada debe estar al menos 30 cm por debajo de la cota del Sobreancho de Plataforma.
  - Condición 3: Tapada mínima de 60 cm.

Para verificar las obras, se emplea el modelo HY8, en donde se introducen las dimensiones propuestas y se corrobora el comportamiento de estas utilizando los caudales de diseño y verificación. El modelo hidráulico para resolución de alcantarillas HY8 fue desarrollado por la *"Federal Highway Administration del U.S. Department of Transportation"*. Actualmente es uno de los modelos hidráulicos que corre en un programa de distribución gratuita (software libre) y es de sencilla utilización.

Seguidamente, se adjunta una tabla con el resumen de los resultados del modelo HY8. Para

el caso de las alcantarillas celulares simples de 1x1, se tuvo en cuenta un único modelo, que verifica para todos los caudales calculados.

Tabla 8. Alcantarillas propuestas

ID Alcantarilla	Prog.	Propuesta	H(m)	Cant.	Long.	C.Ent.	C.Sal.	S (%)	Rasante
1	0+770	ACS 1,5X1,5	1,5	1	10	56,4	56,35	0,50%	58,8
2	1+280	ACS 2,0X2,0	2	1	10,4	55,8	55,74	0,58%	58,8
3	1+880	ACS 2,0X2,0	2	1	10,4	55,62	55,56	0,58%	58,8
4	2+580	ACS 1,0X1,0	1	1	13,2	55,9	55,83	0,53%	58,8
5	3+060	ACS 2,0X2,0	2	1	10,3	55,6	55,54	0,58%	58,7
6	3+420	ACD 1,5X1,5	1,5	2	11,3	55	54,94	0,53%	58,1
8	5+205	ACS 1,5X1,5	1,5	1	13,5	55,9	55,83	0,52%	58,8
9	5+280	ACS 1,5X1,5	1,5	1	15	55,73	55,65	0,53%	58,8
11	6+180	ACT 1,5X1,5	1,5	3	18,3	55,16	55,06	0,55%	58,8
12	6+420	ACD 1,5X1,5	1,5	2	13,5	56,28	56,21	0,52%	58,81
14	9+724	ACD 1,0X1,0	1	2	11,4	57,46	57,4	0,53%	59,4
17	11+733	ACS 1,0X1,0	1	1	12,4	58,11	58,04	0,56%	60,07
18	12+000	ACS 1,0X1,0	1	1	10,6	57,9	57,84	0,57%	60,05
20	13+260	ACS 1,5X1,5	1,5	1	13,4	56,7	56,55	1,12%	59,23
21	13+600	ACS 1,5X1,5	1,5	1	13,4	56,68	56,54	1,04%	59,23
22	14+180	ACS 1,0X1,0	1	1	10,4	57,21	57,15	0,58%	59,4
23	14+900	ACS 1,0X1,0	1	1	11,4	57,6	57,48	1,05%	59,6
24	15+080	ACS 1,0X1,0	1	1	11,4	57,65	57,53	1,05%	59,7
25	15+860	ACS 1,0X1,0	1	1	11,6	57,7	57,64	0,52%	59,7
26	15+900	ACD 1,5X1,5	1,5	2	11,5	57,26	57,2	0,52%	59,7
27	16+820	ACS 1,0X1,0	1	1	10,3	57,35	57,29	0,58%	59,7
29	18+183	ACD 1,5X1,5	1,5	2	10,5	57,49	57,43	0,57%	59,9
31	18+890	ACS 1,5X1,5	1,5	1	10,4	57,38	57,27	1,06%	59,9
32	19+035	ACS 1,0X1,0	1	1	11,4	57,93	57,81	1,05%	59,9
33	19+522	ACS 1,5X1,5	1,5	1	10,5	57,44	57,38	0,57%	59,9
34	20+025	ACD 1,0X1,0	1	2	11,5	58,3	58,24	0,52%	60,3
35	20+968	ACD 1,5X1,5	1,5	2	10,4	57,94	57,83	1,06%	60,4
36	21+493	ACS 1,0X1,0	1	1	11	58,69	58,58	1,00%	60,6
37	21+866	ACD 1,0X1,0	1	2	10,5	58,7	58,59	1,05%	60,6
41	23+705	ACD 2,0X2,0	2	2	15,5	57,88	57,8	0,52%	60,8

Tabla 9. Verificación hidráulica – Alcantarillas

ID Alcantarilla	Condición 1				Condición 2			Condición 3			Verifica ODT
	Hentr	Hw	Sc	Verifica	CSAP	d	Verifica	H+e	Tap.	Verifica	
1	57,89	1,49	-0,01	SI	58,68	0,79	SI	1,65	0,63	SI	Verifica
2	57,39	1,59	-0,41	SI	58,68	1,29	SI	2,15	0,73	SI	Verifica
3	57,38	1,76	-0,24	SI	58,68	1,3	SI	2,15	0,91	SI	Verifica
4	56,92	1,02	0,02	SI	58,68	1,76	SI	1,15	1,63	SI	Verifica
5	56,92	1,32	-0,68	SI	58,58	1,66	SI	2,15	0,83	SI	Verifica
6	56,38	1,38	-0,12	SI	57,98	1,6	SI	1,65	1,33	SI	Verifica
8	57,1	1,2	-0,3	SI	58,68	1,58	SI	1,65	1,13	SI	Verifica
9	57,1	1,37	-0,13	SI	58,68	1,58	SI	1,65	1,3	SI	Verifica
11	56,73	1,57	0,07	SI	58,68	1,95	SI	1,65	1,87	SI	Verifica
12	57,59	1,31	-0,19	SI	58,69	1,1	SI	1,65	0,76	SI	Verifica

IDEAM

ID Alcantarilla	Condición 1				Condición 2			Condición 3			Verifica ODT
	Hentr	Hw	Sc	Verifica	CSAP	d	Verifica	H+e	Tap.	Verifica	
14	58,75	1,29	0,29	SI	59,28	0,53	SI	1,15	0,67	SI	Verifica
17	59,12	1,01	0,01	SI	59,95	0,83	SI	1,15	0,69	SI	Verifica
18	59,12	1,22	0,22	SI	59,93	0,81	SI	1,15	0,88	SI	Verifica
20	58,4	1,7	0,2	SI	59,11	0,71	SI	1,65	0,76	SI	Verifica
21	58,4	1,72	0,22	SI	59,11	0,71	SI	1,65	0,78	SI	Verifica
22	58,4	1,19	0,19	SI	59,28	0,88	SI	1,15	0,92	SI	Verifica
23	58,79	1,19	0,19	SI	59,48	0,69	SI	1,15	0,73	SI	Verifica
24	58,79	1,14	0,14	SI	59,58	0,79	SI	1,15	0,78	SI	Verifica
25	58,44	0,74	-0,26	SI	59,58	1,14	SI	1,15	0,73	SI	Verifica
26	58,44	1,18	-0,32	SI	59,58	1,14	SI	1,65	0,67	SI	Verifica
27	58,44	1,09	0,09	SI	59,58	1,14	SI	1,15	1,08	SI	Verifica
29	59,16	1,67	0,17	SI	59,78	0,62	SI	1,65	0,64	SI	Verifica
31	59,09	1,71	0,21	SI	59,78	0,69	SI	1,65	0,75	SI	Verifica
32	59,09	1,16	0,16	SI	59,78	0,69	SI	1,15	0,7	SI	Verifica
33	58,95	1,51	0,01	SI	59,78	0,83	SI	1,65	0,69	SI	Verifica
34	59,47	1,17	0,17	SI	60,18	0,71	SI	1,15	0,73	SI	Verifica
35	59,46	1,52	0,02	SI	60,28	0,82	SI	1,65	0,69	SI	Verifica
36	59,8	1,11	0,11	SI	60,48	0,68	SI	1,15	0,64	SI	Verifica
37	59,8	1,1	0,1	SI	60,48	0,68	SI	1,15	0,63	SI	Verifica
41	59,75	1,87	-0,13	SI	60,68	0,93	SI	2,15	0,65	SI	Verifica

Referencias:

- Hentr: Cota de la carga en la entrada.
- Hw: Diferencia entre Hentr y la cota de entrada.
- Sc: Sobrecarga.
- CSAP: Cota en el sobreancho de plataforma.
- d: Diferencia entre CSAP y Hentr.
- H+e: Altura de la alcantarilla más su espesor (15cm).
- Tap: Tapada.
- C. Ent.: Cota de entrada.
- C. Sal.: Cota de salida.

En los anexos, se encontrarán los resultados detallados por cada alcantarilla diseñada.

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6. CONCLUSIONES

De acuerdo con las obras identificadas, se delimitaron las cuencas que aportan a cada una para posteriormente, a partir de lo establecido en el Manual de Carreteras, dimensionar y verificar las mismas.

Con los criterios dados, todas las obras verifican hidráulicamente para cada condición dada, por lo que se proponen las dimensiones dadas para su implementación.

Es mi informe,

TDCSA

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Hidrología e Hidráulica

Reg. Prof. M.O.P.C. N° 2224

7. ANEXOS

7.1. Características de las cuencas

Tabla 10. Características de las cuencas.

ID, CUENCA	c1	c2	c3	c4	f	Cf	Área (ha)	Long (m)	S (%)	K DNOS	Tc (min)
1	0,14	0,14	0,08	0,09	1,20	0,54	20,55	702,00	0,369%	3	50,68
2	0,14	0,11	0,08	0,08	1,20	0,49	54,72	1374,00	0,211%	3	97,25
3	0,14	0,11	0,08	0,08	1,20	0,49	50,97	1483,20	0,398%	3	75,02
4	0,14	0,13	0,09	0,08	1,20	0,53	61,29	1934,71	0,222%	3	105,54
5	0,14	0,12	0,08	0,07	1,20	0,49	91,94	2769,74	0,188%	3	137,01
6	0,14	0,12	0,08	0,08	1,20	0,50	1255,65	7425,48	0,074%	3	530,38
7	0,14	0,12	0,08	0,08	1,20	0,50	50636,40	82696,47	0,024%	3	4074,32
8	0,14	0,12	0,06	0,06	1,20	0,46	61,21	2502,93	0,046%	3	207,93
9	0,14	0,12	0,06	0,06	1,20	0,46	106,33	2447,75	0,151%	3	152,27
10	0,14	0,12	0,08	0,08	1,20	0,50	31,45	1473,71	0,043%	3	157,84
11	0,14	0,12	0,08	0,08	1,20	0,50	188,57	2655,76	0,224%	3	157,03
12	0,14	0,11	0,08	0,08	1,20	0,49	79,56	2351,88	0,234%	3	116,29
13	0,14	0,12	0,08	0,08	1,20	0,50	1982,91	13361,22	0,121%	3	561,73
14	0,14	0,12	0,07	0,07	1,20	0,48	72,56	3584,99	0,035%	3	263,10
15	0,14	0,12	0,08	0,08	1,20	0,50	86,45	2690,40	0,045%	3	236,78
16	0,14	0,12	0,07	0,07	1,20	0,48	39,50	1253,40	0,035%	3	177,67
17	0,14	0,12	0,08	0,08	1,20	0,50	32,51	1270,07	0,041%	3	157,73
18	0,14	0,12	0,08	0,08	1,20	0,50	20,96	1101,35	0,372%	3	55,63
19	0,13	0,11	0,08	0,08	1,20	0,48	17,99	944,59	0,136%	3	77,04
20	0,14	0,12	0,08	0,08	1,20	0,50	357,03	6463,26	0,210%	3	232,97
21	0,14	0,12	0,08	0,08	1,20	0,50	83,20	2225,75	0,362%	3	97,92
22	0,13	0,11	0,07	0,08	1,20	0,47	37,36	846,04	0,297%	3	68,64
23	0,15	0,15	0,09	0,09	1,20	0,58	62,16	1767,09	0,407%	3	81,68
24	0,13	0,10	0,07	0,08	1,20	0,46	21,74	988,19	0,208%	3	72,10
25	0,14	0,12	0,07	0,08	1,20	0,49	198,86	3280,84	0,118%	3	215,41
26	0,14	0,12	0,07	0,08	1,20	0,49	14,50	456,10	0,192%	3	54,37
27	0,14	0,12	0,09	0,09	1,20	0,53	35,00	695,05	0,317%	3	63,11
28	0,14	0,12	0,08	0,08	1,20	0,50	23,29	754,12	0,376%	3	52,98
29	0,14	0,12	0,08	0,08	1,20	0,50	19,80	738,32	0,447%	3	46,90
30	0,14	0,12	0,08	0,08	1,20	0,50	110,75	1933,96	0,259%	3	118,64
31	0,14	0,12	0,07	0,07	1,20	0,48	53,98	1489,92	0,309%	3	84,55
32	0,14	0,12	0,07	0,07	1,20	0,48	14,71	591,23	0,285%	3	49,11
33	0,14	0,11	0,08	0,08	1,20	0,49	14,74	694,77	0,220%	3	56,35
34	0,14	0,12	0,08	0,08	1,20	0,50	17,56	1206,33	0,224%	3	65,79
35	0,14	0,13	0,10	0,11	1,20	0,58	182,27	2647,67	0,234%	3	152,62

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7.2. Caudales calculados por el método racional

ID CUENCA	Método de cálculo		Caudales Diseño			Caudales Verificación		
		Thiessen	TR	I max (mm/hr)	Q (m^3/s)	TR	I max (mm/hr)	Q (m^3/s)
1	Racional	Pilar	50	123.29	3.80	100	141.50	4.36
2	Racional	Pilar	50	75.42	5.64	100	86.56	6.47
3	Racional	Pilar	50	93.00	6.48	100	106.73	7.43
4	Racional	Pilar	50	70.35	6.32	100	80.74	7.26
5	Racional	Pilar	50	55.78	7.01	100	64.02	8.04
8	Racional	Pilar	25	32.59	2.53	50	37.41	2.90
9	Racional	Pilar	50	50.57	6.81	100	58.04	7.82
10	Racional	Pilar	25	42.59	1.88	50	48.88	2.15
11	Racional	Pilar	50	49.12	12.97	100	56.38	14.88
12	Racional	Pilar	50	64.65	7.03	100	74.20	8.07
14	Racional	Pilar	25	25.68	2.48	50	29.48	2.85
15	Racional	Pilar	50	32.83	3.97	100	37.68	4.56
16	Racional	Pilar	25	38.03	2.00	50	43.65	2.30
17	Racional	Pilar	25	42.62	1.94	50	48.92	2.23
18	Racional	Pilar	50	115.75	3.40	100	132.85	3.90
19	Racional	Pilar	25	79.38	1.90	50	91.10	2.19
21	Racional	Pilar	50	74.98	8.73	100	86.06	10.02
22	Racional	Pilar	25	86.71	4.21	50	99.51	4.83
23	Racional	Pilar	50	86.99	8.65	100	99.84	9.93
24	Racional	Pilar	25	83.54	2.30	50	95.88	2.64
25	Racional	Pilar	50	36.11	9.81	100	41.44	11.26
26	Racional	Pilar	25	102.47	2.03	50	117.60	2.33
27	Racional	Pilar	50	105.87	5.43	100	121.51	6.24
28	Racional	Pilar	50	119.69	3.90	100	137.37	4.48
29	Racional	Pilar	50	129.67	3.60	100	148.82	4.13
30	Racional	Pilar	50	63.52	9.85	100	72.90	11.30
31	Racional	Pilar	50	84.62	6.09	100	97.12	6.99
32	Racional	Pilar	25	109.68	2.15	50	125.88	2.47
33	Racional	Pilar	25	99.98	2.01	50	114.74	2.31
34	Racional	Pilar	25	89.48	2.20	50	102.69	2.52
35	Racional	Pilar	50	50.46	14.72	100	57.91	16.89

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7.3. Caudales calculados por el HUT

7.3.1. Puente 42

Cálculo de Caudal de Diseño — **Q: 23,8 m3/s**

Proyecto	*Obras de arte varias*		Prog	*3+615*	Puente	*6*		Arroyo:					
Características de la Cuenca			Tiempo de Concentración y Factor Pico (SCS)							IDF, TR			
Área (A):	1.457,0	ha	Fórmula:	DNOS						TR:	100	años	
Área (A):	14,57	km²	K DNOS:	3,0				β calculado:	0,27	IDF:	Pilar		
			Tc:	510,5	min			X calculado:	6,40		c:	11872,82	
Longitud (L):	7.425,0	m	Tc:	8,51	hs			X adoptado:	6,40		n:	0,19873	
Pendiente (i):	0,07	%						1+X:	7,40		d:	40,00	
Desnivel (dh):	5,2	m	Δt:	42,5	min						m:	1,18582	
			Δt Adop.	42,5	min			PRF (inglés):	174,3				
SCS Curve Number:	83		tp:	306,3	min			PRF (SI):	0,75				
Almacenam. (S):	52,0	mm	Tp:	327,6	min								
Porcentaje retenc.:	20%		Tr:	2097,2	min			Vol. hasta el pico:	13,5%				
Abstracc. inic. (Ia):	10,4	mm	Tb:	2424,8	min			qp:	2,00 m³/s/cm				

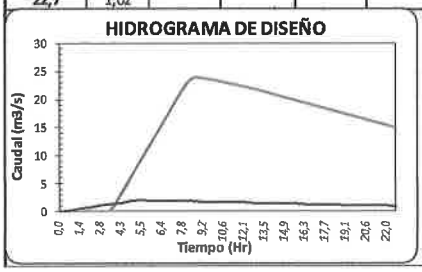
MÉTODO DE LAS ABSTRACCIONES (SCS)

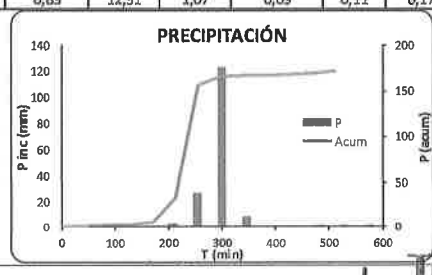
Distribución temporal de la precitació: **Bloques Alternos**

Cálculo de la Precipitación Efectiva											Precipitación Incremental			
Intervalo (min)	Pinc (mm)	Pacum (mm)	S (mm)	Ia (mm)	Fa (mm)	Pe Acum (mm)	Pe Inc (mm)	Pe inc (cm)			Intervalo (min)	Intensidad (mm/h)	P acum (mm)	P inc (mm)
0,0	0,00	0,00	52,02	0,00	0,00	0,00	0,00	0,00	K SCS	1,00	0,0	0,0	0,0	0,0
42,5	1,32	1,32	52,02	1,32	0,00	0,00	0,00	0,00	K Espan.	0,92	42,5	181,9	123,5	123,5
85,1	1,15	2,48	52,02	2,48	0,00	0,00	0,00	0,00	K Fhruling	0,95	85,1	111,1	150,9	27,4
127,6	0,36	2,84	52,02	2,84	0,00	0,00	0,00	0,00	K In.Cv.Eng	0,96	127,6	78,5	159,9	9,1
170,2	3,15	5,98	52,02	5,98	0,00	0,00	0,00	0,00			170,2	60,1	163,1	3,1
212,7	27,37	33,35	52,02	10,40	15,92	7,02	7,02	0,70	k prom	0,96	212,7	48,3	163,8	0,7
255,3	123,48	156,84	52,02	10,40	38,39	108,04	101,02	10,10			255,3	40,1	163,4	0,4
297,8	9,06	165,89	52,02	10,40	38,98	116,51	8,46	0,85	mod IDF	1,15	297,8	34,2	162,6	0,9
340,3	0,74	166,64	52,02	10,40	39,03	117,21	0,70	0,07			340,3	29,7	161,4	1,2
382,9	0,89	167,53	52,02	10,40	39,08	118,04	0,84	0,08			382,9	26,2	160,1	1,3
425,4	1,28	168,81	52,02	10,40	39,16	119,24	1,20	0,12			425,4	23,4	158,8	1,3
468,0	1,33	170,14	52,02	10,40	39,24	120,49	1,25	0,12			468,0	21,1	157,5	1,3
510,5	1,31	171,45	52,02	10,40	39,32	121,72	1,23	0,12			510,5	19,2	156,2	1,3

HIDROGRAMA UNITARIO TRIANGULAR

		P inc (cm)												
Intervalo (hr)	qi	0,00	0,00	0,00	0,00	0,70	10,10	0,85	0,07	0,08	0,12	0,12	0,12	Q tot (m3/s)
0,0	0,00													0,0
0,7	0,26													0,0
1,4	0,52													0,0
2,1	0,78													0,0
2,8	1,04													0,0
3,5	1,30					0,18								0,2
4,3	1,56					0,37	2,63							3,0
5,0	1,82					0,55	5,26	0,22						6,0
5,5	2,00					0,73	7,88	0,44	0,02					9,1
5,7	1,99					0,91	10,51	0,66	0,04	0,02				12,1
6,4	1,95					1,10	13,14	0,88	0,05	0,04	0,03			15,2
7,1	1,91					1,28	15,77	1,10	0,07	0,07	0,06	0,03		18,4
7,8	1,87					1,41	18,39	1,32	0,09	0,09	0,09	0,06	0,03	21,5
8,5	1,83					1,40	20,23	1,54	0,11	0,11	0,12	0,10	0,06	23,7
9,2	1,79					1,37	20,11	1,70	0,13	0,13	0,16	0,13	0,10	23,8
9,9	1,75					1,34	19,70	1,68	0,14	0,15	0,19	0,16	0,13	23,5
10,6	1,71					1,31	19,29	1,65	0,14	0,17	0,22	0,19	0,16	23,1
11,3	1,67					1,28	18,88	1,62	0,14	0,17	0,24	0,23	0,19	22,7
12,1	1,63					1,26	18,47	1,58	0,13	0,16	0,24	0,25	0,22	22,3
12,8	1,58					1,23	18,06	1,55	0,13	0,16	0,23	0,25	0,25	21,9
13,5	1,54					1,20	17,65	1,51	0,13	0,16	0,23	0,24	0,25	21,4
14,2	1,50					1,17	17,24	1,48	0,12	0,15	0,22	0,24	0,24	20,9
14,9	1,46					1,14	16,83	1,44	0,12	0,15	0,22	0,23	0,24	20,4
15,6	1,42					1,11	16,42	1,41	0,12	0,15	0,21	0,23	0,23	19,9
16,3	1,38					1,08	16,01	1,38	0,12	0,14	0,21	0,22	0,23	19,4
17,0	1,34					1,06	15,60	1,34	0,11	0,14	0,20	0,22	0,22	18,9
17,7	1,30					1,03	15,18	1,31	0,11	0,14	0,20	0,21	0,22	18,4
18,4	1,26					1,00	14,77	1,27	0,11	0,13	0,19	0,21	0,21	17,9
19,1	1,22					0,97	14,36	1,24	0,10	0,13	0,19	0,20	0,21	17,4
19,9	1,18					0,94	13,95	1,20	0,10	0,13	0,19	0,20	0,20	16,9
20,6	1,14					0,91	13,54	1,17	0,10	0,12	0,18	0,19	0,20	16,4
21,3	1,10					0,88	13,13	1,13	0,10	0,12	0,18	0,19	0,19	15,9
22,0	1,06					0,86	12,72	1,10	0,09	0,12	0,17	0,18	0,19	15,4
22,7	1,02					0,83	12,31	1,07	0,09	0,11	0,17	0,18	0,18	14,9





I max:	182	mm/hr
P acum:	171,4	mm
P max:	123,5	mm

Q Max:	23,8	m³/s
TR:	100	años

7.3.2. Puente 43

Cálculo de Caudal de Diseño

Q: 89,5 m3/s

Proyecto	Obras de arte varias	Prog	4+071	Puente	43	Arroyo:	-

Características de la Cuenca

Área (A):	53.290,0	ha
Área (A):	532,9	km²
Longitud (L):	82.700,0	m
Pendiente (i):	0,02	%
Desnivel (dh):	16,5	m
SCS Curve Number:	80	
Almacenam. (S):	63,5	mm
Porcentaje retenc.:	20%	
Abstracc. Inic. (Ia):	12,7	mm

Tiempo de Concentración y Factor Pico (SCS)

Fórmula:	DNOS	
K DNOS:	4,0	
Tc:	3013,2	min
Tc:	50,22	hs
Δt:	251,1	min
Δt Adop.	251,1	min
tp:	1807,9	min
Tp:	1933,4	min
Tr:	23201,4	min
Tb:	25134,8	min

β calculado:	0,19	
X calculado:	9,78	
X adoptado:	12,00	
1+X:	13,00	
PRF (inglés):	99,2	
PRF (SI):	0,43	
Vol. hasta el pico:	7,7%	
qp:	7,07	m³/s/cm

IDF, TR

TR:	100 años
IDF:	Pilar
c:	11872,82
n:	0,19873
d:	40,00
m:	1,18582

MÉTODO DE LAS ABSTRACCIONES (SCS)

Distribución temporal de la precitació: **Bloques Alternos**

Cálculo de la Precipitación Efectiva

Intervalo (min)	Pinc (mm)	Pacum (mm)	S (mm)	Ia (mm)	Fa (mm)	Pe Acum (mm)	Pe Inc (mm)	Pe Inc (cm)
0,0	0,00	0,00	63,50	0,00	0,00	0,00	0,00	0,00
251,1	2,03	2,03	63,50	2,03	0,00	0,00	0,00	0,00
502,2	2,59	4,62	63,50	4,62	0,00	0,00	0,00	0,00
753,3	3,51	8,13	63,50	8,13	0,00	0,00	0,00	0,00
1004,4	5,18	13,31	63,50	12,70	0,61	0,01	0,01	0,00
1255,5	6,54	19,85	63,50	12,70	6,43	0,72	0,72	0,07
1506,6	150,56	170,41	63,50	12,70	45,27	112,43	111,71	11,17
1757,7	6,45	176,86	63,50	12,70	45,79	118,37	5,93	0,59
2008,8	4,21	181,07	63,50	12,70	46,11	122,26	3,89	0,39
2259,9	2,99	184,06	63,50	12,70	46,33	125,03	2,77	0,28
2511,0	2,28	186,33	63,50	12,70	46,50	127,14	2,11	0,21
2762,1	1,82	188,16	63,50	12,70	46,63	128,83	1,69	0,17
3013,2	1,65	189,81	63,50	12,70	46,74	130,37	1,54	0,15

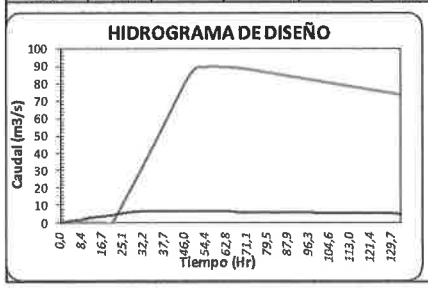
K SCS	0,87	
K Espan.	0,82	
K Fhruling	0,95	
K In.Cv.Eng	0,89	
k prom	0,88	
mod IDF	1,15	

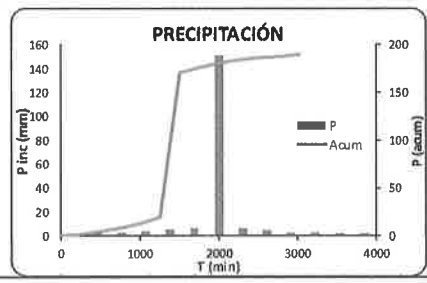
Precipitación Incremental

Intervalo (min)	Intensidad (mm/h)	P acum (mm)	P inc (mm)
0,0	0,0	0,0	0,0
251,1	40,8	150,6	150,6
502,2	19,5	144,0	6,5
753,3	12,4	137,6	6,4
1004,4	9,0	132,4	5,2
1255,5	6,9	128,2	4,2
1506,6	5,6	124,7	3,5
1757,7	4,7	121,7	3,0
2008,8	4,0	119,1	2,6
2259,9	3,5	116,8	2,3
2511,0	3,1	114,8	2,0
2762,1	2,8	113,0	1,8
3013,2	2,5	111,3	1,7

HIDROGRAMA UNITARIO TRIANGULAR

Intervalo (hr)	qi	P inc (cm) 0,00	0,00	0,00	0,00	0,07	11,17	0,59	0,39	0,28	0,21	0,17	0,15	Q tot (m3/s)
0,0	0,00													0,0
4,2	0,92													0,0
8,4	1,84													0,0
12,6	2,75													0,0
16,7	3,67				0,00									0,0
20,9	4,59				0,00	0,07								0,1
25,1	5,51				0,00	0,13	10,25							10,4
29,3	6,42				0,00	0,20	20,51	0,54						21,3
32,2	7,07				0,00	0,26	30,76	1,09	0,36					32,5
33,5	7,04				0,00	0,33	41,01	1,63	0,71	0,25				43,9
37,7	6,97				0,00	0,40	51,27	2,18	1,07	0,51	0,19			55,6
41,8	6,89				0,00	0,46	61,52	2,72	1,43	0,76	0,39	0,16		67,4
46,0	6,81				0,00	0,51	71,77	3,27	1,79	1,02	0,58	0,31	0,14	79,4
50,2	6,74				0,00	0,51	78,95	3,81	2,14	1,27	0,78	0,47	0,28	88,2
54,4	6,66				0,00	0,50	78,69	4,19	2,50	1,52	0,97	0,62	0,42	89,4
58,6	6,59				0,00	0,49	77,84	4,18	2,75	1,78	1,16	0,78	0,56	89,5
62,8	6,51				0,00	0,49	76,98	4,13	2,74	1,95	1,36	0,93	0,71	89,3
67,0	6,43				0,00	0,48	76,13	4,09	2,71	1,95	1,49	1,09	0,85	88,8
71,1	6,36				0,00	0,48	75,27	4,04	2,68	1,93	1,49	1,20	0,99	88,1
75,3	6,28				0,00	0,47	74,42	4,00	2,65	1,91	1,47	1,19	1,09	87,2
79,5	6,20				0,00	0,47	73,57	3,95	2,62	1,89	1,46	1,18	1,08	86,2
83,7	6,13				0,00	0,46	72,71	3,91	2,59	1,86	1,44	1,17	1,07	85,2
87,9	6,05				0,00	0,46	71,86	3,86	2,56	1,84	1,42	1,15	1,06	84,2
92,1	5,97				0,00	0,45	71,00	3,82	2,53	1,82	1,41	1,14	1,05	83,2
96,3	5,90				0,00	0,45	70,15	3,77	2,50	1,80	1,39	1,13	1,04	82,2
100,4	5,82				0,00	0,44	69,29	3,73	2,47	1,78	1,38	1,12	1,02	81,2
104,6	5,74				0,00	0,43	68,44	3,68	2,44	1,76	1,36	1,10	1,01	80,2
108,8	5,67				0,00	0,43	67,58	3,64	2,41	1,74	1,34	1,09	1,00	79,2
113,0	5,59				0,00	0,42	66,73	3,59	2,38	1,72	1,33	1,08	0,99	78,2
117,2	5,51				0,00	0,42	65,88	3,54	2,35	1,69	1,31	1,06	0,98	77,2
121,4	5,44				0,00	0,41	65,02	3,50	2,32	1,67	1,29	1,05	0,97	76,2
125,5	5,36				0,00	0,41	64,17	3,45	2,29	1,65	1,28	1,04	0,95	75,2
129,7	5,29				0,00	0,40	63,31	3,41	2,27	1,63	1,26	1,02	0,94	74,3
133,9	5,21				0,00	0,40	62,46	3,36	2,24	1,61	1,25	1,01	0,93	73,3





I max:	41	mm/hr
P acum:	189,8	mm
P max:	150,6	mm

Q Max:	89,5	m³/s
TR:	100	años

IDCSA

Ing. Alberto Grissetti, MSc.

Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltramino
Representante Legal

7.3.3. Puente 44

Cálculo de Caudal de Diseño — Q: 21,5 m3/s

Proyecto: Obras de arte varias | Prog: 71628 | Puente: 44 | Arroyo: -

Características de la Cuenca			Tiempo de Concentración y Factor Pico (SCS)					IDF, TR		
Área (A):	1.982,0	ha	Fórmula:	DNOS				TR:	100	años
Área (A):	19,82	km²	K DNOS:	3,0		β calculado:	0,32	IDF:	Pilar	
			Tc:	507,6	min	X calculado:	5,30	c:	11872,82	
Longitud (L):	13.361,0	m	Tc:	8,46	hs	X adoptado:	12,00	n:	0,19873	
Pendiente (i):	0,12	%				1+X:	13,00	d:	40,00	
Desnivel (dh):	16,0	m	Δt:	42,3	min			m:	1,18582	
			Δt Adop.	42,3	min	PRF (inglés):	99,2			
SCS Curve Number:	82		tp:	304,5	min	PRF (SI):	0,43			
Almacenam. (S):	55,8	mm	Tp:	325,7	min					
Porcentaje retenc.:	20%		Tr:	3908,4	min	Vol. hasta el pico:	7,7%			
Abstracc. Inic. (Ia):	11,2	mm	Tb:	4234,1	min	qp: 1,56	m³/s/cm			

MÉTODO DE LAS ABSTRACCIONES (SCS)

Distribución temporal de la precitació: Bloques Alternos

Cálculo de la Precipitación Efectiva

Intervalo (min)	Pinc (mm)	Pacum (mm)	S (mm)	Ia (mm)	Fa (mm)	Pe Acum (mm)	Pe Inc (mm)	Pe Inc (cm)
0,0	0,00	0,00	55,76	0,00	0,00	0,00	0,00	0,00
42,3	1,49	1,49	55,76	1,49	0,00	0,00	0,00	0,00
84,6	1,29	2,79	55,76	2,79	0,00	0,00	0,00	0,00
126,9	0,38	3,16	55,76	3,16	0,00	0,00	0,00	0,00
169,2	3,63	6,80	55,76	6,80	0,00	0,00	0,00	0,00
211,5	31,20	38,00	55,76	11,15	18,12	8,73	8,73	0,87
253,8	139,89	177,89	55,76	11,15	41,78	124,95	116,23	11,62
296,1	10,37	188,26	55,76	11,15	42,41	134,71	9,75	0,98
338,4	0,89	189,15	55,76	11,15	42,46	135,54	0,84	0,08
380,7	0,99	190,14	55,76	11,15	42,51	136,48	0,93	0,09
423,0	1,44	191,58	55,76	11,15	42,59	137,83	1,36	0,14
465,3	1,50	193,08	55,76	11,15	42,68	139,25	1,42	0,14
507,6	1,48	194,56	55,76	11,15	42,76	140,65	1,40	0,14

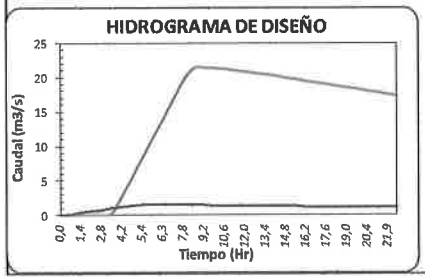
K SCS	1,00		
K Espań.	0,91		
K Fhruling	0,95		
K in.Cv.Eng	0,95		
k prom	1,00		
mod IDF	1,25		

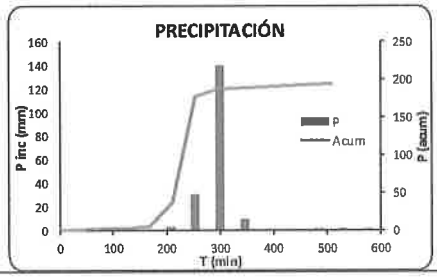
Precipitación Incremental

Intervalo (min)	Intensidad (mm/h)	P acum (mm)	P inc (mm)
0,0	0,0	0,0	0,0
42,3	198,4	139,9	139,9
84,6	121,3	171,1	31,2
126,9	85,8	181,5	10,4
169,2	65,6	185,1	3,6
211,5	52,8	186,0	0,9
253,8	43,9	185,6	0,4
296,1	37,4	184,6	1,0
338,4	32,5	183,3	1,3
380,7	28,7	181,9	1,4
423,0	25,6	180,4	1,5
465,3	23,1	178,9	1,5
507,6	21,0	177,4	1,5

HIDROGRAMA UNITARIO TRIANGULAR

		P inc (cm)												
Intervalo (hr)	qi	0,00	0,00	0,00	0,00	0,87	11,62	0,98	0,08	0,09	0,14	0,14	0,14	Q tot (m3/s)
0,0	0,00													0,0
0,7	0,20													0,0
1,4	0,41													0,0
2,1	0,61													0,0
2,8	0,81													0,0
3,5	1,01					0,18								0,2
4,2	1,22					0,35	2,36							2,7
4,9	1,42					0,53	4,71	0,20						5,4
5,4	1,56					0,71	7,07	0,40	0,02					8,2
5,6	1,56					0,88	9,42	0,59	0,03	0,02				11,0
6,3	1,54					1,06	11,78	0,79	0,05	0,04	0,03			13,7
7,0	1,52					1,24	14,13	0,99	0,07	0,06	0,06	0,03		16,6
7,8	1,50					1,36	16,49	1,19	0,08	0,08	0,08	0,06	0,03	19,4
8,5	1,49					1,36	18,14	1,38	0,10	0,09	0,11	0,09	0,06	21,3
9,2	1,47					1,34	18,08	1,52	0,12	0,11	0,14	0,11	0,09	21,5
9,9	1,45					1,33	17,88	1,52	0,13	0,13	0,17	0,14	0,11	21,4
10,6	1,44					1,31	17,68	1,50	0,13	0,15	0,19	0,17	0,14	21,3
11,3	1,42					1,30	17,49	1,48	0,13	0,15	0,21	0,20	0,17	21,1
12,0	1,40					1,28	17,29	1,47	0,13	0,14	0,21	0,22	0,20	20,9
12,7	1,39					1,27	17,10	1,45	0,13	0,14	0,21	0,22	0,22	20,7
13,4	1,37					1,25	16,90	1,43	0,12	0,14	0,21	0,22	0,22	20,5
14,1	1,35					1,24	16,70	1,42	0,12	0,14	0,20	0,22	0,22	20,3
14,8	1,34					1,22	16,51	1,40	0,12	0,14	0,20	0,21	0,21	20,0
15,5	1,32					1,21	16,31	1,38	0,12	0,14	0,20	0,21	0,21	19,8
16,2	1,30					1,20	16,11	1,37	0,12	0,13	0,20	0,21	0,21	19,5
16,9	1,29					1,18	15,92	1,35	0,12	0,13	0,20	0,21	0,21	19,3
17,6	1,27					1,17	15,72	1,34	0,12	0,13	0,19	0,20	0,20	19,1
18,3	1,25					1,15	15,53	1,32	0,11	0,13	0,19	0,20	0,20	18,8
19,0	1,23					1,14	15,33	1,30	0,11	0,13	0,19	0,20	0,20	18,6
19,7	1,22					1,12	15,13	1,29	0,11	0,13	0,19	0,20	0,20	18,4
20,4	1,20					1,11	14,94	1,27	0,11	0,12	0,18	0,19	0,19	18,1
21,1	1,18					1,09	14,74	1,25	0,11	0,12	0,18	0,19	0,19	17,9
21,9	1,17					1,08	14,54	1,24	0,11	0,12	0,18	0,19	0,19	17,6
22,6	1,15					1,06	14,35	1,22	0,11	0,12	0,18	0,19	0,19	17,4





I max:	198	mm/hr
P acum:	194,6	mm
P max:	139,9	mm

Q Max:	21,5	m³/s
TR:	100	años

TUCSA

Ing. Alberto Grissetti, MSc. — Representante Legal

Sara M. Blanco de Dose — Ing. Carlos Beltramino
Representante Legal

7.3.4. Puente 45

Cálculo de Caudal de Diseño

Q: 25,6 m3/s

Proyecto	Obras de arte varias	Prog	13+015	Puente	45	Arroyo:	-

Características de la Cuenca

Área (A):	357,0	ha
Área (A):	3,57	km²
Longitud (L):	6.463,0	m
Pendiente (i):	0,21	%
Desnivel (dh):	13,6	m
SCS Curve Number:	85	
Almacenam. (S):	44,8	mm
Porcentaje retenc.:	20%	
Abstracc. Inic. (Ia):	9,0	mm

Tiempo de Concentración y Factor Pico (SCS)

Fórmula:	DNOS	
K DNOS:	4,0	
Tc:	157,4	min
Tc:	2,62	hs
Δt:	13,1	min
Δt Adop.	13,1	min
tp:	94,4	min
Tp:	101,0	min
Tr:	436,6	min
Tb:	537,6	min

β calculado:	0,38
X calculado:	4,32
X adoptado:	4,32
1+X:	5,32
PRF (Inglés):	242,3
PRF (SI):	1,04
Vol. hasta el pico:	18,8%
qp: 2,21	m³/s/cm

IDF, TR

TR:	100	años
IDF:	Pilar	
c:	11872,82	
n:	0,19873	
d:	40,00	
m:	1,18582	

MÉTODO DE LAS ABSTRACCIONES (SCS)

Distribución temporal de la precitació: **Bloques Alternos**

Cálculo de la Precipitación Efectiva

Intervalo (min)	Pinc (mm)	Pacum (mm)	S (mm)	Ia (mm)	Fa (mm)	Pe Acum (mm)	Pe Inc (mm)	Pe Inc (cm)
0,0	0,00	0,00	44,82	0,00	0,00	0,00	0,00	0,00
13,1	1,75	1,75	44,82	1,75	0,00	0,00	0,00	0,00
26,2	3,30	5,04	44,82	5,04	0,00	0,00	0,00	0,00
39,3	6,40	11,44	44,82	8,96	2,35	0,13	0,13	0,01
52,5	13,60	25,04	44,82	8,96	11,83	4,24	4,11	0,41
65,6	35,09	60,13	44,82	8,96	23,89	27,27	23,03	2,30
78,7	65,04	125,17	44,82	8,96	32,35	83,86	56,59	5,66
91,8	21,10	146,27	44,82	8,96	33,79	103,52	19,66	1,97
104,9	9,18	155,45	44,82	8,96	34,32	112,16	8,65	0,86
118,0	4,56	160,01	44,82	8,96	34,57	116,48	4,32	0,43
131,1	2,40	162,41	44,82	8,96	34,69	118,75	2,28	0,23
144,3	1,26	163,67	44,82	8,96	34,75	119,96	1,20	0,12
157,4	0,90	164,57	44,82	8,96	34,80	120,81	0,85	0,09

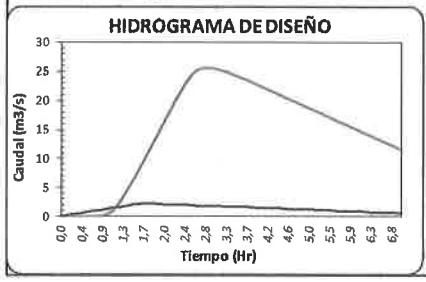
K SCS	1,00	
K Españ.	0,96	
K Fhruling	0,95	
K In.Cv.Eng	0,97	
k prom	0,97	
mod IDF	1,15	

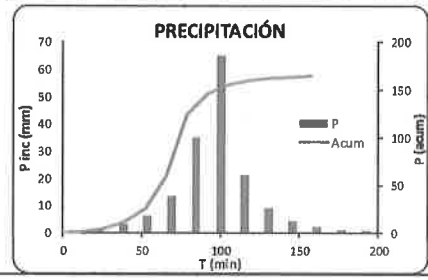
Precipitación Incremental

Intervalo (min)	Intensidad (mm/h)	P acum (mm)	P inc (mm)
0,0	0,0	0,0	0,0
13,1	306,8	65,0	65,0
26,2	236,2	100,1	35,1
39,3	190,6	121,2	21,1
52,5	159,0	134,8	13,6
65,6	135,9	144,0	9,2
78,7	118,3	150,4	6,4
91,8	104,4	155,0	4,6
104,9	93,3	158,3	3,3
118,0	84,2	160,7	2,4
131,1	76,6	162,4	1,7
144,3	70,2	163,7	1,3
157,4	64,7	164,6	0,9

HIDROGRAMA UNITARIO TRIANGULAR

		P inc (cm)												
Intervalo (hr)	qi	0,00	0,00	0,01	0,41	2,30	5,66	1,97	0,86	0,43	0,23	0,12	0,09	Q tot (m3/s)
0,0	0,00													0,0
0,2	0,29													0,0
0,4	0,57													0,0
0,7	0,86			0,00										0,0
0,9	1,15			0,01	0,12									0,1
1,1	1,44			0,01	0,24	0,66								0,9
1,3	1,72			0,01	0,35	1,32	1,63							3,3
1,5	2,01			0,02	0,47	1,99	3,25	0,57						6,3
1,7	2,21			0,02	0,59	2,65	4,88	1,13	0,25					9,5
1,7	2,19			0,03	0,71	3,31	6,51	1,70	0,50	0,12				12,9
2,0	2,13			0,03	0,83	3,97	8,13	2,26	0,75	0,25	0,07			16,3
2,2	2,06			0,03	0,91	4,63	9,76	2,83	0,99	0,37	0,13	0,03		19,7
2,4	1,99			0,03	0,90	5,10	11,39	3,39	1,24	0,50	0,20	0,07	0,02	22,8
2,6	1,93			0,03	0,87	5,05	12,53	3,96	1,49	0,62	0,26	0,10	0,05	25,0
2,8	1,86			0,03	0,85	4,90	12,41	4,35	1,74	0,74	0,33	0,14	0,07	25,6
3,1	1,79			0,03	0,82	4,75	12,04	4,31	1,91	0,87	0,39	0,17	0,10	25,4
3,3	1,73			0,02	0,79	4,59	11,66	4,18	1,90	0,96	0,46	0,21	0,12	24,9
3,5	1,66			0,02	0,77	4,44	11,28	4,05	1,84	0,95	0,50	0,24	0,15	24,2
3,7	1,60			0,02	0,74	4,29	10,91	3,92	1,78	0,92	0,50	0,27	0,17	23,5
3,9	1,53			0,02	0,71	4,13	10,53	3,79	1,72	0,89	0,48	0,26	0,19	22,7
4,2	1,46			0,02	0,68	3,98	10,16	3,66	1,67	0,86	0,47	0,26	0,19	21,9
4,4	1,40			0,02	0,66	3,83	9,78	3,53	1,61	0,83	0,45	0,25	0,18	21,1
4,6	1,33			0,02	0,63	3,67	9,40	3,40	1,55	0,80	0,44	0,24	0,18	20,3
4,8	1,26			0,02	0,60	3,52	9,03	3,27	1,49	0,77	0,42	0,23	0,17	19,5
5,0	1,20			0,02	0,57	3,37	8,65	3,14	1,44	0,75	0,41	0,22	0,16	18,7
5,2	1,13			0,02	0,55	3,21	8,27	3,00	1,38	0,72	0,39	0,22	0,16	17,9
5,5	1,06			0,02	0,52	3,06	7,90	2,87	1,32	0,69	0,38	0,21	0,15	17,1
5,7	1,00			0,01	0,49	2,91	7,52	2,74	1,26	0,66	0,36	0,20	0,15	16,3
5,9	0,93			0,01	0,46	2,75	7,15	2,61	1,21	0,63	0,35	0,19	0,14	15,5
6,1	0,86			0,01	0,44	2,60	6,77	2,48	1,15	0,60	0,33	0,18	0,14	14,7
6,3	0,80			0,01	0,41	2,45	6,39	2,35	1,09	0,57	0,32	0,18	0,13	13,9
6,6	0,73			0,01	0,38	2,30	6,02	2,22	1,03	0,54	0,30	0,17	0,12	13,1
6,8	0,66			0,01	0,36	2,14	5,64	2,09	0,98	0,52	0,29	0,16	0,12	12,3
7,0	0,60			0,01	0,33	1,99	5,26	1,96	0,92	0,49	0,27	0,15	0,11	11,5





I max:	307	mm/hr
P acum:	164,6	mm
P max:	65,0	mm
Q Max:	25,6	m³/s
TR:	100	años

7.4. Salidas de simulación del software HY8 para alcantarillas.

Crossing Properties

Name: 1

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	2.000	cms
Design Flow	3.800	cms
Maximum Flow	4.360	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	2.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	56.350	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.800	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

0+770 | Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	0+770	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	2500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	56.400	m
Outlet Station	10.000	m
Outlet Elevation	56.350	m
Number of Barrels	1	
Computed Culvert ...	0.005000	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2.00	2.00	57.34	0.83	**0.94**	3-M1t	0.59	0.57	0.78	0.78	1.70	1.28
2.24	2.24	57.42	0.90	**1.02**	3-M1t	0.64	0.61	0.85	0.85	1.75	1.32
2.47	2.47	57.49	0.96	**1.09**	3-M1t	0.69	0.65	0.92	0.92	1.80	1.35
2.71	2.71	57.57	1.02	**1.17**	3-M1t	0.74	0.69	0.98	0.98	1.84	1.38
2.94	2.94	57.64	1.08	**1.24**	3-M1t	0.79	0.73	1.04	1.04	1.88	1.41
3.18	3.18	57.71	1.14	**1.31**	3-M1t	0.83	0.77	1.11	1.11	1.92	1.44
3.42	3.42	57.78	1.20	**1.38**	3-M1t	0.88	0.81	1.17	1.17	1.95	1.46
3.65	3.65	57.85	1.25	**1.45**	3-M1t	0.93	0.85	1.23	1.23	1.98	1.49
3.80	3.80	57.89	1.29	**1.49**	3-M1t	0.96	0.87	1.27	1.27	2.00	1.50
4.12	4.12	57.98	1.36	**1.58**	7-M1t	1.02	0.92	1.35	1.35	2.04	1.53
4.36	4.36	58.05	1.41	**1.65**	7-M1t	1.06	0.95	1.41	1.41	2.06	1.55

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 0+770
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	56.40 m
Outlet Elevation:	56.35 m
Culvert Length:	10.00 m
Culvert Slope:	0.0050
Culvert Rise:	1.50 m
Inlet Throat:	56.39 m
Outlet Control:	Profiles

Plot

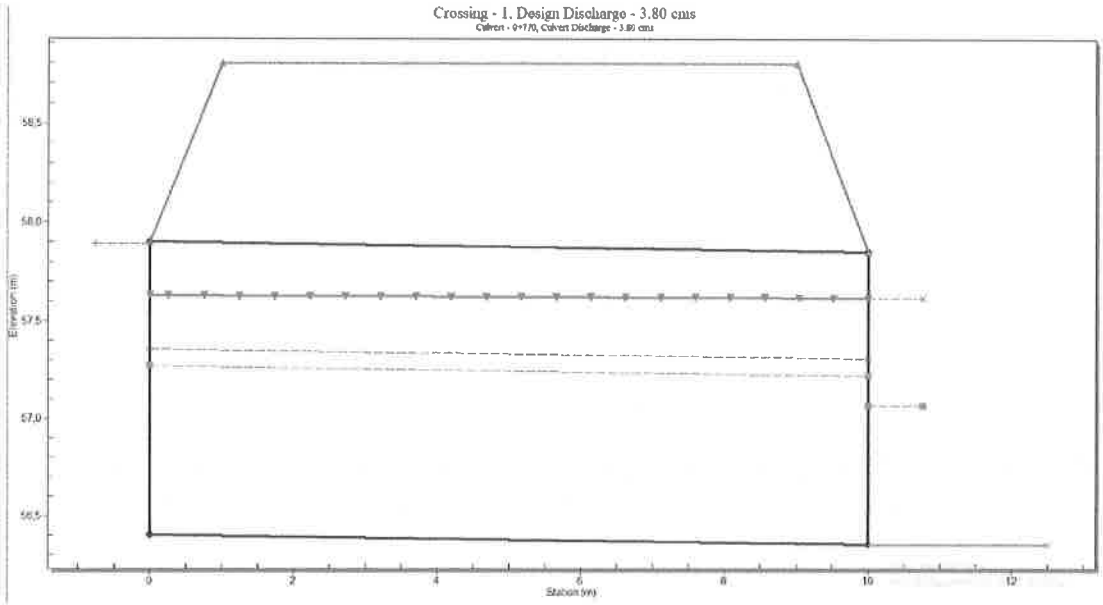
Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

TDCSA

Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltramino
Representante Legal



Crossing Properties

Name: 2

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	4.000	cms
Design Flow	5.640	cms
Maximum Flow	6.470	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	2.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	55.740	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.800	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	1 [2]	
Shape	Concrete Box	
Material	Concrete	
Span	2000.000	mm
Rise	2000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	2500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	55.800	m
Outlet Station	10.400	m
Outlet Elevation	55.740	m
Number of Barrels	1	
Computed Culvert ...	0.005769	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Representante Legal
Ing. Carlos Beltramin
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
4.00	4.00	57.04	1.14	**1.24**	1-S1t	0.71	0.74	1.05	1.05	1.90	1.52
4.25	4.25	57.09	1.18	**1.29**	1-S1t	0.74	0.77	1.10	1.10	1.93	1.55
4.49	4.49	57.15	1.23	**1.35**	1-S1t	0.77	0.80	1.15	1.15	1.96	1.57
4.74	4.74	57.20	1.27	**1.40**	1-S1t	0.80	0.83	1.19	1.19	1.99	1.59
4.99	4.99	57.25	1.32	1.45	1-S1t	0.83	0.86	1.24	1.24	2.01	1.61
5.24	5.24	57.30	1.36	**1.50**	1-S1t	0.86	0.89	1.28	1.28	2.04	1.63
5.48	5.48	57.36	1.40	1.56	1-S1t	0.89	0.91	1.33	1.33	2.06	1.65
5.64	5.64	57.39	1.43	**1.59**	1-S1t	0.91	0.93	1.36	1.36	2.08	1.66
5.98	5.98	57.46	1.49	**1.66**	1-S1t	0.95	0.97	1.42	1.42	2.10	1.68
6.22	6.22	57.51	1.53	**1.71**	1-S1t	0.98	1.00	1.46	1.46	2.12	1.70
6.47	6.47	57.56	1.57	**1.76**	1-S1t	1.01	1.02	1.51	1.51	2.14	1.72

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 1+280
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

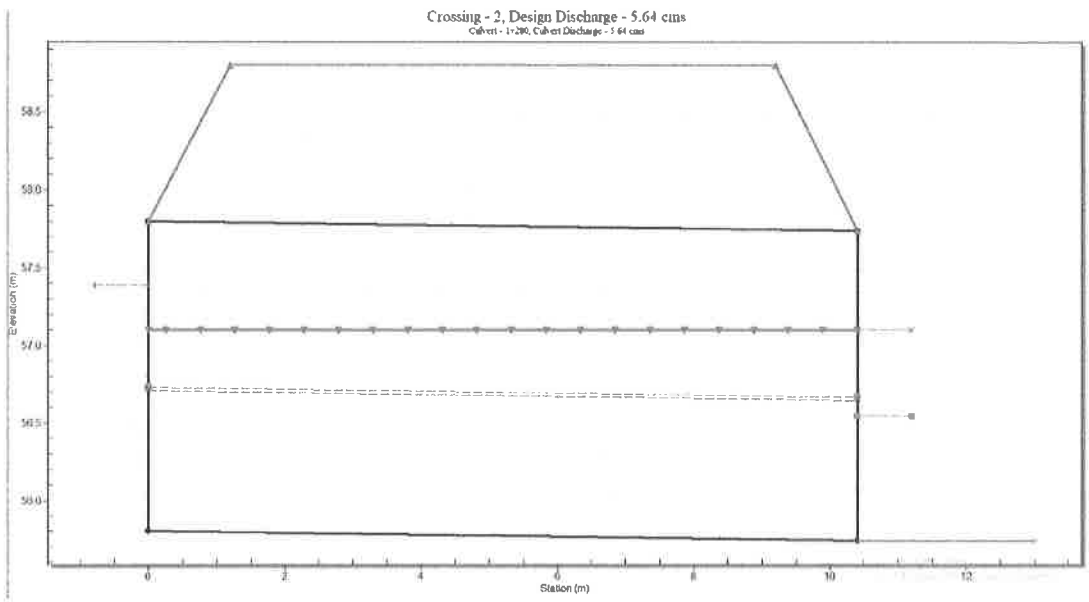
Geometry

Inlet Elevation:	55.80 m
Outlet Elevation:	55.74 m
Culvert Length:	10.40 m
Culvert Slope:	0.0058
Culvert Rise:	2.00 m
Inlet Throat:	55.79 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



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Representante Legal

Ing. Carlos Beltramin
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.00	5.00	57.08	1.32	**1.46**	1-S1t	0.83	0.86	1.25	1.24	2.00	1.61
5.24	5.24	57.13	1.36	**1.51**	1-S1t	0.86	**0.89**	1.30	1.29	2.02	1.63
5.49	5.49	57.18	1.41	**1.56**	1-S1t	0.89	**0.92**	1.34	1.33	2.05	1.65
5.73	5.73	57.23	1.45	**1.61**	1-S1t	0.92	0.94	1.39	1.38	2.07	1.67
5.97	5.97	57.28	1.49	**1.66**	1-S1t	0.95	0.97	1.43	1.42	2.09	1.68
6.22	6.22	57.33	1.53	**1.71**	1-S1t	0.98	0.99	1.47	1.46	2.11	1.70
6.48	6.48	57.38	1.57	**1.76**	1-S1t	1.01	1.02	1.52	1.51	2.13	1.72
6.70	6.70	57.43	1.61	**1.81**	1-S1t	1.04	1.05	1.56	1.55	2.15	**1.73**
6.94	6.94	57.48	1.64	**1.86**	1-S1t	1.06	1.07	1.60	1.59	2.17	1.74
7.19	7.19	57.52	1.68	**1.90**	1-S1t	1.09	1.10	1.65	1.64	2.18	1.76
7.43	7.43	57.57	1.72	**1.95**	1-S1t	1.12	1.12	1.69	1.68	2.20	1.77

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 1+880
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	55.62 m
Outlet Elevation:	55.56 m
Culvert Length:	10.40 m
Culvert Slope:	0.0058
Culvert Rise:	2.00 m
Inlet Throat:	55.61 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

Crossing Properties

Name: 3

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.000	cms
Design Flow	6.480	cms
Maximum Flow	7.430	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	2.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	55.570	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.800	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

1+880

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	1+880	
Shape	Concrete Box	
Material	Concrete	
Span	2000.000	mm
Rise	2000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	2500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	55.620	m
Outlet Station	10.400	m
Outlet Elevation	55.560	m
Number of Barrels	1	
Computed Culvert ...	0.005769	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Representante Legal

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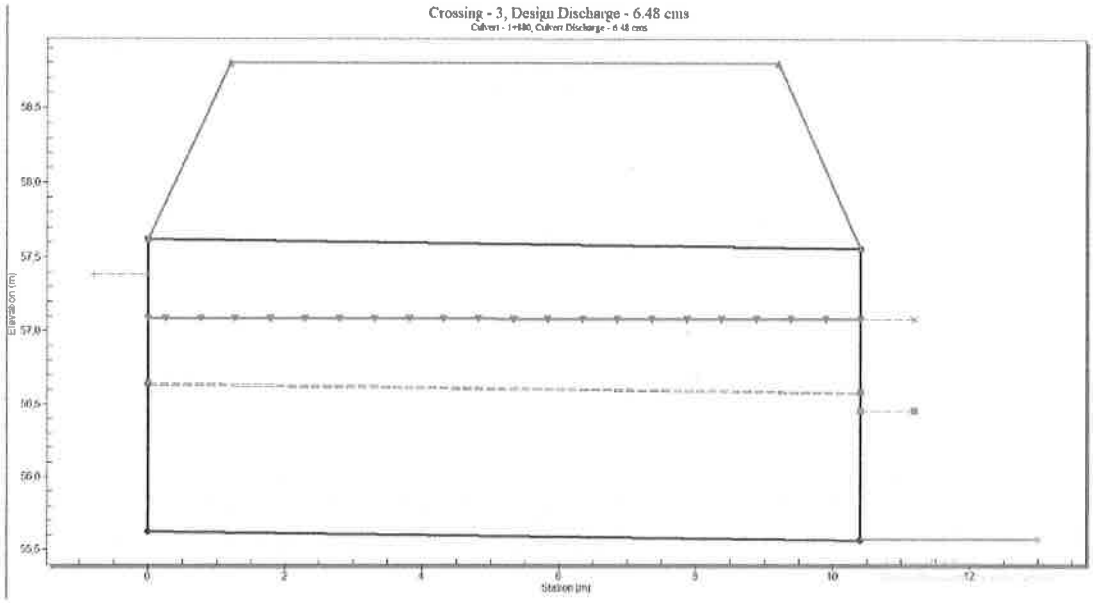

Crossing Properties

Name: 4 y 5

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.000	cms
Design Flow	6.320	cms
Maximum Flow	7.260	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	4.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	55.550	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.800	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

3+060

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	3+060	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	1500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	55.900	m
Outlet Station	13.200	m
Outlet Elevation	55.830	m
Number of Barrels	1	
Computed Culvert ...	0.005303	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.00	1.19	56.74	0.71	0.84	3-M2t	0.59	0.52	0.53	0.81	2.22	1.53
5.23	1.27	56.77	0.74	0.87	3-M2t	0.62	0.55	0.56	0.84	2.27	1.56
5.45	1.34	56.80	0.77	0.90	3-M2t	0.64	0.57	0.58	0.86	2.29	1.58
5.68	1.40	56.84	0.80	0.94	3-M2t	0.67	0.59	0.61	0.89	2.31	1.60
5.90	1.47	56.87	0.82	0.97	3-M2t	0.69	0.60	0.63	0.91	2.33	1.62
6.13	1.54	56.90	0.85	1.00	3-M2t	0.72	0.62	0.66	0.94	2.35	1.64
6.32	1.60	56.92	0.87	1.02	3-M2t	0.74	0.64	0.68	0.96	2.36	1.65
6.58	1.68	56.95	0.90	1.05	3-M2t	0.77	0.66	0.70	0.98	2.38	1.67
6.81	1.75	56.98	0.92	1.08	3-M2t	0.79	0.68	0.73	1.01	2.40	1.69
7.03	1.81	57.01	0.94	1.11	3-M2t	0.81	0.69	0.75	1.03	2.42	1.71
7.26	1.88	57.04	0.97	1.14	3-M2t	0.84	0.71	0.77	1.05	2.44	1.72

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 2+580
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

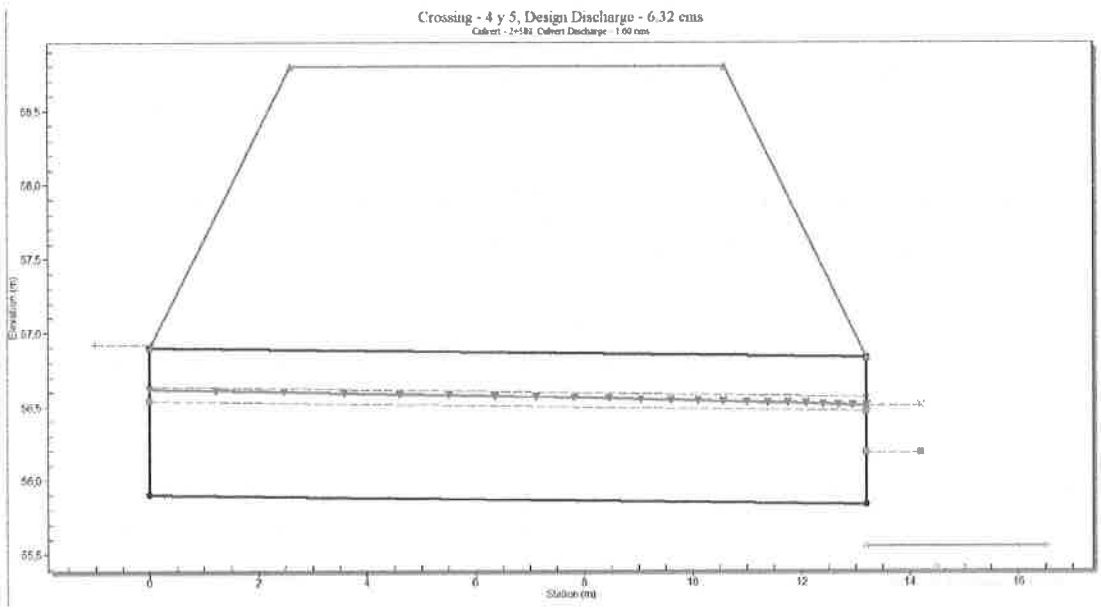
Geometry

Inlet Elevation:	55.90 m
Outlet Elevation:	55.83 m
Culvert Length:	13.20 m
Culvert Slope:	0.0053
Culvert Rise:	1.00 m
Inlet Throat:	55.59 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



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Representante Legal

Ing. Carlos Beltramino
Representante Legal

Crossing Properties

Name: 4 y 5

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.000	cms
Design Flow	6.320	cms
Maximum Flow	7.260	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	4.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	55.550	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.800	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

2+580
3+060

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	U...
CULVERT DATA		
Name	3+060	
Shape	Concrete Box	
Material	Concrete	
Span	2000.000	mm
Rise	2000.000	mm
Embedment Depth	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet Edge	Beveled Edge Top (26-45°) Wingwall (Ke=0.2)	
Face Width	2500.000	mm
Side Taper (4:1 to 6:1)	4.000	_:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	55.600	m
Outlet Station	10.300	m
Outlet Elevation	55.540	m
Number of Barrels	1	
Computed Culvert Sl...	0.005825	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.00	3.77	56.74	1.09	**1.14**	1-S1t	0.68	0.71	0.82	0.81	2.29	1.53
5.23	3.96	56.77	1.13	**1.17**	1-S1t	0.70	0.74	0.85	0.84	2.33	1.56
5.45	4.12	56.80	1.16	**1.20**	1-S1t	0.72	0.76	0.87	0.86	2.35	1.58
5.68	4.27	56.84	1.19	**1.24**	1-S1t	0.74	0.77	0.90	0.89	2.38	1.60
5.90	4.43	56.87	1.22	**1.27**	1-S1t	0.76	0.79	0.92	0.91	2.40	1.62
6.13	4.59	56.90	1.25	**1.30**	1-S1t	0.78	0.81	0.95	0.94	2.43	1.64
6.32	4.72	56.92	1.27	**1.32**	1-S1t	0.80	0.83	0.97	0.96	2.44	1.65
6.58	4.90	56.95	1.30	**1.35**	1-S1t	0.82	0.85	0.99	0.98	2.47	1.67
6.81	5.06	56.98	1.33	**1.38**	1-S1t	0.84	0.87	1.02	1.01	2.49	1.69
7.03	5.22	57.01	1.36	**1.41**	1-S1t	0.86	0.89	1.04	1.03	2.51	1.71
7.26	5.37	57.04	1.39	**1.44**	1-S1t	0.88	0.90	1.06	1.05	2.53	1.72

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 3+060
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	55.60 m
Outlet Elevation:	55.54 m
Culvert Length:	10.30 m
Culvert Slope:	0.0058
Culvert Rise:	2.00 m
Inlet Throat:	55.59 m
Outlet Control:	Profiles

Plot

Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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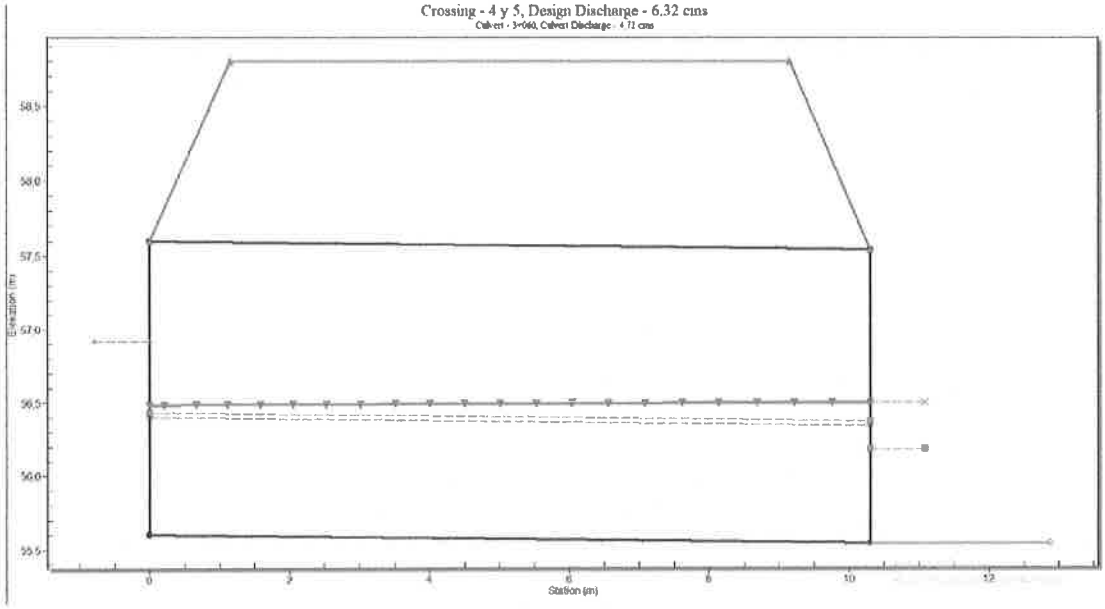

Crossing Properties

Name: 6

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	6.000	cms
Design Flow	7.010	cms
Maximum Flow	8.040	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	3.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	54.940	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.100	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	3+060	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	3500.000	mm
Side Taper (4:1 to ...	4.000	_:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	55.000	m
Outlet Station	11.300	m
Outlet Elevation	54.940	m
Number of Barrels	2	
Computed Culvert ...	0.005310	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Representante Legal

Ing. Carlos Beltramin
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
6.00	6.00	56.24	1.10	1.24	3-M1t	0.78	0.74	1.03	1.03	1.93	1.66
6.20	6.20	56.27	1.13	1.27	3-M1t	0.80	0.76	1.06	1.06	1.95	1.67
6.41	6.41	56.30	1.15	1.30	3-M1t	0.82	0.77	1.08	1.08	1.97	1.69
6.61	6.61	56.32	1.18	1.32	3-M1t	0.84	0.79	1.11	1.11	1.99	1.71
6.82	6.82	56.35	1.20	1.35	3-M1t	0.86	0.81	1.13	1.13	2.01	1.72
7.01	7.01	56.38	1.22	1.38	3-M1t	0.88	0.82	1.15	1.15	2.02	1.73
7.22	7.22	56.41	1.25	1.41	3-M1t	0.90	0.84	1.18	1.18	2.04	1.75
7.43	7.43	56.44	1.27	1.44	3-M1t	0.92	0.85	1.20	1.20	2.06	1.76
7.63	7.63	56.47	1.30	1.47	3-M1t	0.94	0.87	1.23	1.23	2.07	1.78
7.84	7.84	56.49	1.32	1.49	3-M1t	0.96	0.89	1.25	1.25	2.09	1.79
8.04	8.04	56.52	1.34	1.52	7-M1t	0.98	0.90	1.27	1.27	2.10	1.80

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table 3+420
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table Options...

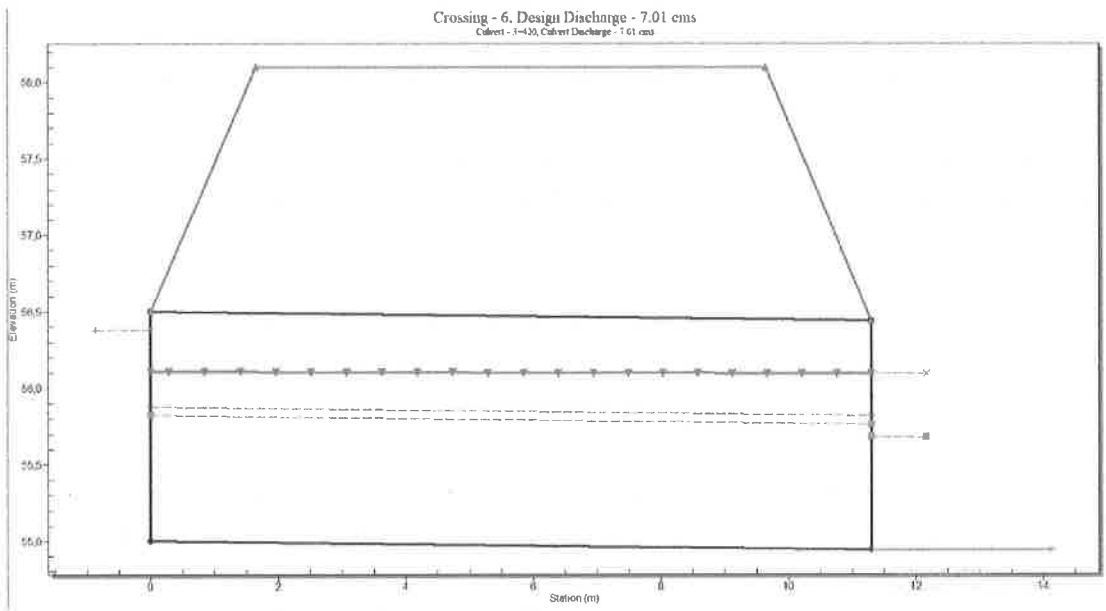
Geometry

Inlet Elevation:	55.00 m
Outlet Elevation:	54.94 m
Culvert Length:	11.30 m
Culvert Slope:	0.0053
Culvert Rise:	1.50 m
Inlet Throat:	54.99 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



TDCSA

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Representante Legal

Ing. Carlos Beltramino
Representante Legal

Crossing Properties

Name: 8 y 9

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.000	cms
Design Flow	6.810	cms
Maximum Flow	7.820	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	4.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	55.660	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.800	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

5+280

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	5+205	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	2000.000	mm
Side Taper (4:1 to ...	4.000	_:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	55.900	m
Outlet Station	13.500	m
Outlet Elevation	55.830	m
Number of Barrels	1	
Computed Culvert ...	0.005185	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.00	2.20	56.86	0.89	**0.96**	3-M1t	0.62	0.60	0.64	0.81	2.27	1.53
5.28	2.33	56.90	0.92	**1.00**	3-M1t	0.65	0.63	0.68	0.85	2.30	1.56
5.56	2.47	56.94	0.96	**1.04**	3-M1t	0.68	0.65	0.71	0.88	2.33	1.59
5.85	2.61	56.98	0.99	**1.08**	3-M1t	0.71	0.68	0.74	0.91	2.36	1.61
6.13	2.75	57.01	1.03	**1.11**	3-M1t	**0.74**	0.70	0.77	0.94	2.39	1.64
6.41	2.88	57.05	1.06	**1.15**	3-M1t	0.76	0.72	0.80	**0.97**	2.42	1.66
6.81	3.08	57.10	1.11	**1.20**	3-M1t	0.80	0.75	0.84	**1.01**	2.45	1.69
6.97	3.16	57.12	1.13	**1.22**	3-M1t	0.82	0.77	**0.85**	1.02	2.47	1.70
7.26	3.30	57.16	1.16	**1.26**	3-M1t	0.85	0.79	0.88	1.05	2.49	1.72
7.54	3.44	57.20	1.19	**1.30**	3-M1t	0.87	0.81	0.91	1.08	2.52	1.74
7.82	3.57	57.23	1.23	**1.33**	3-M1t	0.90	0.83	0.94	1.11	2.54	1.76

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 5+205
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	55.90 m
Outlet Elevation:	55.83 m
Culvert Length:	13.50 m
Culvert Slope:	0.0052
Culvert Rise:	1.50 m
Inlet Throat:	55.72 m
Outlet Control:	Profiles

Plot

Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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Representante Legal

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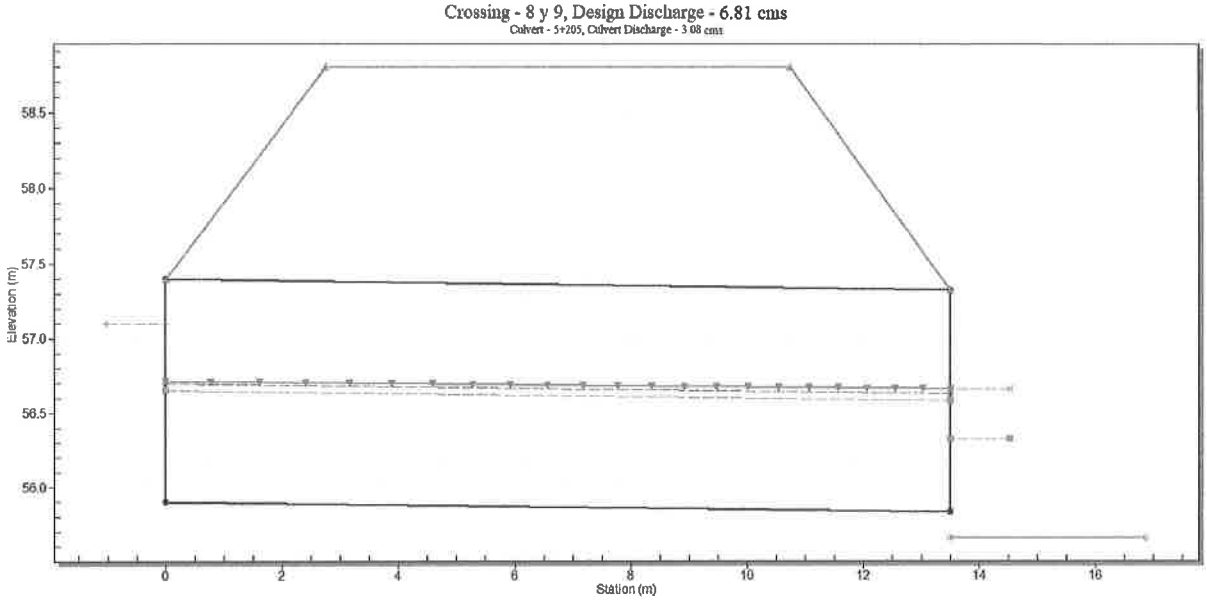
Representante Legal



Crossing Properties

Name: 8 y 9

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.000	cms
Design Flow	6.810	cms
Maximum Flow	7.820	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	4.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	55.660	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.800	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

5+205

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	5+280	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	2000.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	55.730	m
Outlet Station	15.000	m
Outlet Elevation	55.650	m
Number of Barrels	1	
Computed Culvert ...	0.005333	m/m

Help | Click on any (?) icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Ing. Carlos Beltramino
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.00	2.20	56.86	0.89	0.96	3-M1t	0.62	0.60	0.64	0.81	2.27	1.53
5.28	2.33	56.90	0.92	1.00	3-M1t	0.65	0.63	0.68	0.85	2.30	1.56
5.56	2.47	56.94	0.96	1.04	3-M1t	0.68	0.65	0.71	0.88	2.33	1.59
5.85	2.61	56.98	0.99	1.08	3-M1t	0.71	0.68	0.74	0.91	2.36	1.61
6.13	2.75	57.01	1.03	1.11	3-M1t	0.74	0.70	0.77	0.94	2.39	1.64
6.41	2.88	57.05	1.06	1.15	3-M1t	0.76	0.72	0.80	0.97	2.42	1.66
6.81	3.08	57.10	1.11	1.20	3-M1t	0.80	0.75	0.84	1.01	2.45	1.69
6.97	3.16	57.12	1.13	1.22	3-M1t	0.82	0.77	0.85	1.02	2.47	1.70
7.26	3.30	57.16	1.16	1.26	3-M1t	0.85	0.79	0.88	1.05	2.49	1.72
7.54	3.44	57.20	1.19	1.30	3-M1t	0.87	0.81	0.91	1.08	2.52	1.74
7.82	3.57	57.23	1.23	1.33	3-M1t	0.90	0.83	0.94	1.11	2.54	1.76

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 5+205
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

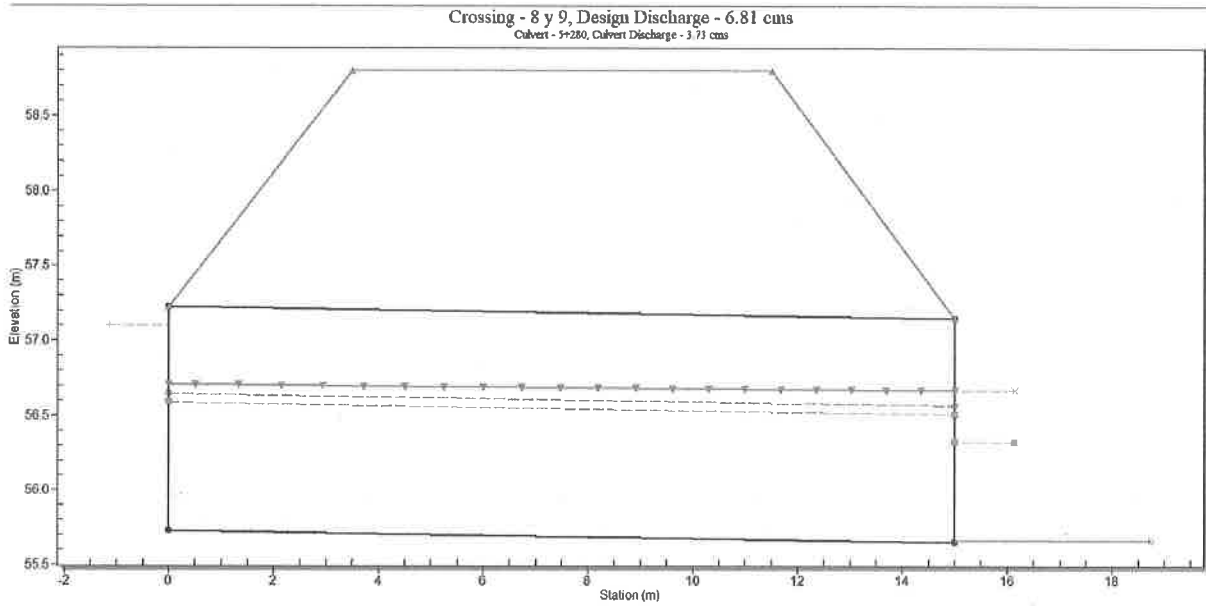
Geometry

Inlet Elevation:	55.90 m
Outlet Elevation:	55.83 m
Culvert Length:	13.50 m
Culvert Slope:	0.0052
Culvert Rise:	1.50 m
Inlet Throat:	55.72 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



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Representante Legal

Ing. Carlos Beltrami
Representante Legal

Crossing Properties

Name: 11

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	10.000	cms
Design Flow	12.970	cms
Maximum Flow	14.880	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	5.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	55.070	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.800	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

6+180

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	6+180	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	5000.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	55.160	m
Outlet Station	18.300	m
Outlet Elevation	55.060	m
Number of Barrels	3	
Computed Culvert ...	0.005464	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
10.00	10.00	56.47	1.18	**1.31**	3-M1t	0.84	0.80	1.10	1.09	2.02	1.84
10.49	10.49	56.51	1.22	**1.35**	3-M1t	0.87	0.82	1.13	1.12	2.05	1.87
10.98	10.98	56.56	1.26	**1.40**	3-M1t	0.90	0.85	1.17	1.16	2.08	1.89
11.46	11.46	56.60	1.30	**1.44**	3-M1t	0.93	0.87	1.21	1.20	2.11	1.92
11.95	11.95	56.64	1.33	**1.48**	3-M1t	0.96	0.90	1.24	1.23	2.14	1.94
12.44	12.44	56.69	1.37	**1.53**	7-M1t	0.99	0.92	1.27	1.26	2.17	1.97
12.97	12.97	56.73	1.41	**1.57**	7-M1t	1.02	0.95	1.31	1.30	2.20	1.99
13.42	13.42	56.77	1.44	**1.61**	7-M1t	1.05	0.97	1.34	1.33	2.22	2.01
13.90	13.90	56.81	1.48	**1.65**	7-M1t	1.08	0.99	1.38	1.37	2.24	2.03
14.39	14.39	56.85	1.51	**1.69**	7-M1t	1.11	1.01	1.41	1.40	2.27	2.06
14.88	14.88	56.89	1.55	**1.73**	7-M1t	1.14	1.04	1.44	1.43	2.29	2.08

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table 6+180
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table Options...

Geometry

Inlet Elevation:	55.16 m
Outlet Elevation:	55.06 m
Culvert Length:	18.30 m
Culvert Slope:	0.0055
Culvert Rise:	1.50 m
Inlet Throat:	55.15 m
Outlet Control:	Profiles

Plot

Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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Representante Legal

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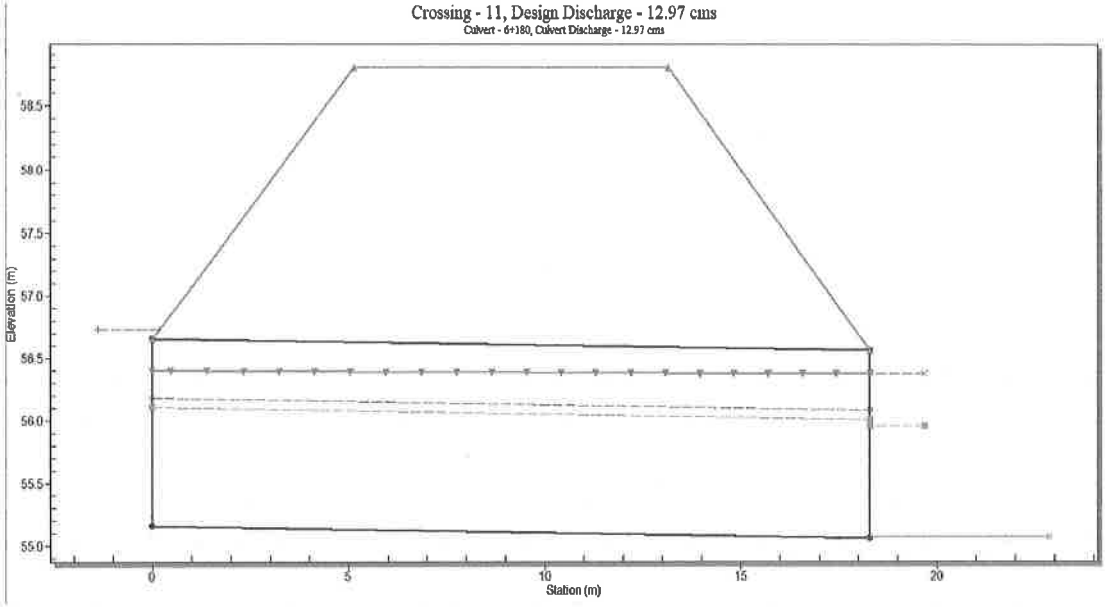
Representante Legal



Crossing Properties

Name: 12

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	6.000	cms
Design Flow	7.030	cms
Maximum Flow	8.070	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	5.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	56.210	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	58.810	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	[redacted]	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	5000.000	mm
Side Taper (H:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	56.280	m
Outlet Station	13.500	m
Outlet Elevation	56.210	m
Number of Barrels	2	
Computed Culvert ...	0.005185	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Representante Legal

Ing. Carlos Beltramino
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
6.00	6.00	57.46	1.09	**1.18**	3-M2t	0.79	0.74	0.77	0.77	2.59	1.55
6.21	6.21	57.49	1.11	**1.21**	3-M2t	0.81	0.76	0.79	0.79	2.62	1.57
6.41	6.41	57.52	1.14	**1.24**	3-M2t	0.83	0.78	0.81	0.81	2.65	1.59
6.62	6.62	57.54	1.16	**1.26**	3-M2t	0.85	0.79	0.82	0.82	2.68	1.61
6.83	6.83	57.57	1.19	**1.29**	3-M2t	0.87	0.81	0.84	0.84	2.71	1.62
7.03	7.03	57.59	1.21	**1.31**	3-M2t	0.89	0.82	0.86	0.86	2.73	1.64
7.24	7.24	57.62	1.24	**1.34**	3-M2t	0.91	0.84	0.88	0.88	2.76	1.66
7.45	7.45	57.65	1.26	**1.37**	3-M2t	0.93	0.86	0.89	0.89	2.78	1.67
7.66	7.66	57.67	1.28	**1.39**	3-M2t	0.95	0.87	0.91	0.91	2.81	1.69
7.86	7.86	57.70	1.31	**1.42**	3-M2t	0.97	0.89	0.92	0.92	2.83	1.70
8.07	8.07	57.72	1.33	**1.44**	3-M2t	0.99	0.90	0.94	0.94	2.86	1.72

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 6+420
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	56.28 m
Outlet Elevation:	56.21 m
Culvert Length:	13.50 m
Culvert Slope:	0.0052
Culvert Rise:	1.50 m
Inlet Throat:	56.26 m
Outlet Control:	Profiles

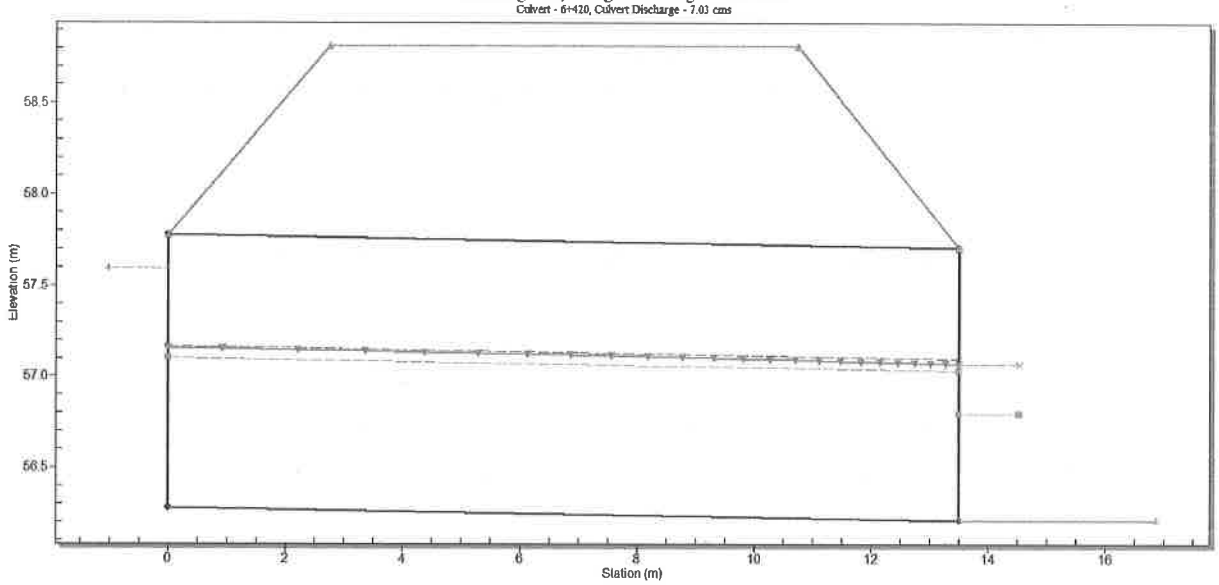
Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

Crossing - 12, Design Discharge - 7.03 cms

Culvert - 6+420, Culvert Discharge - 7.03 cms



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Representante Legal

Ing. Carlos Beltramin
Representante Legal

Crossing Properties

Name: 14

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	3.000	cms
Design Flow	3.970	cms
Maximum Flow	4.560	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	2.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.400	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.400	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

9+724

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	9+724	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	2500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.460	m
Outlet Station	11.400	m
Outlet Elevation	57.400	m
Number of Barrels	2	
Computed Culvert ...	0.005263	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
3.00	3.00	58.48	0.91	**1.02**	7-M1t	0.70	0.61	0.85	0.85	1.76	1.41
3.16	3.16	58.52	0.94	**1.06**	7-M1t	0.73	0.63	0.89	0.89	1.78	1.43
3.31	3.31	58.56	0.97	**1.10**	7-M1t	0.76	0.65	0.92	0.92	1.81	1.45
3.47	3.47	58.59	1.00	**1.13**	7-M1t	0.79	0.67	0.95	0.95	1.83	1.46
3.62	3.62	58.63	1.03	**1.17**	7-M1t	0.82	0.69	0.98	0.98	1.85	1.48
3.78	3.78	58.69	1.07	**1.23**	4-FFf	0.84	0.71	1.00	1.01	1.89	1.50
3.97	3.97	58.75	1.10	**1.29**	4-FFf	0.88	0.74	1.00	1.05	1.98	1.52
4.09	4.09	58.79	1.12	**1.33**	4-FFf	0.90	0.75	1.00	1.07	2.05	1.53
4.25	4.25	58.85	1.15	**1.39**	4-FFf	0.93	0.77	1.00	1.10	2.12	1.55
4.40	4.40	58.90	1.18	**1.44**	4-FFf	0.95	0.79	1.00	1.13	2.20	1.56
4.56	4.56	58.96	1.21	**1.50**	4-FFf	1.00	0.81	1.00	1.16	2.28	1.57

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 9+724
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	57.46 m
Outlet Elevation:	57.40 m
Culvert Length:	11.40 m
Culvert Slope:	0.0053
Culvert Rise:	1.00 m
Inlet Throat:	57.45 m
Outlet Control:	Profiles

Plot

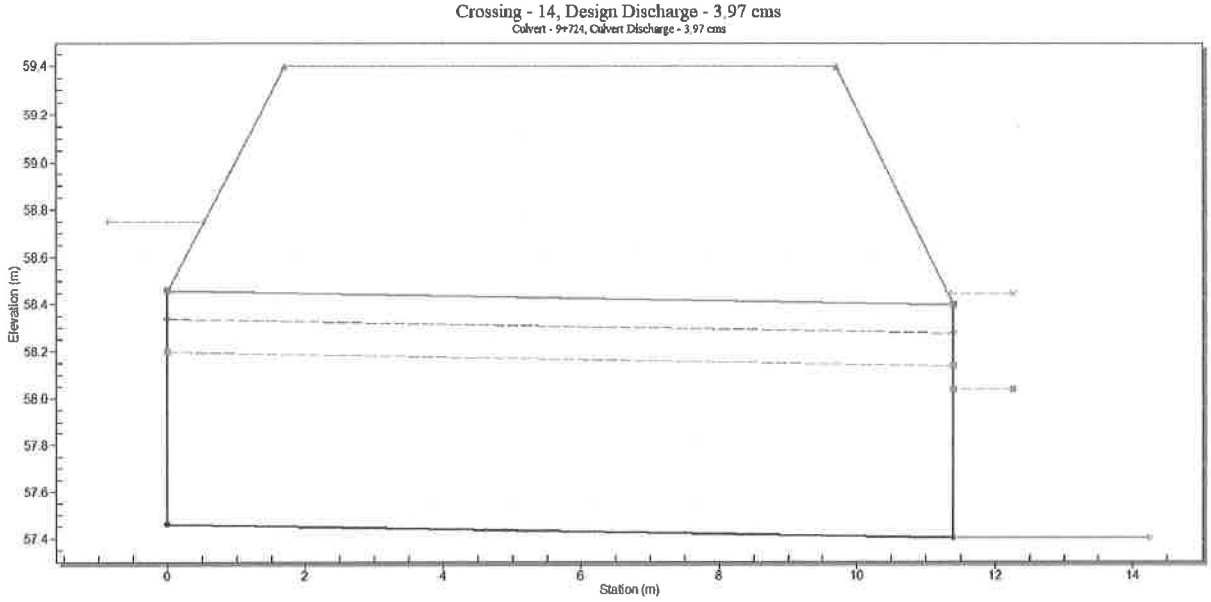
Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

TDCSA

Sara M. Blanco de Done — Representante Legal

Ing. Carlos Beltramin — Representante Legal



Crossing Properties

Name: 17 , 13

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	3.000	cms
Design Flow	3.400	cms
Maximum Flow	3.900	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	3.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	58.040	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	60.070	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

11+722
12+000

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	U.
CULVERT DATA		
Name	11+722	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	m..
Rise	1000.000	m..
Embedment D...	0.000	m..
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	1500.000	m..
Side Taper (4:1 to ...	4.000	-..
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	58.110	m
Outlet Station	12.400	m
Outlet Elevation	58.040	m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltramin
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
3.00	1.41	59.06	0.80	0.95	3-M1t	0.65	0.59	0.73	0.73	1.93	1.37
3.09	1.43	59.07	0.81	0.96	3-M1t	0.66	0.59	0.74	0.74	1.93	1.39
3.18	1.46	59.08	0.82	0.97	3-M1t	0.67	0.60	0.76	0.76	1.92	1.40
3.27	1.48	59.10	0.83	0.99	3-M1t	0.68	0.61	0.77	0.77	1.92	1.41
3.40	1.52	59.12	0.84	1.01	7-M1t	0.69	0.62	0.79	0.79	1.92	1.43
3.45	1.54	59.12	0.85	1.01	7-M1t	0.70	0.62	0.80	0.80	1.92	1.43
3.54	1.57	59.14	0.86	1.03	7-M1t	0.71	0.63	0.82	0.82	1.92	1.44
3.63	1.60	59.15	0.87	1.04	7-M1t	0.72	0.64	0.83	0.83	1.92	1.46
3.72	1.63	59.17	0.88	1.06	7-M1t	0.73	0.65	0.85	0.85	1.93	1.47
3.81	1.66	59.18	0.89	1.07	7-M1t	0.74	0.65	0.86	0.86	1.93	1.48
3.90	1.69	59.20	0.90	1.09	7-M1t	0.75	0.66	0.87	0.87	1.94	1.49

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 11+733
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

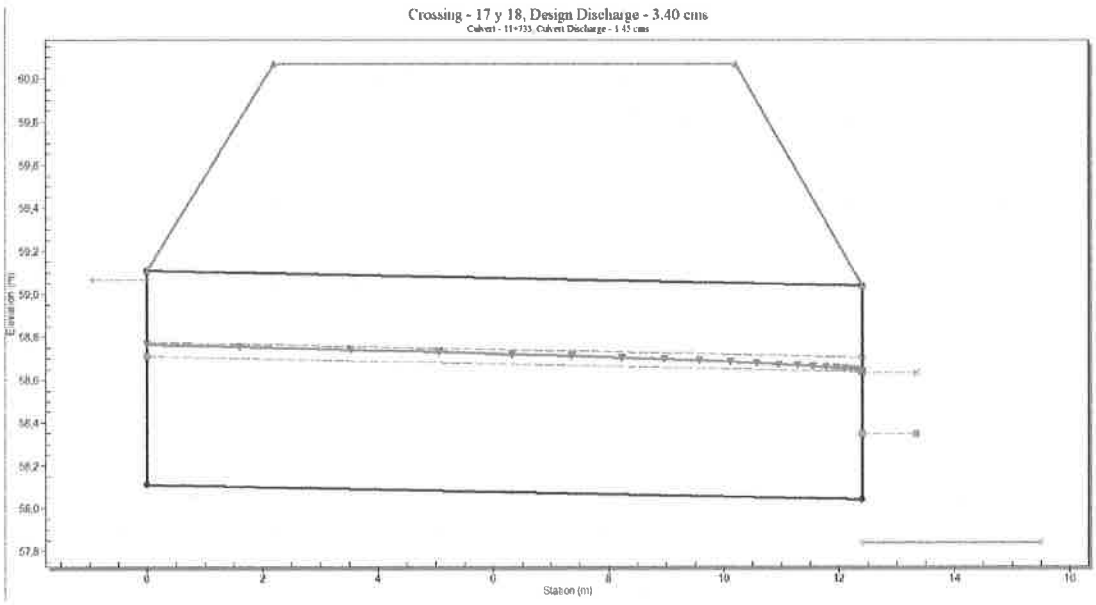
Geometry

Inlet Elevation:	58.11 m
Outlet Elevation:	58.04 m
Culvert Length:	12.40 m
Culvert Slope:	0.0056
Culvert Rise:	1.00 m
Inlet Throat:	57.99 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



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Ing. Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltramino
Representante Legal

Crossing Properties

Name: 17 y 18

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	3.000	cms
Design Flow	3.400	cms
Maximum Flow	3.900	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	3.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.840	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	60.070	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

11+733

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	17 y 18	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	1500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.900	m
Outlet Station	10.600	m
Outlet Elevation	57.840	m
Number of Barrels	1	
Computed Culvert ...	0.005660	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
3.00	1.26	58.98	0.74	0.87	2-M2c	0.60	0.55	0.55	0.73	2.31	1.37
3.09	1.30	59.00	0.76	0.89	2-M2c	0.61	0.56	0.56	0.74	2.34	1.39
3.18	1.35	59.02	0.77	0.91	2-M2c	0.63	0.57	0.57	0.76	2.36	1.40
3.27	1.39	59.04	0.79	0.93	2-M2c	0.64	0.58	0.58	0.77	2.39	1.41
3.40	1.45	59.07	0.81	0.96	2-M2c	0.67	0.60	0.60	0.79	2.42	1.43
3.45	1.48	59.08	0.82	0.97	2-M2c	0.68	0.61	0.61	0.80	2.44	1.43
3.54	1.52	59.09	0.84	0.98	2-M2c	0.69	0.62	0.62	0.82	2.46	1.44
3.63	1.56	59.11	0.85	1.00	3-M2t	0.71	0.63	0.63	0.83	2.47	1.46
3.72	1.60	59.13	0.87	1.02	3-M2t	0.72	0.64	0.65	0.85	2.48	1.47
3.81	1.65	59.15	0.89	1.04	3-M2t	0.74	0.65	0.66	0.86	2.50	1.48
3.90	1.69	59.17	0.90	1.06	3-M2t	0.75	0.66	0.67	0.87	2.51	1.49

Display

- Crossing Summary Table
- Culvert Summary Table — 11+733
- Water Surface Profiles
- Tapered Inlet Table
- Customized Table — Options...

Geometry

Inlet Elevation:	58.11 m
Outlet Elevation:	58.04 m
Culvert Length:	12.40 m
Culvert Slope:	0.0056
Culvert Rise:	1.00 m
Inlet Throat:	57.89 m
Outlet Control:	Profiles

Plot

Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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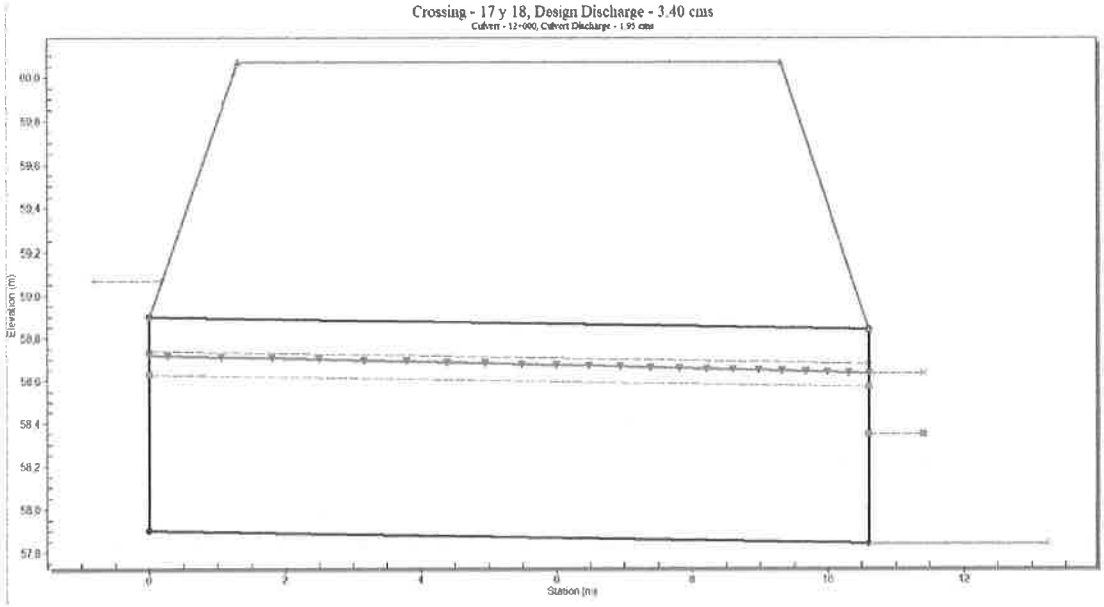
Ing. Carlos Beltramino — Representante Legal



Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
7.00	2.70	58.23	1.53	0.74	5-S2n	0.55	0.69	0.58	0.79	3.11	1.60
7.30	2.81	58.26	1.56	0.77	5-S2n	0.56	0.71	0.60	0.82	3.14	1.62
7.60	2.93	58.29	1.59	0.80	5-S2n	0.58	0.73	0.61	0.84	3.18	1.65
7.91	3.04	58.32	1.62	0.83	5-S2n	0.60	0.75	0.63	0.86	3.21	1.67
8.21	3.16	58.35	1.65	0.87	5-S2n	0.61	0.77	0.65	0.88	3.24	1.69
8.51	3.27	58.38	1.68	0.90	5-S2n	0.63	0.79	0.67	0.90	3.27	1.71
8.73	3.36	58.40	1.70	0.92	5-S2n	0.64	0.80	0.68	0.92	3.30	1.72
9.11	3.51	58.43	1.73	0.96	5-S2n	0.66	0.82	0.70	0.95	3.33	1.75
9.42	3.62	58.46	1.76	1.00	5-S2n	0.68	0.84	0.72	0.97	3.36	1.77
9.72	3.74	58.49	1.79	1.03	5-S2n	0.70	0.86	0.74	0.99	3.39	1.79
10.02	3.85	58.51	1.81	1.06	5-S2n	0.71	0.88	0.75	1.01	3.42	1.81

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 13+260
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	56.70 m
Outlet Elevation:	56.55 m
Culvert Length:	13.40 m
Culvert Slope:	0.0112
Culvert Rise:	1.50 m
Inlet Throat:	57.20 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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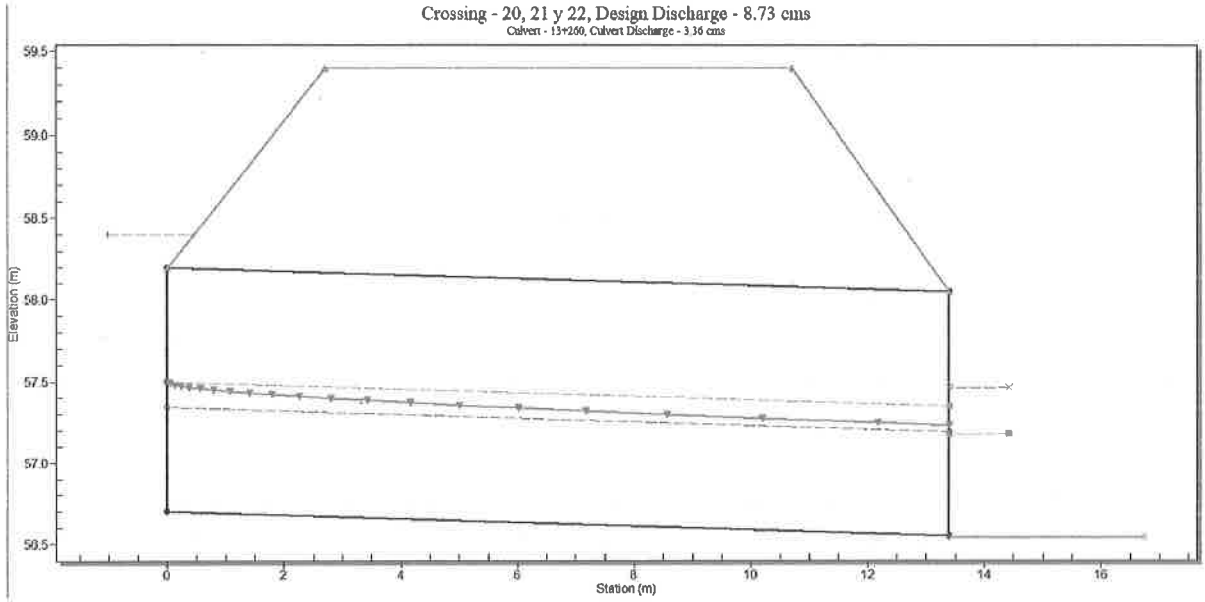
Representante Legal



Crossing Properties

Name:

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	7.000	cms
Design Flow	8.730	cms
Maximum Flow	10.020	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	5.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	56.540	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	1000.000	m
Crest Elevation	59.400	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

13+260
14+180

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	U
CULVERT DATA		
Name		
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	m
Rise	1500.000	m
Embedment D...	0.000	m
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	1500.000	m
Side Taper (4:1 to ...	4.000	
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	56.680	m
Outlet Station	13.400	m
Outlet Elevation	56.540	m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Ing. Carlos Beltramino
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
7.00	2.70	58.23	1.53	0.74	5-S2n	0.55	0.69	0.58	0.79	3.11	1.60
7.30	2.81	58.26	1.56	0.77	5-S2n	0.56	0.71	0.60	0.82	3.14	1.62
7.60	2.93	58.29	1.59	0.80	5-S2n	0.58	0.73	0.61	0.84	3.18	1.65
7.91	3.04	58.32	1.62	0.83	5-S2n	0.60	0.75	0.63	0.86	3.21	1.67
8.21	3.16	58.35	1.65	0.87	5-S2n	0.61	0.77	0.65	0.88	3.24	1.69
8.51	3.27	58.38	1.68	0.90	5-S2n	0.63	0.79	0.67	0.90	3.27	1.71
8.73	3.36	58.40	1.70	0.92	5-S2n	0.64	0.80	0.68	0.92	3.30	1.72
9.11	3.51	58.43	1.73	0.96	5-S2n	0.66	0.82	0.70	0.95	3.33	1.75
9.42	3.62	58.46	1.76	1.00	5-S2n	0.68	0.84	0.72	0.97	3.36	1.77
9.72	3.74	58.49	1.79	1.03	5-S2n	0.70	0.86	0.74	0.99	3.39	1.79
10.02	3.85	58.51	1.81	1.06	5-S2n	0.71	0.88	0.75	1.01	3.42	1.81

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 13+260
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	56.70 m
Outlet Elevation:	56.55 m
Culvert Length:	13.40 m
Culvert Slope:	0.0112
Culvert Rise:	1.50 m
Inlet Throat:	57.20 m
Outlet Control:	Profiles

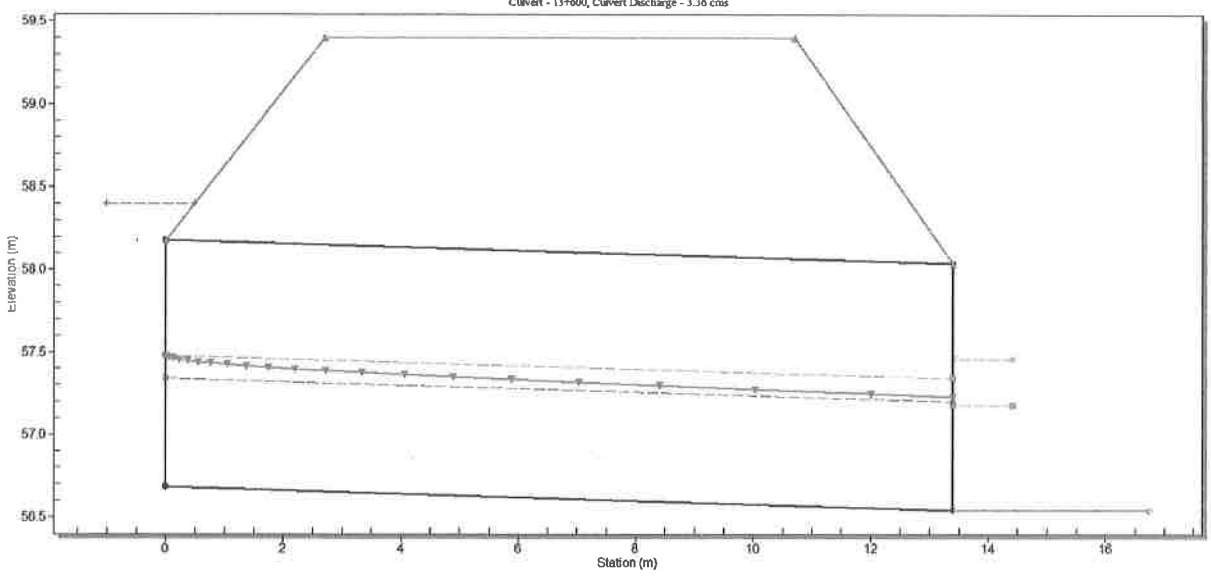
Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

Crossing - 20, 21 y 22, Design Discharge - 8.73 cms

Culvert - 13+600, Culvert Discharge - 3.36 cms



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Ing. Carlos Beltramino
Representante Legal

Crossing Properties

Name: 20, 21 y 22

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	7.000	cms
Design Flow	8.730	cms
Maximum Flow	10.020	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	5.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	56.540	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	1000.000	m
Crest Elevation	59.400	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

13+260
13+600

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	13+260	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	1500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.210	m
Outlet Station	10.400	m
Outlet Elevation	57.150	m
Number of Barrels	1	
Computed Culvert ...	0.005769	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
7.00	2.70	58.23	1.53	0.74	5-S2n	0.55	0.69	0.58	0.79	3.11	1.60
7.30	2.81	58.26	1.56	0.77	5-S2n	0.56	0.71	0.60	0.82	3.14	1.62
7.60	2.93	58.29	1.59	0.80	5-S2n	0.58	0.73	0.61	0.84	3.18	1.65
7.91	3.04	58.32	1.62	0.83	5-S2n	0.60	0.75	0.63	0.86	3.21	1.67
8.21	3.16	58.35	1.65	0.87	5-S2n	0.61	0.77	0.65	0.88	3.24	1.69
8.51	3.27	58.38	1.68	0.90	5-S2n	0.63	0.79	0.67	0.90	3.27	1.71
8.73	3.36	58.40	1.70	0.92	5-S2n	0.64	0.80	0.68	0.92	3.30	1.72
9.11	3.51	58.43	1.73	0.96	5-S2n	0.66	0.82	0.70	0.95	3.33	1.75
9.42	3.62	58.46	1.76	1.00	5-S2n	0.68	0.84	0.72	0.97	3.36	1.77
9.72	3.74	58.49	1.79	1.03	5-S2n	0.70	0.86	0.74	0.99	3.39	1.79
10.02	3.85	58.51	1.81	1.06	5-S2n	0.71	0.88	0.75	1.01	3.42	1.81

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 13+260
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	56.70 m
Outlet Elevation:	56.55 m
Culvert Length:	13.40 m
Culvert Slope:	0.0112
Culvert Rise:	1.50 m
Inlet Throat:	57.20 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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Representante Legal

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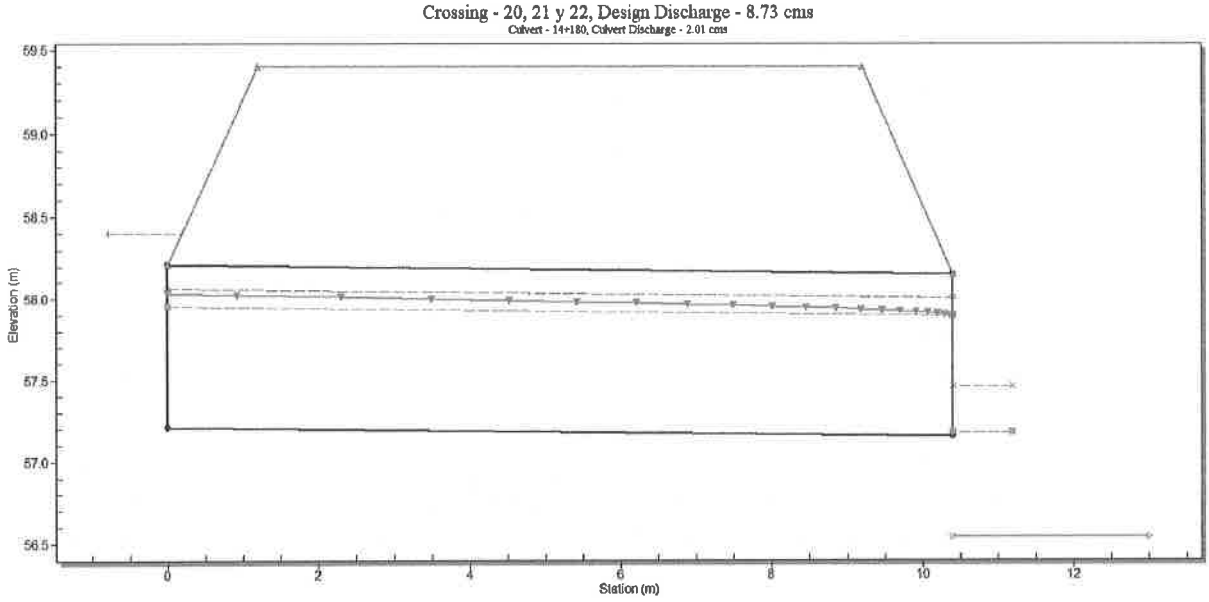
Representante Legal



Crossing Properties

Name: 23 y 24

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	3.000	cms
Design Flow	4.210	cms
Maximum Flow	4.830	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	3.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.480	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.700	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

14+300
12+000

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	14+300	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ce...	
Face Width	1500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.600	m
Outlet Station	11.400	m
Outlet Elevation	57.480	m
Number of Barrels	1	
Computed Culvert ...	0.010526	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Representante Legal

Ing. Carlos Beltrami.
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
3.00	1.50	58.56	0.96	0.70	1-S2n	0.54	0.61	0.55	0.64	2.74	1.34
3.18	1.59	58.59	0.99	0.74	1-S2n	0.56	0.64	0.57	0.67	2.78	1.36
3.37	1.68	58.63	1.03	0.79	5-S2n	0.59	0.66	0.60	0.69	2.82	1.39
3.55	1.77	58.67	1.07	0.84	5-S2n	0.61	0.68	0.62	0.72	2.86	1.41
3.73	1.87	58.70	1.10	0.89	5-S2n	0.64	0.71	0.64	0.74	2.89	1.43
3.91	1.96	58.74	1.14	0.95	5-S2n	0.66	0.73	0.67	0.77	2.93	1.45
4.10	2.05	58.77	1.17	1.00	5-S2n	0.68	0.75	0.69	0.79	2.96	1.48
4.21	2.11	58.79	1.19	1.03	5-S2n	0.70	0.77	0.71	0.81	2.98	1.49
4.46	2.23	58.84	1.24	1.11	5-S2n	0.73	0.80	0.74	0.84	3.02	1.52
4.65	2.32	58.87	1.27	1.16	5-S2n	0.76	0.82	0.76	0.86	3.05	1.53
4.83	2.41	58.91	1.31	1.22	5-S2n	0.78	0.84	0.79	0.89	3.08	1.55

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 14+900
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

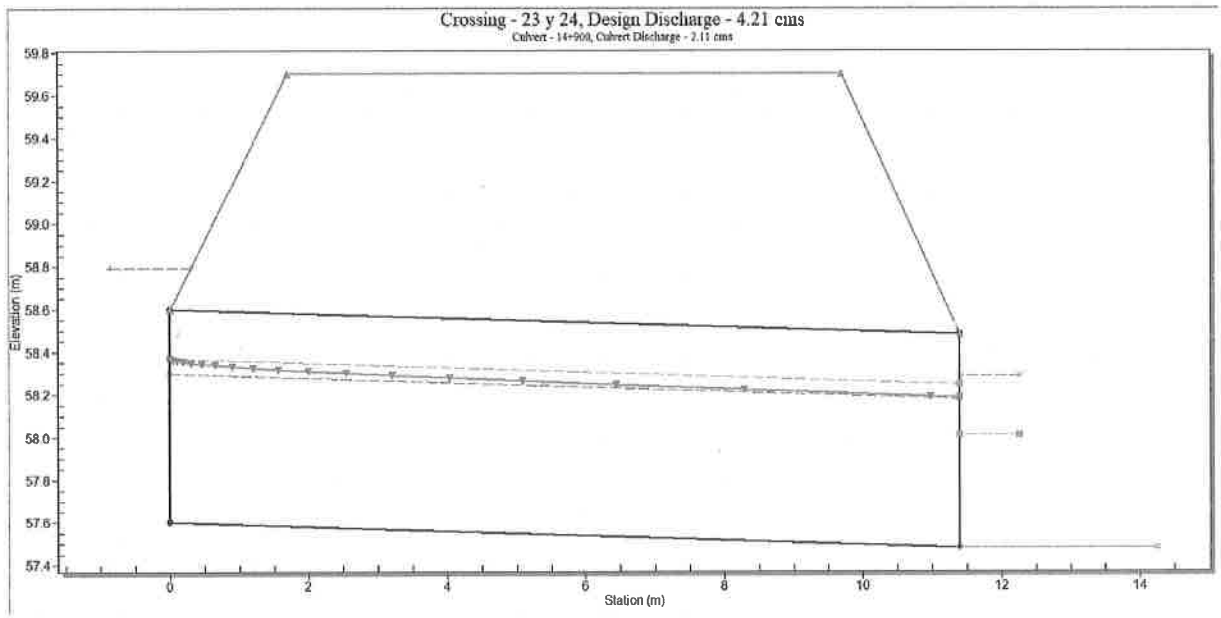
Geometry

Inlet Elevation:	57.60 m
Outlet Elevation:	57.48 m
Culvert Length:	11.40 m
Culvert Slope:	0.0105
Culvert Rise:	1.00 m
Inlet Throat:	57.64 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



TUCSA

Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltramir
Representante Legal

Crossing Properties

Name: 23 y 24

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	3.000	cms
Design Flow	4.210	cms
Maximum Flow	4.830	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	3.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.480	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.700	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

14+900

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	U.
CULVERT DATA		
Name	14+900	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	m..
Rise	1000.000	m..
Embedment D...	0.000	m..
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	1500.000	m..
Side Taper (4:1 to ...	4.000	
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.650	m
Outlet Station	11.400	m
Outlet Elevation	57.530	m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
3.00	1.50	58.56	0.96	0.70	1-S2n	0.54	0.61	0.55	0.64	2.74	1.34
3.18	1.59	58.59	0.99	0.74	1-S2n	0.56	0.64	0.57	0.67	2.78	1.36
3.37	1.68	58.63	1.03	0.79	5-S2n	0.59	0.66	0.60	0.69	2.82	1.39
3.55	1.77	58.67	1.07	0.84	5-S2n	0.61	0.68	0.62	0.72	2.86	1.41
3.73	1.87	58.70	1.10	0.89	5-S2n	0.64	0.71	0.64	0.74	2.89	1.43
3.91	1.96	58.74	1.14	0.95	5-S2n	0.66	0.73	0.67	0.77	2.93	1.45
4.10	2.05	58.77	1.17	1.00	5-S2n	0.68	0.75	0.69	0.79	2.96	1.48
4.21	2.11	58.79	1.19	1.03	5-S2n	0.70	0.77	0.71	0.81	2.98	1.49
4.46	2.23	58.84	1.24	1.11	5-S2n	0.73	0.80	0.74	0.84	3.02	1.52
4.65	2.32	58.87	1.27	1.16	5-S2n	0.76	0.82	0.76	0.86	3.05	1.53
4.83	2.41	58.91	1.31	1.22	5-S2n	0.78	0.84	0.79	0.89	3.08	1.55

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 14+900
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	57.60 m
Outlet Elevation:	57.48 m
Culvert Length:	11.40 m
Culvert Slope:	0.0105
Culvert Rise:	1.00 m
Inlet Throat:	57.64 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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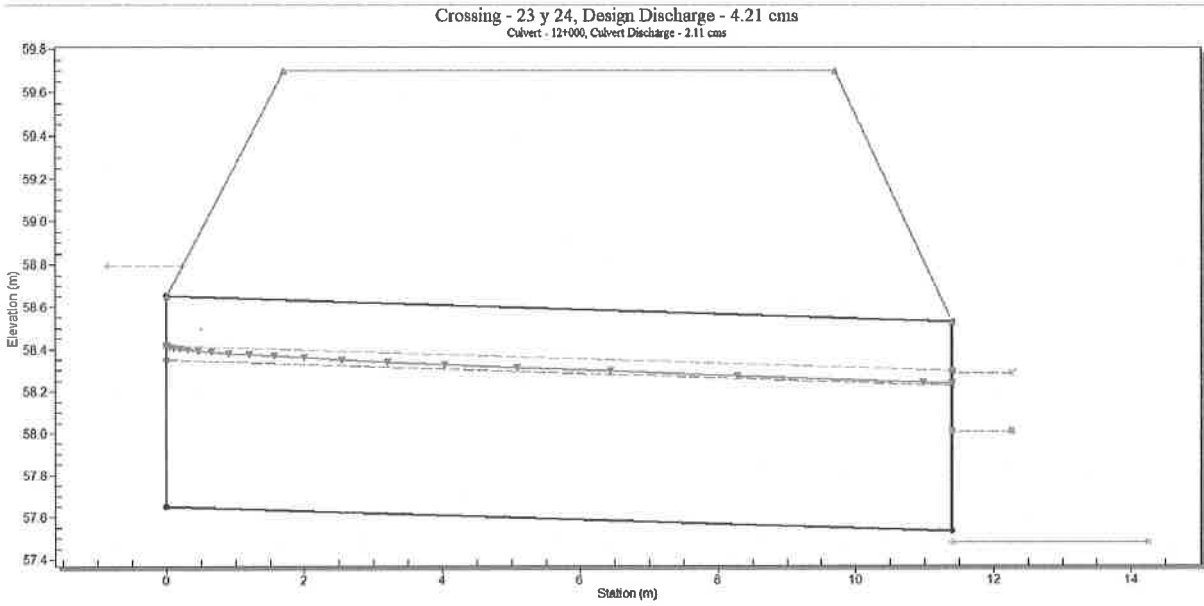
Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltramin
Representante Legal



Crossing Properties

Name: 25, 26 y 27

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	7.000	cms
Design Flow	8.650	cms
Maximum Flow	9.930	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	6.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.200	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.700	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

15+900
16+820

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	15+900	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	1500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.700	m
Outlet Station	11.600	m
Outlet Elevation	57.640	m
Number of Barrels	1	
Computed Culvert ...	0.005172	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Sara M. Blasco de Dose
Representante Legal

Ing. Carlos Beltramino
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
7.00	0.72	58.30	0.51	0.60	2-M2c	0.41	0.38	0.38	0.74	1.92	1.57
7.29	0.77	58.33	0.53	0.63	2-M2c	0.43	0.39	0.39	0.77	1.96	1.59
7.59	0.82	58.35	0.55	0.65	2-M2c	0.45	0.41	0.41	0.79	2.00	1.61
7.88	0.86	58.38	0.58	0.68	2-M2c	0.46	0.42	0.42	0.80	2.04	1.63
8.17	0.91	58.40	0.60	0.70	2-M2c	0.48	0.44	0.44	0.82	2.07	1.65
8.47	0.96	58.42	0.62	0.72	2-M2c	0.50	0.45	0.45	0.84	2.11	1.67
8.65	0.99	58.44	0.63	0.74	2-M2c	0.51	0.46	0.46	0.86	2.13	1.68
9.05	1.05	58.47	0.66	0.77	2-M2c	0.54	0.48	0.48	0.88	2.18	1.71
9.34	1.10	58.49	0.68	0.79	2-M2c	0.56	0.50	0.50	0.90	2.21	1.73
9.64	1.15	58.52	0.70	0.82	2-M2c	0.58	0.51	0.51	0.92	2.24	1.75
9.93	1.20	58.54	0.72	0.84	2-M2c	0.59	0.53	0.53	0.94	2.27	1.77

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 15+860
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	57.70 m
Outlet Elevation:	57.64 m
Culvert Length:	11.60 m
Culvert Slope:	0.0052
Culvert Rise:	1.00 m
Inlet Throat:	57.34 m
Outlet Control:	Profiles

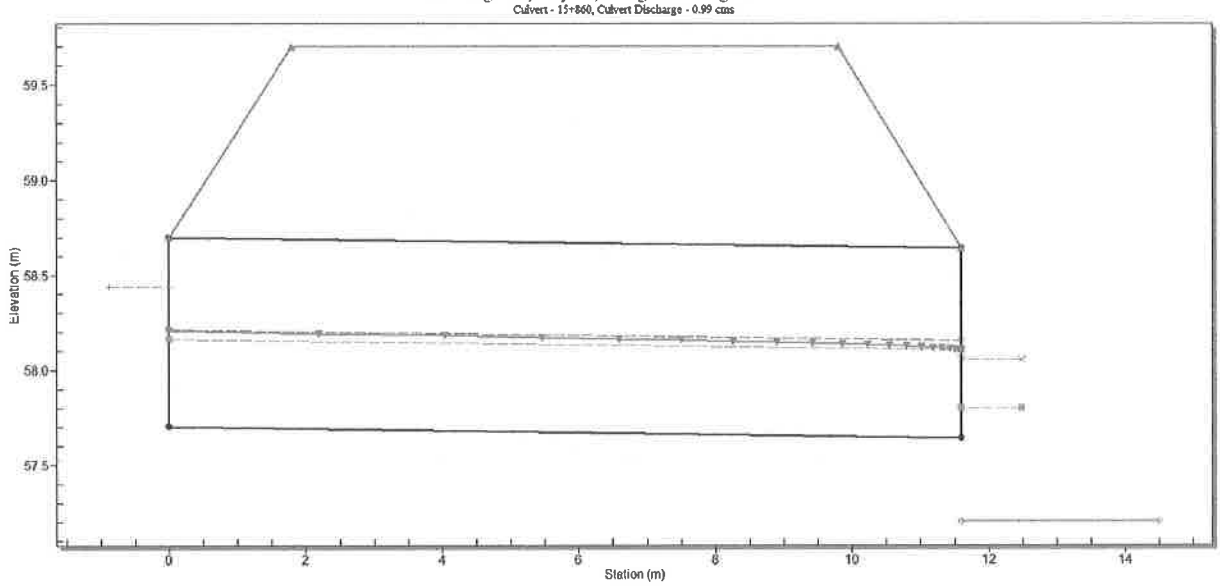
Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

Crossing - 25, 26 y 27, Design Discharge - 8.65 cms

Culvert - 15+860, Culvert Discharge - 0.99 cms



TDCSA

Lic. Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltramino
Representante Legal

Crossing Properties

Name: 25, 26 y 27

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	7.000	cms
Design Flow	8.650	cms
Maximum Flow	9.930	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	6.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.200	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.700	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

15+860
15+900
16+820

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	15+900	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	3500.000	mm
Side Taper (4:1 to ...	4.000	_:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.260	m
Outlet Station	11.500	m
Outlet Elevation	57.200	m
Number of Barrels	2	
Computed Culvert ...	0.005217	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
7.00	4.84	58.30	**1.04~**	1.03	3-M1t	0.67	0.64	0.74	0.74	2.16	1.57
7.29	5.03	58.33	**1.07~**	1.05	3-M1t	0.69	0.66	0.77	0.77	2.19	1.59
7.59	5.22	58.35	**1.09~**	1.08	3-M1t	0.71	0.68	0.79	0.79	2.21	1.61
7.88	5.41	58.38	**1.12~**	1.10	3-M1t	0.73	0.69	0.80	0.80	2.24	1.63
8.17	5.60	58.40	**1.14~**	1.13	3-M1t	0.74	0.71	0.82	0.82	2.26	1.65
8.47	5.78	58.42	**1.16~**	1.16	3-M1t	0.76	0.72	0.84	0.84	2.29	1.67
8.65	5.90	58.44	**1.18~**	1.17	3-M1t	0.78	0.73	0.86	0.86	2.30	1.68
9.05	6.16	58.47	**1.21~**	1.21	3-M1t	0.80	0.75	0.88	0.88	2.33	1.71
9.34	6.35	58.49	**1.23~**	1.23	3-M1t	0.82	0.77	0.90	0.90	2.35	1.73
9.64	6.54	58.52	**1.26~**	1.26	3-M1t	0.84	0.79	0.92	0.92	2.37	1.75
9.93	6.73	58.54	1.28	**1.28**	3-M1t	0.86	0.80	0.94	0.94	2.39	1.77

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table 15+900
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table Options...

Geometry

Inlet Elevation:	57.26 m
Outlet Elevation:	57.20 m
Culvert Length:	11.50 m
Culvert Slope:	0.0052
Culvert Rise:	1.50 m
Inlet Throat:	57.34 m
Outlet Control:	Profiles

Plot

Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

~ Inlet control is shown, but flow profile is substantially FF.

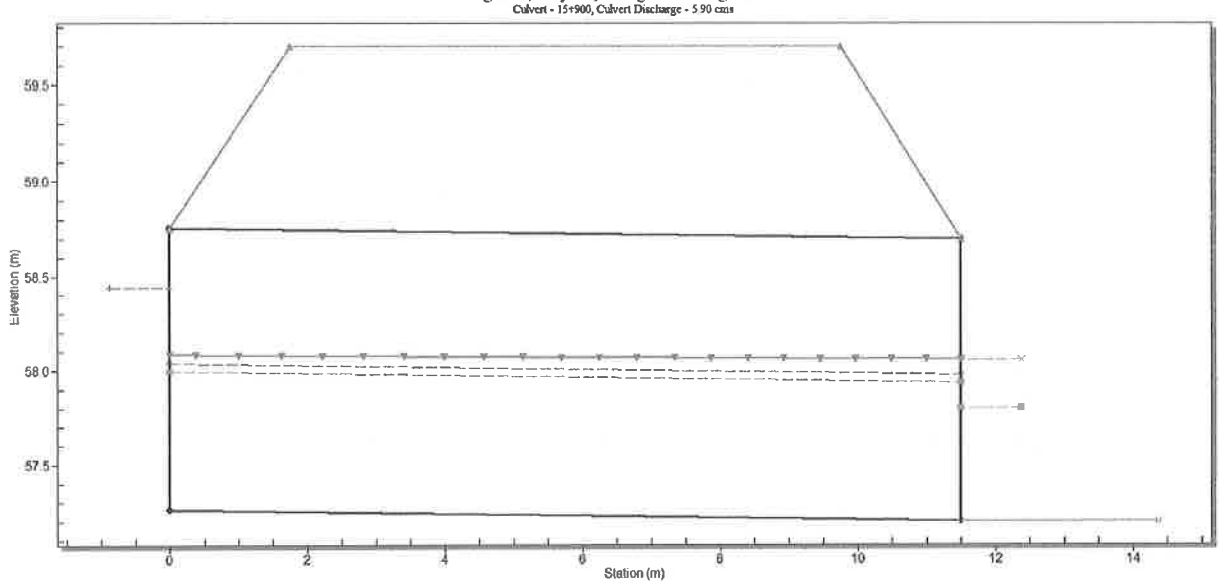
Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

IUCSA

Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltramin
Representante Legal

Crossing - 25, 26 y 27, Design Discharge - 8.65 cms
Culvert - 15+900, Culvert Discharge - 5.90 cms



Crossing Properties

Name: 25, 26 y 27

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	7.000	cms
Design Flow	8.650	cms
Maximum Flow	9.930	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	6.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.200	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.700	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

15+860
15+900
15+920

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	15+920	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (0:e...	
Face Width	1500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.350	m
Outlet Station	10.300	m
Outlet Elevation	57.290	m
Number of Barrels	1	
Computed Culvert ...	0.005825	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

IDCSA

c. Sara M. Blanco de Doee
Representante Legal

Ing. Carlos Beltramin
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
7.00	0.72	58.30	0.51	**0.60**	2-M2c	0.41	0.38	0.38	0.74	1.92	1.57
7.29	0.77	58.33	0.53	**0.63**	2-M2c	0.43	0.39	0.39	0.77	1.96	1.59
7.59	0.82	58.35	0.55	**0.65**	2-M2c	0.45	0.41	0.41	0.79	2.00	1.61
7.88	0.86	58.38	0.58	**0.68**	2-M2c	0.46	0.42	0.42	0.80	2.04	1.63
8.17	0.91	58.40	0.60	**0.70**	2-M2c	0.48	0.44	0.44	0.82	2.07	1.65
8.47	0.96	58.42	0.62	**0.72**	2-M2c	0.50	0.45	0.45	0.84	2.11	1.67
8.65	0.99	58.44	0.63	**0.74**	2-M2c	0.51	0.46	0.46	0.86	2.13	1.68
9.05	1.05	58.47	0.66	**0.77**	2-M2c	0.54	0.48	0.48	0.88	2.18	1.71
9.34	1.10	58.49	0.68	**0.79**	2-M2c	0.56	0.50	0.50	0.90	2.21	1.73
9.64	1.15	58.52	0.70	**0.82**	2-M2c	0.58	0.51	0.51	0.92	2.24	1.75
9.93	1.20	58.54	0.72	**0.84**	2-M2c	0.59	0.53	0.53	0.94	2.27	1.77

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 15+860
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

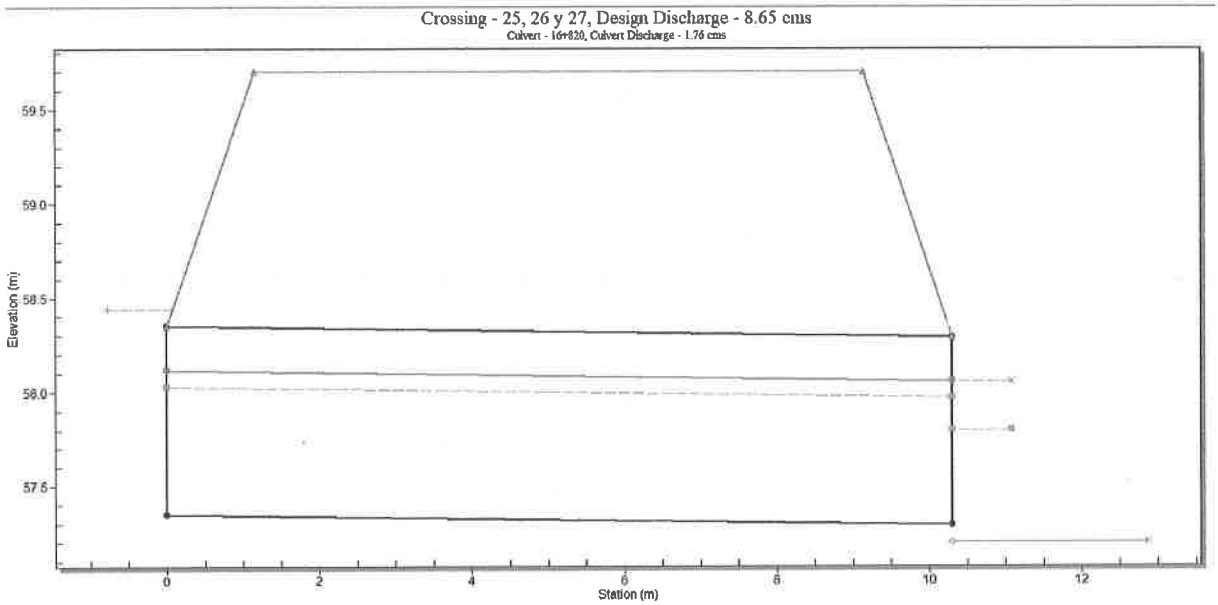
Geometry

Inlet Elevation:	57.70 m
Outlet Elevation:	57.64 m
Culvert Length:	11.60 m
Culvert Slope:	0.0052
Culvert Rise:	1.00 m
Inlet Throat:	57.34 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



IUCSA

c. Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltrami
Representante Le

Crossing Properties

Name: 29

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	8.000	cms
Design Flow	9.810	cms
Maximum Flow	11.260	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	4.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.430	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.900	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

18+183

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	18+183	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	4000.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.490	m
Outlet Station	10.500	m
Outlet Elevation	57.430	m
Number of Barrels	2	
Computed Culvert ...	0.005714	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
8.00	8.00	58.94	1.33	**1.45**	3-M1t	0.94	0.90	1.13	1.13	2.37	1.78
8.33	8.33	58.98	1.37	**1.49**	3-M1t	0.97	0.92	1.16	1.16	2.40	1.80
8.65	8.65	59.02	1.40	**1.53**	7-M1t	1.00	0.95	1.19	1.19	2.42	1.82
8.98	8.98	59.06	1.44	**1.57**	7-M1t	1.03	0.97	1.22	1.22	2.45	1.84
9.30	9.30	59.10	1.48	**1.61**	7-M1t	1.06	0.99	1.25	1.25	2.48	1.86
9.63	9.63	59.14	1.51	**1.65**	7-M1t	1.09	1.02	1.28	1.28	2.50	1.88
9.81	9.81	59.16	1.53	**1.67**	7-M1t	1.11	1.03	1.30	1.30	2.51	1.89
10.28	10.28	59.22	1.58	**1.73**	7-M1t	1.15	1.06	1.35	1.35	2.55	1.91
10.61	10.61	59.26	1.61	**1.77**	7-M1t	1.18	1.08	1.38	1.38	2.57	1.93
10.93	10.93	59.29	1.65	**1.80**	7-M1t	1.21	1.11	1.41	1.41	2.59	1.94
11.26	11.26	59.33	1.68	**1.84**	7-M1t	1.24	1.13	1.44	1.44	2.61	1.96

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 18+183
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	57.49 m
Outlet Elevation:	57.43 m
Culvert Length:	10.50 m
Culvert Slope:	0.0057
Culvert Rise:	1.50 m
Inlet Throat:	57.48 m
Outlet Control:	Profiles

Plot

Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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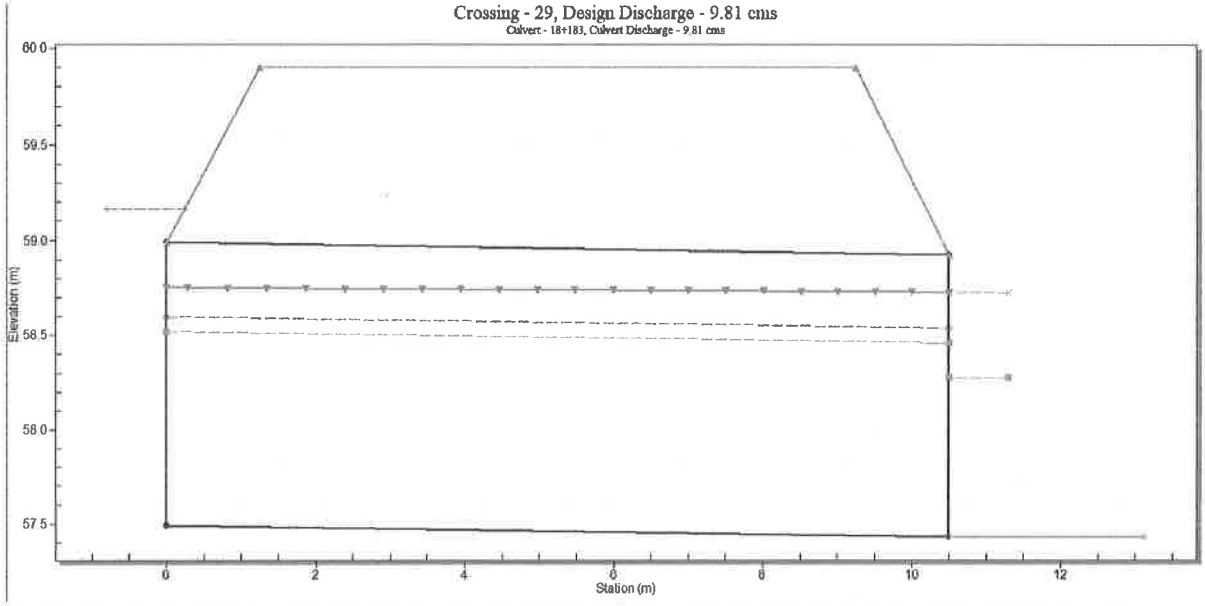

Crossing Properties

Name: 31 y 32

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.000	cms
Design Flow	5.430	cms
Maximum Flow	6.240	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	4.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.270	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.900	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

19+035

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name		
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	2500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.380	m
Outlet Station	10.400	m
Outlet Elevation	57.270	m
Number of Barrels	1	
Computed Culvert ...	0.010577	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Representante Legal
Ing. Carlos Beltramir
Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.00	3.01	59.03	1.65	0.76	5-S2n	0.61	0.74	0.64	0.74	3.12	1.50
5.12	3.08	59.05	1.67	0.78	5-S2n	0.62	0.76	0.65	0.75	3.14	1.51
5.25	3.16	59.07	1.69	0.80	5-S2n	0.63	0.77	0.67	0.77	3.17	1.52
5.43	3.27	59.09	1.71	0.82	5-S2n	0.64	0.79	0.68	0.78	3.19	1.54
5.50	3.31	59.10	1.72	0.83	5-S2n	0.65	0.79	0.69	0.79	3.21	1.55
5.62	3.39	59.12	1.74	0.85	5-S2n	0.66	0.80	0.70	0.80	3.22	1.56
5.74	3.46	59.14	1.76	0.87	5-S2n	0.67	0.82	0.71	0.81	3.24	1.57
5.87	3.54	59.16	1.78	0.89	5-S2n	0.68	0.83	0.72	0.83	3.26	1.58
5.99	3.61	59.17	1.79	0.91	5-S2n	0.69	0.84	0.73	0.84	3.28	1.59
6.12	3.69	59.19	1.81	0.93	5-S2n	0.70	0.85	0.75	0.85	3.30	1.60
6.24	3.77	59.21	1.83	0.95	5-S2n	0.71	0.86	0.76	0.86	3.32	1.61

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 18+890
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

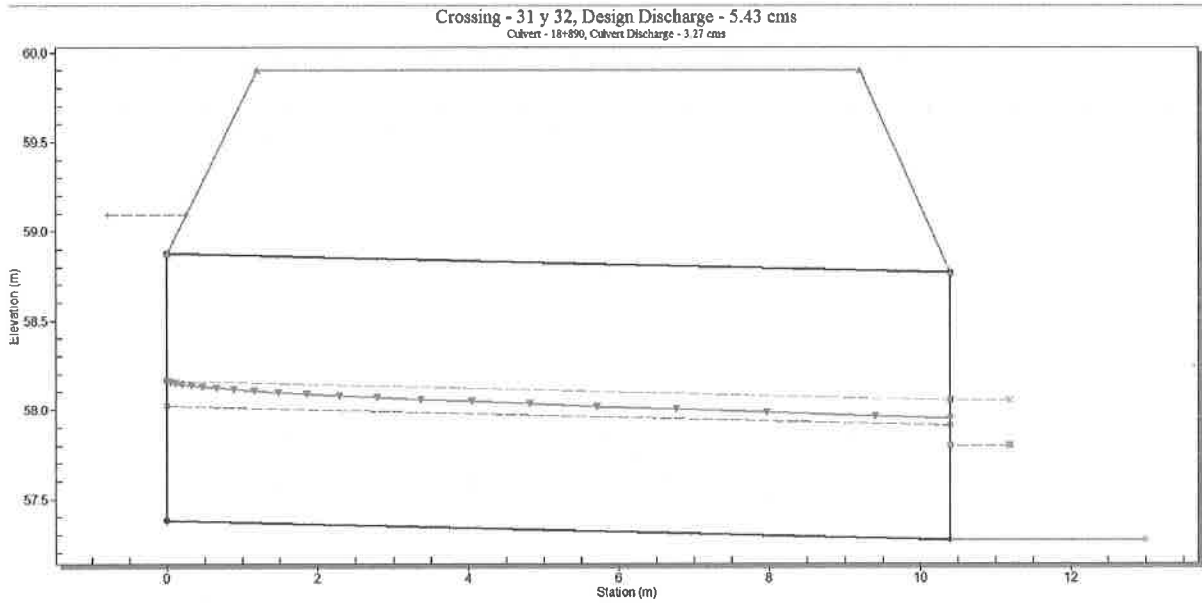
Geometry

Inlet Elevation:	57.38 m
Outlet Elevation:	57.27 m
Culvert Length:	10.40 m
Culvert Slope:	0.0106
Culvert Rise:	1.50 m
Inlet Throat:	57.92 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



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Crossing Properties

Name: 31 y 32

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.000	cms
Design Flow	5.430	cms
Maximum Flow	6.240	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	4.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.270	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.900	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

18+890

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	19+035	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	1500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.930	m
Outlet Station	11.400	m
Outlet Elevation	57.810	m
Number of Barrels	1	
Computed Culvert ...	0.010526	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.00	3.01	59.03	**1.65**	0.76	5-S2n	0.61	0.74	0.64	0.74	3.12	1.50
5.12	3.08	59.05	**1.67**	0.78	5-S2n	0.62	0.76	0.65	0.75	3.14	1.51
5.25	3.16	59.07	**1.69**	0.80	5-S2n	0.63	0.77	0.67	0.77	3.17	1.52
5.43	3.27	59.09	**1.71**	0.82	5-S2n	0.64	0.79	0.68	0.78	3.19	1.54
5.50	3.31	59.10	**1.72**	0.83	5-S2n	0.65	0.79	0.69	0.79	3.21	1.55
5.62	3.39	59.12	**1.74**	0.85	5-S2n	0.66	0.80	0.70	0.80	3.22	1.56
5.74	3.46	59.14	**1.76**	0.87	5-S2n	0.67	0.82	0.71	0.81	3.24	1.57
5.87	3.54	59.16	**1.78**	0.89	5-S2n	0.68	0.83	0.72	0.83	3.26	1.58
5.99	3.61	59.17	**1.79**	0.91	5-S2n	0.69	0.84	0.73	0.84	3.28	1.59
6.12	3.69	59.19	**1.81**	0.93	5-S2n	0.70	0.85	0.75	0.85	3.30	1.60
6.24	3.77	59.21	**1.83**	0.95	5-S2n	0.71	0.86	0.76	0.86	3.32	1.61

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 18+890
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	57.38 m
Outlet Elevation:	57.27 m
Culvert Length:	10.40 m
Culvert Slope:	0.0106
Culvert Rise:	1.50 m
Inlet Throat:	57.92 m
Outlet Control:	Profiles

Plot

Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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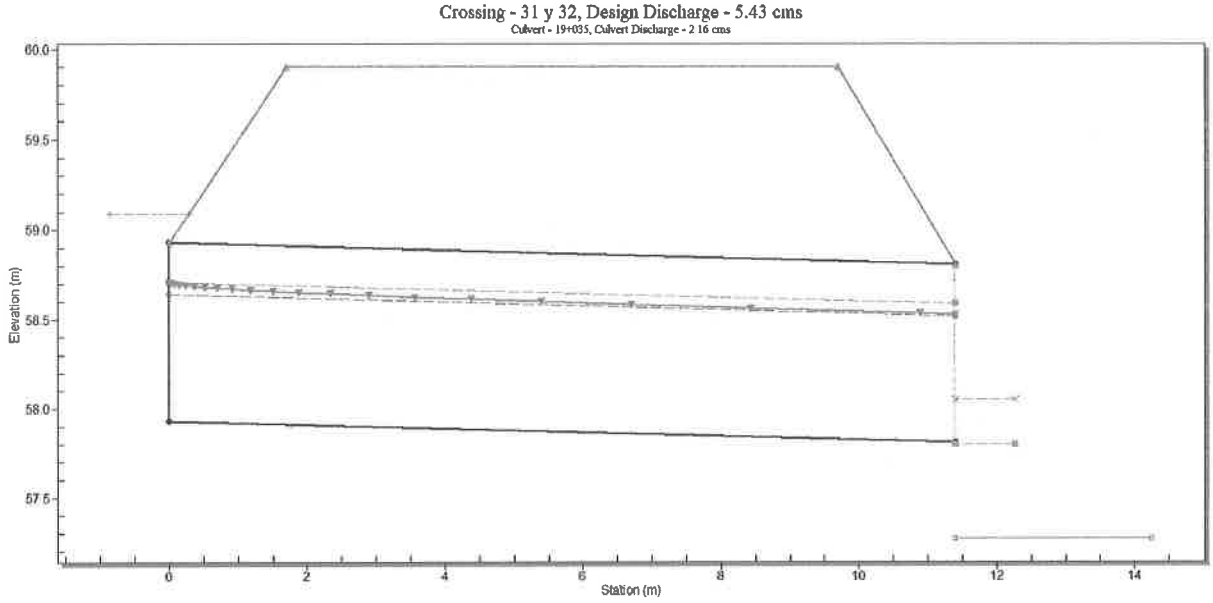

Crossing Properties

Name: 33

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	3.000	cms
Design Flow	3.900	cms
Maximum Flow	4.480	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	2.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.380	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	59.900	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	[illegible]	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (<e...	
Face Width	2000.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.440	m
Outlet Station	10.500	m
Outlet Elevation	57.380	m
Number of Barrels	1	
Computed Culvert ...	0.005714	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
3.00	3.00	58.69	1.10	1.25	3-M1t	0.76	0.74	1.06	1.06	1.89	1.42
3.15	3.15	58.73	1.14	1.29	3-M1t	0.79	0.77	1.10	1.10	1.91	1.43
3.30	3.30	58.78	1.17	1.34	3-M1t	0.81	0.79	1.14	1.14	1.93	1.45
3.44	3.44	58.82	1.21	1.38	3-M1t	0.84	0.81	1.17	1.17	1.95	1.47
3.59	3.59	58.86	1.24	1.42	3-M1t	0.87	0.84	1.21	1.21	1.97	1.48
3.74	3.74	58.90	1.28	1.46	3-M1t	0.90	0.86	1.25	1.25	1.99	1.49
3.90	3.90	58.95	1.32	1.51	7-M1t	0.93	0.88	1.29	1.29	2.01	1.51
4.04	4.04	58.99	1.35	1.55	7-M1t	0.95	0.90	1.33	1.33	2.03	1.52
4.18	4.18	59.03	1.38	1.59	7-M1t	0.98	0.93	1.37	1.37	2.04	1.53
4.33	4.33	59.07	1.41	1.63	7-M1t	1.00	0.95	1.40	1.40	2.06	1.54
4.48	4.48	59.11	1.44	1.67	7-M1t	1.03	0.97	1.44	1.44	2.07	1.55

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 19+522
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

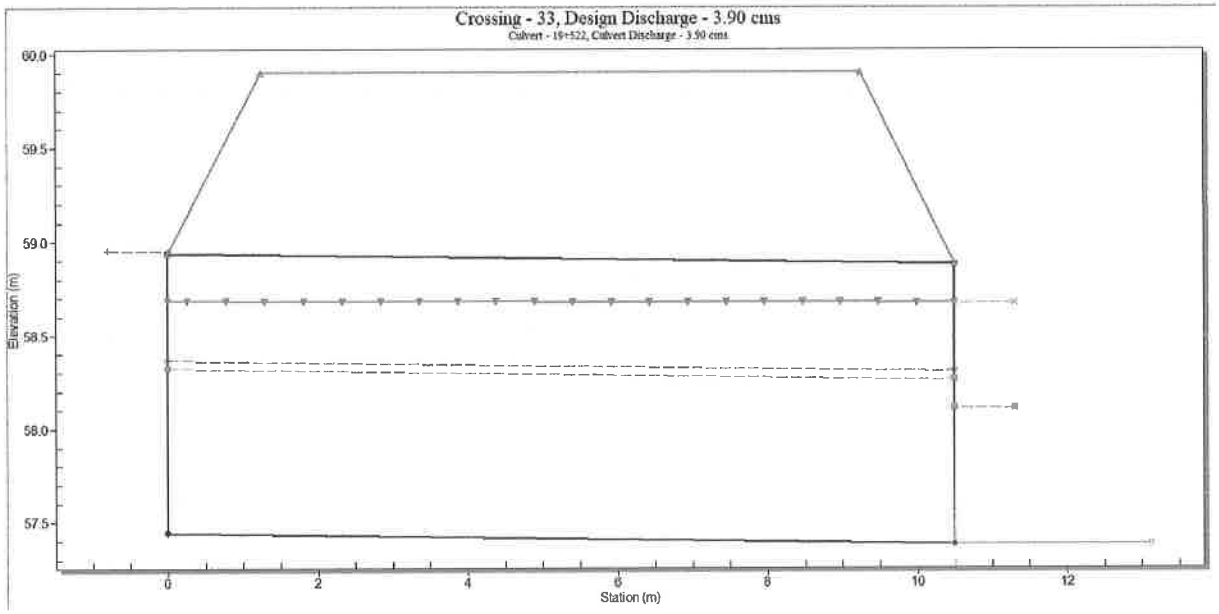
Geometry

Inlet Elevation:	57.44 m
Outlet Elevation:	57.38 m
Culvert Length:	10.50 m
Culvert Slope:	0.0057
Culvert Rise:	1.50 m
Inlet Throat:	57.43 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



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Representante Legal

Ing. Carlos Beltramin
Representante Legal

Crossing Properties

Name: 34

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	3.000	cms
Design Flow	3.600	cms
Maximum Flow	4.130	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	2.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	58.240	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	60.300	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

20+025

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	20+025	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	2500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	58.300	m
Outlet Station	11.500	m
Outlet Elevation	58.240	m
Number of Barrels	2	
Computed Culvert ...	0.005217	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
3.00	3.00	59.32	0.91	**1.02**	7-M1t	0.71	0.61	0.85	0.85	1.76	1.41
3.11	3.11	59.35	0.93	**1.05**	7-M1t	0.73	0.63	0.88	0.88	1.78	1.42
3.23	3.23	59.38	0.96	**1.08**	7-M1t	0.75	0.64	0.90	0.90	1.79	1.43
3.34	3.34	59.41	0.98	**1.11**	7-M1t	0.77	0.66	0.92	0.92	1.81	1.45
3.45	3.45	59.43	1.00	**1.13**	7-M1t	0.79	0.67	0.94	0.94	1.83	1.46
3.60	3.60	59.47	1.03	**1.17**	7-M1t	0.81	0.69	0.97	0.97	1.85	1.48
3.68	3.68	59.48	1.05	**1.18**	7-M1t	0.83	0.70	0.99	0.99	1.86	1.49
3.79	3.79	59.53	1.07	**1.23**	4-FFf	0.85	0.72	1.00	1.01	1.90	1.50
3.90	3.90	59.57	1.09	**1.27**	4-FFf	0.87	0.73	1.00	1.03	1.95	1.51
4.02	4.02	59.61	1.11	**1.31**	4-FFf	0.89	0.74	1.00	1.06	2.01	1.52
4.13	4.13	59.65	1.13	**1.35**	4-FFf	0.91	0.76	1.00	1.08	2.06	1.53

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 20+025
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	58.30 m
Outlet Elevation:	58.24 m
Culvert Length:	11.50 m
Culvert Slope:	0.0052
Culvert Rise:	1.00 m
Inlet Throat:	58.29 m
Outlet Control:	Profiles

Plot

Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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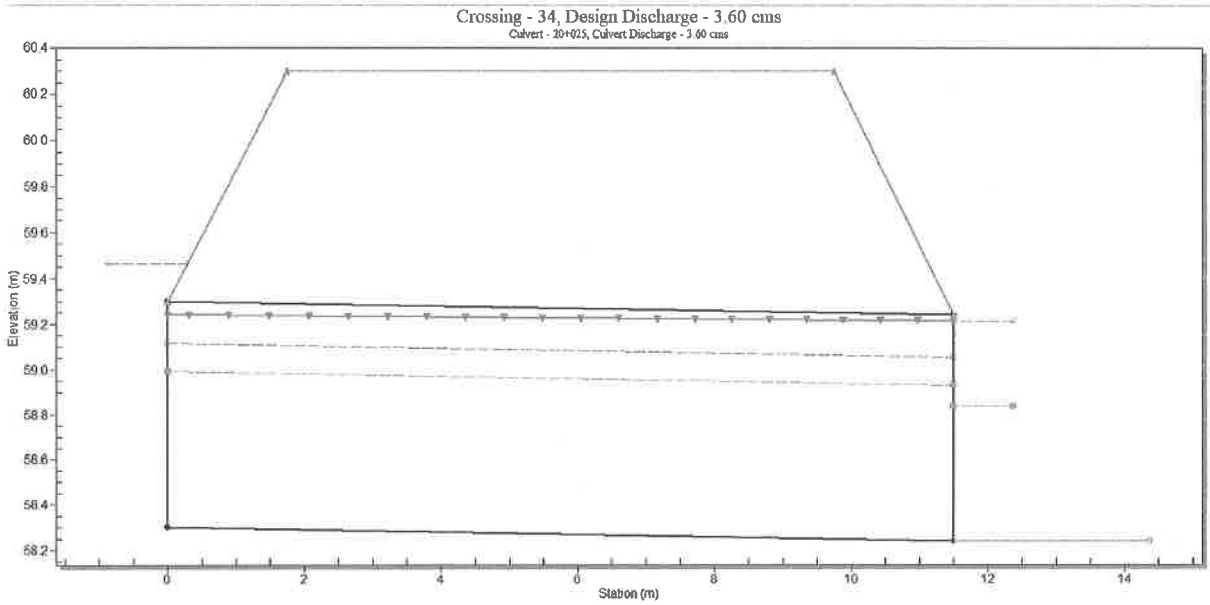
Representante Legal



Crossing Properties

Name: 35

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	9.000	cms
Design Flow	9.850	cms
Maximum Flow	11.300	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	5.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.830	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	60.400	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	20+025	
Shape	Concrete Box	
Material	Concrete	
Span	1500.000	mm
Rise	1500.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	4000.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.940	m
Outlet Station	10.400	m
Outlet Elevation	57.830	m
Number of Barrels	2	
Computed Culvert ...	0.010577	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Representante Legal

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
9.00	9.00	59.37	1.43	1.18	1-S2n	0.82	0.97	0.86	1.01	3.48	1.78
9.23	9.23	59.40	1.46	1.21	1-S2n	0.83	0.99	0.88	1.03	3.50	1.79
9.46	9.46	59.42	1.48	1.25	1-S2n	0.85	1.00	0.89	1.05	3.53	1.81
9.69	9.69	59.45	1.51	1.28	5-S2n	0.86	1.02	0.91	1.07	3.55	1.82
9.85	9.85	59.46	1.52	1.30	5-S2n	0.87	1.03	0.92	1.08	3.56	1.83
10.15	10.15	59.50	1.56	1.34	5-S2n	0.90	1.05	0.94	1.10	3.59	1.85
10.38	10.38	59.52	1.58	1.38	5-S2n	0.91	1.07	0.96	1.12	3.61	1.86
10.61	10.61	59.54	1.60	1.41	5-S2n	0.93	1.08	0.97	1.13	3.63	1.87
10.84	10.84	59.57	1.63	1.44	5-S2n	0.94	1.10	0.99	1.15	3.65	1.88
11.07	11.07	59.59	1.65	1.48	5-S2n	0.96	1.12	1.00	1.17	3.67	1.90
11.30	11.30	59.62	1.68	1.51	5-S2n	0.97	1.13	1.02	1.18	3.69	1.91

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 20+968
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

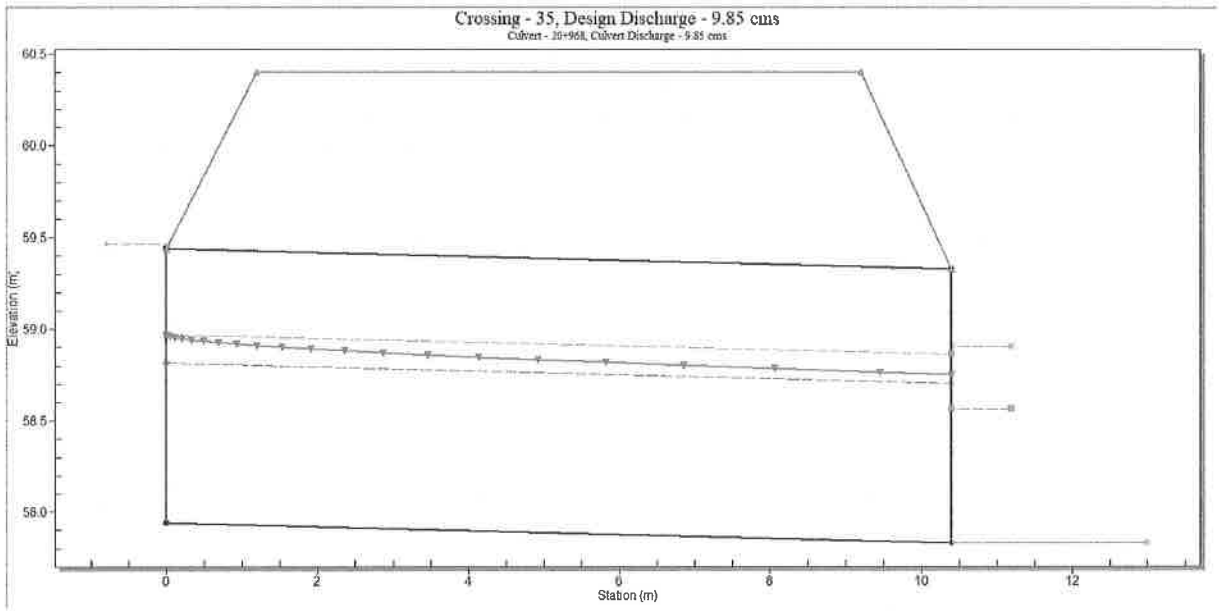
Geometry

Inlet Elevation:	57.94 m
Outlet Elevation:	57.83 m
Culvert Length:	10.40 m
Culvert Slope:	0.0106
Culvert Rise:	1.50 m
Inlet Throat:	57.92 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | ACP... | Low Flow... | Export Report | MS Word (*.docx) | Close



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Ing. Carlos Beltramino
Representante Legal

Crossing Properties

Name: 36 y 37

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.000	cms
Design Flow	6.090	cms
Maximum Flow	6.990	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	5.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	58.580	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	60.600	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

21+493
21+866

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	21+493	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	1500.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	58.690	m
Outlet Station	11.000	m
Outlet Elevation	58.580	m
Number of Barrels	1	
Computed Culvert ...	0.010000	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.00	1.67	59.66	**0.97**	0.79	1-S2n	0.59	0.66	0.60	0.68	2.77	1.46
5.20	1.73	59.69	**1.00**	0.82	1-S2n	0.61	0.67	0.62	0.70	2.80	1.48
5.40	1.80	59.71	**1.02**	0.86	5-S2n	0.63	0.69	0.64	0.72	2.82	1.50
5.60	1.87	59.74	**1.05**	0.89	5-S2n	0.65	0.71	0.65	0.74	2.85	1.52
5.80	1.93	59.77	**1.08**	0.93	5-S2n	0.67	0.72	0.67	0.75	2.87	1.54
6.09	2.03	59.80	**1.11**	0.99	5-S2n	0.69	0.75	0.70	0.78	2.91	1.56
6.19	2.06	59.82	**1.13**	1.01	5-S2n	0.70	0.76	0.71	0.79	2.92	1.57
6.39	2.13	59.84	**1.15**	1.04	5-S2n	0.72	0.77	0.72	0.81	2.94	1.59
6.59	2.20	59.87	**1.18**	1.08	5-S2n	0.74	0.79	0.74	0.82	2.96	1.60
6.79	2.26	59.89	**1.20**	1.12	5-S2n	0.75	0.81	0.76	0.84	2.98	1.62
6.99	2.33	59.92	**1.23**	1.16	5-S2n	0.77	0.82	0.78	0.85	3.00	1.64

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 21+493
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	58.69 m
Outlet Elevation:	58.58 m
Culvert Length:	11.00 m
Culvert Slope:	0.0100
Culvert Rise:	1.00 m
Inlet Throat:	58.68 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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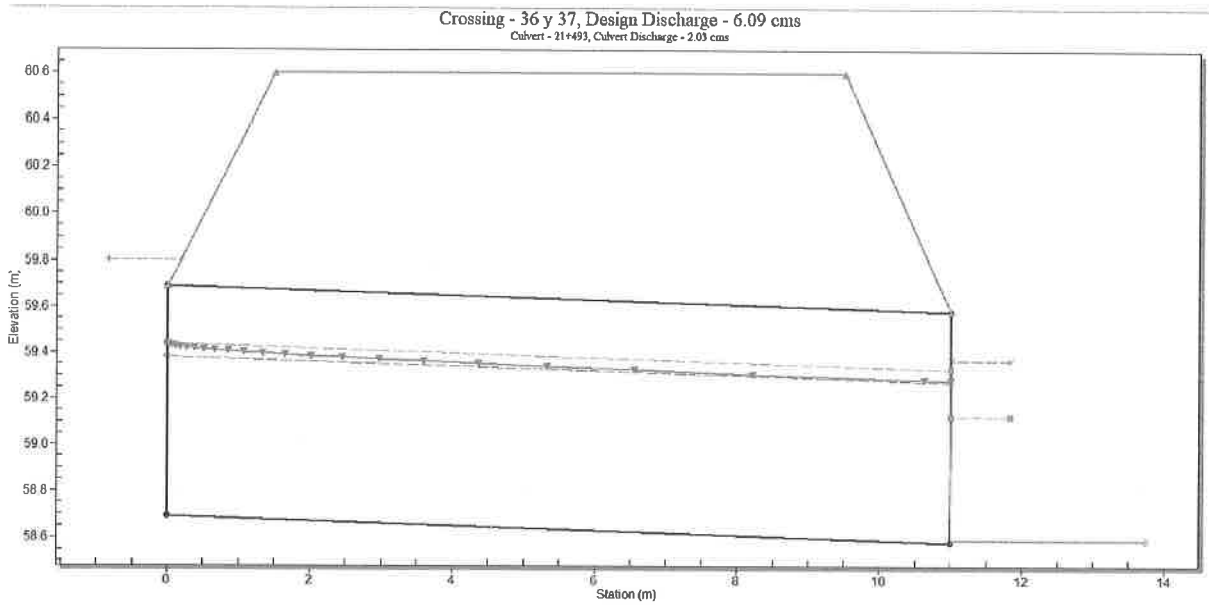
Representante Legal



Crossing Properties

Name: 36 y 37

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.000	cms
Design Flow	6.090	cms
Maximum Flow	6.990	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	5.000	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	58.580	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	60.600	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

21+493

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	21+493	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	mm
Rise	1000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	3000.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	58.700	m
Outlet Station	10.500	m
Outlet Elevation	58.590	m
Number of Barrels	2	
Computed Culvert ...	0.010476	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.00	1.67	59.66	**0.97**	0.79	1-S2n	0.59	0.66	0.60	0.68	2.77	1.46
5.20	1.73	59.69	**1.00**	0.82	1-S2n	0.61	0.67	0.62	0.70	2.80	1.48
5.40	1.80	59.71	**1.02**	0.86	5-S2n	0.63	0.69	0.64	0.72	2.82	1.50
5.60	1.87	59.74	**1.05**	0.89	5-S2n	0.65	0.71	0.65	0.74	2.85	1.52
5.80	1.93	59.77	**1.08**	0.93	5-S2n	0.67	0.72	0.67	0.75	2.87	1.54
6.09	2.03	**59.80**	**1.11**	0.99	5-S2n	0.69	0.75	0.70	0.78	2.91	1.56
6.19	2.06	59.82	**1.13**	1.01	5-S2n	0.70	0.76	0.71	0.79	2.92	1.57
6.39	2.13	59.84	**1.15**	1.04	5-S2n	0.72	0.77	**0.72**	0.81	2.94	1.59
6.59	2.20	59.87	**1.18**	1.08	5-S2n	0.74	**0.79**	0.74	0.82	2.96	1.60
6.79	**2.26**	59.89	**1.20**	1.12	5-S2n	0.75	0.81	0.76	0.84	2.98	**1.62**
6.99	2.33	59.92	**1.23**	1.16	5-S2n	**0.77**	0.82	0.78	0.85	3.00	1.64

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 21+493
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

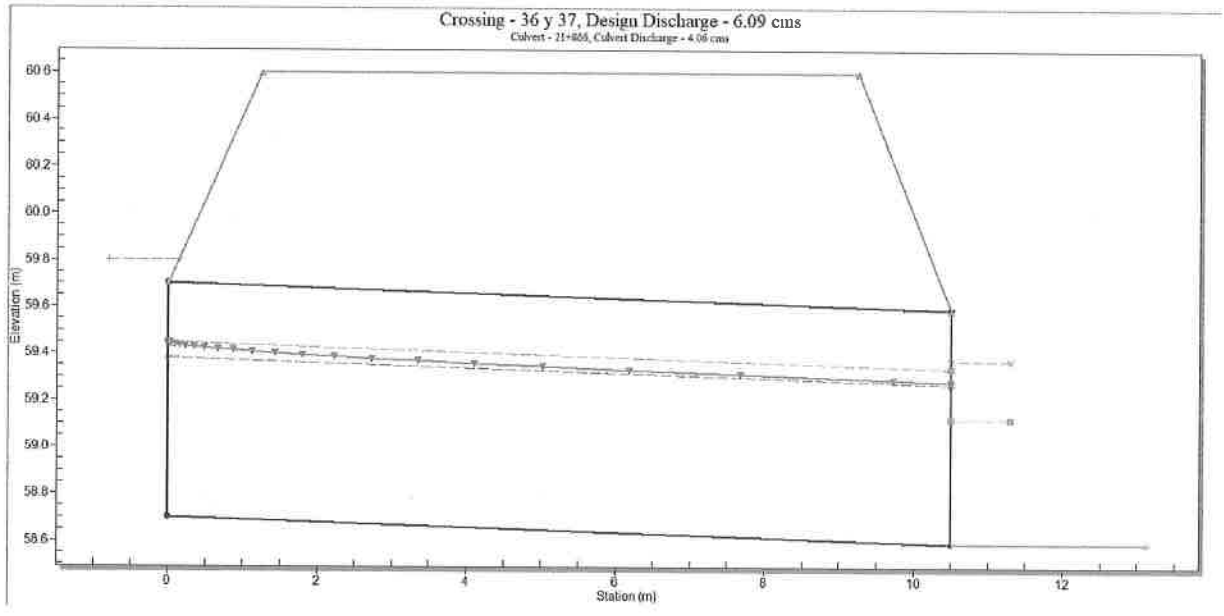
Geometry

Inlet Elevation:	58.69 m
Outlet Elevation:	58.58 m
Culvert Length:	11.00 m
Culvert Slope:	0.0100
Culvert Rise:	1.00 m
Inlet Throat:	58.68 m
Outlet Control:	Profiles

Plot

- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close



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Ing. Carlos Beltrami

Crossing Properties

Name: 41

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	13.000	cms
Design Flow	14.720	cms
Maximum Flow	16.890	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	4.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	57.800	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	60.800	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

23+705

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	23+705	
Shape	Concrete Box	
Material	Concrete	
Span	2000.000	mm
Rise	2000.000	mm
Embedment D...	0.000	mm
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inlet ...	Beveled Edge Top (26-45°) Wingwal (Ke...	
Face Width	3000.000	mm
Side Taper (4:1 to ...	4.000	:1
Inlet Depression?	No	
SITE DATA		
Site Data Input Op...	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	57.880	m
Outlet Station	15.500	m
Outlet Elevation	57.800	m
Number of Barrels	2	
Computed Culvert ...	0.005161	m/m

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
13.00	13.00	59.59	1.54	**1.71**	3-M1t	1.06	1.02	1.43	1.43	2.27	2.02
13.39	13.39	59.63	1.57	**1.75**	3-M1t	1.08	1.05	1.46	1.46	2.29	2.04
13.78	13.78	59.66	1.60	**1.78**	3-M1t	1.10	1.07	1.49	1.49	2.31	2.05
14.17	14.17	59.70	1.63	**1.82**	3-M1t	1.13	1.09	1.52	1.52	2.33	2.07
14.72	14.72	59.75	1.67	**1.87**	3-M1t	1.16	1.11	1.56	1.56	2.36	2.09
14.94	14.94	59.77	1.69	**1.89**	3-M1t	1.17	1.12	1.58	1.58	2.37	2.10
15.33	15.33	59.80	1.72	**1.92**	3-M1t	1.20	1.14	1.61	1.61	2.38	2.12
15.72	15.72	59.84	1.75	**1.96**	3-M1t	1.22	1.16	1.64	1.64	2.40	2.13
16.11	16.11	59.87	1.78	**1.99**	3-M1t	1.24	1.18	1.67	1.67	2.42	2.15
16.50	16.50	59.90	1.81	**2.02**	7-M1t	1.27	1.20	1.70	1.70	2.43	2.16
16.89	16.89	59.94	1.84	**2.06**	7-M1t	1.29	1.22	1.73	1.73	2.45	2.18

Display

- ○ Crossing Summary Table
- ◉ Culvert Summary Table — 23+705
- ○ Water Surface Profiles
- ○ Tapered Inlet Table
- ○ Customized Table — Options...

Geometry

Inlet Elevation:	57.88 m
Outlet Elevation:	57.80 m
Culvert Length:	15.50 m
Culvert Slope:	0.0052
Culvert Rise:	2.00 m
Inlet Throat:	57.89 m
Outlet Control:	Profiles

Plot

Crossing Rating Curve | Culvert Performance Curve | Selected Water Profile | Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | MS Word (*.docx) | Close

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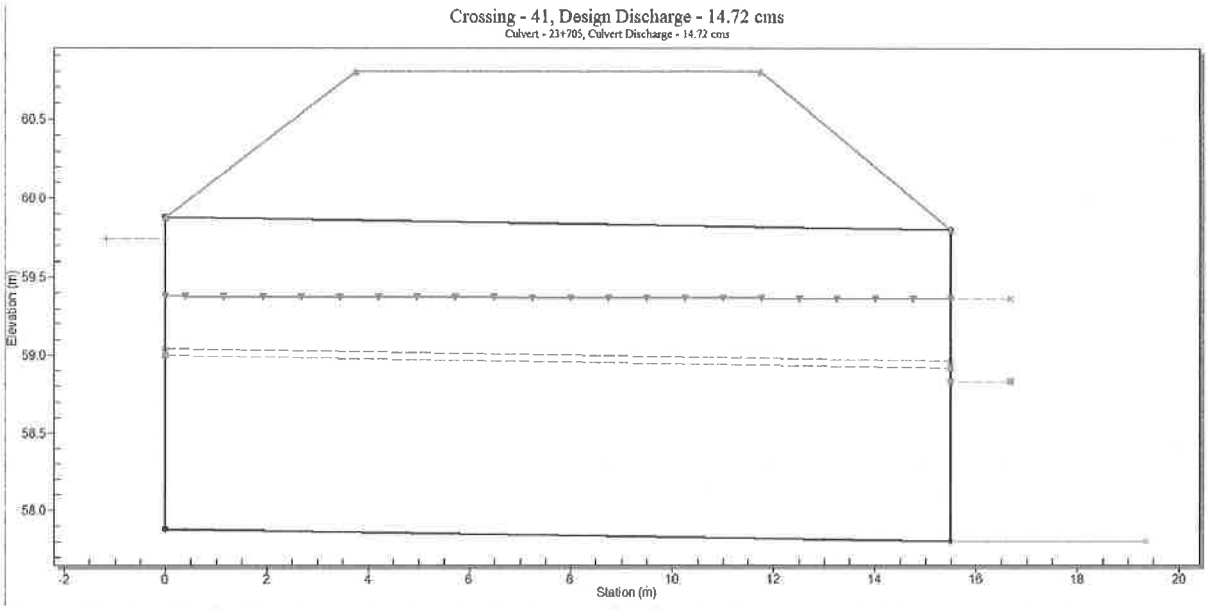

Crossing Data - ACS 1x1

Crossing Properties

Name: ACS 1x1

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	1.000	cms
Design Flow	2.530	cms
Maximum Flow	3.000	cms
TAILWATER DATA		
Channel Type	Rectangular Channel	
Bottom Width	2.500	m
Channel Slope	0.0050	m/m
Manning's n (channel)	0.032	
Channel Invert Elevation	9.800	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	100.000	m
Crest Elevation	13.000	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	U
CULVERT D...		
Name	Project	
Shape	Concrete Box	
Material	Concrete	
Span	1000.000	m
Rise	1000.000	m
Embedment ...	0.000	m
Manning's n	0.015	
Culvert Type	Side-Tapered	
Tapered Inl...	Beveled Edge Top (26-45°) Wingwall (Ke...	
Face Width	2500.000	m
Side Taper (4:1 to...	4.000	
Inlet Depres...	No	
SITE DATA		
Site Data Input Opt...	Culvert Invert Data	

Help | Click on any icon for help on a specific | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

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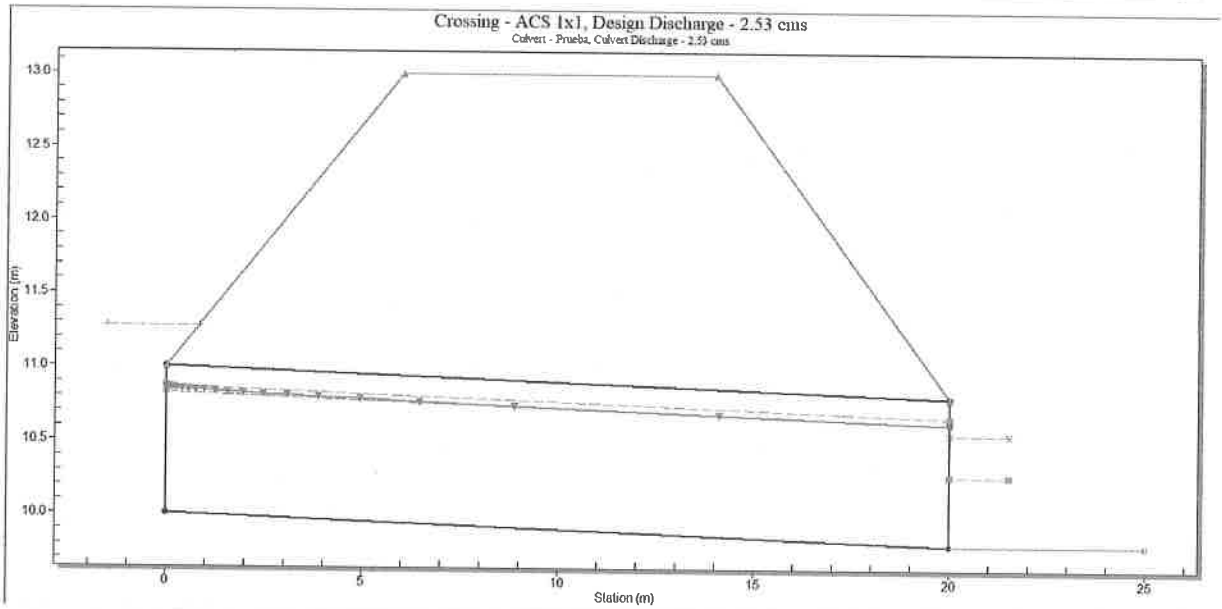
Culvert Summary Table - Prueba

Total Discharge	Culvert Discharge	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1.00	1.00	10.67	**0.67**	0.36	1-S2n	0.41	0.47	0.41	0.40	2.45	1.00
1.20	1.20	10.76	**0.76**	0.46	1-S2n	0.46	0.53	0.47	0.45	2.57	1.06
1.40	1.40	10.84	**0.84**	0.56	1-S2n	0.52	0.58	0.52	0.50	2.67	1.11
1.60	1.60	10.93	**0.93**	0.67	1-S2n	0.58	0.64	0.58	0.55	2.76	1.16
1.80	1.80	11.01	**1.01**	0.78	5-S2n	0.63	0.69	0.63	0.60	2.84	1.21
2.00	2.00	11.08	**1.08**	0.90	5-S2n	0.68	0.74	0.69	0.64	2.91	1.25
2.20	2.20	11.16	**1.16**	1.13	5-S2n	0.74	0.79	0.74	0.69	2.97	1.28
2.40	2.40	11.23	**1.23**	0.53	5-S2n	0.79	0.84	0.79	0.73	3.03	1.32
2.53	2.53	11.28	**1.28**	0.56	5-S2n	0.82	0.87	0.82	0.76	3.07	1.34
2.80	2.80	11.38	**1.38**	0.61	5-S2n	0.89	0.93	0.90	0.81	3.12	1.38
3.00	3.00	11.46	**1.46**	0.65	5-S2n	0.95	0.97	0.95	0.85	3.17	1.41



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c. Sara M. Blanco de Dose
Representante Legal

Ing. Carlos Beltramin
Representante Legal