

**ÁREA DE INFRAESTRUCTURA HIDRÁULICA**

CLAVE:

TIPO:  <b>ESTUDIO</b>	REF. CRONOLÓGICA:  <b>05/02</b>
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CLASE:

**ANTEPROYECTO**

TÍTULO BÁSICO:

**ANTEPROYECTO DE DEFENSA DEL RÍO ARAGÓN  
EN CANFRANC PUEBLO (HUESCA)**

PROVINCIA: **HUESCA**

TÉRMINO MUNICIPAL: **CANFRANC**

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ANTEPROYECTO DE DEFENSA DEL RÍO ARAGÓN  
EN CANFRANC PUEBLO (HUESCA)

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## 1.- CONSIDERACIONES GENERALES

Los pasos seguidos en el presente anejo pueden resumirse en lo siguiente:

- Cálculo hidráulico de la situación actual, para conocer la problemática existente para caudales correspondientes a diferentes periodos de retorno.
- Estudio de posibles alternativas.
- Cálculos hidráulicos de la solución adoptada.

Los cálculos hidráulicos se han realizado mediante el programa HEC-RAS del Soil Conservation Service de los EE.UU. que utiliza la ecuación de la energía para calcular los caudales, velocidades y demás parámetros hidráulicos, en modo estacionario, para un cauce de geometría variable.

A partir de la topografía existente a escala 1:500 se han elaborado 35 perfiles transversales, aunque la zona de actuación comprende los perfiles 7 a 35.

Este cálculo se ha realizado con los caudales, calculados en el estudio hidrológico, correspondientes a las avenidas de 2, 5, 10, 25, 50, 100, 250 y 500 años.

## 2.- ESTADO ACTUAL

En una primera aproximación se ha considerado el estado actual del río Aragón para lo cual, y dada la gran cantidad de vegetación existente, se ha dividido la sección en tres canales, con coeficientes de rugosidad Manning independientes:

Canal	Coefficiente de Manning
Derecho	0,15
Principal	0,05
Izquierdo	0,15

Los valores del coeficiente de Manning se han tomado en base a lo expuesto en el libro Hidráulica de Canales Abiertos de Ven Te Chow publicado por Mc Graw Hill.

Este cálculo proporciona una buena estimación del riesgo de inundación bajo el que se encuentra, actualmente, la población de Canfranc.

En el anejo nº 2 figuran los resultados obtenidos, comparados con la cota de la actual calle – camino. Los resultados por tramos se pueden resumir en lo siguiente:

- Perfiles 1 a 16.- No se afecta al camino.
- Perfiles 17 a 25.- Se afecta al camino para periodos de retorno entre 20 años (P-21) y 40 años (P-19, 20 y 23).El resto no se afecta para  $T > 100$  años.
- Perfiles 26 a 33.- el camino en los perfiles 29 a 32 inclusive se ve afectado por caudales de periodo de retorno inferior a 10 años.

Generalizando estos resultados, a fin de tener un orden de magnitud representativo y, dado a su vez, que el régimen hidráulico del río conlleva una cierta imprecisión, tenemos:

- La zona situada más aguas arriba, próxima a la Estación de Aforos, se ve afectada para caudales de periodo de retorno de 10 años.
- La zona central del estudio, entorno de la iglesia se ve afectada para caudales de periodo de retorno de 25 años.
- Es de destacar las elevadas velocidades del agua en el tramo estudiado.

### 3.- ESTUDIO DE ALTERNATIVAS

#### 3.1.- LIMPIEZA DE CAUCE

En primer lugar se realiza un cálculo en la hipótesis de que tan sólo se realice una limpieza de la vegetación existente en el cauce, adoptando un coeficiente de Manning uniforme de 0,05 en toda la sección.

Bajo esta hipótesis, el riesgo de inundación se reduce ya que, como orden de magnitud, se pasa de un valor medio en los perfiles de 45 años a 145 años.

No obstante siguen quedando perfiles inundables para periodos muy bajos.

- Perfiles 17 a 26. Existen cuatro perfiles afectados por avenidas inferiores a 50 años. En el resto es superior a 90 años.
- Perfiles 27 a 33. Existen dos perfiles afectados por avenidas inferiores a 20 años.
- Lógicamente siguen existiendo velocidades importantes en el tramo.

A la vista de la forma del cauce, se ha estudiado la ampliación del mismo, mediante una pequeña excavación en la margen izquierda.

Nuevamente se produce una disminución del riesgo de inundación ya que, como orden de magnitud, el valor medio en los perfiles pasa a ser de 185 años.

No obstante en el tramo P-17 a P-26 sigue quedando un perfil a cota inferior al caudal de 100 años, y en el tramo P-27 a P-33 quedan cuatro perfiles a cota inferior al caudal de 25 años.

### 3.2.- CONCLUSIONES PREVIAS

Generalizando los resultados obtenidos, con objeto de disponer de un orden de magnitud representativo, tenemos lo siguiente:

TRAMO	Periodo de retorno representativo del caudal cuyo nivel supera al camino - calle		
	Actual	Limpieza cauce	Limpieza y ampliación
P-6 a P-16	500	500	500
P-17 a P-25	25	50	100
P-26 a P-33	10	20	20

A la vista de los cálculos efectuados pueden concluirse:

Es posible reducir el calado del agua en avenidas mediante la limpieza del cauce y realizando una pequeña ampliación del mismo en la margen izquierda.

Para que el nivel de agua con caudales de periodo de retorno de 100 – 500 años no alcance el camino – calle se requerirían obras importantes en el tramo situado más aguas arriba. Hay que señalar que, probablemente, el puente situado inmediatamente aguas arriba no sea capaz de desaguar esos caudales sin entrar en carga.

Las obras que esto conlleva supondrían un importante cambio morfológico y un significativo impacto paisajístico en la zona, además de un elevado coste económico.

Sin embargo, elevando la cota de coronación del muro, a modo de barandilla opaca puede aumentarse la capacidad del río sin inundar la calle.

En este caso, debería estudiarse detenidamente la evacuación de las aguas pluviales urbanas hacia el río Aragón instalando, en su caso, clapetas.

Es de destacar la elevada velocidad del agua en el tramo, lo que debe tenerse en cuenta mediante un estudio de la socavación.



### 3.3.- REVESTIMIENTO DEL CAUCE

#### 3.3.1.- Consideraciones generales

Una alternativa es realizar un revestimiento completo del cauce.

Éste puede realizarse, normalmente, con hormigón o escollera, ya sea suelta o tomada con hormigón para aumentar su rigidez.

Las soluciones basadas en el hormigón conllevan dificultades constructivas, ya que el río Aragón a su paso por Canfranc lleva agua durante todo el año. Además uno de los objetivos de la obra es que quede integrada en el entorno y cause un impacto ambiental pequeño tanto una vez terminada como durante la construcción, en la que habría que hacer desvíos del río.

Esta solución no evita construir un nuevo muro junto a la población de Canfranc, por lo que resultaría la solución más cara.

A continuación se estudia la solución de recubrir el fondo del cauce mediante un manto de escollera suelta.

#### 3.3.2.- Cálculo de la escollera

De los cálculos hidráulicos se obtiene que el régimen de circulación del agua a su paso por Canfranc, para la avenida de 500 años, es rápido, número de Froude mayor que 1, por lo que no resulta de aplicación la normativa sobre *Control de la Erosión Fluvial en Puentes* publicada por el Ministerio de Obras Públicas y Transportes en 1988.

Desestimado este procedimiento para el cálculo de la escollera en el fondo se ha buscado un método, que permitiese el cálculo de dicho recubrimiento. Finalmente se ha optado por utilizar el método para el cálculo de estabilidad en canales abiertos sin revestir publicado en el *Hydraulic Engineering Circular n° 11* y publicado por la Federal Highway Administration del gobierno de EE.UU. en el manual del programa Hydrain en Marzo de 1999.

El método fue propuesto para el diseño de canales y basa el cálculo en la teoría de la fuerza tractiva. Esta teoría sostiene que el agua circulando por un canal ejerce una fuerza tractiva sobre las partículas del mismo, la cual a su vez es función de la geometría del canal, de las características de las partículas, de la velocidad de circulación y del calado máximo en el canal. Al tener en cuenta, de forma independiente, la velocidad de circulación y el calado máximo se hace posible el cálculo en régimen rápido mientras que otros métodos o bien se limitan a presuponer un régimen de circulación lento o bien trabajan con el régimen normal.

Para la estimación de la geometría se ha procedido a aproximar el cauce por secciones regulares estandarizadas, en este caso se ha optado por secciones trapezoidales (Trapezoidal or V-Shaped) o por secciones triangulares con el fondo redondeado (V-Shaped with Rounded Bottom), según sea la sección estudiada.

Los datos relativos a la sección necesarios para la aplicación del método son:

a) Sección triangular o trapezoidal:

$n$ : número de rugosidad de Manning que se ha tomado constante y de valor 0,035.

$B$ : ancho del fondo del canal en metros.

$z_1$ : pendiente lateral izquierdo expresada como  $H/V$ .

$z_2$ : pendiente lateral izquierdo expresada como  $H/V$ .

b) Sección triangular con fondo redondeado:

$n$ : número de rugosidad de Manning que se ha tomado constante y de valor 0,035.

$B$ : ancho máximo de la parte redondeada del canal en metros.

$h1$ : altura máxima de la parte redondeada del canal en metros.

$z1$ : pendiente lateral izquierdo de la parte recta expresada como H/V.

$z2$ : pendiente lateral izquierdo de la parte recta expresada como H/V.

Los datos relativos al caudal circulante por la sección para la aplicación del método son:

$Y_n$ : Calado máximo en la sección en metros.

$v$ : Velocidad de circulación en m/s.

Los datos relativos a la escollera requeridos para la aplicación del método son:

$\gamma$ : Peso específico del material en Tm/m<sup>3</sup>.

$\alpha$ : Ángulo de rozamiento interno de la superficie. Éste viene limitado, para partículas de diámetro superior a 5cm, inferiormente por 39° para material muy redondeado y superiormente por 41° para material muy anguloso.

Además hace falta un factor de estabilidad  $SF$  que proporciona el coeficiente de seguridad en el cálculo de la escollera.

Con estos datos se procede a calcular la fuerza tractiva por unidad de superficie en el fondo como:

$$\tau_c = \gamma * Y_n * S_f = \gamma * Y_n * \frac{v^2 * n^2}{0.455 * R_h^{4/3}} \quad (\text{donde } R_h \text{ es el radio hidráulico en metros)}$$

ya y la fuerza estabilizante de la escollera como:

$$\tau_p = F_* * (\gamma_s - 1) * D_{50} = \begin{pmatrix} 0,047 \\ 0,5 \end{pmatrix} * (\gamma_s - 1) * D_{50}$$

el valor 0,047 se toma cuando el número de Reynolds es inferior o igual a 100.000 y 0,15 cuando el número de Reynolds es superior a dicho valor, y  $D_{50}$  es el valor del diámetro medio de la escollera (en metros).

El factor de estabilidad se deduce de la razón entre ambas magnitudes anteriores:  $SF = \tau_p / \tau_c$ .

De todas las relaciones anteriores se deduce que el diámetro característico o medio de la escollera puede calcularse como:

$$D_{50} = \frac{SF * Y_n * v^2 * h^2}{F_* * (\gamma_s - 1) * 0,455 * R_h^{4/3}}$$

Para el cálculo de la escollera en los laterales inclinados hay que tener en cuenta dicha inclinación que influye tanto en la fuerza tractiva como en la fuerza estabilizante.

El parámetro de influencia en la fuerza estabilizante viene dado por el factor  $K_2$  que multiplica a  $\tau_p$  y toma el valor:

$$K_2 = \sqrt{1 - \frac{\sin(\Gamma)^2}{\sin(\alpha)^2}} \quad (\text{donde } \Gamma \text{ es el ángulo de inclinación del talud con la}$$

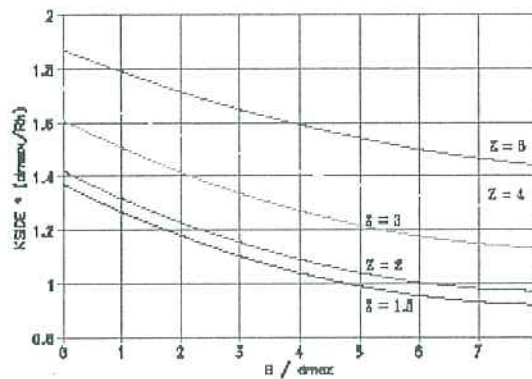
horizontal y  $\alpha$  es el ángulo de rozamiento interno de la escollera)

La influencia de la inclinación en la fuerza tractiva viene dada por el factor  $K_{SIDE}$  que multiplica al valor de fuerza tractiva calculado para la solera, y toma los siguientes valores:

- Canal parabólico:  $K_{SIDE} = 1$
- Canal triangular con fondo redondeado:  $K_{SIDE} = 1$
- Canal triangular: toma el valor de la siguiente gráfica.



- Canal trapezoidal: toma el valor de la siguiente gráfica.



El cálculo de la escollera se ha realizado para una serie de perfiles que abarcan todo el rango de velocidades que se obtienen en el cálculo hidráulico y ha sido realizado mediante un programa de elaboración propia que aplica la metodología anteriormente expuesta.

Para el diseño de una granulometría en la escollera, en función de el diámetro medio, se han utilizado los coeficientes para la granulometría propuestos en la Monografía del CEDEX *Control de la Erosión Fluvial* dirigida por J. A. Hinojosa y escrita por J. R. Temez.

En este trabajo se proponen unos coeficientes para los distintos diámetros en base al diámetro medio y son los de la tabla siguiente:

% Pasa	Dmín	Dmáx
100	1,2599*D <sub>50</sub>	1,7100*D <sub>50</sub>
90	1,2164*D <sub>50</sub>	1,6386*D <sub>50</sub>
80	1,1696*D <sub>50</sub>	1,5605*D <sub>50</sub>
70	1,1187*D <sub>50</sub>	1,4736*D <sub>50</sub>
60	1,0627*D <sub>50</sub>	1,3751*D <sub>50</sub>
50	1,0000*D <sub>50</sub>	1,2599*D <sub>50</sub>
40	0,9407*D <sub>50</sub>	1,2051*D <sub>50</sub>
30	0,8729*D <sub>50</sub>	1,1447*D <sub>50</sub>
20	0,7924*D <sub>50</sub>	1,0772*D <sub>50</sub>
10	0,6934*D <sub>50</sub>	1,0000*D <sub>50</sub>
0	0,6934*D <sub>50</sub>	1,0000*D <sub>50</sub>

De los resultados observados se tomará, por criterios constructivos, una escollera uniforme para todo el tramo a proteger. En este caso se opta por la escollera obtenida para la sección 26. Esto hace que la granulometría de escollera a disponer varíe su tamaño mínimo entre un radio equivalente de 4,26 m y uno de 2,57 m obteniéndose un radio medio de 3,71 m, lo que hace inviable esta solución

### 3.4.- ESCALONAMIENTO DEL CAUCE

La siguiente solución propuesta consiste en frenar el agua mediante la creación de secciones de control en el cauce.

Estas secciones deben contar con la característica de garantizar que aguas arriba de ellas el régimen de circulación del agua es lento ( $Froude > 1$ ) por lo que el cauce una vez escalonado deberá de constar de tramos con pendientes constantes e inferiores a la pendiente crítica y de saltos de forma que al final la pendiente media sea aproximadamente la natural (en torno al 2%).

Para la estimación de la longitud de estos tramos se ha procedido a calcular, con diferentes pendientes comprendidas entre 0,5% y 0,75% ya que pendientes mayores resultaban críticas o supercríticas, las longitudes necesarias para que se produzca el siguiente cambio de regímenes:

- Aguas arriba de la sección el agua viene en régimen rápido y con el calado estacionario correspondiente a este régimen, por lo que se deberá producir un resalto hidráulico de forma que el agua alcance el calado estacionario para régimen lento.
- Una vez obtenido el régimen lento deberá haber espacio suficiente para que se alcance un crítico en la sección de vertido, por lo que se calcula la longitud de estabilización en la curva de remanso correspondiente, esta longitud viene dada por la integración de la ecuación diferencial:

$$\frac{dh}{dx} = \frac{S_0 - S_f}{1 - Fr^2}$$
 donde  $h$  es el calado en la sección en m,  $S_0$  es la pendiente del canal,  $S_f$  es la pendiente motriz calculada según la fórmula de Manning y  $Fr$  es el número de Froude de la sección.

Esta estimación de longitud da como resultado longitudes del orden de 300 metros por lo que en los 812m estudiados solo cabrían dos saltos y por lo tanto la altura de salto en cada uno de ellos sería del orden de 8m lo que hace que la solución no sea viable.

### **3.5.- LIMPIEZA Y AMPLIACIÓN DE CAUCE Y NUEVO MURO**

Fundamentalmente se estudia una solución consistente en la limpieza del cauce de toda la vegetación existente y la construcción de un muro nuevo.

Las cotas superiores del muro vienen condicionadas por la del camino – calle existente en la margen derecha y, lógicamente, la lámina de agua.

Se deben buscar soluciones que disminuyan los calados respecto a la situación actual.

Por otro lado, estos cálculos no deben superar de forma significativa los obtenidos en las hipótesis de limpieza de cauce y la pequeña excavación de la margen izquierda, considerando como la solución que mejores resultados obtiene sin modificar sustancialmente la morfología de la zona.

Las soluciones a analizar son las siguientes:

- Realizando una limpieza de la vegetación existente, sin ampliar la margen izquierda, construyendo un nuevo muro en la margen derecha.
- Eliminar la vegetación existente, realizar la ampliación de la margen izquierda y construir un muro en la margen derecha.
- Solución igual a la anterior, pero excavando también la pequeña isla situada en el cauce.

Esta solución será la desarrollada en los cálculos posteriores y en el anteproyecto ya que cuenta con la ventaja de ser económicamente más aceptable y además respeta el cauce lo máximo posible consiguiéndose de esta forma un menor impacto ambiental

#### **4.- CÁLCULOS DE LA SOLUCIÓN PROPUESTA**

##### **4.1.- ESTUDIO DE NIVELES**

En este apartado se desarrollan los cálculos de las alternativas indicadas en el anterior epígrafe. En todos los casos se adopta un coeficiente de Manning de 0,05 en toda la sección.



Estas alternativas, cuyos resultados figuran en el apéndice n° 4, son las siguientes:

- Limpieza de vegetación y muro
- Limpieza de vegetación, ampliación de cauce y muro
- Limpieza de vegetación, ampliación de cauce, eliminación de isla y muro

La tercera es la que mayor sección hidráulica proporciona y en general, la que obtiene calados inferiores, por lo que es la que se adopta.

Se realiza un estudio comparativo, mediante la elaboración de perfiles longitudinales entre tres alternativas:

- Alternativa propuesta
- Situación actual
- Situación actual, limpiando la vegetación

Se observa (apéndice n° 5) que, en general, el nivel de agua es inferior en las dos alternativas, comparando con la situación actual, mientras que entre estas dos alternativas las diferencias son pequeñas.

Por tanto, cabe establecer las siguientes conclusiones:

- El estrechamiento que conlleva el muro propuesto, es pequeño y apenas tiene influencia en los calados del río.
- La alternativa propuesta produce un descenso de niveles de agua significativo.
- Para conseguir uniformidad en el nivel de inundación para un periodo de retorno determinado, se deben realizar unos recrecimientos (barandilla opaca) en la calle.

Con todo ello se obtiene

TRAMO	PERIODO DE RETORNO DEL NIVEL DE AGUA
P-6 a P-16	500
P-17 a P-25	100
P-25 a P-33	50

En el apéndice n° 6 se incluye una tabla con los resultados obtenidos, y su comparación con la cota del muro propuesto, así como la representación gráfica de los perfiles transversales.

#### 4.2.- ESTUDIO DE LA SOCAVACIÓN

Aun siendo conscientes de que el método propuesto en la publicación “Control de la erosión fluvial en puentes” no sería, en teoría, de aplicación a nuestro caso ya que el régimen hidráulico es en la mayor parte supracrítico, se van a aplicar las fórmulas para buscar una alternativa razonable.

La fórmula empleada corresponde al apartado 5.4 “Tamaño de los bloques de escollera”, que se encuentra desarrollada en la hoja de cálculo adjunta en el anejo n° 7.

En cada perfil se ha calculado, para los diferentes caudales, el diámetro representativo de la esfera equivalente, obteniendo los valores máximo, medio y mínimo, así como los percentiles 80, 60, 50, 40 y 20.

Si adoptamos un diámetro de 0,80 m, estaríamos cumpliendo lo siguiente:

Valores medios de los perfiles para  $T = 85$  años

Percentil 80 para  $T = 28$  años

Percentil 60 para  $T = 69$  años

Percentil 50 para  $T > 100$  años

Para el cumplimiento de las condiciones de socavación en todos los perfiles, para  $T = 500$  años se requeriría un diámetro de 1,91 m y para  $T = 100$  años de 1,50 m.

El diseño de los muros de defensa es con un talón relleno de tierra sobre el que irá el futuro vial. Tanto el muro como el relleno tienen una masa que comprimirá el material sobre el que apoya dicho muro.

Por ello, podría adoptarse como solución los diámetros de la esfera equivalente de 0,80 y espesor mínimo de 2 veces dicho diámetro, es decir, 1,60 m.

Se adjunta en el apéndice nº 7 una tabla, con su correspondiente gráfico, en el que figura la curva granulométrica propuesta, adoptando como tipo el perfil 20 para un caudal de 435, 85 m<sup>3</sup>/s.

No obstante, como se ha indicado, podrían producirse descalces en diferentes secciones, en función del caudal (velocidad) con que circule el agua.

Al tratarse de unos muros, que en definitiva es una estructura de hormigón armado rígida, sería difícil que se lleve un bloque entero si se disponen juntas cada 7 m, aunque puede haber movimientos de giro hacia el cauce que habría que reponer una finalizada la avenida.

Se propone que sobre cada tongada de escollera se vierta hormigón, seco si está bajo el nivel freático, a fin de dar rigidez a la escollera.

Una mayor seguridad frente a la socavación se conseguiría mediante la ejecución de micropilotes de unos 7 m de profundidad, que atraviesan la capa de escollera, con la finalidad de realizar un “cosido” del apoyo del muro.

En cada bloque de muro, se podrían colocar dos filas de 5 micropilotes, de

manera que la separación, en la dirección del cauce, sería de 1,40 m.

En una primera aproximación, para 75 bloques de muro, el presupuesto sería el siguiente:

$$75 \times 10 \times 7 = 5.250 \text{ m de micropilotes}$$

Con un precio unitario de 72 euros/m, se obtiene:

- Presupuesto de Ejecución Material: 378.000,00 euros.
- Presupuesto de Ejecución por Contrato: 521.197,20 euros.

La necesidad o no de esta propuesta de micropilotes, entendemos que debería deducirse a partir de un ensayo en modelo reducido.

Por otro lado, el río Aragón en Canfranc lleva un caudal significativo durante todo el año, por lo que también resultaría de interés realizar uno o dos tramos de prueba “in situ”, para la ejecución de la escollera y el vertido de hormigón.

**APÉNDICE N° 1**

**PLANOS DE PLANTA**

**APÉNDICE N 2**

**RESULTADOS ESTADO ACTUAL**

Profile 1le - Stand le 1  
 HEC-Ragon Reach: 1

# Rivers 1  
 # Hydraulic Reaches = 1  
 # River Stations 35  
 # Plans 8  
 # Profiles 1

ESTADO ACTUAL

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude #	Chl (m)	Cota calle (m)	Diferencia (m)
1	35	Plan500 actu	750.69	42.38	49.35	49.35	51.86	0.0116	7.68	169.46	41.48	3.73		0.94		
1	35	Plan250	616.68	42.38	48.67	48.67	50.95	0.0118	7.23	142.02	38.91	3.34		0.94		
1	35	Plan100	521.15	42.38	48.07	48.07	50.18	0.0123	6.89	119.65	36.68	2.99		0.94		
1	35	Plan050	435.85	42.38	47.48	47.48	49.46	0.0132	6.6	99.38	30.12		3	0.95		
1	35	Plan025	354.58	42.38	46.88	46.88	48.68	0.014	6.24	81.88	28.34	2.66		0.96		
1	35	Plan010	260.57	42.38	46.09	46.09	47.65	0.0156	5.75	60.99	24.31	2.32		0.98		
1	35	Plan005	195.71	42.38	45.5	45.5	46.82	0.0166	5.25	47.69	21.42	2.06		0.98		
1	35	plan002	116.13	42.38	44.68	44.68	45.64	0.0186	4.45	31.15	18.53	1.58		0.98		
1	34	Plan500 actu	750.69	42.26	46.28	47.8	51.3	0.0455	10.36	98.9	36.11	2.62		1.7		
1	34	Plan250	616.68	42.26	45.83	47.21	50.41	0.0485	9.82	82.78	34.52	2.32		1.72		
1	34	Plan100	521.15	42.26	45.5	46.76	49.65	0.0501	9.31	71.62	32.45	2.14		1.72		
1	34	Plan050	435.85	42.26	45.17	46.35	48.93	0.0523	8.81	61.41	30.44	1.95		1.72		
1	34	Plan025	354.58	42.26	44.84	45.87	48.16	0.0546	8.25	51.75	28.41	1.77		1.72		
1	34	Plan010	260.57	42.26	44.44	45.27	47.13	0.0563	7.39	40.82	25.92	1.53		1.69		
1	34	Plan005	195.71	42.26	44.14	44.79	46.32	0.0568	6.63	33.22	24.03	1.35		1.65		
1	34	plan002	116.13	42.26	43.71	44.13	45.14	0.055	5.35	23.53	21.89	1.05		1.55		
1	33	Plan500 actu	750.69	42.1	45.74	47.11	50.32	0.0464	9.88	103.53	41.33	2.4		1.69	44.50	-1.24
1	33	Plan250	616.68	42.1	48.1	46.59	49.01	0.0049	4.54	204.45	43.6	4.18		0.6	44.50	-3.60
1	33	Plan100	521.15	42.1	45.14	46.19	48.56	0.0439	8.47	79.4	36.96	2.07		1.59	44.50	-0.64
1	33	Plan050	435.85	42.1	46.68	45.81	47.55	0.0066	4.38	143.05	42.76	3.12		0.66	44.50	-2.18
1	33	Plan025	354.58	42.1	44.65	45.31	47.03	0.039	7.04	62.34	33.5	1.8		1.46	44.50	-0.15
1	33	Plan010	260.57	42.1	44.38	44.8	46.06	0.0317	5.87	53.66	32.81	1.59		1.29	44.50	0.12
1	33	Plan005	195.71	42.1	44.21	44.38	45.36	0.0241	4.84	48.03	32.36	1.45		1.11	44.50	0.29
1	33	plan002	116.13	42.1	43.75	43.75	44.47	0.0212	3.79	34.42	27.05	1.25		0.99	44.50	0.75
1	32	Plan500 actu	750.69	41.52	47.82	46.63	48.95	0.006	5.14	234.93	51.91	4.15		0.67	44.21	-3.61

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude #	Chl (m)	Cota calle (m)	Diferencia (m)
1	32	Plan250	616.68	41.52	48.21		48.87	0.0032	3.93	255.34	52.14	4.44	0.49	44.21	44.21	-4.00
1	32	Plan100	521.15	41.52	46.28	45.74	47.41	0.0084	5.02	156.84	49.67	2.99	0.75	44.21	44.21	-2.07
1	32	Plan050	435.85	41.52	46.78		47.39	0.004	3.72	181.59	50.39	3.38	0.53	44.21	44.21	-2.57
1	32	Plan025	354.58	41.52	44.35	44.83	46.33	0.0285	6.4	69.76	36.32	1.86	1.26	44.21	44.21	-0.14
1	32	Plan010	260.57	41.52	45	44.26	45.64	0.0071	3.7	95.24	43.16	2.13	0.65	44.21	44.21	-0.79
1	32	Plan005	195.71	41.52	44.14	43.88	44.86	0.0117	3.87	62.14	33.77	1.78	0.8	44.21	44.21	0.07
1	32	plan002	116.13	41.52	43.05	43.23	43.99	0.0327	4.33	29.34	25.68	1.12	1.21	44.21	44.21	1.16
1	31	Plan500 actu	750.69	39.63	47.2		48.73	0.0063	5.78	187.94	34.91	4.48	0.7	43.17	43.17	-4.03
1	31	Plan250	616.68	39.63	46.3		48.54	0.0116	7.16	140.12	32.81	3.66	0.92	43.17	43.17	-3.13
1	31	Plan100	521.15	39.63	46.12		47.19	0.0054	4.81	151.15	33.2	3.89	0.63	43.17	43.17	-2.95
1	31	Plan050	435.85	39.63	45.68		47.13	0.0085	5.71	120.43	31.41	3.33	0.77	43.17	43.17	-2.51
1	31	Plan025	354.58	39.63	44.46	44.46	46.22	0.0139	6.18	83.88	28.63	2.63	0.95	43.17	43.17	-1.29
1	31	Plan010	260.57	39.63	43.56	43.54	45.22	0.0175	5.92	58.87	24.05	2.24	1.03	43.17	43.17	-0.39
1	31	Plan005	195.71	39.63	43.06	43.06	44.38	0.0169	5.25	47.9	21.6	2.06	0.98	43.17	43.17	0.11
1	31	plan002	116.13	39.63	42.22	42.26	43.22	0.0198	4.52	30.5	19.42	1.51	1	43.17	43.17	0.95
1	30	Plan500 actu	750.69	38.4	46.14	46.14	48.41	0.0103	7.75	211.29	56.35	3.36	0.9	42.40	42.40	-3.74
1	30	Plan250	616.68	38.4	46.16	46.16	48.15	0.0096	7.49	206.88	56.41	3.29	0.87	42.40	42.40	-3.76
1	30	Plan100	521.15	38.4	44.85	44.85	46.88	0.0109	7.03	140.84	53.36	2.41	0.9	42.40	42.40	-2.45
1	30	Plan050	435.85	38.4	44.34	44.34	46.71	0.015	7.76	110.99	29.91	3.24	1.04	42.40	42.40	-1.94
1	30	Plan025	354.58	38.4	43.85	43.89	45.84	0.014	7.06	96.52	28.72	2.97	0.99	42.40	42.40	-1.45
1	30	Plan010	260.57	38.4	43.09	43.09	44.74	0.0138	6.31	75.36	26.9	2.53	0.96	42.40	42.40	-0.69
1	30	Plan005	195.71	38.4	42.14	42.3	43.81	0.0186	6.25	51.92	21.81	2.19	1.07	42.40	42.40	0.26
1	30	plan002	116.13	38.4	41.11	41.39	42.53	0.0238	5.59	30.8	18.63	1.58	1.14	42.40	42.40	1.29
1	29	Plan500 actu	750.69	37.81	44.97	45.81	48	0.0179	9.35	203.39	71.1	2.64	1.15	41.92	41.92	-3.05
1	29	Plan250	616.68	37.81	44.38	45.41	47.68	0.0201	9.32	161.78	69.74	2.16	1.2	41.92	41.92	-2.46
1	29	Plan100	521.15	37.81	44.23	44.78	46.53	0.0149	7.88	150.89	69.38	2.03	1.03	41.92	41.92	-2.31
1	29	Plan050	435.85	37.81	43.85	44.58	46.32	0.0158	7.77	124.85	68.51	1.71	1.05	41.92	41.92	-1.93
1	29	Plan025	354.58	37.81	42.9	44.12	45.39	0.0201	7.74	84.37	30.02	2.52	1.15	41.92	41.92	-0.98
1	29	Plan010	260.57	37.81	42.18	42.68	44.28	0.0206	6.99	63.65	25.57	2.23	1.13	41.92	41.92	-0.26
1	29	Plan005	195.71	37.81	41.5	41.78	43.3	0.0225	6.43	48.39	20.85	2.08	1.14	41.92	41.92	0.42
1	29	plan002	116.13	37.81	40.84	40.86	41.94	0.018	4.94	35.25	19.26	1.69	0.98	41.92	41.92	1.08
1	28	Plan500 actu	750.69	37.68	42.15	43.6	47.03	0.0408	10.37	102.74	33.71	2.79	1.63	40.70	40.70	-1.45
1	28	Plan250	616.68	37.68	41.51	43.05	46.59	0.0515	10.42	81.63	32.45	2.34	1.78	40.70	40.70	-0.81
1	28	Plan100	521.15	37.68	41.18	42.51	45.57	0.051	9.7	70.94	31.65	2.11	1.74	40.70	40.70	-0.48



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1	28	Plan050	435.85	37.68	40.71	42.1	45.26	0.0642	9.77	57.1	26.94	1.98	1.9	40.70	-0.01	
1	28	Plan025	354.58	37.68	40.41	41.64	44.27	0.0635	8.98	49.4	25.35	1.84	1.85	40.70	0.29	
1	28	Plan010	260.57	37.68	40	40.94	43.15	0.0659	8.07	39.2	24.51	1.54	1.83	40.70	0.70	
1	28	Plan005	195.71	37.68	39.73	40.49	42.18	0.0613	7.07	32.76	23.96	1.33	1.73	40.70	0.97	
1	28	plan002	116.13	37.68	39.28	39.79	40.96	0.0621	5.81	22.32	21.77	1.01	1.65	40.70	1.42	
1	27	Plan500 actu	750.69	37.21	41.05	42.16	44.86	0.1035	9.26	103.45	36.84	2.55	1.57	39.90	-1.15	
1	27	Plan250	616.68	37.21	40.78	41.69	43.97	0.0953	8.41	93.29	36.52	2.34	1.48	39.90	-0.88	
1	27	Plan100	521.15	37.21	40.64	41.27	43.12	0.0784	7.42	88.2	36.36	2.23	1.33	39.90	-0.74	
1	27	Plan050	435.85	37.21	40.45	40.93	42.51	0.0694	6.71	81.61	36.16	2.09	1.24	39.90	-0.55	
1	27	Plan025	354.58	37.21	40.36	40.56	41.84	0.052	5.67	78.07	36.05	2.01	1.07	39.90	-0.46	
1	27	Plan010	260.57	37.21	39.86	39.86	41.1	0.0546	5.13	60.54	33.42	1.71	1.06	39.90	0.04	
1	27	Plan005	195.71	37.21	39.6	39.6	40.52	0.0469	4.39	52.29	30.74	1.61	0.97	39.90	0.30	
1	27	plan002	116.13	37.21	39.06	39.01	39.7	0.047	3.62	36.07	28.72	1.21	0.92	39.90	0.84	
1	26	Plan500 actu	750.69	36.14	40.45	40.57	42.34	0.0445	6.33	137.91	42.96	2.91	1.04	38.94	-1.51	
1	26	Plan250	616.68	36.14	40.37	40.14	41.74	0.0328	5.36	134.5	42.85	2.85	0.89	38.94	-1.43	
1	26	Plan100	521.15	36.14	39.89	39.77	41.19	0.0374	5.21	114.22	42.19	2.49	0.93	38.94	-0.95	
1	26	Plan050	435.85	36.14	39.67	39.48	40.76	0.0342	4.75	104.84	41.88	2.32	0.88	38.94	-0.73	
1	26	Plan025	354.58	36.14	39.11	39.14	40.26	0.0467	4.84	81.71	41.1	1.87	0.99	38.94	-0.17	
1	26	Plan010	260.57	36.14	38.95	38.63	39.66	0.0319	3.81	75.08	36.71	1.91	0.81	38.94	-0.01	
1	26	Plan005	195.71	36.14	38.58	38.3	39.15	0.0324	3.41	62.23	34.94	1.68	0.79	38.94	0.36	
1	26	plan002	116.13	36.14	38.08	38.08	38.46	0.0325	2.78	44.78	34.2	1.26	0.76	38.94	0.86	
1	25	Plan500 actu	750.69	35.25	39.9	39.65	41.28	0.0338	5.65	168.2	52	2.99	0.91	38.57	-1.33	
1	25	Plan250	616.68	35.25	40.08	40.96	40.96	0.0201	4.49	177.62	52	3.14	0.71	38.57	-1.51	
1	25	Plan100	521.15	35.25	39.24	39.24	40.25	0.0313	4.8	134.3	50.75	2.48	0.85	38.57	-0.67	
1	25	Plan050	435.85	35.25	38.96	39.89	39.89	0.0317	4.55	120.2	50.15	2.26	0.84	38.57	-0.39	
1	25	Plan025	354.58	35.25	38.13	38.13	39.34	0.0634	5.17	80.66	40.46	1.89	1.13	38.57	0.44	
1	25	Plan010	260.57	35.25	38.32	38.32	38.89	0.0266	3.54	88.78	44.88	1.88	0.74	38.57	0.25	
1	25	Plan005	195.71	35.25	38.01	38.01	38.43	0.0231	3.01	76.21	40.21	1.8	0.68	38.57	0.56	
1	25	plan002	116.13	35.25	37.52	37.52	37.78	0.0208	2.37	56.67	39.11	1.39	0.61	38.57	1.05	
1	24	Plan500 actu	750.69	34.88	39.24	39.24	40.6	0.0335	5.47	166.7	54	2.91	0.9	37.64	-1.60	
1	24	Plan250	616.68	34.88	39.94	39.94	40.57	0.0124	3.74	204.58	54	3.48	0.57	37.64	-2.30	
1	24	Plan100	521.15	34.88	38.56	39.61	39.61	0.0332	4.75	130.02	53.35	2.34	0.87	37.64	-0.92	
1	24	Plan050	435.85	34.88	38.24	38.24	39.22	0.035	4.54	113.42	52.85	2.07	0.88	37.64	-0.60	
1	24	Plan025	354.58	34.88	37.58	37.58	38.75	0.0599	4.93	80.14	42.38	1.82	1.1	37.64	0.06	

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1	24	Plan010	260.57	34.88	37.34	37.3	38.16	0.0492	4.12	70.1	41.93	1.62	0.97	37.64	0.30	
1	24	Plan005	195.71	34.88	37	36.99	37.71	0.0561	3.83	55.97	40.63	1.34	1	37.64	0.64	
1	24	plan002	116.13	34.88	36.56	36.56	37.08	0.0648	3.25	38.49	38.77	0.97	1.02	37.64	1.08	
1	23	Plan500 actu	750.69	34.53	39.44		40.1	0.0127	3.94	276.92	96.83	2.73	0.58	37.3	-2.14	
1	23	Plan250	616.68	34.53	40.05	40.05	40.36	0.0053	2.75	335.64	97	3.27	0.38	37.30	-2.75	
1	23	Plan100	521.15	34.53	38.56	38.56	39.16	0.0144	3.64	191.4	96.56	1.92	0.6	37.30	-1.26	
1	23	Plan050	435.85	34.53	38.15	38.15	38.77	0.0164	3.61	151.66	96.43	1.54	0.63	37.30	-0.85	
1	23	Plan025	354.58	34.53	36.87	36.94	37.98	0.0548	4.81	83.1	45.2	1.78	1.06	37.30	0.43	
1	23	Plan010	260.57	34.53	37.17		37.62	0.0186	3.07	97.24	47.44	1.99	0.63	37.30	0.13	
1	23	Plan005	195.71	34.53	36.77		37.15	0.0195	2.78	78.94	44.53	1.72	0.63	37.30	0.53	
1	23	plan002	116.13	34.53	36.21	35.82	36.47	0.0207	2.31	55.07	41.24	1.31	0.61	37.30	1.09	
1	22	Plan500 actu	750.69	34.33	38.8	38.8	39.89	0.0087	4.99	251.08	107.69	2.27	0.76	36.8	-2.00	
1	22	Plan250	616.68	34.33	39.92	39.92	40.3	0.0024	3.04	374.03	110	3.26	0.41	36.80	-3.12	
1	22	Plan100	521.15	34.33	38.05	38.05	38.95	0.0089	4.43	173.38	99.05	1.72	0.74	36.80	-1.25	
1	22	Plan050	435.85	34.33	37.57	37.57	38.52	0.0108	4.45	131.59	72.25	1.78	0.8	36.80	-0.77	
1	22	Plan025	354.58	34.33	36.73	36.73	37.93	0.0208	5	85.71	46.49	1.8	1.06	36.80	0.07	
1	22	Plan010	260.57	34.33	36.7	36.7	37.37	0.0116	3.71	84.65	46.18	1.79	0.79	36.80	0.10	
1	22	Plan005	195.71	34.33	36.33	36.33	36.89	0.0121	3.37	68.39	42.64	1.58	0.78	36.80	0.47	
1	22	plan002	116.13	34.33	35.81	35.81	36.2	0.0131	2.81	46.54	39.64	1.16	0.77	36.80	0.99	
1	21	Plan500 actu	750.69	34.13	38.38	38.38	39.77	0.0123	5.71	224.11	101.84	2.14	0.9	36.56	-1.82	
1	21	Plan250	616.68	34.13	39.9	39.9	40.28	0.0024	3.11	384.74	109.49	3.38	0.42	36.56	-3.34	
1	21	Plan100	521.15	34.13	37.56	37.56	38.83	0.014	5.27	142.82	95	1.47	0.92	36.56	-1.00	
1	21	Plan050	435.85	34.13	37.51	37.51	38.43	0.0104	4.5	137.54	83.79	1.61	0.79	36.56	-0.95	
1	21	Plan025	354.58	34.13	36.66	36.66	37.89	0.0202	5.11	90.85	49.23	1.81	1.05	36.56	-0.10	
1	21	Plan010	260.57	34.13	36.31	36.31	37.23	0.0185	4.41	74.75	44.41	1.65	0.98	36.56	0.25	
1	21	Plan005	195.71	34.13	35.96	35.96	36.74	0.0197	4.03	59.76	42.97	1.38	0.98	36.56	0.60	
1	21	plan002	116.13	34.13	35.47	35.47	36.05	0.0225	3.44	39.3	38.68	1.01	0.99	36.56	1.09	
1	20	Plan500 actu	750.69	32.89	37.85	37.85	39.44	0.0126	6.36	243.56	108.88	2.18	0.93	36.32	-1.53	
1	20	Plan250	616.68	32.89	39.89	39.89	40.2	0.0018	3.05	473.91	114	3.96	0.37	36.32	-3.57	
1	20	Plan100	521.15	32.89	37.2	37.2	38.5	0.0116	5.54	173.77	106.01	1.61	0.87	36.32	-0.88	
1	20	Plan050	435.85	32.89	36.43	36.43	38.07	0.0181	6.03	108.56	48.17	2.19	1.05	36.32	-0.11	
1	20	Plan025	354.58	32.89	36.14	36.14	37.43	0.0161	5.35	95.84	42.17	2.21	0.98	36.32	0.18	
1	20	Plan010	260.57	32.89	35.5	35.5	36.72	0.0203	5.13	69.65	39.08	1.75	1.05	36.32	0.82	
1	20	Plan005	195.71	32.89	35.02	35.02	36.16	0.0248	4.9	51.81	35.46	1.45	1.12	36.32	1.30	

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude #	Chl (m)	Cota calle (m)	Diferencia (m)
1	20	plan002	116.13	32.89	34.41	34.6	35.34	0.0329	4.38	31.73	29.72	1.06	1.21	36.32	1.91	
1	19	Plan500 actu	750.69	31.76	37.77	37.18	38.71	0.0062	5.14	337.83	108.62	2.95	0.68	36.29	-1.48	
1	19	Plan250	616.68	31.76	39.92		40.13	0.0011	2.64	576.59	112	4.76	0.3	36.29	-3.63	
1	19	Plan100	521.15	31.76	36.99	36.4	37.76	0.0058	4.49	253.66	106.46	2.28	0.64	36.29	-0.70	
1	19	Plan050	435.85	31.76	36.76	35.66	37.43	0.0051	4.1	229.9	104.85	2.1	0.59	36.29	-0.47	
1	19	Plan025	354.58	31.76	34.92	35.52	36.8	0.0227	6.32	74.9	37.74	1.84	1.16	36.29	1.37	
1	19	Plan010	260.57	31.76	35.42	34.67	36.11	0.0069	3.87	105.59	71	1.42	0.66	36.29	0.87	
1	19	Plan005	195.71	31.76	34.8	34.18	35.43	0.0081	3.66	70.77	31.37	2.08	0.68	36.29	1.49	
1	19	plan002	116.13	31.76	33.79	33.52	34.35	0.0124	3.41	41.29	26.63	1.46	0.79	36.29	2.50	
1	18	Plan500 actu	750.69	31.22	37.87		38.53	0.0046	4.76	420.34	112.34	3.51	0.59	35.47	-2.40	
1	18	Plan250	616.68	31.22	39.93	36.48	40.1	0.0009	2.56	656.6	115	5.23	0.28	35.47	-4.46	
1	18	Plan100	521.15	31.22	37.07		37.61	0.004	4.09	332.06	110.5	2.84	0.54	35.47	-1.60	
1	18	Plan050	435.85	31.22	36.85		37.29	0.0035	3.69	306.97	109.97	2.64	0.5	35.47	-1.38	
1	18	Plan025	354.58	31.22	34.92	35.13	36.42	0.016	5.97	112.29	72.73	1.47	1	35.47	0.55	
1	18	Plan010	260.57	31.22	35.42		35.96	0.0051	3.68	153.49	92.57	1.58	0.58	35.47	0.05	
1	18	Plan005	195.71	31.22	34.75		35.28	0.006	3.52	100.17	66.85	1.42	0.61	35.47	0.72	
1	18	plan002	116.13	31.22	33.67		34.15	0.0084	3.25	50.18	27.27	1.69	0.68	35.47	1.80	
1	17	Plan500 actu	750.69	30.7	37.03		38.38	0.0099	6.7	315.42	109.35	2.76	0.86	35.45	-1.58	
1	17	Plan250	616.68	30.7	35.17	35.17	39.64	0.0398	10.57	121.99	64.94	1.78	1.62	35.45	0.28	
1	17	Plan100	521.15	30.7	36.33	36.33	37.47	0.0089	5.86	239.51	107.14	2.15	0.8	35.45	-0.88	
1	17	Plan050	435.85	30.7	36.4		37.2	0.0061	4.88	247.28	107.37	2.21	0.66	35.45	-0.95	
1	17	Plan025	354.58	30.7	35.07	35.07	36.66	0.0144	6.27	115.65	62.1	1.76	0.97	35.45	0.38	
1	17	Plan010	260.57	30.7	34.53	34.53	35.79	0.0134	5.5	85.2	49.84	1.6	0.92	35.45	0.92	
1	17	Plan005	195.71	30.7	33.82	33.82	35.09	0.0169	5.36	55.39	27.11	1.84	0.99	35.45	1.63	
1	17	plan002	116.13	30.7	33.03	33.03	33.96	0.0181	4.52	36.29	22.44	1.48	0.98	35.45	2.42	
1	16	Plan500 actu	750.69	30.26	35.96		38.15	0.0181	8.33	252.33	108.7	2.23	1.14	35.56	-0.40	
1	16	Plan250	616.68	30.26	34.81	36.26	39.11	0.04	10.6	134.91	88.83	1.46	1.63	35.56	0.75	
1	16	Plan100	521.15	30.26	35.29	35.89	37.25	0.0172	7.45	181.71	101.46	1.72	1.08	35.56	0.27	
1	16	Plan050	435.85	30.26	34.62	34.62	36.92	0.023	7.79	119.85	59.02	1.91	1.22	35.56	0.94	
1	16	Plan025	354.58	30.26	34.09	34.65	36.36	0.026	7.56	92.32	49.71	1.74	1.27	35.56	1.47	
1	16	Plan010	260.57	30.26	33.57	34.14	35.51	0.026	6.82	67.91	43.61	1.47	1.24	35.56	1.99	
1	16	Plan005	195.71	30.26	33.1	33.57	34.79	0.0275	6.28	49.92	29.44	1.58	1.24	35.56	2.46	
1	16	plan002	116.13	30.26	32.89	32.69	33.62	0.0131	4.09	44.45	25.51	1.62	0.84	35.56	2.67	

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude #	Chl (m)	Cota calle (m)	Diferencia (m)
1	15	Plan500 actu	750.69	30.04	35.27	36.14	37.98	0.0264	9.4	229.71	103.4	2.17	1.35	35.59	0.32	
1	15	Plan250	616.68	30.04	34.27	35.81	38.84	0.0518	11.33	134.07	80.34	1.63	1.82	35.59	1.32	
1	15	Plan100	521.15	30.04	34.59	35.42	37.09	0.0264	8.52	162.23	92.22	1.72	1.32	35.59	1.00	
1	15	Plan050	435.85	30.04	34.12	35.18	36.75	0.0307	8.5	122.71	76.5	1.57	1.39	35.59	1.47	
1	15	Plan025	354.58	30.04	33.8	34.5	36.19	0.03	7.93	99.5	67.98	1.43	1.36	35.59	1.79	
1	15	Plan010	260.57	30.04	33.4	34.05	35.36	0.0272	6.97	74.63	57.46	1.27	1.27	35.59	2.19	
1	15	Plan005	195.71	30.04	33.19	33.53	34.57	0.0205	5.77	63.3	50.36	1.23	1.09	35.59	2.40	
1	15	plan002	116.13	30.04	32.62	32.62	33.52	0.0171	4.54	40.39	29.53	1.33	0.95	35.59	2.97	
1	14	Plan500 actu	750.69	29.28	34.71	34.44	35.87	0.0104	6.11	303.37	96.41	3.07	0.85	35.44	0.73	
1	14	Plan250	616.68	29.28	33.05	34.08	36.41	0.0406	9.34	147.93	90.5	1.61	1.59	35.44	2.39	
1	14	Plan100	521.15	29.28	32.92	33.8	35.71	0.0346	8.4	136.4	90.05	1.49	1.45	35.44	2.52	
1	14	Plan050	435.85	29.28	32.69	33.49	35.29	0.0339	7.93	115.5	89.22	1.28	1.42	35.44	2.75	
1	14	Plan025	354.58	29.28	32.47	33.2	34.79	0.0316	7.3	95.93	88.44	1.07	1.36	35.44	2.97	
1	14	Plan010	260.57	29.28	32.06	32.8	34.05	0.0312	6.57	63.54	52.83	1.18	1.32	35.44	3.38	
1	14	Plan005	195.71	29.28	31.72	32.19	33.42	0.0311	5.97	46.57	45.91	0.99	1.28	35.44	3.72	
1	14	plan002	116.13	29.28	31.06	31.44	32.39	0.0376	5.18	25.79	20.13	1.24	1.33	35.44	4.38	
1	13	Plan500 actu	750.69	28.94	34.44	33.52	35.53	0.0082	5.53	288.61	85.43	3.29	0.76	34.7	0.26	
1	13	Plan250	616.68	28.94	33.64	33.52	34.88	0.0108	5.7	221.87	82.57	2.62	0.85	34.70	1.06	
1	13	Plan100	521.15	28.94	32.81	33.19	34.54	0.0182	6.46	154.37	79.56	1.9	1.07	34.70	1.89	
1	13	Plan050	435.85	28.94	32.48	32.88	34.14	0.019	6.21	128.19	78.37	1.61	1.08	34.70	2.22	
1	13	Plan025	354.58	28.94	32.16	32.56	33.71	0.0193	5.86	103.26	77.21	1.32	1.07	34.70	2.54	
1	13	Plan010	260.57	28.94	31.83	32.1	33.04	0.0167	5.05	78.37	70.08	1.1	0.98	34.70	2.87	
1	13	Plan005	195.71	28.94	31.32	31.35	32.44	0.0198	4.8	51.55	35.99	1.4	1.03	34.70	3.38	
1	13	plan002	116.13	28.94	30.71	30.71	31.47	0.0204	3.94	34.41	25.5	1.32	0.99	34.70	3.99	
1	12	Plan500 actu	750.69	27.81	34.25	34.25	35.22	0.0072	5.74	332.9	86.19	3.77	0.73	35.5	1.25	
1	12	Plan250	616.68	27.81	33.46	33.46	34.46	0.0085	5.71	266.37	80.59	3.24	0.78	35.50	2.04	
1	12	Plan100	521.15	27.81	32.86	32.34	33.88	0.0098	5.66	219.59	74.74	2.88	0.82	35.50	2.64	
1	12	Plan050	435.85	27.81	32.26	31.99	33.33	0.0117	5.67	176.56	68.92	2.52	0.88	35.50	3.24	
1	12	Plan025	354.58	27.81	31.2	31.61	32.91	0.0249	6.82	108.97	58.62	1.83	1.22	35.50	4.30	
1	12	Plan010	260.57	27.81	30.71	31.11	32.26	0.0265	6.3	81.54	53.88	1.5	1.22	35.50	4.79	
1	12	Plan005	195.71	27.81	30.34	30.4	31.61	0.026	5.65	63.15	41.14	1.52	1.18	35.50	5.16	
1	12	plan002	116.13	27.81	29.87	29.98	30.7	0.0217	4.45	44.77	37.99	1.17	1.04	35.50	5.63	
1	11	Plan500 actu	750.69	26.55	32.65	32.65	34.72	0.0186	8.79	220.65	55.35	3.8	1.16	38.76	6.11	
1	11	Plan250	616.68	26.55	32.08	32.08	33.95	0.0188	8.24	189.85	52.76	3.44	1.15	38.76	6.68	

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude #	Chl (m)	Cota calle (m)	Diferencia (m)
1	11	Plan100	521.15	26.55	31.64	31.64	33.35	0.0189	7.8	166.88	50.74	3.15	1.13	38.76	38.76	7.12
1	11	Plan050	435.85	26.55	31.22	31.22	32.77	0.0188	7.33	146.28	48.85	2.88	1.11	38.76	38.76	7.54
1	11	Plan025	354.58	26.55	30.79	30.79	32.17	0.0187	6.82	125.66	46.89	2.58	1.09	38.76	38.76	7.97
1	11	Plan010	260.57	26.55	30.22	30.24	31.4	0.0187	6.16	99.66	44.3	2.18	1.06	38.76	38.76	8.54
1	11	Plan005	195.71	26.55	29.78	29.79	30.79	0.0185	5.59	80.42	42.27	1.85	1.04	38.76	38.76	8.98
1	11	plan002	116.13	26.55	29.01	29.17	29.93	0.0224	5.04	49.39	38.12	1.27	1.08	38.76	38.76	9.75
1	10	Plan500 actu	750.69	25.58	31.44	32.05	34.25	0.0273	10.27	196.18	55.11	3.36	1.39	39.09	39.09	7.65
1	10	Plan250	616.68	25.58	30.96	31.53	33.49	0.0268	9.58	170.22	53.29	3.03	1.35	39.09	39.09	8.13
1	10	Plan100	521.15	25.58	30.6	31.12	32.9	0.0261	9.01	151.17	51.91	2.78	1.32	39.09	39.09	8.49
1	10	Plan050	435.85	25.58	30.25	30.71	32.34	0.0254	8.45	133.11	50.57	2.53	1.29	39.09	39.09	8.84
1	10	Plan025	354.58	25.58	29.89	30.32	31.75	0.0245	7.83	115.07	49.19	2.27	1.25	39.09	39.09	9.20
1	10	Plan010	260.57	25.58	29.42	29.78	30.99	0.023	6.98	92.45	47.41	1.91	1.18	39.09	39.09	9.67
1	10	Plan005	195.71	25.58	29	29.36	30.4	0.0227	6.37	72.92	44.36	1.61	1.15	39.09	39.09	10.09
1	10	plan002	116.13	25.58	28.3	28.6	29.49	0.0241	5.55	44.13	37.91	1.14	1.14	39.09	39.09	10.79
1	9	Plan500 actu	750.69	25.2	30.49	31.21	33.52	0.0303	10.19	184.31	53.86	3.18	1.45	39.93	39.93	9.44
1	9	Plan250	616.68	25.2	30.02	30.71	32.76	0.0303	9.55	159.31	52.56	2.84	1.43	39.93	39.93	9.91
1	9	Plan100	521.15	25.2	29.66	30.31	32.18	0.0302	9.03	140.79	51.57	2.57	1.4	39.93	39.93	10.27
1	9	Plan050	435.85	25.2	29.32	29.91	31.63	0.03	8.51	123.35	50.62	2.31	1.38	39.93	39.93	10.61
1	9	Plan025	354.58	25.2	28.97	29.53	31.05	0.0295	7.93	105.96	49.65	2.03	1.35	39.93	39.93	10.96
1	9	Plan010	260.57	25.2	28.52	29.02	30.33	0.029	7.17	83.61	48.38	1.66	1.31	39.93	39.93	11.41
1	9	Plan005	195.71	25.2	28.17	28.62	29.75	0.0279	6.49	67.04	47.42	1.37	1.25	39.93	39.93	11.76
1	9	plan002	116.13	25.2	27.67	28.02	28.88	0.0249	5.36	43.57	46.02	0.93	1.15	39.93	39.93	12.26
1	8	Plan500 actu	750.69	25.05	29.72	30.69	33.14	0.0391	10.64	166.6	54.18	2.97	1.61	39.84	39.84	10.12
1	8	Plan250	616.68	25.05	29.31	30.19	32.38	0.0389	9.95	144.55	52.89	2.65	1.58	39.84	39.84	10.53
1	8	Plan100	521.15	25.05	28.99	29.79	31.81	0.0389	9.41	127.7	51.89	2.4	1.56	39.84	39.84	10.85
1	8	Plan050	435.85	25.05	28.68	29.43	31.26	0.0388	8.87	111.9	50.94	2.14	1.54	39.84	39.84	11.16
1	8	Plan025	354.58	25.05	28.37	29.04	30.69	0.0385	8.28	95.97	49.95	1.88	1.51	39.84	39.84	11.47
1	8	Plan010	260.57	25.05	28.6	28.55	29.59	0.0154	5.49	107.7	50.68	2.08	0.96	39.84	39.84	11.24
1	8	Plan005	195.71	25.05	28.23	28.16	29.05	0.0142	4.88	89.18	49.53	1.77	0.91	39.84	39.84	11.61
1	8	plan002	116.13	25.05	27.07	27.6	28.53	0.0403	5.9	35.21	34.09	1.02	1.41	39.84	39.84	12.77
1	7	Plan500 actu	750.69	24.59	29.7	30.11	31.93	0.0219	8.18	203.84	66.12	3	1.21	38.03	38.03	8.33
1	7	Plan250	616.68	24.59	29.5	29.68	31.22	0.0177	7.14	190.49	65.57	2.83	1.08	38.03	38.03	8.53
1	7	Plan100	521.15	24.59	29.31	29.33	30.72	0.0151	6.41	178.33	65.07	2.68	0.99	38.03	38.03	8.72
1	7	Plan050	435.85	24.59	28.95	29.01	30.25	0.0151	6.06	155.34	64.1	2.37	0.98	38.03	38.03	9.08

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Width (m)	Hydr Radius (m)	Froude #	Chl (m)	Cota calle (m)	Diferencia (m)
1	1	7 Plan025	354.58	24.59	28.57	28.66	29.78	0.0155	5.72	130.88	63.06	2.04	0.97	38.03	9.46	
1	1	7 Plan010	260.57	24.59	28.22	28.22	29.15	0.0131	4.91	108.92	62.11	1.73	0.88	38.03	9.81	
1	1	7 Plan005	195.71	24.59	27.89	27.89	28.64	0.0118	4.32	88.67	59.17	1.48	0.82	38.03	10.14	
1	1	7 plan002	116.13	24.59	26.93	26.93	27.67	0.0187	4.14	45.09	35.98	1.24	0.96	38.03	11.10	
1	1	6 Plan500 actu	750.69	24.07	28.61	29.31	31.23	0.031	8.91	189.71	71.49	2.57	1.41			
1	1	6 Plan250	616.68	24.07	28.28	28.91	30.6	0.0296	8.24	166.51	70.77	2.28	1.36			
1	1	6 Plan100	521.15	24.07	28	28.59	30.13	0.0292	7.78	147.04	70.15	2.04	1.33			
1	1	6 Plan050	435.85	24.07	27.75	28.27	29.68	0.0285	7.3	128.89	69.58	1.81	1.3			
1	1	6 Plan025	354.58	24.07	27.47	27.96	29.21	0.0277	6.78	110.12	68.97	1.56	1.26			
1	1	6 Plan010	260.57	24.07	27.09	27.54	28.63	0.0277	6.17	83.8	65.27	1.26	1.23			
1	1	6 Plan005	195.71	24.07	26.64	26.64	28.11	0.0327	5.89	56.47	51.72	1.07	1.3			
1	1	6 plan002	116.13	24.07	26.29	26.43	27.14	0.0231	4.39	41.89	38.23	1.07	1.06			
1	1	5 Plan500 actu	750.69	23.56	28.34	28.01	29.62	0.0112	5.7	236.23	73.02	3.12	0.86			
1	1	5 Plan250	616.68	23.56	26.73	27.62	29.69	0.0426	8.24	122.01	68.83	1.74	1.56			
1	1	5 Plan100	521.15	23.56	26.48	27.31	29.22	0.0436	7.84	104.98	67.48	1.53	1.56			
1	1	5 Plan050	435.85	23.56	26.23	27.02	28.77	0.0455	7.46	88.21	62.96	1.38	1.56			
1	1	5 Plan025	354.58	23.56	25.87	26.71	28.25	0.0531	7.21	68.56	47	1.42	1.64			
1	1	5 Plan010	260.57	23.56	25.48	26.04	27.61	0.0625	6.75	51.37	43.27	1.17	1.72			
1	1	5 Plan005	195.71	23.56	25.24	25.74	27.02	0.0634	6.1	41.23	42.33	0.96	1.68			
1	1	5 plan002	116.13	23.56	24.88	25.28	26.2	0.0691	5.16	26.24	40.29	0.65	1.67			
1	1	4 Plan500 actu	750.69	22.72	28.58		29.27	0.0039	3.98	288.45	63.89	4.28	0.53			
1	1	4 Plan250	616.68	22.72	27.63	26.4	28.34	0.0051	4.02	227.82	62.72	3.51	0.59			
1	1	4 Plan100	521.15	22.72	26.88	26.06	27.66	0.0067	4.13	181.7	61.37	2.9	0.66			
1	1	4 Plan050	435.85	22.72	26.16	25.75	27.03	0.0096	4.33	138.36	58.13	2.34	0.76			
1	1	4 Plan025	354.58	22.72	24.75	25.3	26.78	0.0449	6.46	65.67	43.23	1.51	1.5			
1	1	4 Plan010	260.57	22.72	24.48	24.89	26.02	0.0418	5.61	54.12	40.78	1.32	1.41			
1	1	4 Plan005	195.71	22.72	24.26	24.55	25.45	0.0387	4.9	45.5	38.84	1.16	1.33			
1	1	4 plan002	116.13	22.72	23.92	24.07	24.68	0.0356	3.9	32.74	35.79	0.91	1.21			
1	1	3 Plan500 actu	750.69	21.38	28.52		29.12	0.0025	3.69	301.19	55.69	5.02	0.44			
1	1	3 Plan250	616.68	21.38	27.58		28.15	0.0029	3.56	249.39	54.59	4.33	0.46			
1	1	3 Plan100	521.15	21.38	26.86		27.41	0.0032	3.45	211.23	52.22	3.86	0.48			
1	1	3 Plan050	435.85	21.38	26.18		26.7	0.0036	3.35	176.5	49.7	3.4	0.49			
1	1	3 Plan025	354.58	21.38	24	24.15	25.4	0.0212	5.37	78.04	37.72	2.02	1.08			
1	1	3 Plan010	260.57	21.38	24.6	23.66	25.08	0.0055	3.15	102.47	43.74	2.27	0.57			

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude #	Chl (m)	Cota calle (m)	Diferencia (m)
1	3	Plan005	195.71	21.38	23.95	23.29	24.4	0.0069	3.02	76.3	37.48	1.99	0.62			
1	3	plan002	116.13	21.38	23.08	22.78	23.48	0.0107	2.82	45.76	32.94	1.36	0.71			
1	2	Plan500 actu	750.69	20.16	26.15	26.15	28.75	0.0133	7.41	135.63	31.28	3.85	0.98			
1	2	Plan250	616.68	20.16	25.93		27.85	0.0102	6.35	128.97	30.7	3.74	0.86			
1	2	Plan100	521.15	20.16	24.95	24.95	27.05	0.0144	6.6	100.15	28.05	3.21	0.98			
1	2	Plan050	435.85	20.16	24.45	24.45	26.34	0.0151	6.25	86.29	26.68	2.93	0.99			
1	2	Plan025	354.58	20.16	23.95	23.95	25.61	0.0156	5.84	73.35	25.33	2.64	0.99			
1	2	Plan010	260.57	20.16	23.3	23.3	24.68	0.0168	5.29	57.46	23.58	2.25	0.99			
1	2	Plan005	195.71	20.16	22.79	22.79	23.96	0.0181	4.84	45.86	22.21	1.93	0.99			
1	2	plan002	116.13	20.16	22.09	22.09	22.93	0.0204	4.09	30.92	20.31	1.45	1			
1	1	Plan500 actu	750.69	19.51	25.54	25.97	28.43	0.016	8.22	154.67	41.16	3.48	1.08			
1	1	Plan250	616.68	19.51	24.76	24.76	27.5	0.0179	7.91	123.63	35.85	3.24	1.12			
1	1	Plan100	521.15	19.51	24.43	24.63	26.73	0.0163	7.22	112.3	33.24	3.17	1.06			
1	1	Plan050	435.85	19.51	23.98	24.12	26.01	0.0163	6.76	97.68	31.58	2.92	1.04			
1	1	Plan025	354.58	19.51	23.5	23.6	25.28	0.0165	6.28	82.83	29.79	2.63	1.02			
1	1	Plan010	260.57	19.51	22.86	22.93	24.33	0.017	5.65	64.56	27.44	2.24	1.01			
1	1	Plan005	195.71	19.51	22.35	22.4	23.59	0.0177	5.14	51.14	25.57	1.92	1			
1	1	plan002	116.13	19.51	21.6	21.62	22.52	0.0199	4.37	32.99	22.14	1.44	1			

## **APÉNDICE N° 3**

### **RESULTADOS CON LIMPIEZA DE CAUCE Y AMPLIACIÓN**



Profile Output Table  
 HEC-RAS River: Aragon  
 Standard Table  
 Reach: 1

# Rivers 1  
 # Hydraulic Reaches 1  
 # River Stations 35  
 # Plans 8  
 # Profiles 1

RESULTADOS SIN VEGETACION

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	35	Plan500sinve	750.69	42.38	48.58	48.58	50.44	0.0109	6.88	138.88	38.61	0.9		
1	35	Plan250sinve	616.68	42.38	48.06	48.06	49.74	0.011	6.49	119.1	36.63	0.89		
1	35	Plan100sinve	521.15	42.38	47.52	47.52	49.19	0.0122	6.38	100.63	30.22	0.92		
1	35	Plan050sinve	435.85	42.38	47.12	47.12	48.62	0.0121	6	88.84	29.22	0.9		
1	35	Plan025sinve	354.58	42.38	46.56	46.56	48.01	0.0136	5.82	72.97	26.75	0.93		
1	35	Plan010sinve	260.57	42.38	45.87	45.87	47.17	0.0151	5.41	55.85	23.19	0.95		
1	35	Plan005sinve	195.71	42.38	45.36	45.36	46.48	0.0158	4.95	44.75	20.94	0.95		
1	35	Plan002sinve	116.13	42.38	44.61	44.61	45.46	0.0178	4.26	29.97	18.31	0.96		
1	34	Plan500sinve	750.69	42.26	46.13	47.29	49.96	0.0393	9.36	93.36	35.77	1.57		
1	34	Plan250sinve	616.68	42.26	45.74	46.82	49.27	0.0413	8.9	79.69	33.96	1.58		
1	34	Plan100sinve	521.15	42.26	45.43	46.46	48.71	0.0432	8.52	69.51	32.05	1.59		
1	34	Plan050sinve	435.85	42.26	45.13	46.13	48.15	0.0452	8.12	60.24	30.2	1.59		
1	34	Plan025sinve	354.58	42.26	44.83	45.69	47.54	0.0468	7.62	51.47	28.35	1.59		
1	34	Plan010sinve	260.57	42.26	44.45	45.16	46.7	0.0483	6.88	41.14	26	1.57		
1	34	Plan005sinve	195.71	42.26	44.16	44.73	46.01	0.0491	6.21	33.68	24.15	1.54		
1	34	Plan002sinve	116.13	42.26	43.73	44.1	45	0.0494	5.1	23.83	21.94	1.47		
1	33	Plan500sinve	750.69	42.1	45.6	46.65	49.12	0.0405	8.98	97.5	41.11	1.57	44.50	-1.10
1	33	Plan250sinve	616.68	42.1	45.28	46.24	48.39	0.0401	8.36	84.85	38.55	1.54	44.50	-0.78
1	33	Plan100sinve	521.15	42.1	45.03	45.92	47.78	0.0395	7.82	75.3	35.71	1.5	44.50	-0.53
1	33	Plan050sinve	435.85	42.1	44.78	45.62	47.2	0.0389	7.29	66.78	33.84	1.47	44.50	-0.28
1	33	Plan025sinve	354.58	42.1	44.57	45.12	46.57	0.0358	6.6	59.8	33.3	1.39	44.50	-0.07
1	33	Plan010sinve	260.57	42.1	44.33	44.69	45.77	0.0294	5.56	51.93	32.67	1.23	44.50	0.17
1	33	Plan005sinve	195.71	42.1	44.19	44.35	45.17	0.0219	4.57	47.26	32.3	1.05	44.50	0.31
1	33	Plan002sinve	116.13	42.1	43.72	43.72	44.37	0.0204	3.67	33.63	26.89	0.97	44.50	0.78
1	32	Plan500sinve	750.69	41.52	45.21	46.18	48.36	0.0346	8.53	104.95	45.49	1.46	44.21	-1.00

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota (m)	Diferencia (m)
1	32	Plan250sinve	616.68	41.52	44.92	45.81	47.64	0.033	7.86	92.13	42.38	1.41	44.21	-0.71
1	32	Plan100sinve	521.15	41.52	44.71	45.44	47.05	0.0308	7.25	83.37	40.12	1.34	44.21	-0.50
1	32	Plan050sinve	435.85	41.52	44.49	45.08	46.49	0.0287	6.66	74.96	37.82	1.28	44.21	-0.28
1	32	Plan025sinve	354.58	41.52	44.21	44.68	45.94	0.0283	6.14	64.58	33.89	1.25	44.21	0.00
1	32	Plan010sinve	260.57	41.52	43.85	44.15	45.27	0.0278	5.49	52.65	33.29	1.21	44.21	0.36
1	32	Plan005sinve	195.71	41.52	43.54	43.86	44.71	0.0279	4.95	42.87	29.83	1.18	44.21	0.67
1	32	Plan002sinve	116.13	41.52	43.03	43.22	43.91	0.0322	4.25	28.75	25.56	1.19	44.21	1.18
1	31	Plan500sinve	750.69	39.63	45.34	45.39	47.44	0.0136	6.92	125.81	31.97	0.97	43.17	-2.17
1	31	Plan250sinve	616.68	39.63	44.43	44.85	46.77	0.0192	7.24	97.17	30.52	1.12	43.17	-1.26
1	31	Plan100sinve	521.15	39.63	43.91	44.45	46.26	0.0224	7.17	81.68	29.71	1.18	43.17	-0.74
1	31	Plan050sinve	435.85	39.63	43.53	44.04	45.69	0.0235	6.83	70.48	25.3	1.19	43.17	-0.36
1	31	Plan025sinve	354.58	39.63	43.08	43.59	45.08	0.0262	6.55	59.22	24.56	1.23	43.17	0.09
1	31	Plan010sinve	260.57	39.63	42.51	42.97	44.33	0.0313	6.18	45.5	23.63	1.29	43.17	0.66
1	31	Plan005sinve	195.71	39.63	42.1	42.53	43.72	0.0353	5.78	36.06	22.46	1.33	43.17	1.07
1	31	Plan002sinve	116.13	39.63	41.54	41.88	42.77	0.0411	4.97	24.25	20.17	1.36	43.17	1.63
1	30	Plan500sinve	750.69	38.4	44.29	45.11	46.92	0.0176	8.38	115.3	29.8	1.13	42.40	-1.89
1	30	Plan250sinve	616.68	38.4	43.66	44.37	46.17	0.0193	8.11	97.02	28.53	1.16	42.40	-1.26
1	30	Plan100sinve	521.15	38.4	43.2	43.74	45.6	0.0206	7.86	84.07	27.59	1.18	42.40	-0.80
1	30	Plan050sinve	435.85	38.4	43.68	43.32	44.92	0.0094	5.69	97.73	28.58	0.81	42.40	-1.28
1	30	Plan025sinve	354.58	38.4	43.24	42.39	44.32	0.0092	5.27	85.27	27.68	0.79	42.40	-0.84
1	30	Plan010sinve	260.57	38.4	42.49	42.13	43.46	0.01	4.9	65.17	24.18	0.8	42.40	-0.09
1	30	Plan005sinve	195.71	38.4	42.01	41.65	42.79	0.0094	4.34	54.17	22.36	0.75	42.40	0.39
1	30	Plan002sinve	116.13	38.4	41.19	40.89	41.79	0.0101	3.74	36.51	20.21	0.75	42.40	1.21
1	29	Plan500sinve	750.69	37.81	43.76	44.63	46.43	0.0212	8.9	118.86	68.31	1.21	41.92	-1.84
1	29	Plan250sinve	616.68	37.81	43.8	44.28	45.54	0.0137	7.19	121.82	68.41	0.98	41.92	-1.88
1	29	Plan100sinve	521.15	37.81	43.96	43.96	45.03	0.0083	5.71	132.6	68.77	0.76	41.92	-2.04
1	29	Plan050sinve	435.85	37.81	43.57	43.57	44.65	0.0087	5.55	105.72	57.01	0.77	41.92	-1.65
1	29	Plan025sinve	354.58	37.81	42.73	42.73	44.03	0.0125	5.95	79.17	29.6	0.9	41.92	-0.81
1	29	Plan010sinve	260.57	37.81	41.82	41.82	43.14	0.0161	5.8	55.18	21.63	0.98	41.92	0.10
1	29	Plan005sinve	195.71	37.81	41.34	41.34	42.46	0.0161	5.26	45.09	20.46	0.96	41.92	0.58
1	29	Plan002sinve	116.13	37.81	40.63	40.63	41.45	0.0164	4.45	31.11	18.73	0.93	41.92	1.29
1	28	Plan500sinve	750.69	37.68	41.93	43.02	45.53	0.0345	9.19	95.18	33.26	1.48	40.70	-1.23
1	28	Plan250sinve	616.68	37.68	41.54	42.5	44.77	0.0349	8.62	82.56	32.51	1.47	40.70	-0.84
1	28	Plan100sinve	521.15	37.68	41.14	42.12	44.34	0.04	8.52	69.56	31.21	1.54	40.70	-0.44

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	28	Plan050sinve	435.85	37.68	40.74	41.74	43.93	0.047	8.42	57.92	27.24	1.63	40.70	-0.04
1	28	Plan025sinve	354.58	37.68	40.45	41.36	43.23	0.047	7.82	50.45	25.43	1.6	40.70	0.25
1	28	Plan010sinve	260.57	37.68	40.1	40.78	42.3	0.0453	6.91	41.64	24.71	1.53	40.70	0.60
1	28	Plan005sinve	195.71	37.68	39.8	40.34	41.63	0.0455	6.25	34.35	24.1	1.5	40.70	0.90
1	28	Plan002sinve	116.13	37.68	39.38	39.75	40.64	0.0442	5.13	24.34	22.43	1.41	40.70	1.32
1	27	Plan500sinve	750.69	37.21	40.8	41.87	44.38	0.0423	9.01	94.21	36.55	1.58	39.90	-0.90
1	27	Plan250sinve	616.68	37.21	40.5	41.41	43.6	0.0411	8.34	83.36	36.21	1.53	39.90	-0.60
1	27	Plan100sinve	521.15	37.21	40.27	41.07	43	0.04	7.8	75	35.95	1.49	39.90	-0.37
1	27	Plan050sinve	435.85	37.21	40.06	40.75	42.42	0.0381	7.22	67.36	35.7	1.44	39.90	-0.16
1	27	Plan025sinve	354.58	37.21	39.87	40.41	41.78	0.0338	6.46	60.66	33.53	1.34	39.90	0.03
1	27	Plan010sinve	260.57	37.21	39.6	39.95	41	0.0287	5.5	52.17	30.73	1.21	39.90	0.30
1	27	Plan005sinve	195.71	37.21	39.38	39.56	40.42	0.0242	4.7	45.67	30.46	1.09	39.90	0.52
1	27	Plan002sinve	116.13	37.21	38.97	39	39.64	0.0211	3.73	33.47	27.96	0.98	39.90	0.93
1	26	Plan500sinve	750.69	36.14	39.37	40.46	42.98	0.0516	8.71	92.39	41.46	1.7	38.94	-0.43
1	26	Plan250sinve	616.68	36.14	39.09	40.03	42.22	0.0513	8.07	80.93	41.08	1.66	38.94	-0.15
1	26	Plan100sinve	521.15	36.14	38.86	39.72	41.64	0.0518	7.58	72.12	35.35	1.64	38.94	0.08
1	26	Plan050sinve	435.85	36.14	38.64	39.4	41.08	0.0524	7.09	64.25	35.02	1.62	38.94	0.30
1	26	Plan025sinve	354.58	36.14	38.41	39.07	40.51	0.0531	6.56	56.28	34.69	1.6	38.94	0.53
1	26	Plan010sinve	260.57	36.14	38.11	38.59	39.8	0.0551	5.88	45.94	34.25	1.58	38.94	0.83
1	26	Plan005sinve	195.71	36.14	37.86	38.28	39.29	0.06	5.4	37.45	33.88	1.6	38.94	1.08
1	26	Plan002sinve	116.13	36.14	37.53	37.82	38.56	0.0676	4.56	26.1	33.15	1.6	38.94	1.41
1	25	Plan500sinve	750.69	35.25	38.52	39.43	41.58	0.0477	8.04	98.5	49.21	1.61	38.57	0.05
1	25	Plan250sinve	616.68	35.25	38.3	39.07	40.86	0.0443	7.29	88.17	44.55	1.53	38.57	0.27
1	25	Plan100sinve	521.15	35.25	38.12	38.78	40.31	0.042	6.72	80.44	40.44	1.47	38.57	0.45
1	25	Plan050sinve	435.85	35.25	37.95	38.52	39.77	0.0389	6.12	73.73	40.07	1.4	38.57	0.62
1	25	Plan025sinve	354.58	35.25	37.78	38.12	39.25	0.0355	5.49	66.72	39.68	1.31	38.57	0.79
1	25	Plan010sinve	260.57	35.25	37.55	37.73	38.61	0.0308	4.67	57.59	39.17	1.2	38.57	1.02
1	25	Plan005sinve	195.71	35.25	37.37	37.44	38.14	0.0265	3.99	50.59	38.77	1.09	38.57	1.20
1	25	Plan002sinve	116.13	35.25	36.96	37.02	37.52	0.0279	3.43	35.22	35.74	1.07	38.57	1.61
1	24	Plan500sinve	750.69	34.88	38.29	38.91	40.57	0.0318	7.01	116.04	52.93	1.34	37.64	-0.65
1	24	Plan250sinve	616.68	34.88	38.08	38.55	39.95	0.0287	6.32	104.97	52.14	1.26	37.64	-0.44
1	24	Plan100sinve	521.15	34.88	37.94	38.27	39.47	0.0253	5.71	97.51	50.92	1.17	37.64	-0.30
1	24	Plan050sinve	435.85	34.88	37.82	37.98	39.03	0.0213	5.06	91.43	49.9	1.07	37.64	-0.18
1	24	Plan025sinve	354.58	34.88	37.67	37.68	38.61	0.0179	4.44	84.07	48.63	0.97	37.64	-0.03

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	24	Plan010sinve	260.57	34.88	37.23	37.26	38.07	0.0217	4.19	65.23	41.58	1.02	37.64	0.41
1	24	Plan005sinve	195.71	34.88	36.95	36.96	37.64	0.0226	3.79	53.72	40.4	1.01	37.64	0.69
1	24	Plan002sinve	116.13	34.88	36.48	36.54	37.04	0.03	3.38	35.37	38.12	1.1	37.64	1.16
1	23	Plan500sinve	750.69	34.53	37.46	38.45	40.03	0.0367	7.43	111.83	53.47	1.44	37.3	-0.16
1	23	Plan250sinve	616.68	34.53	37.14	37.89	39.42	0.0382	6.96	95.58	47.18	1.44	37.30	0.16
1	23	Plan100sinve	521.15	34.53	36.9	37.53	38.95	0.0391	6.58	84.8	45.48	1.43	37.30	0.40
1	23	Plan050sinve	435.85	34.53	36.66	37.19	38.53	0.0416	6.26	73.89	43.69	1.45	37.30	0.64
1	23	Plan025sinve	354.58	34.53	36.38	36.88	38.11	0.0475	6	61.87	41.63	1.51	37.30	0.92
1	23	Plan010sinve	260.57	34.53	36.08	36.49	37.53	0.0513	5.46	49.78	40.94	1.51	37.30	1.22
1	23	Plan005sinve	195.71	34.53	35.86	36.21	37.08	0.0554	5.02	40.64	40.4	1.52	37.30	1.44
1	23	Plan002sinve	116.13	34.53	35.57	35.81	36.41	0.0565	4.13	29.07	38.78	1.46	37.30	1.73
1	22	Plan500sinve	750.69	34.33	37.37	38.21	39.69	0.0311	7.21	119.17	56.35	1.35	36.8	-0.57
1	22	Plan250sinve	616.68	34.33	37.21	37.84	39.03	0.0261	6.36	110.3	54.85	1.22	36.80	-0.41
1	22	Plan100sinve	521.15	34.33	37.08	37.41	38.55	0.0223	5.7	103.28	53.11	1.12	36.80	-0.28
1	22	Plan050sinve	435.85	34.33	36.74	36.77	38.13	0.0246	5.48	86.56	46.73	1.15	36.80	0.06
1	22	Plan025sinve	354.58	34.33	36.58	36.71	37.68	0.0214	4.85	79.03	44.53	1.06	36.80	0.22
1	22	Plan010sinve	260.57	34.33	36.29	36.33	37.13	0.0194	4.2	66.71	42.49	0.99	36.80	0.51
1	22	Plan005sinve	195.71	34.33	36.04	36.03	36.71	0.0188	3.75	55.96	41.51	0.95	36.80	0.76
1	22	Plan002sinve	116.13	34.33	35.69	35.57	36.1	0.016	2.93	41.9	38.67	0.84	36.80	1.11
1	21	Plan500sinve	750.69	34.13	37.27	38.02	39.4	0.0282	7.03	123.77	55.16	1.29	36.56	-0.71
1	21	Plan250sinve	616.68	34.13	37.08	37.7	38.8	0.0246	6.29	113.48	54.39	1.19	36.56	-0.52
1	21	Plan100sinve	521.15	34.13	36.9	37.2	38.37	0.0228	5.8	103.83	53.66	1.13	36.56	-0.34
1	21	Plan050sinve	435.85	34.13	36.63	36.96	37.97	0.0236	5.49	89.62	48.73	1.13	36.56	-0.07
1	21	Plan025sinve	354.58	34.13	36.42	36.47	37.51	0.0213	4.91	79.86	44.89	1.06	36.56	0.14
1	21	Plan010sinve	260.57	34.13	36.12	36.18	36.97	0.02	4.31	66.56	43.63	1	36.56	0.44
1	21	Plan005sinve	195.71	34.13	35.89	35.89	36.55	0.0183	3.78	56.83	42.69	0.94	36.56	0.67
1	21	Plan002sinve	116.13	34.13	35.43	35.43	35.94	0.0215	3.29	37.92	38.29	0.96	36.56	1.13
1	20	Plan500sinve	750.69	32.89	36.95	37.51	38.71	0.019	6.8	148.1	104.93	1.1	36.32	-0.63
1	20	Plan250sinve	616.68	32.89	36.82	37.23	38.23	0.0154	5.98	134.54	104.36	0.99	36.32	-0.50
1	20	Plan100sinve	521.15	32.89	36.2	36.25	37.82	0.021	6.18	98.17	42.44	1.12	36.32	0.12
1	20	Plan050sinve	435.85	32.89	35.89	36.15	37.39	0.0221	5.92	85.25	40.95	1.13	36.32	0.43
1	20	Plan025sinve	354.58	32.89	35.6	35.85	36.94	0.0227	5.57	73.43	39.54	1.12	36.32	0.72
1	20	Plan010sinve	260.57	32.89	35.16	35.44	36.37	0.0257	5.23	56.76	36.73	1.16	36.32	1.16
1	20	Plan005sinve	195.71	32.89	34.78	35.07	35.92	0.0309	5.01	43.56	33.22	1.23	36.32	1.54

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	20	Plan002sinve	116.13	32.89	34.3	34.53	35.21	0.0376	4.41	28.45	28.67	1.28	36.32	2.02
1	19	Plan500sinve	750.69	31.71	35.79	36.55	38.03	0.0238	7.67	134.11	85.42	1.24	36.29	0.50
1	19	Plan250sinve	616.68	31.71	35.51	36.27	37.59	0.0233	7.22	111.88	73.74	1.21	36.29	0.78
1	19	Plan100sinve	521.15	31.71	35.32	35.99	37.16	0.0214	6.68	98.47	67.33	1.15	36.29	0.97
1	19	Plan050sinve	435.85	31.71	35.09	35.66	36.74	0.0202	6.21	84.09	59.69	1.1	36.29	1.20
1	19	Plan025sinve	354.58	31.71	34.74	35.26	36.26	0.021	5.86	69.42	31.26	1.1	36.29	1.55
1	19	Plan010sinve	260.57	31.71	34.18	34.47	35.59	0.0253	5.57	52.62	28.7	1.17	36.29	2.11
1	19	Plan005sinve	195.71	31.71	33.79	34.05	35.03	0.0281	5.18	41.68	26.63	1.19	36.29	2.50
1	19	Plan002sinve	116.13	31.71	33.25	33.45	34.18	0.0315	4.41	28.2	23.83	1.2	36.29	3.04
1	18	Plan500sinve	750.69	31.22	36.58	35.98	37.05	0.0044	4	277.86	109.36	0.56	35.47	-1.11
1	18	Plan250sinve	616.68	31.22	36.29	35.74	36.71	0.0041	3.75	246.48	108.69	0.54	35.47	-0.82
1	18	Plan100sinve	521.15	31.22	36.06	35.36	36.45	0.0039	3.55	221.65	108.16	0.52	35.47	-0.59
1	18	Plan050sinve	435.85	31.22	35.74	35.14	36.14	0.0043	3.53	187.32	107.42	0.53	35.47	-0.27
1	18	Plan025sinve	354.58	31.22	35.34	34.75	35.76	0.0049	3.53	146.08	89.28	0.56	35.47	0.13
1	18	Plan010sinve	260.57	31.22	34.72	34.22	35.2	0.0062	3.58	98.64	66.07	0.62	35.47	0.75
1	18	Plan005sinve	195.71	31.22	34.12	33.63	34.66	0.0084	3.65	64.83	45.57	0.69	35.47	1.35
1	18	Plan002sinve	116.13	31.22	33.32	33.01	33.78	0.0105	3.28	40.83	25.94	0.74	35.47	2.15
1	17	Plan500sinve	750.69	30.7	36.04	36.04	36.94	0.0086	5.55	208.82	106.23	0.78	35.45	-0.59
1	17	Plan250sinve	616.68	30.7	35.79	35.79	36.6	0.0081	5.21	182.12	105.43	0.75	35.45	-0.34
1	17	Plan100sinve	521.15	30.7	35.57	35.57	36.34	0.0078	4.96	159.69	104.76	0.73	35.45	-0.12
1	17	Plan050sinve	435.85	30.7	35.02	35.02	36	0.0105	5.3	112.22	60.77	0.83	35.45	0.43
1	17	Plan025sinve	354.58	30.7	34.71	34.71	35.62	0.0104	5.01	94.66	53.42	0.81	35.45	0.74
1	17	Plan010sinve	260.57	30.7	34.13	34.13	35.05	0.012	4.83	66.88	42.97	0.85	35.45	1.32
1	17	Plan005sinve	195.71	30.7	33.49	33.49	34.48	0.0162	4.86	47.06	24.2	0.96	35.45	1.96
1	17	Plan002sinve	116.13	30.7	32.84	32.84	33.59	0.0173	4.16	32.15	21.73	0.94	35.45	2.61
1	16	Plan500sinve	750.69	30.26	34.98	35.49	36.71	0.0191	7.51	150.34	99.08	1.13	35.56	0.58
1	16	Plan250sinve	616.68	30.26	34.52	35.26	36.36	0.0213	7.37	114.47	54.98	1.17	35.56	1.04
1	16	Plan100sinve	521.15	30.26	34.14	34.69	36.07	0.0246	7.43	94.74	50.21	1.24	35.56	1.42
1	16	Plan050sinve	435.85	30.26	33.83	34.48	35.72	0.0263	7.23	79.73	47.03	1.26	35.56	1.73
1	16	Plan025sinve	354.58	30.26	33.5	34.08	35.34	0.028	6.97	64.81	42.97	1.28	35.56	2.06
1	16	Plan010sinve	260.57	30.26	33.03	33.62	34.75	0.031	6.54	47.95	26.84	1.31	35.56	2.53
1	16	Plan005sinve	195.71	30.26	32.67	33.11	34.16	0.0324	6.04	38.81	24.71	1.31	35.56	2.89
1	16	Plan002sinve	116.13	30.26	32.18	32.47	33.27	0.0322	5.09	27.18	22.99	1.25	35.56	3.38

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	15	Plan500sinve	750.69	30.04	34.21	35.03	36.52	0.0317	8.77	129.57	78.84	1.42	35.59	1.38
1	15	Plan250sinve	616.68	30.04	33.92	34.7	36.17	0.0329	8.48	107.62	71.07	1.43	35.59	1.67
1	15	Plan100sinve	521.15	30.04	33.68	34.45	35.88	0.0336	8.2	91.89	64.94	1.43	35.59	1.91
1	15	Plan050sinve	435.85	30.04	33.47	34.17	35.54	0.0331	7.8	78.7	59.31	1.4	35.59	2.12
1	15	Plan025sinve	354.58	30.04	33.24	33.88	35.16	0.0324	7.33	65.66	52.04	1.37	35.59	2.35
1	15	Plan010sinve	260.57	30.04	32.92	33.49	34.56	0.0304	6.57	50.79	40.34	1.3	35.59	2.67
1	15	Plan005sinve	195.71	30.04	32.78	33.11	33.91	0.0218	5.36	45.64	35.4	1.09	35.59	2.81
1	15	Plan002sinve	116.13	30.04	32.26	32.38	33.09	0.0209	4.49	31.28	23.99	1.03	35.59	3.33
1	14	Plan500sinve	750.69	29.28	32.94	33.58	35.03	0.0312	8.02	138.48	90.13	1.38	35.44	2.50
1	14	Plan250sinve	616.68	29.28	32.76	33.32	34.66	0.0297	7.54	121.67	89.46	1.34	35.44	2.68
1	14	Plan100sinve	521.15	29.28	32.62	33.15	34.36	0.028	7.11	109.16	88.97	1.29	35.44	2.82
1	14	Plan050sinve	435.85	29.28	32.48	32.97	34.07	0.0262	6.66	96.85	88.47	1.24	35.44	2.96
1	14	Plan025sinve	354.58	29.28	32.33	32.79	33.76	0.024	6.16	83.84	87.95	1.17	35.44	3.11
1	14	Plan010sinve	260.57	29.28	32.02	32.53	33.27	0.0228	5.55	61.05	51.87	1.12	35.44	3.42
1	14	Plan005sinve	195.71	29.28	31.72	32.11	32.89	0.0233	5.17	46.82	46.02	1.11	35.44	3.72
1	14	Plan002sinve	116.13	29.28	31.23	31.42	32.11	0.0229	4.33	29.29	24.07	1.06	35.44	4.21
1	13	Plan500sinve	750.69	28.94	33.18	33.18	34.22	0.0114	5.46	184.48	80.92	0.86	34.7	1.52
1	13	Plan250sinve	616.68	28.94	32.85	32.92	33.84	0.0119	5.28	157.77	79.72	0.87	34.70	1.85
1	13	Plan100sinve	521.15	28.94	32.66	32.69	33.54	0.0112	4.94	142.75	79.04	0.83	34.70	2.04
1	13	Plan050sinve	435.85	28.94	32.4	32.48	33.26	0.0117	4.81	122.31	78.1	0.84	34.70	2.30
1	13	Plan025sinve	354.58	28.94	32.08	32.26	32.99	0.0135	4.82	97.13	76.92	0.89	34.70	2.62
1	13	Plan010sinve	260.57	28.94	31.79	31.87	32.56	0.0122	4.28	75.49	67.16	0.83	34.70	2.91
1	13	Plan005sinve	195.71	28.94	31.33	31.34	32.13	0.0151	4.2	51.95	36.47	0.9	34.70	3.37
1	13	Plan002sinve	116.13	28.94	30.63	30.66	31.34	0.021	3.86	32.4	25.08	0.99	34.70	4.07
1	12	Plan500sinve	750.69	27.81	31.49	32.07	33.52	0.0274	7.6	126.48	61.46	1.3	35.5	4.01
1	12	Plan250sinve	616.68	27.81	31.16	31.72	33.1	0.0298	7.4	106.29	58.17	1.33	35.50	4.34
1	12	Plan100sinve	521.15	27.81	30.88	31.46	32.8	0.0327	7.29	90.69	55.51	1.37	35.50	4.62
1	12	Plan050sinve	435.85	27.81	30.63	31.2	32.49	0.0352	7.11	77.13	53.08	1.4	35.50	4.87
1	12	Plan025sinve	354.58	27.81	30.36	30.92	32.14	0.0384	6.91	64.21	41.31	1.44	35.50	5.14
1	12	Plan010sinve	260.57	27.81	29.97	30.57	31.7	0.047	6.77	48.44	38.64	1.54	35.50	5.53
1	12	Plan005sinve	195.71	27.81	29.75	30.19	31.2	0.0449	6.12	40.33	37.2	1.48	35.50	5.75
1	12	Plan002sinve	116.13	27.81	29.48	29.75	30.37	0.0337	4.73	30.5	33.36	1.25	35.50	6.02
1	11	Plan500sinve	750.69	26.55	31.17	31.2	32.68	0.0159	6.69	143.63	48.6	1.02	38.76	7.59
1	11	Plan250sinve	616.68	26.55	30.62	30.8	32.15	0.0191	6.71	117.79	46.12	1.1	38.76	8.14

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	11	Plan100sinve	521.15	26.55	30.24	30.5	31.76	0.0219	6.68	100.29	44.36	1.15	38.76	8.52
1	11	Plan050sinve	435.85	26.55	29.92	30.2	31.36	0.0236	6.51	86.52	42.93	1.18	38.76	8.84
1	11	Plan025sinve	354.58	26.55	29.63	29.9	30.94	0.0245	6.21	74.31	41.61	1.18	38.76	9.13
1	11	Plan010sinve	260.57	26.55	29.31	29.52	30.38	0.0233	5.59	61.33	40.16	1.13	38.76	9.45
1	11	Plan005sinve	195.71	26.55	29.04	29.22	29.95	0.0228	5.13	50.69	38.66	1.1	38.76	9.72
1	11	Plan002sinve	116.13	26.55	28.51	28.66	29.28	0.0272	4.67	32.33	30.77	1.14	38.76	10.25
1	10	Plan500sinve	750.69	25.58	30.01	30.61	32.25	0.0277	8.49	121.17	49.66	1.33	39.09	9.08
1	10	Plan250sinve	616.68	25.58	29.7	30.23	31.71	0.0276	8.06	106.09	48.49	1.31	39.09	9.39
1	10	Plan100sinve	521.15	25.58	29.47	29.94	31.3	0.0275	7.71	94.72	47.59	1.3	39.09	9.62
1	10	Plan050sinve	435.85	25.58	29.24	29.69	30.9	0.0273	7.35	84	46.61	1.28	39.09	9.85
1	10	Plan025sinve	354.58	25.58	29	29.42	30.48	0.0265	6.89	73.01	44.38	1.24	39.09	10.09
1	10	Plan010sinve	260.57	25.58	28.67	29.02	29.93	0.0253	6.26	59.06	41.38	1.19	39.09	10.42
1	10	Plan005sinve	195.71	25.58	28.39	28.7	29.51	0.0248	5.78	47.93	38.82	1.16	39.09	10.70
1	10	Plan002sinve	116.13	25.58	27.87	28.12	28.8	0.0264	5.1	30.28	26.71	1.15	39.09	11.22
1	9	Plan500sinve	750.69	25.2	29.26	29.86	31.52	0.0301	8.43	120.14	50.44	1.38	39.93	10.67
1	9	Plan250sinve	616.68	25.2	28.96	29.51	30.99	0.0301	7.99	105.4	49.62	1.36	39.93	10.97
1	9	Plan100sinve	521.15	25.2	28.74	29.22	30.58	0.0298	7.62	94.48	49	1.34	39.93	11.19
1	9	Plan050sinve	435.85	25.2	28.53	28.98	30.2	0.0296	7.26	83.97	48.4	1.32	39.93	11.40
1	9	Plan025sinve	354.58	25.2	28.32	28.72	29.79	0.0286	6.8	73.9	47.82	1.28	39.93	11.61
1	9	Plan010sinve	260.57	25.2	28.05	28.38	29.27	0.0264	6.13	61.41	47.09	1.21	39.93	11.88
1	9	Plan005sinve	195.71	25.2	27.85	28.13	28.87	0.0238	5.52	52.01	46.53	1.14	39.93	12.08
1	9	Plan002sinve	116.13	25.2	27.66	27.76	28.22	0.0139	3.99	43.13	46	0.86	39.93	12.27
1	8	Plan500sinve	750.69	25.05	28.73	29.42	31.18	0.0351	8.52	114.2	51.08	1.47	39.84	11.11
1	8	Plan250sinve	616.68	25.05	28.44	29.08	30.65	0.0357	8.1	99.79	50.19	1.46	39.84	11.40
1	8	Plan100sinve	521.15	25.05	28.23	28.8	30.23	0.0355	7.72	89.39	49.54	1.43	39.84	11.61
1	8	Plan050sinve	435.85	25.05	28.02	28.54	29.85	0.036	7.4	78.9	48.88	1.43	39.84	11.82
1	8	Plan025sinve	354.58	25.05	27.81	28.29	29.46	0.0359	7.01	68.72	48.22	1.41	39.84	12.03
1	8	Plan010sinve	260.57	25.05	28.35	27.95	28.79	0.0074	3.61	95.14	49.9	0.66	39.84	11.49
1	8	Plan005sinve	195.71	25.05	27.34	27.7	28.57	0.0338	5.92	46.29	46.75	1.32	39.84	12.50
1	8	Plan002sinve	116.13	25.05	26.85	27.1	27.95	0.0396	5.34	27.92	30.35	1.36	39.84	12.99
1	7	Plan500sinve	750.69	24.59	29.11	29.11	30.3	0.0137	5.93	165.51	64.53	0.94	38.03	8.92
1	7	Plan250sinve	616.68	24.59	28.81	28.81	29.86	0.0135	5.58	146.12	63.71	0.92	38.03	9.22
1	7	Plan100sinve	521.15	24.59	28.58	28.58	29.53	0.0132	5.29	131.81	63.1	0.9	38.03	9.45
1	7	Plan050sinve	435.85	24.59	28.36	28.36	29.21	0.0129	5.02	117.59	62.49	0.88	38.03	9.67

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	7	Plan025sinve	354.58	24.59	28.15	28.15	28.89	0.0121	4.64	104.58	61.92	0.84	38.03	9.88
1	7	Plan010sinve	260.57	24.59	27.46	27.46	28.4	0.0194	4.97	65.53	42.21	1.02	38.03	10.57
1	7	Plan005sinve	195.71	24.59	27.23	27.23	27.94	0.0164	4.28	56.38	39.21	0.92	38.03	10.80
1	7	Plan002sinve	116.13	24.59	26.72	26.72	27.28	0.0175	3.71	37.82	33.74	0.91	38.03	11.31
1	6	Plan500sinve	750.69	24.07	27.8	28.33	29.74	0.0302	7.59	132.98	69.71	1.34		
1	6	Plan250sinve	616.68	24.07	27.57	28.07	29.31	0.0297	7.18	117.09	69.2	1.31		
1	6	Plan100sinve	521.15	24.07	27.4	27.85	28.99	0.0293	6.85	104.82	68.8	1.29		
1	6	Plan050sinve	435.85	24.07	27.23	27.64	28.68	0.0286	6.5	93.15	67.65	1.26		
1	6	Plan025sinve	354.58	24.07	27.02	27.44	28.38	0.0289	6.2	79.65	64.18	1.25		
1	6	Plan010sinve	260.57	24.07	26.85	27.14	27.86	0.0232	5.29	68.69	61.23	1.11		
1	6	Plan005sinve	195.71	24.07	26.5	26.66	27.43	0.0244	4.87	50.07	40.15	1.11		
1	6	Plan002sinve	116.13	24.07	26.14	26.27	26.79	0.0214	3.99	36.38	37.8	1		
1	5	Plan500sinve	750.69	23.56	26.8	27.43	28.95	0.0335	7.42	126.49	69	1.39		
1	5	Plan250sinve	616.68	23.56	26.56	27.13	28.53	0.0338	7.04	110.17	68.38	1.38		
1	5	Plan100sinve	521.15	23.56	26.36	26.92	28.2	0.0346	6.75	96.61	65.26	1.38		
1	5	Plan050sinve	435.85	23.56	26.12	26.71	27.88	0.0365	6.49	82.07	58.38	1.39		
1	5	Plan025sinve	354.58	23.56	25.77	26.46	27.49	0.0436	6.3	63.97	44.4	1.47		
1	5	Plan010sinve	260.57	23.56	25.44	25.8	27.01	0.0505	5.96	49.72	43.11	1.54		
1	5	Plan005sinve	195.71	23.56	25.24	25.64	26.56	0.0505	5.43	41.01	42.31	1.5		
1	5	Plan002sinve	116.13	23.56	24.91	25.24	25.97	0.0553	4.71	27.49	41.04	1.5		
1	4	Plan500sinve	750.69	22.72	27.9	26.49	28.42	0.0037	3.57	244.78	63.05	0.51		
1	4	Plan250sinve	616.68	22.72	27.09	26.15	27.67	0.005	3.7	194.33	62.06	0.58		
1	4	Plan100sinve	521.15	22.72	26.45	25.88	27.1	0.0069	3.9	155.33	59.42	0.66		
1	4	Plan050sinve	435.85	22.72	24.98	25.42	26.83	0.0373	6.35	75.67	45.25	1.4		
1	4	Plan025sinve	354.58	22.72	24.78	25.24	26.34	0.0353	5.79	66.97	43.5	1.34		
1	4	Plan010sinve	260.57	22.72	24.49	24.81	25.74	0.0351	5.16	54.51	40.86	1.3		
1	4	Plan005sinve	195.71	22.72	24.24	24.5	25.29	0.0363	4.69	44.53	38.62	1.28		
1	4	Plan002sinve	116.13	22.72	23.88	24.05	24.61	0.0366	3.87	31.52	35.49	1.22		
1	3	Plan500sinve	750.69	21.38	27.82	27.82	28.29	0.0024	3.35	262.59	54.87	0.43		
1	3	Plan250sinve	616.68	21.38	27.03	27.03	27.48	0.0027	3.26	219.97	52.84	0.44		
1	3	Plan100sinve	521.15	21.38	26.42	26.42	26.86	0.003	3.19	188.32	50.57	0.46		
1	3	Plan050sinve	435.85	21.38	25.82	24.36	26.26	0.0035	3.14	158.92	48.37	0.48		
1	3	Plan025sinve	354.58	21.38	25.21	24.05	25.64	0.0042	3.1	129.74	46.09	0.51		
1	3	Plan010sinve	260.57	21.38	24.42	23.6	24.84	0.0055	3.04	94.61	42.5	0.57		



Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	3	Plan005sinve	195.71	21.38	23.82	23.26	24.24	0.0071	2.95	71.61	36.82	0.62		
1	3	Plan002sinve	116.13	21.38	23.01	22.76	23.4	0.0114	2.82	43.41	32.57	0.73		
1	2	Plan500sinve	750.69	20.16	25.8	25.8	27.96	0.0127	6.97	124.98	30.35	0.95		
1	2	Plan250sinve	616.68	20.16	25.2	25.2	27.15	0.0133	6.58	107.24	28.73	0.96		
1	2	Plan100sinve	521.15	20.16	24.73	24.73	26.53	0.0138	6.27	94.04	27.45	0.96		
1	2	Plan050sinve	435.85	20.16	24.29	24.29	25.92	0.0144	5.95	82.05	26.25	0.96		
1	2	Plan025sinve	354.58	20.16	23.82	23.82	25.28	0.015	5.59	70.15	24.99	0.96		
1	2	Plan010sinve	260.57	20.16	23.22	23.22	24.45	0.0162	5.1	55.59	23.36	0.97		
1	2	Plan005sinve	195.71	20.16	22.75	22.75	23.8	0.0174	4.68	44.86	22.09	0.97		
1	2	Plan002sinve	116.13	20.16	22.1	22.07	22.85	0.0188	3.93	31.07	20.33	0.96		
1	1	Plan500sinve	750.69	19.51	24.12	24.82	27.32	0.0268	8.85	102.15	32.1	1.34		
1	1	Plan250sinve	616.68	19.51	23.71	24.5	26.52	0.0264	8.24	89.25	30.58	1.31		
1	1	Plan100sinve	521.15	19.51	23.4	24.05	25.9	0.0258	7.73	79.89	29.43	1.28		
1	1	Plan050sinve	435.85	19.51	23.09	23.64	25.3	0.0253	7.22	70.94	28.28	1.25		
1	1	Plan025sinve	354.58	19.51	22.77	23.22	24.67	0.0245	6.65	62.16	27.11	1.21		
1	1	Plan010sinve	260.57	19.51	22.37	22.67	23.86	0.0227	5.83	51.52	25.63	1.13		
1	1	Plan005sinve	195.71	19.51	22.05	22.23	23.22	0.0207	5.13	43.57	24.45	1.06		
1	1	Plan002sinve	116.13	19.51	21.54	21.54	22.3	0.018	4.07	31.81	21.85	0.95		

Profile Output Table  
 HEC-RAS River: Aragon  
 Standard Table  
 Reach: 1

# Rivers 1  
 # Hydraulic Reaches 1  
 # River Stations 35  
 # Plans 8  
 # Profiles 1

RESULTADOS SIN VEGETACION Y CON AMPLIACION

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	35	Plan500	750.69	42.38	48.07	48.07	49.99	0.0143	6.26	127.64	36.68	0.9		
1	35	Plan250	616.68	42.38	47.42	47.42	49.25	0.0161	6.07	105.61	29.97	0.94		
1	35	Plan100	521.15	42.38	46.96	46.96	48.66	0.0168	5.82	92.2	28.73	0.95		
1	35	plan050	435.85	42.38	46.47	46.47	48.07	0.0182	5.63	78.67	26.3	0.97		
1	35	plan025	354.58	42.38	45.98	45.98	47.44	0.0195	5.36	66.44	23.76	0.99		
1	35	plan010	260.57	42.38	45.36	45.36	46.61	0.0212	4.95	52.59	21.31	1.01		
1	35	plan005	195.71	42.38	44.9	44.9	45.96	0.022	4.56	42.91	20.53	1.01		
1	35	plan002	116.13	42.38	44.43	44.24	45.04	0.0165	3.47	33.45	19.74	0.85		
1	34	Plan500	750.69	42.26	46.09	47.11	49.48	0.0495	8.15	92.06	35.69	1.62		
1	34	Plan250	616.68	42.26	45.78	46.64	48.73	0.0479	7.61	81.07	34.21	1.58		
1	34	Plan100	521.15	42.26	45.52	46.31	48.16	0.0466	7.19	72.48	32.62	1.54		
1	34	plan050	435.85	42.26	45.28	45.97	47.59	0.0444	6.73	64.77	31.12	1.49		
1	34	plan025	354.58	42.26	45.04	45.59	46.98	0.0409	6.16	57.52	29.64	1.41		
1	34	plan010	260.57	42.26	44.74	45.09	46.19	0.0346	5.32	48.99	27.8	1.28		
1	34	plan005	195.71	42.26	44.51	44.69	45.58	0.0286	4.58	42.71	26.37	1.15		
1	34	plan002	116.13	42.26	44.11	44.08	44.76	0.0216	3.56	32.61	23.88	0.97		
1	33	Plan500	750.69	42.1	45.74	46.52	48.51	0.0364	7.4	103.49	41.33	1.41	44.50	-1.24
1	33	Plan250	616.68	42.1	45.47	46.1	47.8	0.0342	6.77	92.27	40.63	1.34	44.50	-0.97
1	33	Plan100	521.15	42.1	45.26	45.76	47.24	0.0322	6.25	83.9	38.28	1.29	44.50	-0.76
1	33	plan050	435.85	42.1	45.04	45.42	46.72	0.0303	5.74	75.99	35.92	1.23	44.50	-0.54
1	33	plan025	354.58	42.1	44.82	45.05	46.2	0.0278	5.19	68.34	33.96	1.17	44.50	-0.32
1	33	plan010	260.57	42.1	44.58	44.61	45.54	0.0222	4.33	60.19	33.33	1.03	44.50	-0.08
1	33	plan005	195.71	42.1	44.25	44.27	45.05	0.0235	3.98	49.2	32.45	1.03	44.50	0.25
1	33	plan002	116.13	42.1	43.7	43.7	44.33	0.0238	3.51	33.12	26.79	1.01	44.50	0.80
1	32	Plan500	750.69	41.52	45.33	46.04	47.84	0.0321	7.1	110.05	46.67	1.33	44.21	-1.12

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota (m)	Diferencia (m)
1	32	Plan250 ampl	616.68	41.52	45.05	45.66	47.18	0.0303	6.51	97.42	43.69	1.27	44.21	-0.84
1	32	Plan100 amp	521.15	41.52	44.82	45.28	46.67	0.0291	6.06	87.68	41.25	1.23	44.21	-0.61
1	32	plan050 ampl	435.85	41.52	44.57	44.93	46.19	0.0286	5.64	78	38.66	1.2	44.21	-0.36
1	32	plan025 ampl	354.58	41.52	44.29	44.56	45.7	0.0293	5.27	67.37	35.61	1.2	44.21	-0.08
1	32	plan010 ampl	260.57	41.52	43.93	44.1	45.06	0.0295	4.71	55.27	33.42	1.17	44.21	0.28
1	32	plan005 ampl	195.71	41.52	43.6	43.78	44.58	0.0302	4.4	44.45	30.44	1.16	44.21	0.61
1	32	plan002 ampl	116.13	41.52	43.08	43.19	43.84	0.0313	3.86	30.06	25.83	1.14	44.21	1.13
1	31	Plan500 ampl	750.69	39.63	45.27	45.27	47.23	0.0166	6.26	123.41	31.85	0.98	43.17	-2.10
1	31	Plan250 ampl	616.68	39.63	44.64	44.75	46.51	0.0186	6.1	103.57	30.85	1.01	43.17	-1.47
1	31	Plan100 amp	521.15	39.63	44.32	44.33	45.94	0.0177	5.67	93.75	30.34	0.98	43.17	-1.15
1	31	plan050 ampl	435.85	39.63	43.71	43.94	45.42	0.0226	5.8	75.63	29.38	1.08	43.17	-0.54
1	31	plan025 ampl	354.58	39.63	43.21	43.44	44.85	0.0259	5.67	62.58	24.78	1.14	43.17	-0.04
1	31	plan010 ampl	260.57	39.63	42.6	42.91	44.12	0.0313	5.45	47.84	23.79	1.23	43.17	0.57
1	31	plan005 ampl	195.71	39.63	42.16	42.49	43.55	0.0367	5.23	37.45	22.71	1.3	43.17	1.01
1	31	plan002 ampl	116.13	39.63	41.57	41.85	42.69	0.0436	4.69	24.76	20.27	1.35	43.17	1.60
1	30	Plan500 ampl	750.69	38.4	43.12	44.03	46.38	0.0358	8.02	94.84	30.6	1.4	42.40	-0.72
1	30	Plan250 ampl	616.68	38.4	42.68	43.51	45.62	0.037	7.6	81.57	29.7	1.4	42.40	-0.28
1	30	Plan100 amp	521.15	38.4	42.31	43.09	45.05	0.0392	7.33	71.1	26.14	1.42	42.40	0.09
1	30	plan050 ampl	435.85	38.4	41.99	42.7	44.44	0.0395	6.94	62.8	25.47	1.41	42.40	0.41
1	30	plan025 ampl	354.58	38.4	41.66	42.24	43.81	0.0398	6.51	54.47	24.77	1.4	42.40	0.74
1	30	plan010 ampl	260.57	38.4	41.22	41.7	43.01	0.0404	5.94	43.9	23.53	1.39	42.40	1.18
1	30	plan005 ampl	195.71	38.4	40.88	41.27	42.37	0.0397	5.42	36.1	21.93	1.35	42.40	1.52
1	30	plan002 ampl	116.13	38.4	40.35	40.61	41.43	0.0396	4.62	25.12	19.47	1.3	42.40	2.05
1	29	Plan500 ampl	750.69	37.81	42.23	43.19	45.44	0.0384	7.94	95.16	33.39	1.42	41.92	-0.31
1	29	Plan250 ampl	616.68	37.81	41.88	42.69	44.63	0.0372	7.35	83.91	29.12	1.38	41.92	0.04
1	29	Plan100 amp	521.15	37.81	41.6	42.25	44	0.0356	6.86	75.99	28.56	1.34	41.92	0.32
1	29	plan050 ampl	435.85	37.81	41.32	41.82	43.41	0.0344	6.39	68.18	27.99	1.31	41.92	0.60
1	29	plan025 ampl	354.58	37.81	41.05	41.42	42.8	0.0324	5.85	60.62	27.43	1.26	41.92	0.87
1	29	plan010 ampl	260.57	37.81	40.69	40.92	42.03	0.0298	5.13	50.79	26.69	1.19	41.92	1.23
1	29	plan005 ampl	195.71	37.81	40.68	40.53	41.44	0.017	3.86	50.65	26.68	0.9	41.92	1.24
1	29	plan002 ampl	116.13	37.81	40.2	39.98	40.68	0.0144	3.05	38.02	25.69	0.8	41.92	1.72
1	28	Plan500 ampl	750.69	37.68	41.82	42.37	44.22	0.0283	6.91	111.16	39.19	1.25	40.70	-1.12
1	28	Plan250 ampl	616.68	37.68	41.63	41.95	43.48	0.0232	6.05	104.06	38.81	1.12	40.70	-0.93
1	28	Plan100 amp	521.15	37.68	41.52	41.59	42.96	0.0187	5.33	99.72	38.58	1	40.70	-0.82

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	28	plan050 ampl	435.85	37.68	41.19	41.25	42.49	0.0194	5.07	86.97	37.82	1.01	40.70	-0.49
1	28	plan025 ampl	354.58	37.68	40.72	40.85	42.02	0.0241	5.05	70.23	33.2	1.09	40.70	-0.02
1	28	plan010 ampl	260.57	37.68	40.2	40.39	41.39	0.0295	4.84	53.85	31.08	1.17	40.70	0.50
1	28	plan005 ampl	195.71	37.68	40.04	40.04	40.86	0.0223	3.99	49.02	30.76	1.01	40.70	0.66
1	28	plan002 ampl	116.13	37.68	39.59	39.56	40.14	0.0218	3.28	35.39	29.82	0.96	40.70	1.11
1	27	Plan500 ampl	750.69	37.21	41.08	41.52	43.32	0.0278	6.69	115.01	41.25	1.24	39.90	-1.18
1	27	Plan250 ampl	616.68	37.21	40.73	41.16	42.71	0.028	6.28	100.45	40.54	1.23	39.90	-0.83
1	27	Plan100 amp	521.15	37.21	40.45	40.84	42.24	0.0284	5.96	89.15	39.98	1.22	39.90	-0.55
1	27	plan050 ampl	435.85	37.21	40.2	40.52	41.77	0.0279	5.58	79.23	39.48	1.2	39.90	-0.30
1	27	plan025 ampl	354.58	37.21	39.98	40.19	41.28	0.0256	5.05	70.62	39.04	1.13	39.90	-0.08
1	27	plan010 ampl	260.57	37.21	39.67	39.73	40.65	0.0227	4.38	59.54	33.99	1.06	39.90	0.23
1	27	plan005 ampl	195.71	37.21	39.35	39.4	40.17	0.0234	4.03	48.6	33.29	1.06	39.90	0.55
1	27	plan002 ampl	116.13	37.21	38.9	38.9	39.48	0.0221	3.39	34.29	29.83	1.01	39.90	1.00
1	26	Plan500 ampl	750.69	36.14	39.59	40.35	42.29	0.0396	7.32	104.69	43.64	1.43	38.94	-0.65
1	26	Plan250 ampl	616.68	36.14	39.28	39.96	41.66	0.0398	6.84	91.38	43.05	1.41	38.94	-0.34
1	26	Plan100 amp	521.15	36.14	39.02	39.64	41.18	0.0412	6.51	80.28	42.27	1.42	38.94	-0.08
1	26	plan050 ampl	435.85	36.14	38.77	39.33	40.71	0.0428	6.18	70.54	36.63	1.42	38.94	0.17
1	26	plan025 ampl	354.58	36.14	38.5	38.97	40.23	0.0451	5.84	60.77	36.09	1.44	38.94	0.44
1	26	plan010 ampl	260.57	36.14	38.15	38.55	39.63	0.0501	5.39	48.31	35.39	1.47	38.94	0.79
1	26	plan005 ampl	195.71	36.14	37.91	38.24	39.13	0.0514	4.89	39.99	34.92	1.46	38.94	1.03
1	26	plan002 ampl	116.13	36.14	37.56	37.8	38.44	0.056	4.15	27.96	34.1	1.46	38.94	1.38
1	25	Plan500 ampl	750.69	35.25	38.72	39.45	41.26	0.0394	7.09	108.12	49.63	1.43	38.57	-0.15
1	25	Plan250 ampl	616.68	35.25	38.45	39.08	40.63	0.0383	6.55	95.04	48.03	1.38	38.57	0.12
1	25	Plan100 amp	521.15	35.25	38.25	38.77	40.13	0.0366	6.07	85.92	43.36	1.34	38.57	0.32
1	25	plan050 ampl	435.85	35.25	38.05	38.46	39.66	0.0351	5.62	77.61	40.29	1.29	38.57	0.52
1	25	plan025 ampl	354.58	35.25	37.86	38.1	39.17	0.032	5.06	70.11	39.87	1.22	38.57	0.71
1	25	plan010 ampl	260.57	35.25	37.62	37.73	38.57	0.0276	4.31	60.44	39.33	1.11	38.57	0.95
1	25	plan005 ampl	195.71	35.25	37.4	37.42	38.12	0.025	3.76	52.02	38.85	1.04	38.57	1.17
1	25	plan002 ampl	116.13	35.25	36.9	37	37.53	0.0334	3.49	33.27	35	1.14	38.57	1.67
1	24	Plan500 ampl	750.69	34.88	38.4	38.89	40.43	0.0293	6.37	121.7	53.1	1.25	37.64	-0.76
1	24	Plan250 ampl	616.68	34.88	38.18	38.54	39.85	0.0267	5.76	109.83	52.74	1.18	37.64	-0.54
1	24	Plan100 amp	521.15	34.88	38.02	38.25	39.4	0.0239	5.24	101.45	51.57	1.1	37.64	-0.38
1	24	plan050 ampl	435.85	34.88	37.91	37.96	38.99	0.0196	4.61	96.08	50.68	0.99	37.64	-0.27
1	24	plan025 ampl	354.58	34.88	37.59	37.62	38.58	0.0216	4.4	80.61	42.4	1.02	37.64	0.05

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Width (m)	Froude #	Chl (m)	Cota calle (m)	Diferencia (m)
1	24	plan010 ampl	260.57	34.88	37.22	37.23	38.04	0.0229	4.01	65.06	41.57	1.02	37.64	0.42	
1	24	plan005 ampl	195.71	34.88	36.9	36.94	37.62	0.026	3.76	52.02	40.22	1.06	37.64	0.74	
1	24	plan002 ampl	116.13	34.88	36.4	36.53	37.05	0.0386	3.58	32.46	36.61	1.21	37.64	1.24	
1	23	Plan500 ampl	750.69	34.53	37.43	38.37	39.88	0.0388	6.97	109.98	52.79	1.43	37.3	-0.13	
1	23	Plan250 ampl	616.68	34.53	37.13	37.82	39.3	0.0399	6.55	95.12	47.11	1.42	37.30	0.17	
1	23	Plan100 amp	521.15	34.53	36.88	37.46	38.87	0.042	6.26	83.69	45.3	1.43	37.30	0.42	
1	23	plan050 ampl	435.85	34.53	36.63	37.15	38.47	0.046	6.02	72.41	43.44	1.47	37.30	0.67	
1	23	plan025 ampl	354.58	34.53	36.39	36.85	38.03	0.0487	5.68	62.39	41.66	1.48	37.30	0.91	
1	23	plan010 ampl	260.57	34.53	36.09	36.47	37.47	0.0534	5.22	49.92	40.94	1.51	37.30	1.21	
1	23	plan005 ampl	195.71	34.53	35.87	36.19	37.02	0.0561	4.76	41.12	40.43	1.51	37.30	1.43	
1	23	plan002 ampl	116.13	34.53	35.58	35.79	36.37	0.056	3.93	29.56	38.87	1.44	37.30	1.72	
1	22	Plan500 ampl	750.69	34.33	37.33	38.13	39.51	0.0342	6.58	117.05	56.21	1.35	36.8	-0.53	
1	22	Plan250 ampl	616.68	34.33	37.1	37.64	38.92	0.0315	5.99	104.63	53.45	1.28	36.80	-0.30	
1	22	Plan100 amp	521.15	34.33	36.95	37.3	38.46	0.0282	5.45	96.58	51.41	1.2	36.80	-0.15	
1	22	plan050 ampl	435.85	34.33	36.79	36.98	38.03	0.025	4.93	88.86	47.36	1.11	36.80	0.01	
1	22	plan025 ampl	354.58	34.33	36.6	36.66	37.6	0.0226	4.44	79.91	44.79	1.05	36.80	0.20	
1	22	plan010 ampl	260.57	34.33	36.25	36.28	37.07	0.0235	4.03	64.66	42.31	1.04	36.80	0.55	
1	22	plan005 ampl	195.71	34.33	36.07	36	36.67	0.0191	3.41	57.45	41.65	0.93	36.80	0.73	
1	22	plan002 ampl	116.13	34.33	35.71	35.56	36.09	0.0164	2.72	42.74	38.85	0.83	36.80	1.09	
1	21	Plan500 ampl	750.69	34.13	37.34	37.96	39.16	0.027	6.01	127.64	55.44	1.21	36.56	-0.78	
1	21	Plan250 ampl	616.68	34.13	37.18	37.38	38.6	0.0226	5.3	118.6	54.77	1.09	36.56	-0.62	
1	21	Plan100 amp	521.15	34.13	36.93	37.1	38.21	0.0227	5.02	105.23	53.77	1.08	36.56	-0.37	
1	21	plan050 ampl	435.85	34.13	36.64	36.82	37.84	0.0245	4.84	90.23	48.98	1.1	36.56	-0.08	
1	21	plan025 ampl	354.58	34.13	36.43	36.49	37.42	0.0233	4.43	80.09	44.91	1.06	36.56	0.13	
1	21	plan010 ampl	260.57	34.13	36.07	36.12	36.91	0.0248	4.05	64.27	43.41	1.06	36.56	0.49	
1	21	plan005 ampl	195.71	34.13	35.84	35.84	36.5	0.0232	3.58	54.6	42.47	1.01	36.56	0.72	
1	21	plan002 ampl	116.13	34.13	35.41	35.41	35.91	0.0253	3.12	37.22	38.09	1.01	36.56	1.15	
1	20	Plan500 ampl	750.69	32.89	36.45	37.23	38.45	0.0283	6.28	120.01	50.23	1.23	36.32	-0.13	
1	20	Plan250 ampl	616.68	32.89	36.07	36.49	37.9	0.0306	5.99	102.94	44.56	1.26	36.32	0.25	
1	20	Plan100 amp	521.15	32.89	35.78	36.17	37.49	0.0335	5.8	89.78	43.93	1.3	36.32	0.54	
1	20	plan050 ampl	435.85	32.89	35.53	35.88	37.08	0.0348	5.51	79.13	43.42	1.3	36.32	0.79	
1	20	plan025 ampl	354.58	32.89	35.26	35.61	36.67	0.0378	5.25	67.53	42.6	1.33	36.32	1.06	
1	20	plan010 ampl	260.57	32.89	34.95	35.23	36.11	0.0386	4.77	54.64	40.55	1.31	36.32	1.37	
1	20	plan005 ampl	195.71	32.89	34.67	34.93	35.71	0.0435	4.51	43.37	38.27	1.35	36.32	1.65	

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	20	plan002 ampl	116.13	32.89	34.28	34.48	35.07	0.0443	3.93	29.55	32.57	1.32	36.32	2.04
1	19	Plan500 ampl	750.69	31.71	35.46	36.2	37.57	0.0294	6.57	125.63	77.22	1.23	36.29	0.83
1	19	Plan250 ampl	616.68	31.71	35.21	35.87	37.04	0.0272	6.04	107.9	69.01	1.17	36.29	1.08
1	19	Plan100 amp	521.15	31.71	35.03	35.51	36.59	0.0246	5.54	95.97	62.88	1.11	36.29	1.26
1	19	plan050 ampl	435.85	31.71	34.71	34.91	36.15	0.0263	5.32	81.95	36.29	1.13	36.29	1.58
1	19	plan025 ampl	354.58	31.71	34.38	34.57	35.68	0.0282	5.06	70.11	35.62	1.15	36.29	1.91
1	19	plan010 ampl	260.57	31.71	33.98	34.15	35.08	0.0304	4.64	56.19	34.82	1.17	36.29	2.31
1	19	plan005 ampl	195.71	31.71	33.72	33.83	34.6	0.0297	4.15	47.2	34.29	1.13	36.29	2.57
1	19	plan002 ampl	116.13	31.71	33.3	33.37	33.93	0.0306	3.52	33.02	31.75	1.1	36.29	2.99
1	18	Plan500 ampl	750.69	31.22	36.34	35.64	36.8	0.0048	3.32	273.79	108.81	0.52	35.47	-0.87
1	18	Plan250 ampl	616.68	31.22	36.02	35.23	36.43	0.0048	3.14	238.23	108.05	0.51	35.47	-0.55
1	18	Plan100 amp	521.15	31.22	35.64	34.93	36.08	0.0056	3.17	198.19	107.18	0.54	35.47	-0.17
1	18	plan050 ampl	435.85	31.22	35.26	34.63	35.72	0.0064	3.18	159.97	89.14	0.58	35.47	0.21
1	18	plan025 ampl	354.58	31.22	34.85	34.25	35.32	0.0072	3.15	126.4	76.13	0.6	35.47	0.62
1	18	plan010 ampl	260.57	31.22	34.21	33.69	34.73	0.0097	3.19	84.55	55.81	0.68	35.47	1.26
1	18	plan005 ampl	195.71	31.22	33.76	33.37	34.23	0.0112	3.03	64.62	35.38	0.72	35.47	1.71
1	18	plan002 ampl	116.13	31.22	33.17	32.86	33.52	0.0127	2.64	44.01	33.03	0.73	35.47	2.30
1	17	Plan500 ampl	750.69	30.7	35.71	35.71	36.66	0.0105	4.65	194.46	105.2	0.77	35.45	-0.26
1	17	Plan250 ampl	616.68	30.7	35.25	35.25	36.28	0.0127	4.71	147.54	81.59	0.83	35.45	0.20
1	17	Plan100 amp	521.15	30.7	34.84	34.84	35.91	0.0147	4.72	121.42	60.54	0.87	35.45	0.61
1	17	plan050 ampl	435.85	30.7	34.53	34.53	35.54	0.0155	4.55	102.94	55.57	0.88	35.45	0.92
1	17	plan025 ampl	354.58	30.7	34.15	34.15	35.14	0.0172	4.42	83.15	49.7	0.91	35.45	1.30
1	17	plan010 ampl	260.57	30.7	33.6	33.56	34.52	0.0211	4.24	61.38	32.02	0.98	35.45	1.85
1	17	plan005 ampl	195.71	30.7	33.38	33.56	34.04	0.0172	3.59	54.49	31.57	0.87	35.45	2.07
1	17	plan002 ampl	116.13	30.7	32.78	32.78	33.31	0.0203	3.21	36.15	28.35	0.91	35.45	2.67
1	16	Plan500 ampl	750.69	30.26	34.65	35.22	36.4	0.0248	6.13	134.77	68.85	1.14	35.56	0.91
1	16	Plan250 ampl	616.68	30.26	34.26	34.87	35.99	0.0283	6.03	111.23	57.09	1.2	35.56	1.30
1	16	Plan100 amp	521.15	30.26	34.01	34.42	35.62	0.0291	5.78	97.22	54.89	1.2	35.56	1.56
1	16	plan050 ampl	435.85	30.26	33.77	34.17	35.26	0.0299	5.51	84.27	52.76	1.2	35.56	1.79
1	16	plan025 ampl	354.58	30.26	33.54	33.86	34.85	0.0292	5.11	72.65	50.09	1.16	35.56	2.02
1	16	plan010 ampl	260.57	30.26	33.46	33.46	34.24	0.0181	3.94	68.71	49.49	0.91	35.56	2.10
1	16	plan005 ampl	195.71	30.26	33	33	33.79	0.0229	3.94	49.73	31.62	1	35.56	2.56
1	16	plan002 ampl	116.13	30.26	32.58	32.58	33.07	0.0172	3.12	37.27	27.37	0.85	35.56	2.98

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude #	Chl	Cota calle (m)	Diferencia (m)
1	15	Plan500	750.69	30.04	33.97	34.75	36.18	0.0425	6.99	123.19	79.53	1.47	1.47	35.59	1.62
1	15	Plan250	616.68	30.04	33.74	34.38	35.77	0.043	6.62	105.36	74.1	1.46	1.46	35.59	1.85
1	15	Plan100	521.15	30.04	33.59	34.16	35.39	0.0411	6.19	94.09	70.45	1.41	1.41	35.59	2.00
1	15	plan050	435.85	30.04	33.41	33.92	35.05	0.0406	5.84	82.26	66.4	1.39	1.39	35.59	2.18
1	15	plan025	354.58	30.04	33.24	33.68	34.65	0.0389	5.38	71.16	61.25	1.34	1.34	35.59	2.35
1	15	plan010	260.57	30.04	33.05	33.34	34.09	0.0302	4.57	60.15	52.83	1.17	1.17	35.59	2.54
1	15	plan005	195.71	30.04	32.99	32.99	33.63	0.0188	3.57	57.41	50.48	0.92	0.92	35.59	2.60
1	15	plan002	116.13	30.04	32.35	32.32	32.95	0.0224	3.44	33.8	26.77	0.98	0.98	35.59	3.24
1	14	Plan500	750.69	29.28	33.96	33.5	34.54	0.0075	3.89	231.74	93.73	0.66	0.66	35.44	1.48
1	14	Plan250	616.68	29.28	33.62	33.27	34.16	0.0079	3.79	199.79	92.52	0.67	0.67	35.44	1.82
1	14	Plan100	521.15	29.28	33.34	33.08	33.87	0.0084	3.74	174.62	91.54	0.68	0.68	35.44	2.10
1	14	plan050	435.85	29.28	33.07	32.92	33.6	0.0091	3.72	149.96	90.58	0.7	0.7	35.44	2.37
1	14	plan025	354.58	29.28	32.54	32.74	33.39	0.0169	4.55	101.93	88.68	0.94	0.94	35.44	2.90
1	14	plan010	260.57	29.28	32.01	32.13	33.15	0.0259	4.95	61.01	51.85	1.12	1.12	35.44	3.43
1	14	plan005	195.71	29.28	31.83	32.05	32.7	0.0217	4.29	51.58	48.06	1.01	1.01	35.44	3.61
1	14	plan002	116.13	29.28	31.39	31.36	32.02	0.019	3.55	33.68	31.29	0.92	0.92	35.44	4.05
1	13	Plan500	750.69	28.94	33.14	33.14	34.16	0.0129	4.98	181.2	80.77	0.86	0.86	34.7	1.56
1	13	Plan250	616.68	28.94	32.88	32.88	33.78	0.0124	4.68	159.71	79.81	0.84	0.84	34.70	1.82
1	13	Plan100	521.15	28.94	32.67	32.67	33.5	0.0119	4.41	143.77	79.08	0.81	0.81	34.70	2.03
1	13	plan050	435.85	28.94	32.45	32.45	33.22	0.0118	4.21	126.12	78.27	0.8	0.8	34.70	2.25
1	13	plan025	354.58	28.94	32.17	32.23	32.93	0.0126	4.11	104.01	77.25	0.82	0.82	34.70	2.53
1	13	plan010	260.57	28.94	31.64	31.77	32.54	0.0175	4.25	66.36	56.96	0.93	0.93	34.70	3.06
1	13	plan005	195.71	28.94	31.1	31.21	32.07	0.0261	4.38	44.7	27.55	1.1	1.1	34.70	3.60
1	13	plan002	116.13	28.94	30.63	30.63	31.29	0.0233	3.57	32.5	25.1	1	1	34.70	4.07
1	12	Plan500	750.69	27.81	31.52	32.02	33.42	0.0276	6.24	128.44	61.76	1.23	1.23	35.5	3.98
1	12	Plan250	616.68	27.81	31.15	31.66	33.01	0.0321	6.13	105.76	58.09	1.3	1.3	35.50	4.35
1	12	Plan100	521.15	27.81	30.85	31.4	32.7	0.0371	6.06	88.93	55.2	1.37	1.37	35.50	4.65
1	12	plan050	435.85	27.81	30.57	31.12	32.38	0.0434	5.97	73.79	52.47	1.45	1.45	35.50	4.93
1	12	plan025	354.58	27.81	30.27	30.83	32.02	0.0513	5.86	60.55	40.71	1.53	1.53	35.50	5.23
1	12	plan010	260.57	27.81	29.95	30.39	31.46	0.0563	5.45	47.84	38.54	1.56	1.56	35.50	5.55
1	12	plan005	195.71	27.81	29.82	30.09	30.89	0.0447	4.58	42.72	37.63	1.37	1.37	35.50	5.68
1	12	plan002	116.13	27.81	29.51	29.65	30.2	0.0377	3.69	31.5	33.88	1.22	1.22	35.50	5.99
1	11	Plan500	750.69	26.55	31.09	31.16	32.65	0.0169	5.74	139.89	48.25	0.99	0.99	38.76	7.67
1	11	Plan250	616.68	26.55	30.75	30.76	32.1	0.0163	5.32	123.55	46.69	0.96	0.96	38.76	8.01

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area Top (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)	
1	11	Plan100	amp	521.15	26.55	30.41	30.44	31.67	0.0172	5.12	108.16	45.16	0.97	38.76	8.35
1	11	plan050	amp	435.85	26.55	30.09	30.14	31.26	0.0184	4.92	93.72	43.68	0.99	38.76	8.67
1	11	plan025	amp	354.58	26.55	29.84	29.84	30.82	0.0174	4.5	82.95	42.54	0.95	38.76	8.92
1	11	plan010	amp	260.57	26.55	29.37	29.43	30.27	0.0204	4.25	63.8	40.44	0.99	38.76	9.39
1	11	plan005	amp	195.71	26.55	29.06	29.1	29.83	0.0216	3.91	51.36	38.94	1	38.76	9.70
1	11	plan002	amp	116.13	26.55	28.53	28.59	29.16	0.0295	3.54	32.83	30.85	1.09	38.76	10.23
1	10	Plan500	amp	750.69	25.58	29.89	30.49	32.18	0.0333	6.93	114.97	49.18	1.34	39.09	9.20
1	10	Plan250	amp	616.68	25.58	29.59	30.12	31.61	0.0337	6.49	100.53	48.05	1.33	39.09	9.50
1	10	Plan100	amp	521.15	25.58	29.36	29.83	31.18	0.0343	6.14	89.5	47.17	1.33	39.09	9.73
1	10	plan050	amp	435.85	25.58	29.12	29.54	30.78	0.0349	5.84	78.54	45.52	1.32	39.09	9.97
1	10	plan025	amp	354.58	25.58	28.87	29.27	30.36	0.0349	5.5	67.58	43.24	1.3	39.09	10.22
1	10	plan010	amp	260.57	25.58	28.56	28.87	29.79	0.0341	4.97	54.44	40.34	1.26	39.09	10.53
1	10	plan005	amp	195.71	25.58	28.29	28.56	29.34	0.0345	4.57	43.78	37.82	1.24	39.09	10.80
1	10	plan002	amp	116.13	25.58	27.85	27.98	28.62	0.0334	3.9	29.78	26.49	1.17	39.09	11.24
1	9	Plan500	amp	750.69	25.2	29.29	29.75	31.3	0.0304	6.52	121.69	50.53	1.26	39.93	10.64
1	9	Plan250	amp	616.68	25.2	29.04	29.38	30.72	0.0287	5.97	109.17	49.83	1.21	39.93	10.89
1	9	Plan100	amp	521.15	25.2	28.84	29.11	30.3	0.0277	5.55	99.08	49.27	1.18	39.93	11.09
1	9	plan050	amp	435.85	25.2	28.65	28.85	29.89	0.0259	5.1	90.16	48.76	1.13	39.93	11.28
1	9	plan025	amp	354.58	25.2	28.42	28.57	29.5	0.0263	4.76	78.62	48.1	1.12	39.93	11.51
1	9	plan010	amp	260.57	25.2	28.17	28.24	28.98	0.0233	4.1	67.05	47.42	1.03	39.93	11.76
1	9	plan005	amp	195.71	25.2	27.94	27.98	28.59	0.0231	3.69	55.92	46.76	1	39.93	11.99
1	9	plan002	amp	116.13	25.2	27.37	27.59	28.17	0.0423	3.97	30.13	39.22	1.29	39.93	12.56
1	8	Plan500	amp	750.69	25.05	28.78	29.35	30.97	0.0336	6.74	116.96	51.24	1.35	39.84	11.06
1	8	Plan250	amp	616.68	25.05	28.52	28.99	30.4	0.0329	6.25	103.64	50.43	1.31	39.84	11.32
1	8	Plan100	amp	521.15	25.05	28.31	28.71	29.97	0.0323	5.85	93.44	49.79	1.28	39.84	11.53
1	8	plan050	amp	435.85	25.05	28.1	28.46	29.58	0.0326	5.51	82.89	49.13	1.27	39.84	11.74
1	8	plan025	amp	354.58	25.05	28.58	28.18	29.17	0.0099	3.49	106.7	50.62	0.72	39.84	11.26
1	8	plan010	amp	260.57	25.05	28.25	27.85	28.7	0.009	3.03	90.28	49.6	0.67	39.84	11.59
1	8	plan005	amp	195.71	25.05	27.91	27.57	28.29	0.0094	2.78	73.64	48.54	0.67	39.84	11.93
1	8	plan002	amp	116.13	25.05	26.87	27.09	27.71	0.0461	4.06	28.58	30.71	1.34	39.84	12.97
1	7	Plan500	amp	750.69	24.59	29.02	29.02	30.26	0.0146	5.14	159.58	64.28	0.92	38.03	9.01
1	7	Plan250	amp	616.68	24.59	28.43	28.71	29.86	0.0215	5.44	122.36	62.69	1.09	38.03	9.60
1	7	Plan100	amp	521.15	24.59	28.46	28.46	29.46	0.0147	4.54	124.11	62.77	0.9	38.03	9.57
1	7	plan050	amp	435.85	24.59	28.21	28.21	29.12	0.0152	4.3	108.46	62.09	0.9	38.03	9.82



Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	7	plan025 ampl	354.58	24.59	27.92	27.92	28.76	0.0165	4.1	90.44	59.85	0.92	38.03	10.11
1	7	plan010 ampl	260.57	24.59	27.46	27.46	28.26	0.0215	3.96	65.81	42.38	1	38.03	10.57
1	7	plan005 ampl	195.71	24.59	27.14	27.14	27.84	0.0228	3.72	52.67	38.18	1.01	38.03	10.89
1	7	plan002 ampl	116.13	24.59	26.76	26.65	27.21	0.0185	2.96	39.25	34.19	0.88	38.03	11.27
1	6	Plan500 ampl	750.69	24.07	27.76	28.29	29.68	0.031	6.47	130.25	69.62	1.29		
1	6	Plan250 ampl	616.68	24.07	27.55	28	29.21	0.0298	5.98	115.44	69.15	1.25		
1	6	Plan100 amp	521.15	24.07	27.34	27.76	28.9	0.0312	5.75	100.75	68.67	1.26		
1	6	plan050 ampl	435.85	24.07	27.16	27.56	28.56	0.0307	5.39	88.82	66.56	1.23		
1	6	plan025 ampl	354.58	24.07	26.98	27.33	28.19	0.0294	4.95	77.24	63.55	1.18		
1	6	plan010 ampl	260.57	24.07	26.77	26.97	27.68	0.0257	4.25	64.06	59.93	1.08		
1	6	plan005 ampl	195.71	24.07	26.56	26.61	27.27	0.0239	3.73	52.75	45.3	1.02		
1	6	plan002 ampl	116.13	24.07	26.16	26.16	26.66	0.0261	3.14	36.95	37.84	1.02		
1	5	Plan500 ampl	750.69	23.56	26.73	27.35	28.86	0.0359	6.61	121.71	68.82	1.37		
1	5	Plan250 ampl	616.68	23.56	26.48	27.03	28.39	0.0367	6.21	104.92	67.46	1.36		
1	5	Plan100 amp	521.15	23.56	26.27	26.81	28.05	0.0388	5.94	90.75	63.67	1.38		
1	5	plan050 ampl	435.85	23.56	26.05	26.56	27.68	0.041	5.65	78.07	54.83	1.39		
1	5	plan025 ampl	354.58	23.56	25.8	26.28	27.29	0.0449	5.4	65.65	44.55	1.42		
1	5	plan010 ampl	260.57	23.56	25.48	25.84	26.79	0.0527	5.08	51.26	43.26	1.49		
1	5	plan005 ampl	195.71	23.56	25.25	25.56	26.38	0.0579	4.71	41.54	42.36	1.52		
1	5	plan002 ampl	116.13	23.56	24.98	25.17	25.73	0.0556	3.83	30.36	41.31	1.42		
1	4	Plan500 ampl	750.69	22.72	27.61	26.38	28.19	0.0049	3.41	226.79	62.7	0.55		
1	4	Plan250 ampl	616.68	22.72	26.88	26.02	27.49	0.0066	3.49	181.67	61.37	0.62		
1	4	Plan100 amp	521.15	22.72	26.3	25.75	26.97	0.0088	3.63	146.84	58.78	0.7		
1	4	plan050 ampl	435.85	22.72	25.09	25.47	26.57	0.0351	5.4	80.73	46.24	1.3		
1	4	plan025 ampl	354.58	22.72	24.88	25.16	26.14	0.033	4.96	71.48	44.42	1.25		
1	4	plan010 ampl	260.57	22.72	24.6	24.78	25.59	0.0311	4.41	59.04	41.84	1.19		
1	4	plan005 ampl	195.71	22.72	24.35	24.47	25.16	0.0303	3.99	49.03	39.65	1.15		
1	4	plan002 ampl	116.13	22.72	23.96	24.03	24.55	0.0308	3.38	34.38	36.2	1.11		
1	3	Plan500 ampl	750.69	21.38	27.51		28	0.0032	3.14	246.03	54.51	0.46		
1	3	Plan250 ampl	616.68	21.38	26.8		27.26	0.0035	3.04	207.73	51.97	0.47		
1	3	Plan100 amp	521.15	21.38	26.23		26.67	0.0039	2.97	178.97	49.88	0.49		
1	3	plan050 ampl	435.85	21.38	25.68	24.34	26.11	0.0043	2.91	152.26	47.86	0.51		
1	3	plan025 ampl	354.58	21.38	25.12	24	25.53	0.0051	2.86	125.76	45.77	0.53		
1	3	plan010 ampl	260.57	21.38	24.39	23.57	24.79	0.0065	2.79	93.52	42.19	0.58		

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude #	Chl Cota calle (m)	Diferencia (m)
1	3	plan005 ampl	195.71	21.38	23.82	23.23	24.2	0.008	2.74	71.52	36.8	0.63		
1	3	plan002 ampl	116.13	21.38	23	22.74	23.37	0.0129	2.7	42.97	32.5	0.75		
1	2	Plan500 ampl	750.69	20.16	25.63	25.63	27.63	0.018	6.27	119.68	29.87	1		
1	2	Plan250 ampl	616.68	20.16	25.04	25.04	26.88	0.0187	6.01	102.64	28.29	1.01		
1	2	Plan100 amp	521.15	20.16	24.6	24.6	26.29	0.019	5.76	90.46	27.1	1.01		
1	2	plan050 ampl	435.85	20.16	24.18	24.18	25.72	0.0194	5.5	79.18	25.95	1.01		
1	2	plan025 ampl	354.58	20.16	23.73	23.73	25.12	0.0199	5.22	67.92	24.75	1.01		
1	2	plan010 ampl	260.57	20.16	23.16	23.16	24.34	0.0206	4.81	54.2	23.2	1		
1	2	plan005 ampl	195.71	20.16	22.73	22.7	23.72	0.0208	4.4	44.5	22.04	0.99		
1	2	plan002 ampl	116.13	20.16	22.21	22.7	22.83	0.0172	3.48	33.33	20.63	0.87		
1	1	Plan500 ampl	750.69	19.51	24.13	24.86	26.86	0.0309	7.32	102.54	32.14	1.31		
1	1	Plan250 ampl	616.68	19.51	23.74	24.32	26.12	0.03	6.84	90.13	30.69	1.27		
1	1	Plan100 amp	521.15	19.51	23.42	23.9	25.55	0.0295	6.47	80.56	29.51	1.25		
1	1	plan050 ampl	435.85	19.51	23.12	23.51	24.99	0.0284	6.05	72.01	28.42	1.21		
1	1	plan025 ampl	354.58	19.51	22.82	23.09	24.41	0.0269	5.58	63.51	27.3	1.17		
1	1	plan010 ampl	260.57	19.51	22.42	22.55	23.66	0.0249	4.94	52.77	25.81	1.1		
1	1	plan005 ampl	195.71	19.51	22.13	22.13	23.07	0.0214	4.29	45.67	24.77	1.01		
1	1	plan002 ampl	116.13	19.51	21.5	21.5	22.22	0.0231	3.77	30.8	21.61	1.01		

**APÉNDICE N° 4**

**RESULTADOS CON LIMPIEZA Y AMPLIACIÓN DE CAUCE  
Y NUEVO MURO**

HEC-RAS River: Aragon Reach: 1

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	35	Plan500conmu	750.69	15.00	42.38	48.58	48.58	50.44	0.0109	6.88	138.88	38.61	3.29	0.90
1	35	Plan250conmu	616.68	15.00	42.38	48.15	48.15	49.80	0.0105	6.41	122.56	36.98	3.04	0.87
1	35	Plan100conmu	521.15	15.00	42.38	47.52	47.52	49.19	0.0122	6.38	100.63	30.22	3.03	0.92
1	35	Plan050conmu	435.85	15.00	42.38	47.12	47.12	48.62	0.0121	6.00	88.84	29.22	2.79	0.90
1	35	Plan025conmu	354.58	15.00	42.38	46.56	46.56	48.01	0.0136	5.82	72.97	26.75	2.51	0.93
1	35	Plan010conmu	260.57	15.00	42.38	45.87	45.87	47.17	0.0151	5.41	55.85	23.19	2.23	0.95
1	35	Plan005conmu	195.71	15.00	42.38	45.36	45.36	46.48	0.0158	4.95	44.75	20.94	1.98	0.95
1	35	Plan002conmu	116.13	15.00	42.38	44.61	44.61	45.46	0.0178	4.26	29.97	18.31	1.54	0.96
1	34	Plan500conmu	750.69	18.50	42.26	46.13	47.29	49.96	0.0393	9.36	93.36	35.77	2.51	1.57
1	34	Plan250conmu	616.68	18.50	42.26	45.71	46.82	49.32	0.0426	8.99	78.81	33.80	2.25	1.60
1	34	Plan100conmu	521.15	18.50	42.26	45.43	46.46	48.71	0.0432	8.52	69.51	32.05	2.10	1.59
1	34	Plan050conmu	435.85	18.50	42.26	45.13	46.13	48.15	0.0452	8.12	60.24	30.20	1.93	1.59
1	34	Plan025conmu	354.58	18.50	42.26	44.83	45.69	47.54	0.0468	7.62	51.47	28.35	1.76	1.59
1	34	Plan010conmu	260.57	18.50	42.26	44.45	45.16	46.70	0.0483	6.88	41.14	26.00	1.54	1.57
1	34	Plan005conmu	195.71	18.50	42.26	44.16	44.73	46.01	0.0491	6.21	33.68	24.15	1.36	1.54
1	34	Plan002conmu	116.13	18.50	42.26	43.73	44.10	45.00	0.0494	5.10	23.83	21.94	1.06	1.47
1	33	Plan500conmu	750.69	17.50	42.10	45.52	46.61	49.13	0.0425	9.05	94.20	40.99	2.21	1.60
1	33	Plan250conmu	616.68	17.50	42.10	45.27	46.24	48.41	0.0407	8.40	84.39	38.42	2.12	1.55
1	33	Plan100conmu	521.15	17.50	42.10	44.99	45.86	47.79	0.0406	7.86	74.20	35.37	2.02	1.52
1	33	Plan050conmu	435.85	17.50	42.10	44.78	45.62	47.20	0.0389	7.29	66.78	33.84	1.91	1.47
1	33	Plan025conmu	354.58	17.50	42.10	44.57	45.12	46.57	0.0358	6.60	59.80	33.30	1.74	1.39
1	33	Plan010conmu	260.57	17.50	42.10	44.33	44.69	45.77	0.0294	5.56	51.93	32.67	1.55	1.23
1	33	Plan005conmu	195.71	17.50	42.10	44.19	44.35	45.17	0.0219	4.57	47.26	32.30	1.43	1.05
1	33	Plan002conmu	116.13	17.50	42.10	43.72	43.72	44.37	0.0204	3.67	33.63	26.89	1.22	0.97
1	32	Plan500conmu	750.69	30.50	41.52	45.24	46.18	48.31	0.0335	8.44	106.15	45.77	2.24	1.44
1	32	Plan250conmu	616.68	30.50	41.52	47.29	45.81	47.80	0.0033	3.59	207.40	51.13	3.76	0.49
1	32	Plan100conmu	521.15	30.50	41.52	44.72	45.44	47.04	0.0303	7.22	83.82	40.24	2.01	1.33
1	32	Plan050conmu	435.85	30.50	41.52	45.84	45.08	46.48	0.0058	3.91	135.10	49.03	2.64	0.62
1	32	Plan025conmu	354.58	30.50	41.52	45.21	44.68	45.91	0.0078	4.04	104.54	45.39	2.22	0.69
1	32	Plan010conmu	260.57	30.50	41.52	43.85	44.15	45.27	0.0278	5.49	52.65	33.29	1.54	1.21
1	32	Plan005conmu	195.71	30.50	41.52	43.54	43.86	44.71	0.0279	4.95	42.87	29.83	1.40	1.18
1	32	Plan002conmu	116.13	30.50	41.52	43.03	43.22	43.91	0.0322	4.25	28.75	25.56	1.10	1.19

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	31	Plan500conmu	750.69	30.50	39.63	44.53	45.36	47.72	0.0124	8.43	100.35	30.89	2.93	1.29
1	31	Plan250conmu	616.68	30.00	39.63	46.52		47.61	0.0061	5.29	147.66	33.33	3.78	0.67
1	31	Plan100conmu	521.15	30.00	39.63	43.66	44.42	46.40	0.0138	7.68	74.31	29.31	2.33	1.31
1	31	Plan050conmu	435.85	30.00	39.63	44.61	44.61	46.14	0.0127	6.05	88.21	28.97	2.72	0.91
1	31	Plan025conmu	354.58	30.00	39.63	44.18	44.18	45.55	0.0128	5.67	75.89	27.98	2.45	0.90
1	31	Plan010conmu	260.57	30.00	39.63	43.34	43.42	44.70	0.0167	5.54	53.96	22.25	2.22	0.99
1	31	Plan005conmu	195.71	30.00	39.63	42.83	42.94	44.03	0.0182	5.15	42.93	21.06	1.91	1.00
1	31	Plan002conmu	116.13	30.00	39.63	42.06	42.22	43.07	0.0230	4.61	27.52	18.66	1.42	1.07
1	30	Plan500conmu	750.69	25.00	38.40	44.72	45.41	47.23	0.0074	8.17	120.60	48.36	2.23	1.06
1	30	Plan250conmu	616.68	25.00	38.40	44.48	44.22	47.16	0.0180	8.65	104.19	38.52	2.38	1.14
1	30	Plan100conmu	521.15	25.00	38.40	43.05	43.76	45.99	0.0124	8.52	74.80	22.63	2.84	1.30
1	30	Plan050conmu	435.85	25.00	38.40	42.98	43.56	45.52	0.0239	8.17	67.68	22.00	2.65	1.25
1	30	Plan025conmu	354.58	25.00	38.40	42.41	43.05	44.89	0.0274	7.97	55.47	20.63	2.36	1.31
1	30	Plan010conmu	260.57	25.00	38.40	41.81	42.38	43.97	0.0293	7.34	43.49	19.20	2.04	1.32
1	30	Plan005conmu	195.71	25.00	38.40	41.33	41.85	43.25	0.0317	6.84	34.55	18.06	1.76	1.33
1	30	Plan002conmu	116.13	25.00	38.40	40.67	41.10	42.18	0.0348	5.93	23.11	16.42	1.35	1.33
1	29	Plan500conmu	750.69	30.00	37.81	43.98	44.95	46.96	0.0108	9.30	115.67	61.14	1.73	1.24
1	29	Plan250conmu	616.68	30.00	37.81	43.42	43.42	46.60	0.0245	9.16	86.36	23.62	3.01	1.29
1	29	Plan100conmu	521.15	30.00	37.81	43.85	44.25	45.47	0.0059	6.78	107.72	60.84	1.62	0.92
1	29	Plan050conmu	435.85	30.00	37.81	43.19	43.19	44.99	0.0146	6.87	80.89	23.06	2.90	0.99
1	29	Plan025conmu	354.58	30.00	37.81	42.63	42.63	44.28	0.0154	6.50	68.47	21.74	2.65	0.99
1	29	Plan010conmu	260.57	30.00	37.81	41.95	41.95	43.35	0.0160	5.91	54.14	20.12	2.31	0.98
1	29	Plan005conmu	195.71	30.00	37.81	41.42	41.42	42.61	0.0164	5.40	43.73	18.85	2.03	0.97
1	29	Plan002conmu	116.13	30.00	37.81	40.64	40.64	41.53	0.0172	4.58	29.82	17.00	1.59	0.95
1	28	Plan500conmu	750.69	30.00	37.68	41.94	43.28	46.39	0.0199	10.00	85.67	26.56	2.84	1.61
1	28	Plan250conmu	616.68	30.00	37.68	41.46	42.70	45.54	0.0440	9.53	73.01	25.60	2.55	1.54
1	28	Plan100conmu	521.15	30.00	37.68	41.07	42.24	44.93	0.0237	9.21	63.20	24.83	2.31	1.68
1	28	Plan050conmu	435.85	30.00	37.68	40.82	41.80	44.11	0.0460	8.49	57.01	24.34	2.15	1.62
1	28	Plan025conmu	354.58	30.00	37.68	40.49	41.37	43.40	0.0472	7.93	49.26	23.70	1.93	1.61
1	28	Plan010conmu	260.57	30.00	37.68	40.09	40.79	42.47	0.0484	7.13	39.85	22.91	1.64	1.58
1	28	Plan005conmu	195.71	30.00	37.68	39.78	40.36	41.75	0.0492	6.44	32.84	22.30	1.41	1.55
1	28	Plan002conmu	116.13	30.00	37.68	39.36	39.74	40.69	0.0466	5.23	23.66	21.47	1.08	1.44

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Val Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	27	Plan500conmu	750.69	30.00	37.21	40.53	42.02	45.58	0.0315	10.51	78.64	29.84	2.38	1.92
1	27	Plan250conmu	616.68	30.00	37.21	40.48	41.52	44.03	0.0463	8.80	77.02	29.78	2.34	1.63
1	27	Plan100conmu	521.15	30.00	37.21	39.91	41.12	44.04	0.0346	9.44	60.28	29.13	1.91	1.94
1	27	Plan050conmu	435.85	30.00	37.21	40.04	40.76	42.59	0.0407	7.43	64.12	29.28	2.01	1.49
1	27	Plan025conmu	354.58	30.00	37.21	39.82	40.38	41.90	0.0371	6.69	57.85	29.04	1.85	1.40
1	27	Plan010conmu	260.57	30.00	37.21	39.56	39.90	41.05	0.0310	5.64	50.23	28.74	1.64	1.25
1	27	Plan005conmu	195.71	30.00	37.21	39.34	39.54	40.44	0.0261	4.82	44.07	28.49	1.46	1.13
1	27	Plan002conmu	116.13	30.00	37.21	39.00	39.01	39.64	0.0197	3.64	34.29	28.10	1.17	0.95
1	26	Plan500conmu	750.69	25.00	36.14	38.90	40.43	44.38	0.0486	10.61	73.48	35.41	1.94	2.28
1	26	Plan250conmu	616.68	25.00	36.14	39.04	40.06	42.44	0.0570	8.38	78.80	41.00	1.81	1.75
1	26	Plan100conmu	521.15	25.00	36.14	38.44	39.70	42.76	0.0521	9.41	57.36	34.73	1.57	2.27
1	26	Plan050conmu	435.85	25.00	36.14	38.60	39.44	41.16	0.0568	7.27	62.67	34.96	1.69	1.68
1	26	Plan025conmu	354.58	25.00	36.14	38.39	38.90	40.55	0.0556	6.66	55.47	34.65	1.52	1.63
1	26	Plan010conmu	260.57	25.00	36.14	38.11	38.59	39.81	0.0555	5.90	45.82	34.24	1.28	1.58
1	26	Plan005conmu	195.71	25.00	36.14	37.87	38.28	39.28	0.0583	5.35	37.79	33.90	1.08	1.57
1	26	Plan002conmu	116.13	25.00	36.14	37.51	37.82	38.58	0.0710	4.63	25.70	33.09	0.76	1.64
1	25	Plan500conmu	750.69	20.00	35.25	38.04	39.45	43.00	0.0503	10.24	77.22	40.27	1.82	2.28
1	25	Plan250conmu	616.68	20.00	35.25	38.35	39.14	40.92	0.0461	7.53	90.18	45.60	1.88	1.57
1	25	Plan100conmu	521.15	20.00	35.25	37.67	38.79	41.31	0.0479	8.74	62.32	39.43	1.51	2.16
1	25	Plan050conmu	435.85	20.00	35.25	37.97	38.60	39.77	0.0390	6.17	74.33	40.11	1.76	1.40
1	25	Plan025conmu	354.58	20.00	35.25	37.79	38.11	39.24	0.0353	5.51	67.41	39.72	1.62	1.31
1	25	Plan010conmu	260.57	20.00	35.25	37.56	37.73	38.61	0.0307	4.68	58.04	39.19	1.42	1.19
1	25	Plan005conmu	195.71	20.00	35.25	37.37	37.44	38.14	0.0265	4.00	50.80	38.78	1.26	1.09
1	25	Plan002conmu	116.13	20.00	35.25	36.95	37.02	37.53	0.0289	3.47	34.84	35.60	0.95	1.08
1	24	Plan500conmu	750.69	15.00	34.88	37.67	38.91	41.89	0.0393	9.40	84.30	48.67	1.68	2.05
1	24	Plan250conmu	616.68	15.00	34.88	38.13	38.59	40.00	0.0282	6.34	107.50	52.55	1.98	1.25
1	24	Plan100conmu	521.15	15.00	34.88	37.33	38.28	40.30	0.0347	7.87	69.54	41.90	1.61	1.87
1	24	Plan050conmu	435.85	15.00	34.88	38.03	38.03	39.06	0.0163	4.70	102.11	51.68	1.91	0.95
1	24	Plan025conmu	354.58	15.00	34.88	37.53	37.57	38.63	0.0227	4.78	78.00	42.28	1.78	1.08
1	24	Plan010conmu	260.57	15.00	34.88	37.22	37.25	38.07	0.0218	4.19	65.13	41.57	1.52	1.03
1	24	Plan005conmu	195.71	15.00	34.88	36.95	36.96	37.64	0.0225	3.79	53.80	40.40	1.30	1.01
1	24	Plan002conmu	116.13	15.00	34.88	36.47	36.54	37.04	0.0309	3.41	34.98	37.93	0.90	1.11

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	23	Plan500conmu	750.69	16.00	34.53	36.87	38.45	41.26	0.0418	9.62	83.44	45.26	1.79	2.11
1	23	Plan250conmu	616.68	16.00	34.53	37.11	38.24	39.45	0.0398	7.05	94.32	46.99	1.95	1.47
1	23	Plan100conmu	521.15	16.00	34.53	36.49	37.53	39.72	0.0395	8.19	66.74	41.90	1.55	1.98
1	23	Plan050conmu	435.85	16.00	34.53	36.62	37.19	38.58	0.0450	6.41	72.04	43.38	1.61	1.50
1	23	Plan025conmu	354.58	16.00	34.53	36.40	36.88	38.09	0.0456	5.93	62.68	41.67	1.47	1.48
1	23	Plan010conmu	260.57	16.00	34.53	36.08	36.49	37.53	0.0513	5.46	49.80	40.94	1.20	1.51
1	23	Plan005conmu	195.71	16.00	34.53	35.86	36.21	37.08	0.0555	5.02	40.62	40.40	0.99	1.53
1	23	Plan002conmu	116.13	16.00	34.53	35.57	35.81	36.40	0.0558	4.11	29.18	38.80	0.75	1.46
1	22	Plan500conmu	750.69	8.00	34.33	36.93	38.21	40.47	0.0280	8.79	95.85	51.22	1.83	1.78
1	22	Plan250conmu	616.68	8.00	34.33	38.40	38.02	38.99	0.0059	3.83	208.70	103.07	1.98	0.61
1	22	Plan100conmu	521.15	8.00	34.33	36.55	37.41	39.01	0.0239	7.26	77.62	44.10	1.73	1.60
1	22	Plan050conmu	435.85	8.00	34.33	37.17	36.77	38.11	0.0138	4.58	108.06	54.30	1.95	0.89
1	22	Plan025conmu	354.58	8.00	34.33	36.78	36.71	37.69	0.0158	4.43	88.31	47.23	1.83	0.92
1	22	Plan010conmu	260.57	8.00	34.33	36.42	36.33	37.13	0.0153	3.90	72.03	42.97	1.65	0.89
1	22	Plan005conmu	195.71	8.00	34.33	36.09	36.03	36.71	0.0168	3.62	58.04	41.70	1.38	0.90
1	22	Plan002conmu	116.13	8.00	34.33	35.68	35.57	36.10	0.0162	2.94	41.68	38.62	1.07	0.84
1	21	Plan500conmu	750.69	25.00	34.13	36.85	38.13	40.21	0.0254	8.61	96.01	43.92	2.10	1.70
1	21	Plan250conmu	616.68	25.00	34.13	37.43	37.43	38.84	0.0169	5.63	122.19	46.27	2.51	1.01
1	21	Plan100conmu	521.15	25.00	34.13	36.48	37.16	38.79	0.0211	7.10	80.27	42.45	1.83	1.51
1	21	Plan050conmu	435.85	25.00	34.13	36.86	36.86	37.98	0.0171	4.97	96.67	43.98	2.11	0.98
1	21	Plan025conmu	354.58	25.00	34.13	36.55	36.55	37.54	0.0179	4.67	83.14	42.72	1.88	0.98
1	21	Plan010conmu	260.57	25.00	34.13	36.17	36.17	36.99	0.0186	4.22	67.16	41.18	1.59	0.97
1	21	Plan005conmu	195.71	25.00	34.13	35.86	35.86	36.56	0.0196	3.87	54.80	39.94	1.35	0.97
1	21	Plan002conmu	116.13	25.00	34.13	35.44	35.44	35.94	0.0209	3.26	38.28	38.23	1.00	0.95
1	20	Plan500conmu	750.69	30.00	32.89	36.22	37.50	39.62	0.0213	8.93	97.20	40.82	2.28	1.61
1	20	Plan250conmu	616.68	30.00	32.89	36.51	36.54	38.33	0.0208	6.56	109.45	42.20	2.47	1.13
1	20	Plan100conmu	521.15	30.00	32.89	35.74	36.50	38.27	0.0194	7.63	78.14	38.56	1.96	1.49
1	20	Plan050conmu	435.85	30.00	32.89	35.86	36.17	37.44	0.0234	6.04	82.72	39.11	2.04	1.16
1	20	Plan025conmu	354.58	30.00	32.89	35.53	35.84	36.98	0.0249	5.74	70.36	37.60	1.82	1.17
1	20	Plan010conmu	260.57	30.00	32.89	35.12	35.41	36.39	0.0275	5.33	55.25	35.66	1.53	1.19
1	20	Plan005conmu	195.71	30.00	32.89	34.80	35.08	35.92	0.0301	4.97	43.96	33.33	1.31	1.21
1	20	Plan002conmu	116.13	30.00	32.89	34.29	34.53	35.22	0.0381	4.43	28.33	28.63	0.98	1.29

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	19	Plan500conmu	750.69	17.50	31.76	35.22	36.20	38.87	0.0288	9.56	102.60	93.60	1.05	1.67
1	19	Plan250conmu	616.68	17.50	31.76	35.58	36.39	37.59	0.0286	7.05	109.54	74.00	1.40	1.17
1	19	Plan100conmu	521.15	17.50	31.76	34.97	35.78	37.65	0.0214	7.88	79.53	86.66	0.88	1.43
1	19	Plan050conmu	435.85	17.50	31.76	35.28	35.66	36.73	0.0214	5.82	89.06	63.99	1.31	1.01
1	19	Plan025conmu	354.58	17.50	31.76	35.14	35.42	36.27	0.0170	5.07	80.80	59.48	1.28	0.90
1	19	Plan010conmu	260.57	17.50	31.76	34.62	34.62	35.66	0.0181	4.75	60.19	28.95	1.88	0.92
1	19	Plan005conmu	195.71	17.50	31.76	34.07	34.18	35.11	0.0230	4.69	45.04	26.08	1.58	1.01
1	19	Plan002conmu	116.13	17.50	31.76	33.48	33.55	34.26	0.0248	4.02	30.46	22.98	1.23	1.02
1	18	Plan500conmu	750.69	12.50	31.22	34.22	35.17	38.21	0.0448	10.80	97.06	94.12	1.00	2.01
1	18	Plan250conmu	616.68	12.50	31.22	36.37	35.60	36.76	0.0054	3.46	235.64	99.04	2.24	0.49
1	18	Plan100conmu	521.15	12.50	31.22	34.01	34.79	37.13	0.0357	9.26	76.94	93.62	0.80	1.79
1	18	Plan050conmu	435.85	12.50	31.22	35.79	35.14	36.17	0.0060	3.45	178.98	97.72	1.74	0.52
1	18	Plan025conmu	354.58	12.50	31.22	35.35	34.87	35.78	0.0070	3.55	137.00	86.97	1.49	0.56
1	18	Plan010conmu	260.57	12.50	31.22	34.71	34.41	35.22	0.0089	3.66	89.73	63.08	1.34	0.63
1	18	Plan005conmu	195.71	12.50	31.22	34.09	33.78	34.74	0.0124	3.88	57.22	42.22	1.26	0.74
1	18	Plan002conmu	116.13	12.50	31.22	33.29	33.14	33.87	0.0154	3.59	35.79	23.35	1.40	0.81
1	17	Plan500conmu	750.69	12.00	30.70	33.94	34.82	37.53	0.0459	10.86	102.88	87.93	1.13	1.97
1	17	Plan250conmu	616.68	12.00	30.70	35.86	35.86	36.62	0.0126	4.99	176.84	95.20	1.75	0.71
1	17	Plan100conmu	521.15	12.00	30.70	33.65	34.45	36.62	0.0395	9.58	79.58	73.32	1.04	1.82
1	17	Plan050conmu	435.85	12.00	30.70	35.01	35.01	36.00	0.0162	5.20	105.14	55.65	1.74	0.81
1	17	Plan025conmu	354.58	12.00	30.70	34.92	34.92	35.63	0.0118	4.41	100.10	53.69	1.72	0.70
1	17	Plan010conmu	260.57	12.00	30.70	34.19	34.19	35.04	0.0155	4.58	65.92	41.20	1.47	0.80
1	17	Plan005conmu	195.71	12.00	30.70	33.55	33.55	34.51	0.0206	4.74	45.99	23.43	1.75	0.92
1	17	Plan002conmu	116.13	12.00	30.70	32.90	32.90	33.63	0.0208	4.12	31.61	20.98	1.37	0.92
1	16	Plan500conmu	750.69	5.50	30.26	33.39	34.26	36.96	0.0483	10.90	102.99	91.71	1.09	2.04
1	16	Plan250conmu	616.68	5.50	30.26	34.46	34.95	36.30	0.0295	6.97	106.87	50.96	1.92	1.12
1	16	Plan100conmu	521.15	5.50	30.26	33.14	33.89	36.13	0.0421	9.73	81.45	84.34	0.94	1.90
1	16	Plan050conmu	435.85	5.50	30.26	33.82	34.36	35.64	0.0337	6.83	76.10	44.73	1.57	1.19
1	16	Plan025conmu	354.58	5.50	30.26	33.49	34.06	35.30	0.0359	6.69	61.82	41.77	1.38	1.23
1	16	Plan010conmu	260.57	5.50	30.26	33.09	33.63	34.70	0.0351	6.14	47.64	28.09	1.55	1.22
1	16	Plan005conmu	195.71	5.50	30.26	32.70	33.16	34.14	0.0371	5.80	38.10	23.79	1.47	1.24
1	16	Plan002conmu	116.13	5.50	30.26	32.20	32.48	33.28	0.0363	4.98	26.65	22.05	1.13	1.21



Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	15	Plan500conmu	750.69	45.00	30.04	33.16	34.05	36.71	0.0391	11.29	108.11	92.15	1.15	2.14
1	15	Plan250conmu	616.68	45.00	30.04	34.04	34.67	36.11	0.0290	8.15	112.95	71.22	1.51	1.35
1	15	Plan100conmu	521.15	45.00	30.04	32.92	33.67	35.91	0.0351	10.08	86.12	89.30	0.95	1.99
1	15	Plan050conmu	435.85	45.00	30.04	33.59	34.21	35.46	0.0289	7.46	83.25	59.80	1.33	1.32
1	15	Plan025conmu	354.58	45.00	30.04	33.33	33.92	35.12	0.0293	7.11	68.43	52.95	1.24	1.31
1	15	Plan010conmu	260.57	45.00	30.04	33.04	33.52	34.48	0.0255	6.20	54.69	42.92	1.22	1.20
1	15	Plan005conmu	195.71	45.00	30.04	32.96	33.13	33.87	0.0165	4.89	51.29	40.05	1.22	0.96
1	15	Plan002conmu	116.13	45.00	30.04	32.26	32.38	33.11	0.0214	4.53	30.87	23.16	1.27	1.04
1	14	Plan500conmu	750.69	35.00	29.28	32.89	33.58	35.22	0.0173	8.44	133.40	88.61	1.47	1.47
1	14	Plan250conmu	616.68	35.00	29.28	32.76	33.34	34.73	0.0308	7.67	121.47	88.39	1.35	1.36
1	14	Plan100conmu	521.15	35.00	29.28	32.56	33.17	34.60	0.0161	7.60	104.24	88.07	1.16	1.39
1	14	Plan050conmu	435.85	35.00	29.28	32.49	32.99	34.14	0.0269	6.77	97.73	87.95	1.09	1.25
1	14	Plan025conmu	354.58	35.00	29.28	32.36	32.81	33.82	0.0241	6.22	86.10	87.74	0.97	1.18
1	14	Plan010conmu	260.57	35.00	29.28	32.01	32.56	33.34	0.0240	5.69	60.76	51.80	1.15	1.15
1	14	Plan005conmu	195.71	35.00	29.28	31.68	32.11	32.93	0.0253	5.32	45.06	44.91	0.98	1.15
1	14	Plan002conmu	116.13	35.00	29.28	31.23	31.42	32.11	0.0230	4.33	29.26	24.00	1.19	1.06
1	13	Plan500conmu	750.69	36.00	28.94	32.64	33.21	34.61	0.0123	7.38	140.89	78.27	1.76	1.25
1	13	Plan250conmu	616.68	36.00	28.94	32.89	32.94	33.87	0.0118	5.29	160.22	78.79	1.98	0.87
1	13	Plan100conmu	521.15	36.00	28.94	32.18	32.75	34.03	0.0129	6.89	105.18	77.30	1.34	1.25
1	13	Plan050conmu	435.85	36.00	28.94	32.44	32.55	33.31	0.0118	4.86	124.91	77.84	1.57	0.85
1	13	Plan025conmu	354.58	36.00	28.94	32.15	32.33	33.05	0.0128	4.77	103.13	77.20	1.32	0.87
1	13	Plan010conmu	260.57	36.00	28.94	32.00	32.05	32.63	0.0094	3.94	90.88	76.63	1.17	0.74
1	13	Plan005conmu	195.71	36.00	28.94	31.11	31.11	32.17	0.0222	4.76	45.13	27.63	1.59	1.07
1	13	Plan002conmu	116.13	36.00	28.94	30.63	30.66	31.34	0.0211	3.87	32.32	25.06	1.26	1.00
1	12	Plan500conmu	750.69	35.00	27.81	31.29	32.12	33.99	0.0193	8.75	112.73	57.51	1.90	1.54
1	12	Plan250conmu	616.68	35.00	27.81	31.24	31.78	33.15	0.0284	7.35	110.18	57.14	1.87	1.31
1	12	Plan100conmu	521.15	35.00	27.81	30.70	31.51	33.33	0.0237	8.50	80.46	52.67	1.50	1.65
1	12	Plan050conmu	435.85	35.00	27.81	30.70	31.26	32.54	0.0339	7.11	80.44	52.67	1.50	1.38
1	12	Plan025conmu	354.58	35.00	27.81	30.32	30.99	32.19	0.0411	7.08	62.57	40.51	1.52	1.49
1	12	Plan010conmu	260.57	35.00	27.81	29.91	30.39	31.83	0.0542	7.11	46.09	38.18	1.20	1.65
1	12	Plan005conmu	195.71	35.00	27.81	29.81	30.19	31.10	0.0386	5.81	42.49	37.55	1.12	1.38
1	12	Plan002conmu	116.13	35.00	27.81	29.48	29.75	30.37	0.0336	4.72	30.54	33.38	0.91	1.24

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	11	Plan500conmu	750.69	17.50	26.55	30.31	31.19	33.27	0.0202	9.31	103.32	43.91	2.25	1.59
1	11	Plan250conmu	616.68	17.50	26.55	30.47	30.79	32.22	0.0228	7.13	110.51	44.48	2.37	1.19
1	11	Plan100conmu	521.15	17.50	26.55	29.64	30.49	32.46	0.0257	9.10	74.49	41.51	1.75	1.73
1	11	Plan050conmu	435.85	17.50	26.55	29.84	30.19	31.41	0.0268	6.80	82.85	42.22	1.90	1.25
1	11	Plan025conmu	354.58	17.50	26.55	29.64	29.90	30.94	0.0242	6.19	74.55	41.52	1.75	1.17
1	11	Plan010conmu	260.57	17.50	26.55	29.31	29.52	30.38	0.0235	5.61	61.09	40.13	1.49	1.13
1	11	Plan005conmu	195.71	17.50	26.55	29.03	29.22	29.95	0.0236	5.19	50.08	38.41	1.28	1.11
1	11	Plan002conmu	116.13	17.50	26.55	28.51	28.66	29.28	0.0272	4.68	32.32	30.77	1.03	1.14
1	10	Plan500conmu	750.69	25.00	25.58	29.65	30.63	32.88	0.0216	10.07	101.26	45.17	2.15	1.65
1	10	Plan250conmu	616.68	25.00	25.58	29.73	30.24	31.75	0.0269	7.97	104.84	45.47	2.21	1.30
1	10	Plan100conmu	521.15	25.00	25.58	29.06	29.94	32.01	0.0247	9.62	75.28	42.94	1.71	1.72
1	10	Plan050conmu	435.85	25.00	25.58	29.21	29.67	30.93	0.0275	7.34	81.95	43.52	1.83	1.28
1	10	Plan025conmu	354.58	25.00	25.58	28.99	29.38	30.48	0.0263	6.85	72.25	42.67	1.65	1.24
1	10	Plan010conmu	260.57	25.00	25.58	28.67	29.00	29.94	0.0253	6.26	59.02	41.37	1.40	1.19
1	10	Plan005conmu	195.71	25.00	25.58	28.40	28.72	29.51	0.0247	5.77	47.98	38.83	1.21	1.16
1	10	Plan002conmu	116.13	25.00	25.58	27.87	28.12	28.80	0.0264	5.10	30.28	26.71	1.11	1.15
1	9	Plan500conmu	750.69	10.00	25.20	28.94	29.95	32.30	0.0242	10.19	99.74	46.55	2.04	1.74
1	9	Plan250conmu	616.68	10.00	25.20	29.08	29.59	31.06	0.0276	7.82	106.17	46.93	2.14	1.31
1	9	Plan100conmu	521.15	10.00	25.20	28.43	29.28	31.36	0.0261	9.52	76.00	45.12	1.62	1.76
1	9	Plan050conmu	435.85	10.00	25.20	28.64	29.03	30.21	0.0261	6.98	85.72	45.71	1.79	1.25
1	9	Plan025conmu	354.58	10.00	25.20	28.40	28.76	29.80	0.0256	6.57	75.02	45.06	1.60	1.22
1	9	Plan010conmu	260.57	10.00	25.20	28.10	28.39	29.29	0.0247	6.00	61.45	44.22	1.35	1.18
1	9	Plan005conmu	195.71	10.00	25.20	27.88	28.14	28.88	0.0229	5.45	51.62	43.60	1.15	1.11
1	9	Plan002conmu	116.13	10.00	25.20	27.66	27.75	28.22	0.0138	3.98	42.37	43.01	0.96	0.85
1	8	Plan500conmu	750.69	30.00	25.05	28.45	29.52	32.01	0.0273	10.15	95.30	45.59	2.00	1.82
1	8	Plan250conmu	616.68	30.00	25.05	28.54	29.13	30.74	0.0330	7.96	99.51	45.77	2.08	1.41
1	8	Plan100conmu	521.15	30.00	25.05	27.94	28.85	31.05	0.0302	9.49	72.30	44.61	1.57	1.86
1	8	Plan050conmu	435.85	30.00	25.05	28.08	28.58	29.89	0.0334	7.24	78.71	44.89	1.69	1.38
1	8	Plan025conmu	354.58	30.00	25.05	27.85	28.31	29.49	0.0339	6.88	68.20	44.44	1.49	1.37
1	8	Plan010conmu	260.57	30.00	25.05	27.55	27.95	28.97	0.0343	6.37	55.05	43.87	1.23	1.35
1	8	Plan005conmu	195.71	30.00	25.05	27.32	27.69	28.57	0.0339	5.90	45.10	43.43	1.02	1.32
1	8	Plan002conmu	116.13	30.00	25.05	26.85	27.10	27.95	0.0397	5.35	27.87	30.29	0.91	1.37

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	7	Plan500conmu	750.69	25.00	24.59	28.28	29.11	31.06	0.0212	9.04	112.84	62.28	1.79	1.60
1	7	Plan250conmu	616.68	25.00	24.59	28.74	28.81	29.87	0.0149	5.79	141.50	63.52	2.19	0.96
1	7	Plan100conmu	521.15	25.00	24.59	27.94	28.58	30.06	0.0183	7.80	92.00	60.45	1.51	1.46
1	7	Plan050conmu	435.85	25.00	24.59	28.36	28.36	29.21	0.0129	5.02	117.59	62.49	1.85	0.88
1	7	Plan025conmu	354.58	25.00	24.59	28.15	28.15	28.89	0.0121	4.64	104.58	61.92	1.67	0.84
1	7	Plan010conmu	260.57	25.00	24.59	27.46	27.46	28.40	0.0194	4.97	65.53	42.21	1.53	1.02
1	7	Plan005conmu	195.71	25.00	24.59	27.23	27.23	27.94	0.0164	4.28	56.38	39.21	1.42	0.92
1	7	Plan002conmu	116.13	25.00	24.59	26.72	26.72	27.28	0.0175	3.71	37.82	33.74	1.11	0.91
1	6	Plan500conmu	750.69	24.00	24.07	27.52	28.33	30.29	0.0485	9.07	113.27	69.08	1.60	1.67
1	6	Plan250conmu	616.68	24.00	24.07	27.58	28.07	29.30	0.0293	7.14	117.65	69.22	1.66	1.30
1	6	Plan100conmu	521.15	24.00	24.07	27.20	27.85	29.38	0.0435	7.96	91.04	67.12	1.33	1.55
1	6	Plan050conmu	435.85	24.00	24.07	27.23	27.64	28.68	0.0286	6.50	93.15	67.65	1.35	1.26
1	6	Plan025conmu	354.58	24.00	24.07	27.02	27.44	28.38	0.0289	6.20	79.65	64.18	1.22	1.25
1	6	Plan010conmu	260.57	24.00	24.07	26.85	27.14	27.86	0.0232	5.29	68.69	61.23	1.10	1.11
1	6	Plan005conmu	195.71	24.00	24.07	26.50	26.66	27.43	0.0244	4.87	50.07	40.15	1.22	1.11
1	6	Plan002conmu	116.13	24.00	24.07	26.14	26.27	26.79	0.0214	3.99	36.38	37.80	0.95	1.00
1	5	Plan500conmu	750.69	28.00	23.56	26.69	27.43	29.14	0.0398	7.89	119.27	68.73	1.70	1.51
1	5	Plan250conmu	616.68	28.00	23.56	26.56	27.13	28.52	0.0336	7.02	110.35	68.39	1.58	1.38
1	5	Plan100conmu	521.15	28.00	23.56	26.27	26.92	28.35	0.0403	7.12	91.27	63.81	1.40	1.48
1	5	Plan050conmu	435.85	28.00	23.56	26.12	26.71	27.88	0.0365	6.49	82.07	58.38	1.38	1.39
1	5	Plan025conmu	354.58	28.00	23.56	25.77	26.46	27.49	0.0435	6.30	63.97	44.40	1.41	1.47
1	5	Plan010conmu	260.57	28.00	23.56	25.44	25.80	27.01	0.0505	5.96	49.72	43.11	1.13	1.54
1	5	Plan005conmu	195.71	28.00	23.56	25.24	25.64	26.56	0.0505	5.43	41.01	42.31	0.96	1.50
1	5	Plan002conmu	116.13	28.00	23.56	24.91	25.24	25.97	0.0553	4.71	27.49	41.04	0.67	1.50
1	4	Plan500conmu	750.69	40.00	22.72	27.90	26.49	28.42	0.0037	3.57	244.78	63.05	3.73	0.51
1	4	Plan250conmu	616.68	40.00	22.72	27.09	26.15	27.67	0.0050	3.70	194.33	62.06	3.06	0.58
1	4	Plan100conmu	521.15	40.00	22.72	26.45	25.88	27.10	0.0069	3.90	155.33	59.42	2.57	0.66
1	4	Plan050conmu	435.85	40.00	22.72	24.98	25.42	26.83	0.0373	6.35	75.67	45.25	1.66	1.40
1	4	Plan025conmu	354.58	40.00	22.72	24.78	25.24	26.34	0.0353	5.79	66.97	43.50	1.53	1.34
1	4	Plan010conmu	260.57	40.00	22.72	24.49	24.81	25.74	0.0351	5.16	54.51	40.86	1.32	1.30
1	4	Plan005conmu	195.71	40.00	22.72	24.24	24.50	25.29	0.0363	4.69	44.53	38.62	1.14	1.28
1	4	Plan002conmu	116.13	40.00	22.72	23.88	24.05	24.61	0.0366	3.87	31.52	35.49	0.88	1.22

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	3	Plan500conmu	750.69	35.00	21.38	27.82		28.29	0.0024	3.35	262.59	54.87	4.51	0.43
1	3	Plan250conmu	616.68	35.00	21.38	27.03		27.48	0.0027	3.26	219.97	52.84	3.96	0.44
1	3	Plan100conmu	521.15	35.00	21.38	26.42		26.86	0.0030	3.19	188.32	50.57	3.56	0.46
1	3	Plan050conmu	435.85	35.00	21.38	25.82	24.36	26.26	0.0035	3.14	158.92	48.37	3.16	0.48
1	3	Plan025conmu	354.58	35.00	21.38	25.21	24.05	25.64	0.0042	3.10	129.74	46.09	2.72	0.51
1	3	Plan010conmu	260.57	35.00	21.38	24.42	23.60	24.84	0.0055	3.04	94.61	42.50	2.17	0.57
1	3	Plan005conmu	195.71	35.00	21.38	23.82	23.26	24.24	0.0071	2.95	71.61	36.82	1.90	0.62
1	3	Plan002conmu	116.13	35.00	21.38	23.02	22.76	23.40	0.0111	2.80	43.78	32.63	1.32	0.72
1	2	Plan500conmu	750.69	20.00	20.16	25.80	25.80	27.96	0.0127	6.97	124.98	30.35	3.67	0.95
1	2	Plan250conmu	616.68	20.00	20.16	25.20	25.20	27.15	0.0133	6.58	107.24	28.73	3.35	0.96
1	2	Plan100conmu	521.15	20.00	20.16	24.73	24.73	26.53	0.0138	6.27	94.04	27.45	3.09	0.96
1	2	Plan050conmu	435.85	20.00	20.16	24.29	24.29	25.92	0.0144	5.95	82.05	26.25	2.84	0.96
1	2	Plan025conmu	354.58	20.00	20.16	23.82	23.82	25.28	0.0150	5.59	70.15	24.99	2.57	0.96
1	2	Plan010conmu	260.57	20.00	20.16	23.22	23.22	24.45	0.0162	5.10	55.59	23.36	2.20	0.97
1	2	Plan005conmu	195.71	20.00	20.16	22.75	22.75	23.80	0.0174	4.68	44.86	22.09	1.90	0.97
1	2	Plan002conmu	116.13	20.00	20.16	22.07	22.07	22.85	0.0196	3.99	30.61	20.27	1.43	0.98
1	1	Plan500conmu	750.69		19.51	23.99	24.82	27.45	0.0300	9.19	98.11	31.63	2.92	1.41
1	1	Plan250conmu	616.68		19.51	23.58	24.50	26.66	0.0301	8.60	85.26	30.09	2.68	1.39
1	1	Plan100conmu	521.15		19.51	23.25	24.05	26.03	0.0301	8.13	75.70	28.90	2.49	1.37
1	1	Plan050conmu	435.85		19.51	22.94	23.64	25.43	0.0301	7.64	66.80	27.74	2.29	1.35
1	1	Plan025conmu	354.58		19.51	22.61	23.22	24.80	0.0299	7.11	57.94	26.53	2.09	1.32
1	1	Plan010conmu	260.57		19.51	22.19	22.67	23.97	0.0294	6.36	47.05	24.97	1.81	1.28
1	1	Plan005conmu	195.71		19.51	21.85	22.23	23.32	0.0289	5.71	38.80	23.49	1.59	1.23
1	1	Plan002conmu	116.13		19.51	21.32	21.54	22.36	0.0285	4.72	27.12	20.68	1.27	1.17

HEC-RAS River: Aragon Reach: 1

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	35	Plan500mudf	750.69	15.00	42.38	48.10	48.10	50.02	0.0147	6.27	128.06	36.77	3.00	0.90
1	35	Plan250mudf	616.68	15.00	42.38	47.36	47.36	49.28	0.0170	6.19	102.44	27.00	3.26	0.96
1	35	plan100mudf	521.15	15.00	42.38	46.93	46.93	48.66	0.0172	5.87	90.89	26.78	2.98	0.96
1	35	plan050mudf	435.85	15.00	42.38	46.49	46.49	48.07	0.0178	5.59	79.20	26.40	2.68	0.96
1	35	plan025mudf	354.58	15.00	42.38	45.98	45.98	47.44	0.0195	5.36	66.44	23.76	2.50	0.99
1	35	Plan010mudf	260.57	15.00	42.38	45.36	45.36	46.61	0.0212	4.95	52.59	21.31	2.22	1.01
1	35	plan005mudf	195.71	15.00	42.38	44.90	44.90	45.96	0.0220	4.56	42.91	20.53	1.91	1.01
1	35	plan002mudf	116.13	15.00	42.38	44.43	44.24	45.04	0.0165	3.47	33.45	19.74	1.57	0.85
1	34	Plan500mudf	750.69	18.50	42.26	46.31	47.28	49.54	0.0416	7.97	94.23	31.72	2.73	1.48
1	34	Plan250mudf	616.68	18.50	42.26	45.81	46.67	48.78	0.0440	7.63	80.78	30.98	2.45	1.51
1	34	plan100mudf	521.15	18.50	42.26	45.54	46.30	48.18	0.0434	7.19	72.49	30.39	2.26	1.49
1	34	plan050mudf	435.85	18.50	42.26	45.29	45.94	47.59	0.0426	6.73	64.78	29.83	2.08	1.46
1	34	plan025mudf	354.58	18.50	42.26	45.03	45.55	46.99	0.0410	6.20	57.23	29.27	1.89	1.41
1	34	Plan010mudf	260.57	18.50	42.26	44.73	45.08	46.20	0.0357	5.38	48.44	27.68	1.70	1.30
1	34	plan005mudf	195.71	18.50	42.26	44.51	44.68	45.58	0.0287	4.58	42.70	26.36	1.57	1.15
1	34	plan002mudf	116.13	18.50	42.26	44.11	44.08	44.76	0.0216	3.56	32.61	23.88	1.33	0.97
1	33	Plan500mudf	750.69	17.50	42.10	47.43	46.71	48.80	0.0111	5.18	145.05	32.22	3.84	0.78
1	33	Plan250mudf	616.68	17.50	42.10	46.98	46.18	48.07	0.0099	4.63	133.15	32.89	3.55	0.73
1	33	plan100mudf	521.15	17.50	42.10	46.34	45.80	47.44	0.0117	4.64	112.37	32.12	3.13	0.79
1	33	plan050mudf	435.85	17.50	42.10	45.72	45.44	46.85	0.0146	4.71	92.60	31.19	2.71	0.87
1	33	plan025mudf	354.58	17.50	42.10	45.04	45.07	46.28	0.0208	4.93	71.94	30.18	2.23	1.02
1	33	Plan010mudf	260.57	17.50	42.10	44.55	44.60	45.61	0.0226	4.55	57.32	29.45	1.86	1.04
1	33	plan005mudf	195.71	17.50	42.10	44.21	44.24	45.08	0.0232	4.14	47.29	28.93	1.58	1.03
1	33	plan002mudf	116.13	17.50	42.10	43.70	43.70	44.33	0.0238	3.51	33.12	26.79	1.21	1.01
1	32	Plan500mudf	750.69	30.50	41.52	47.41		48.56	0.0087	4.76	157.78	32.58	4.08	0.69
1	32	Plan250mudf	616.68	30.50	41.52	46.91		47.88	0.0081	4.37	141.14	31.75	3.79	0.66
1	32	plan100mudf	521.15	30.50	41.52	46.27		47.21	0.0090	4.30	121.24	30.84	3.42	0.69
1	32	plan050mudf	435.85	30.50	41.52	45.65		46.57	0.0104	4.26	102.25	29.95	3.03	0.74
1	32	plan025mudf	354.58	30.50	41.52	45.00	44.59	45.93	0.0127	4.26	83.17	29.02	2.60	0.80
1	32	Plan010mudf	260.57	30.50	41.52	43.94	44.09	45.16	0.0268	4.90	53.18	27.50	1.83	1.12
1	32	plan005mudf	195.71	30.50	41.52	43.56	43.72	44.62	0.0295	4.56	42.91	26.96	1.53	1.15
1	32	plan002mudf	116.13	30.50	41.52	43.08	43.19	43.84	0.0313	3.86	30.06	25.83	1.14	1.14

HEC-RAS River: Aragon Reach: 1 (Continued)

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	31	Plan500mudf	750.69	30.50	39.63	45.76	45.76	48.06	0.0205	6.72	111.68	24.30	3.60	1.00
1	31	Plan250mudf	616.68	30.50	39.63	45.27	45.27	47.39	0.0211	6.45	95.65	22.62	3.31	1.00
1	31	plan100mudf	521.15	30.50	39.63	44.77	44.77	46.71	0.0212	6.17	84.53	21.84	3.08	1.00
1	31	plan050mudf	435.85	30.50	39.63	44.29	44.29	46.05	0.0214	5.88	74.16	21.09	2.84	1.00
1	31	plan025mudf	354.58	30.50	39.63	43.79	43.79	45.36	0.0217	5.56	63.82	20.31	2.59	1.00
1	31	Plan010mudf	260.57	30.50	39.63	43.08	43.15	44.47	0.0238	5.22	49.89	19.21	2.20	1.03
1	31	plan005mudf	195.71	30.50	39.63	42.56	42.65	43.78	0.0256	4.90	39.97	18.39	1.89	1.06
1	31	plan002mudf	116.13	30.50	39.63	41.73	41.92	42.81	0.0358	4.61	25.21	17.09	1.34	1.21
1	30	Plan500mudf	750.69	25.00	38.40	43.62	44.99	47.11	0.0375	8.28	90.62	23.63	3.13	1.35
1	30	Plan250mudf	616.68	25.00	38.40	42.78	43.81	46.33	0.0451	8.35	73.84	22.69	2.76	1.48
1	30	plan100mudf	521.15	25.00	38.40	42.39	43.34	45.64	0.0457	7.99	65.23	21.92	2.55	1.48
1	30	plan050mudf	435.85	25.00	38.40	42.02	42.88	44.98	0.0465	7.63	57.15	21.16	2.35	1.48
1	30	plan025mudf	354.58	25.00	38.40	41.63	42.40	44.29	0.0477	7.22	49.08	20.39	2.13	1.49
1	30	Plan010mudf	260.57	25.00	38.40	41.14	41.78	43.37	0.0486	6.61	39.43	19.41	1.83	1.48
1	30	plan005mudf	195.71	25.00	38.40	40.76	41.29	42.65	0.0499	6.08	32.17	18.65	1.59	1.48
1	30	plan002mudf	116.13	25.00	38.40	40.27	40.60	41.54	0.0466	5.00	23.25	17.67	1.25	1.39
1	29	Plan500mudf	750.69	30.00	37.81	43.65	44.41	46.07	0.0230	6.89	111.56	55.30	1.81	1.07
1	29	Plan250mudf	616.68	30.00	37.81	42.13	42.93	45.13	0.0383	7.67	80.37	25.34	2.75	1.38
1	29	plan100mudf	521.15	30.00	37.81	41.84	42.49	44.44	0.0362	7.15	72.92	24.75	2.58	1.33
1	29	plan050mudf	435.85	30.00	37.81	41.55	42.07	43.78	0.0339	6.61	65.90	24.17	2.41	1.28
1	29	plan025mudf	354.58	30.00	37.81	41.27	41.63	43.09	0.0306	5.99	59.22	23.61	2.24	1.21
1	29	Plan010mudf	260.57	30.00	37.81	40.92	41.06	42.24	0.0254	5.09	51.16	22.92	2.02	1.09
1	29	plan005mudf	195.71	30.00	37.81	40.57	40.61	41.61	0.0236	4.52	43.27	22.22	1.79	1.03
1	29	plan002mudf	116.13	30.00	37.81	39.83	39.98	40.75	0.0333	4.24	27.36	20.74	1.25	1.18
1	28	Plan500mudf	750.69	30.00	37.68	41.62	42.61	45.03	0.0445	8.18	91.73	30.47	2.70	1.51
1	28	Plan250mudf	616.68	30.00	37.68	41.17	41.91	43.85	0.0407	7.25	85.08	33.07	2.41	1.44
1	28	plan100mudf	521.15	30.00	37.68	40.97	41.55	43.22	0.0374	6.66	78.30	32.66	2.26	1.37
1	28	plan050mudf	435.85	30.00	37.68	40.76	41.21	42.65	0.0341	6.08	71.73	32.25	2.11	1.30
1	28	plan025mudf	354.58	30.00	37.68	40.54	40.84	42.08	0.0314	5.51	64.39	31.78	1.94	1.23
1	28	Plan010mudf	260.57	30.00	37.68	40.21	40.39	41.39	0.0290	4.81	54.15	31.11	1.68	1.16
1	28	plan005mudf	195.71	30.00	37.68	40.03	40.04	40.86	0.0228	4.02	48.65	30.73	1.54	1.02
1	28	plan002mudf	116.13	30.00	37.68	39.59	39.56	40.14	0.0219	3.28	35.36	29.82	1.17	0.96

HEC-RAS River: Aragon Reach: 1 (Continued)

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude #	Chl
1	27	Plan500mudf	750.69	30.00	37.21	41.16	42.07	43.67	0.0305	7.02	106.98	34.41	2.82	1.27	
1	27	Plan250mudf	616.68	30.00	37.21	41.13	41.21	42.80	0.0205	5.72	107.80	35.14	2.79	1.04	
1	27	plan100mudf	521.15	30.00	37.21	40.77	40.87	42.30	0.0212	5.47	95.20	34.42	2.54	1.05	
1	27	plan050mudf	435.85	30.00	37.21	40.42	40.53	41.81	0.0220	5.22	83.46	33.73	2.30	1.06	
1	27	plan025mudf	354.58	30.00	37.21	40.08	40.18	41.32	0.0227	4.92	72.04	33.05	2.05	1.06	
1	27	Plan010mudf	260.57	30.00	37.21	39.64	39.72	40.68	0.0242	4.53	57.48	32.15	1.70	1.08	
1	27	plan005mudf	195.71	30.00	37.21	39.36	39.38	40.18	0.0226	4.03	48.61	31.60	1.48	1.04	
1	27	plan002mudf	116.13	30.00	37.21	38.90	38.90	39.48	0.0220	3.38	34.33	29.84	1.12	1.01	
1	26	Plan500mudf	750.69	25.00	36.14	39.77	40.53	42.59	0.0400	7.44	100.85	35.69	2.53	1.41	
1	26	Plan250mudf	616.68	25.00	36.14	39.28	39.99	41.84	0.0436	7.09	86.98	36.24	2.21	1.46	
1	26	plan100mudf	521.15	25.00	36.14	39.01	39.66	41.32	0.0445	6.73	77.47	35.72	2.01	1.46	
1	26	plan050mudf	435.85	25.00	36.14	38.76	39.34	40.82	0.0455	6.36	68.54	35.24	1.82	1.46	
1	26	plan025mudf	354.58	25.00	36.14	38.49	39.00	40.33	0.0479	6.00	59.07	34.71	1.60	1.47	
1	26	Plan010mudf	260.57	25.00	36.14	38.19	38.57	39.65	0.0473	5.35	48.73	34.13	1.36	1.43	
1	26	plan005mudf	195.71	25.00	36.14	37.93	38.25	39.15	0.0497	4.89	40.01	33.63	1.14	1.43	
1	26	plan002mudf	116.13	25.00	36.14	37.57	37.80	38.45	0.0551	4.17	27.87	32.93	0.82	1.45	
1	25	Plan500mudf	750.69	20.00	35.25	38.68	39.49	41.52	0.0455	7.47	100.45	40.13	2.31	1.51	
1	25	Plan250mudf	616.68	20.00	35.25	38.57	39.10	40.73	0.0364	6.51	94.72	39.31	2.22	1.34	
1	25	plan100mudf	521.15	20.00	35.25	38.33	38.78	40.22	0.0355	6.09	85.57	38.80	2.05	1.31	
1	25	plan050mudf	435.85	20.00	35.25	38.14	38.46	39.72	0.0328	5.57	78.22	38.39	1.90	1.25	
1	25	plan025mudf	354.58	20.00	35.25	37.92	38.15	39.23	0.0308	5.07	69.94	37.93	1.73	1.19	
1	25	Plan010mudf	260.57	20.00	35.25	37.65	37.75	38.62	0.0273	4.36	59.71	37.34	1.51	1.10	
1	25	plan005mudf	195.71	20.00	35.25	37.43	37.44	38.17	0.0246	3.80	51.45	36.86	1.33	1.03	
1	25	plan002mudf	116.13	20.00	35.25	36.91	37.00	37.55	0.0328	3.54	32.82	33.04	0.96	1.13	
1	24	Plan500mudf	750.69	15.00	34.88	38.36	38.88	40.58	0.0320	6.60	113.98	44.03	2.45	1.31	
1	24	Plan250mudf	616.68	15.00	34.88	38.07	38.48	39.96	0.0318	6.09	101.26	43.18	2.23	1.27	
1	24	plan100mudf	521.15	15.00	34.88	37.88	38.18	39.48	0.0296	5.60	93.02	42.87	2.08	1.21	
1	24	plan050mudf	435.85	15.00	34.88	37.68	37.89	39.04	0.0280	5.16	84.53	42.56	1.91	1.17	
1	24	plan025mudf	354.58	15.00	34.88	37.45	37.60	38.60	0.0277	4.76	74.51	42.13	1.71	1.14	
1	24	Plan010mudf	260.57	15.00	34.88	37.10	37.23	38.06	0.0294	4.34	60.09	41.06	1.42	1.14	
1	24	plan005mudf	195.71	15.00	34.88	36.86	36.94	37.63	0.0290	3.90	50.24	40.03	1.22	1.11	
1	24	plan002mudf	116.13	15.00	34.88	36.42	36.53	37.05	0.0363	3.50	33.21	37.01	0.88	1.18	

HEC-RAS River: Aragon Reach: 1 (Continued)

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	23	Plan500mudf	750.69	8.00	34.53	37.35	38.38	39.98	0.0429	7.20	105.09	45.71	2.20	1.49
1	23	Plan250mudf	616.68	8.00	34.53	37.07	37.71	39.37	0.0433	6.72	92.28	44.82	1.98	1.47
1	23	plan100mudf	521.15	8.00	34.53	36.86	37.41	38.90	0.0435	6.33	82.70	44.33	1.80	1.46
1	23	plan050mudf	435.85	8.00	34.53	36.64	37.14	38.46	0.0450	5.98	72.92	43.52	1.63	1.45
1	23	plan025mudf	354.58	8.00	34.53	36.40	36.85	38.02	0.0474	5.64	62.90	41.69	1.47	1.46
1	23	Plan010mudf	260.57	8.00	34.53	36.11	36.47	37.45	0.0508	5.14	50.71	40.99	1.21	1.47
1	23	plan005mudf	195.71	8.00	34.53	35.88	36.19	37.01	0.0539	4.70	41.64	40.46	1.02	1.48
1	23	plan002mudf	116.13	8.00	34.53	35.57	35.79	36.38	0.0581	3.98	29.20	38.80	0.75	1.46
1	22	Plan500mudf	750.69	8.00	34.33	37.36	38.18	39.55	0.0332	6.56	114.79	46.99	2.36	1.33
1	22	Plan250mudf	616.68	8.00	34.33	37.12	37.57	38.94	0.0309	5.97	103.53	46.08	2.16	1.27
1	22	plan100mudf	521.15	8.00	34.33	36.95	37.23	38.47	0.0284	5.47	95.41	45.45	2.03	1.20
1	22	plan050mudf	435.85	8.00	34.33	37.16	36.94	38.04	0.0148	4.16	104.98	46.20	2.18	0.88
1	22	plan025mudf	354.58	8.00	34.33	36.84	36.65	37.62	0.0154	3.92	90.54	45.07	1.94	0.88
1	22	Plan010mudf	260.57	8.00	34.33	36.44	36.28	37.09	0.0161	3.57	72.96	43.05	1.67	0.88
1	22	plan005mudf	195.71	8.00	34.33	36.13	36.00	36.68	0.0168	3.26	59.94	41.88	1.42	0.87
1	22	plan002mudf	116.13	8.00	34.33	35.71	35.57	36.09	0.0165	2.72	42.68	38.84	1.09	0.83
1	21	Plan500mudf	750.69	25.00	34.13	37.81	38.06	39.15	0.0168	5.18	154.92	90.22	1.67	0.96
1	21	Plan250mudf	616.68	25.00	34.13	37.12	37.40	38.76	0.0268	5.68	108.50	45.31	2.29	1.17
1	21	plan100mudf	521.15	25.00	34.13	36.85	37.09	38.33	0.0271	5.39	96.61	44.24	2.10	1.17
1	21	plan050mudf	435.85	25.00	34.13	36.80	36.80	37.89	0.0202	4.61	94.54	44.05	2.07	1.00
1	21	plan025mudf	354.58	25.00	34.13	36.50	36.50	37.47	0.0210	4.35	81.45	42.83	1.84	1.01
1	21	Plan010mudf	260.57	25.00	34.13	36.12	36.12	36.93	0.0220	3.98	65.52	41.30	1.55	1.01
1	21	plan005mudf	195.71	25.00	34.13	35.83	35.83	36.51	0.0231	3.65	53.60	40.11	1.32	1.01
1	21	plan002mudf	116.13	25.00	34.13	35.41	35.41	35.91	0.0252	3.12	37.27	38.11	0.97	1.01
1	20	Plan500mudf	750.69	30.00	32.89	36.56	37.28	38.56	0.0265	6.27	119.79	42.26	2.67	1.19
1	20	Plan250mudf	616.68	30.00	32.89	36.19	36.55	38.05	0.0286	6.04	102.03	40.30	2.39	1.21
1	20	plan100mudf	521.15	30.00	32.89	35.87	36.22	37.60	0.0307	5.83	89.42	39.67	2.15	1.24
1	20	plan050mudf	435.85	30.00	32.89	35.55	35.92	37.19	0.0343	5.67	76.89	39.04	1.89	1.29
1	20	plan025mudf	354.58	30.00	32.89	35.28	35.62	36.74	0.0365	5.36	66.13	38.48	1.66	1.31
1	20	Plan010mudf	260.57	30.00	32.89	34.93	35.22	36.17	0.0399	4.93	52.91	37.79	1.37	1.33
1	20	plan005mudf	195.71	30.00	32.89	34.68	34.92	35.71	0.0419	4.51	43.36	36.92	1.16	1.33
1	20	plan002mudf	116.13	30.00	32.89	34.28	34.48	35.07	0.0444	3.93	29.54	32.56	0.90	1.32



HEC-RAS River: Aragon Reach: 1 (Continued)

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	19	Plan500mudf	750.69	17.50	31.71	35.74	36.39	37.74	0.0283	6.53	133.22	82.71	1.52	1.19
1	19	Plan250mudf	616.68	17.50	31.71	35.56	36.12	37.20	0.0240	5.83	119.47	76.80	1.47	1.09
1	19	plan100mudf	521.15	17.50	31.71	35.50	35.84	36.76	0.0186	5.09	114.72	74.68	1.45	0.96
1	19	plan050mudf	435.85	17.50	31.71	35.46	35.48	36.38	0.0138	4.35	111.43	73.17	1.44	0.83
1	19	plan025mudf	354.58	17.50	31.71	34.66	34.82	35.99	0.0267	5.11	69.36	32.14	1.96	1.11
1	19	Plan010mudf	260.57	17.50	31.71	34.24	34.37	35.35	0.0281	4.67	55.85	31.29	1.64	1.11
1	19	plan005mudf	195.71	17.50	31.71	33.90	34.02	34.84	0.0300	4.30	45.55	30.62	1.38	1.12
1	19	plan002mudf	116.13	17.50	31.71	33.41	33.53	34.14	0.0358	3.77	30.82	29.26	0.99	1.17
1	18	Plan500mudf	750.69	12.50	31.22	36.46	35.82	36.96	0.0057	3.51	255.77	97.18	2.47	0.55
1	18	Plan250mudf	616.68	12.50	31.22	36.17	35.51	36.61	0.0053	3.26	227.95	96.50	2.22	0.53
1	18	plan100mudf	521.15	12.50	31.22	35.90	35.23	36.31	0.0054	3.13	201.96	95.88	1.99	0.53
1	18	plan050mudf	435.85	12.50	31.22	35.48	34.94	35.94	0.0067	3.25	161.82	91.61	1.67	0.58
1	18	plan025mudf	354.58	12.50	31.22	35.03	34.61	35.54	0.0081	3.32	124.11	77.34	1.52	0.63
1	18	Plan010mudf	260.57	12.50	31.22	34.40	34.01	34.99	0.0111	3.43	81.72	57.20	1.35	0.72
1	18	plan005mudf	195.71	12.50	31.22	33.86	33.61	34.47	0.0151	3.46	56.51	30.92	1.68	0.82
1	18	plan002mudf	116.13	12.50	31.22	33.27	33.08	33.73	0.0169	2.99	38.83	29.48	1.23	0.83
1	17	Plan500mudf	750.69	12.00	30.70	35.83	35.83	36.81	0.0121	4.76	187.21	94.00	1.86	0.78
1	17	Plan250mudf	616.68	12.00	30.70	35.56	35.56	36.47	0.0118	4.51	159.65	92.59	1.62	0.77
1	17	plan100mudf	521.15	12.00	30.70	35.03	35.03	36.14	0.0157	4.84	118.92	56.22	1.94	0.88
1	17	plan050mudf	435.85	12.00	30.70	34.72	34.72	35.76	0.0160	4.64	102.10	52.30	1.79	0.88
1	17	plan025mudf	354.58	12.00	30.70	34.37	34.37	35.35	0.0169	4.45	84.40	47.82	1.62	0.89
1	17	Plan010mudf	260.57	12.00	30.70	33.73	33.73	34.74	0.0231	4.47	58.30	29.48	1.78	1.01
1	17	plan005mudf	195.71	12.00	30.70	33.42	33.37	34.22	0.0220	3.98	49.22	28.95	1.55	0.97
1	17	plan002mudf	116.13	12.00	30.70	32.92	33.48	33.48	0.0217	3.31	35.05	27.15	1.19	0.93
1	16	Plan500mudf	750.69	5.50	30.26	34.80	35.34	36.54	0.0260	6.15	136.01	85.14	1.50	1.13
1	16	Plan250mudf	616.68	5.50	30.26	34.36	35.03	36.16	0.0307	6.18	108.60	53.94	1.86	1.22
1	16	plan100mudf	521.15	5.50	30.26	34.08	34.53	35.82	0.0328	6.02	93.65	51.83	1.67	1.24
1	16	plan050mudf	435.85	5.50	30.26	33.85	34.28	35.44	0.0329	5.71	81.84	50.10	1.52	1.23
1	16	plan025mudf	354.58	5.50	30.26	33.60	33.99	35.04	0.0333	5.39	69.55	48.23	1.35	1.22
1	16	Plan010mudf	260.57	5.50	30.26	33.34	33.61	34.44	0.0292	4.66	57.36	43.18	1.24	1.13
1	16	plan005mudf	195.71	5.50	30.26	33.17	33.17	33.94	0.0225	3.90	50.57	36.68	1.28	0.98
1	16	plan002mudf	116.13	5.50	30.26	32.54	32.54	33.19	0.0246	3.58	32.43	24.69	1.21	1.00

HEC-RAS River: Aragon Reach: 1 (Continued)

Reach	River Sta	Plan	Q Total (m <sup>3</sup> /s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	15	Plan500mudf	750.69	45.00	30.04	34.07	34.84	36.30	0.0425	7.10	122.94	77.04	1.52	1.44
1	15	Plan250mudf	616.68	45.00	30.04	33.81	34.50	35.93	0.0442	6.82	103.59	70.90	1.40	1.45
1	15	plan100mudf	521.15	45.00	30.04	33.62	34.26	35.59	0.0443	6.51	90.45	66.41	1.30	1.44
1	15	plan050mudf	435.85	45.00	30.04	33.45	34.02	35.22	0.0428	6.11	79.43	62.40	1.22	1.40
1	15	plan025mudf	354.58	45.00	30.04	33.26	33.75	34.82	0.0413	5.67	68.14	57.06	1.14	1.36
1	15	Plan010mudf	260.57	45.00	30.04	33.01	33.40	34.24	0.0352	4.98	55.07	46.96	1.12	1.24
1	15	plan005mudf	195.71	45.00	30.04	32.74	33.04	33.78	0.0320	4.51	44.09	36.08	1.16	1.17
1	15	plan002mudf	116.13	45.00	30.04	32.19	32.32	33.01	0.0323	4.02	28.91	23.08	1.18	1.15
1	14	Plan500mudf	750.69	35.00	29.28	33.95	33.52	34.57	0.0077	4.05	226.66	89.75	2.43	0.65
1	14	Plan250mudf	616.68	35.00	29.28	33.60	33.29	34.18	0.0082	3.94	195.51	89.24	2.12	0.67
1	14	plan100mudf	521.15	35.00	29.28	33.32	33.09	33.88	0.0088	3.90	170.29	88.78	1.86	0.69
1	14	plan050mudf	435.85	35.00	29.28	32.64	32.93	33.72	0.0204	5.19	110.56	87.68	1.24	1.02
1	14	plan025mudf	354.58	35.00	29.28	32.49	32.74	33.44	0.0186	4.78	97.36	87.44	1.09	0.97
1	14	Plan010mudf	260.57	35.00	29.28	32.04	32.13	33.13	0.0245	4.86	62.28	52.15	1.17	1.09
1	14	plan005mudf	195.71	35.00	29.28	32.08	32.05	32.66	0.0128	3.55	64.33	54.08	1.17	0.79
1	14	plan002mudf	116.13	35.00	29.28	31.17	31.36	32.05	0.0300	4.16	27.95	21.40	1.27	1.14
1	13	Plan500mudf	750.69	36.00	28.94	33.15	33.15	34.18	0.0128	5.03	180.17	78.90	2.21	0.85
1	13	Plan250mudf	616.68	36.00	28.94	32.88	32.88	33.80	0.0123	4.71	159.33	78.33	1.98	0.83
1	13	plan100mudf	521.15	36.00	28.94	32.67	32.67	33.50	0.0118	4.44	143.11	77.89	1.79	0.80
1	13	plan050mudf	435.85	36.00	28.94	32.32	32.45	33.24	0.0144	4.57	115.92	77.15	1.47	0.88
1	13	plan025mudf	354.58	36.00	28.94	32.18	32.24	32.93	0.0122	4.07	105.02	76.85	1.34	0.80
1	13	Plan010mudf	260.57	36.00	28.94	31.65	31.78	32.53	0.0171	4.22	67.03	57.76	1.14	0.93
1	13	plan005mudf	195.71	36.00	28.94	31.21	31.21	32.06	0.0210	4.08	48.08	31.64	1.48	0.99
1	13	plan002mudf	116.13	36.00	28.94	30.41	30.63	31.35	0.0407	4.31	26.94	23.91	1.10	1.30
1	12	Plan500mudf	750.69	35.00	27.81	31.65	32.07	33.48	0.0248	6.15	131.35	59.01	2.14	1.15
1	12	Plan250mudf	616.68	35.00	27.81	31.23	31.70	33.05	0.0297	6.09	107.15	55.60	1.86	1.24
1	12	plan100mudf	521.15	35.00	27.81	30.92	31.43	32.72	0.0343	6.01	90.20	53.02	1.65	1.31
1	12	plan050mudf	435.85	35.00	27.81	30.65	31.14	32.36	0.0377	5.81	76.59	50.86	1.47	1.35
1	12	plan025mudf	354.58	35.00	27.81	30.28	30.85	32.06	0.0504	5.90	60.08	38.88	1.51	1.52
1	12	Plan010mudf	260.57	35.00	27.81	29.96	30.39	31.47	0.0540	5.44	47.89	37.18	1.27	1.53
1	12	plan005mudf	195.71	35.00	27.81	29.77	30.09	30.94	0.0500	4.80	40.74	36.14	1.11	1.44
1	12	plan002mudf	116.13	35.00	27.81	29.56	29.64	30.18	0.0325	3.49	33.30	34.80	0.95	1.14

HEC-RAS River: Aragon Reach: 1 (Continued)

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	11	Plan500mudf	750.69	17.50	26.55	31.33	31.33	32.79	0.0164	5.58	143.67	47.83	2.77	0.94
1	11	Plan250mudf	616.68	17.50	26.55	30.55	30.76	32.12	0.0206	5.74	114.25	45.77	2.41	1.07
1	11	plan100mudf	521.15	17.50	26.55	30.26	30.44	31.69	0.0209	5.45	101.31	44.47	2.21	1.06
1	11	plan050mudf	435.85	17.50	26.55	29.99	30.14	31.27	0.0210	5.14	89.52	43.24	2.01	1.05
1	11	plan025mudf	354.58	17.50	26.55	29.79	29.84	30.83	0.0187	4.61	80.98	42.33	1.86	0.98
1	11	Plan010mudf	260.57	17.50	26.55	29.40	29.43	30.27	0.0195	4.19	64.82	40.56	1.56	0.97
1	11	plan005mudf	195.71	17.50	26.55	29.04	29.10	29.83	0.0224	3.96	50.66	38.65	1.29	1.01
1	11	plan002mudf	116.13	17.50	26.55	28.57	28.59	29.16	0.0262	3.41	34.09	31.05	1.08	1.04
1	10	Plan500mudf	750.69	25.00	25.58	30.00	30.64	32.32	0.0309	7.00	114.66	45.71	2.39	1.29
1	10	Plan250mudf	616.68	25.00	25.58	29.67	30.16	31.65	0.0298	6.44	101.82	44.85	2.18	1.25
1	10	plan100mudf	521.15	25.00	25.58	29.39	29.85	31.22	0.0313	6.17	89.47	43.80	1.97	1.27
1	10	plan050mudf	435.85	25.00	25.58	29.15	29.54	30.79	0.0316	5.81	79.12	42.89	1.79	1.26
1	10	plan025mudf	354.58	25.00	25.58	28.88	29.25	30.36	0.0332	5.49	67.76	41.88	1.58	1.27
1	10	Plan010mudf	260.57	25.00	25.58	28.56	28.85	29.79	0.0343	4.98	54.34	40.32	1.32	1.26
1	10	plan005mudf	195.71	25.00	25.58	28.29	28.56	29.34	0.0345	4.57	43.79	37.82	1.14	1.24
1	10	plan002mudf	116.13	25.00	25.58	27.84	27.98	28.62	0.0341	3.93	29.56	26.39	1.10	1.19
1	9	Plan500mudf	750.69	10.00	25.20	29.37	29.93	31.48	0.0314	6.69	118.81	48.39	2.32	1.28
1	9	Plan250mudf	616.68	10.00	25.20	29.15	29.47	30.86	0.0268	6.03	108.63	46.61	2.20	1.18
1	9	plan100mudf	521.15	10.00	25.20	28.94	29.19	30.42	0.0255	5.60	98.89	46.03	2.04	1.14
1	9	plan050mudf	435.85	10.00	25.20	28.78	28.92	29.99	0.0228	5.07	91.30	45.57	1.91	1.07
1	9	plan025mudf	354.58	10.00	25.20	28.56	28.62	29.57	0.0213	4.61	81.57	44.98	1.74	1.02
1	9	Plan010mudf	260.57	10.00	25.20	28.25	28.27	29.05	0.0205	4.09	67.63	44.11	1.48	0.98
1	9	plan005mudf	195.71	10.00	25.20	27.92	27.99	28.65	0.0238	3.88	53.45	43.22	1.20	1.03
1	9	plan002mudf	116.13	10.00	25.20	27.37	27.58	28.17	0.0406	3.98	30.01	37.95	0.78	1.27
1	8	Plan500mudf	750.69	30.00	25.05	28.93	29.49	31.15	0.0321	6.82	116.07	47.29	2.33	1.30
1	8	Plan250mudf	616.68	30.00	25.05	28.61	29.08	30.55	0.0309	6.36	102.29	45.66	2.13	1.27
1	8	plan100mudf	521.15	30.00	25.05	28.37	28.78	30.12	0.0313	6.02	91.27	45.20	1.94	1.26
1	8	plan050mudf	435.85	30.00	25.05	28.14	28.51	29.69	0.0313	5.65	81.19	44.77	1.75	1.24
1	8	plan025mudf	354.58	30.00	25.05	28.58	28.21	29.24	0.0107	3.71	100.94	45.61	2.11	0.74
1	8	Plan010mudf	260.57	30.00	25.05	28.21	27.87	28.73	0.0100	3.26	84.20	44.90	1.80	0.71
1	8	plan005mudf	195.71	30.00	25.05	27.88	27.57	28.31	0.0102	2.97	69.26	44.26	1.52	0.70
1	8	plan002mudf	116.13	30.00	25.05	26.86	27.08	27.72	0.0478	4.12	28.20	30.50	0.91	1.37

HEC-RAS River Aragon Reach: 1 (Continued)

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	7	Plan500mudf	750.69	25.00	24.59	28.97	29.03	30.30	0.0158	5.29	153.90	61.70	2.42	0.96
1	7	Plan250mudf	616.68	25.00	24.59	28.71	28.71	30.00	0.0170	5.12	125.11	48.94	2.44	0.96
1	7	plan100mudf	521.15	25.00	24.59	28.44	28.44	29.59	0.0172	4.82	111.79	48.52	2.21	0.95
1	7	plan050mudf	435.85	25.00	24.59	28.14	28.14	29.20	0.0180	4.59	97.74	48.07	1.97	0.96
1	7	plan025mudf	354.58	25.00	24.59	27.86	27.86	28.80	0.0188	4.31	84.06	47.63	1.72	0.97
1	7	Plan010mudf	260.57	25.00	24.59	27.44	27.44	28.27	0.0217	4.02	64.81	39.95	1.59	1.01
1	7	plan005mudf	195.71	25.00	24.59	27.14	27.14	27.84	0.0228	3.71	52.71	38.19	1.36	1.01
1	7	plan002mudf	116.13	25.00	24.59	26.76	26.65	27.21	0.0185	2.96	39.25	34.19	1.14	0.88
1	6	Plan500mudf	750.69	24.00	24.07	27.75	28.29	29.69	0.0316	6.51	129.48	69.59	1.82	1.30
1	6	Plan250mudf	616.68	24.00	24.07	27.44	28.00	29.35	0.0361	6.38	107.91	68.90	1.53	1.36
1	6	plan100mudf	521.15	24.00	24.07	27.30	27.76	28.96	0.0339	5.91	97.86	68.58	1.40	1.30
1	6	plan050mudf	435.85	24.00	24.07	27.15	27.56	28.57	0.0313	5.42	88.18	66.39	1.30	1.24
1	6	plan025mudf	354.58	24.00	24.07	26.98	27.33	28.19	0.0297	4.97	76.95	63.47	1.19	1.19
1	6	Plan010mudf	260.57	24.00	24.07	26.78	26.97	27.68	0.0253	4.22	64.51	60.06	1.05	1.07
1	6	plan005mudf	195.71	24.00	24.07	26.56	26.61	27.27	0.0239	3.73	52.76	45.31	1.14	1.02
1	6	plan002mudf	116.13	24.00	24.07	26.16	26.16	26.66	0.0261	3.14	36.95	37.84	0.96	1.02
1	5	Plan500mudf	750.69	28.00	23.56	26.72	27.35	28.86	0.0362	6.62	121.46	68.81	1.73	1.38
1	5	Plan250mudf	616.68	28.00	23.56	26.45	27.05	28.44	0.0390	6.33	102.56	66.84	1.51	1.40
1	5	plan100mudf	521.15	28.00	23.56	26.25	26.81	28.06	0.0397	5.99	90.03	63.47	1.39	1.39
1	5	plan050mudf	435.85	28.00	23.56	26.05	26.56	27.68	0.0411	5.66	78.00	54.77	1.40	1.39
1	5	plan025mudf	354.58	28.00	23.56	25.80	26.28	27.29	0.0449	5.40	65.63	44.54	1.44	1.42
1	5	Plan010mudf	260.57	28.00	23.56	25.47	25.84	26.79	0.0530	5.09	51.18	43.25	1.16	1.49
1	5	plan005mudf	195.71	28.00	23.56	25.25	25.56	26.38	0.0579	4.71	41.54	42.36	0.97	1.52
1	5	plan002mudf	116.13	28.00	23.56	24.98	25.17	25.73	0.0556	3.83	30.36	41.31	0.73	1.42
1	4	Plan500mudf	750.69	40.00	22.72	27.61	26.38	28.19	0.0049	3.41	226.79	62.70	3.50	0.55
1	4	Plan250mudf	616.68	40.00	22.72	26.88	26.03	27.49	0.0066	3.49	181.31	61.34	2.90	0.62
1	4	plan100mudf	521.15	40.00	22.72	26.30	25.75	26.97	0.0088	3.63	146.84	58.78	2.46	0.70
1	4	plan050mudf	435.85	40.00	22.72	25.09	25.47	26.57	0.0351	5.40	80.75	46.25	1.73	1.30
1	4	plan025mudf	354.58	40.00	22.72	24.88	25.16	26.14	0.0330	4.96	71.48	44.42	1.59	1.25
1	4	Plan010mudf	260.57	40.00	22.72	24.60	24.78	25.59	0.0310	4.41	59.13	41.86	1.40	1.18
1	4	plan005mudf	195.71	40.00	22.72	24.35	24.47	25.16	0.0303	3.99	49.03	39.65	1.23	1.15
1	4	plan002mudf	116.13	40.00	22.72	23.96	24.03	24.55	0.0308	3.38	34.38	36.20	0.94	1.11

HEC-RAS River: Aragon Reach: 1 (Continued)

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	3	Plan500mudf	750.69	35.00	21.38	27.51		28.00	0.0032	3.14	246.03	54.51	4.28	0.46
1	3	Plan250mudf	616.68	35.00	21.38	26.79		27.26	0.0035	3.04	207.53	51.96	3.81	0.47
1	3	plan100mudf	521.15	35.00	21.38	26.23		26.67	0.0039	2.97	178.97	49.88	3.44	0.49
1	3	plan050mudf	435.85	35.00	21.38	25.68	24.34	26.11	0.0043	2.91	152.26	47.86	3.06	0.51
1	3	plan025mudf	354.58	35.00	21.38	25.12	24.00	25.53	0.0051	2.86	125.76	45.77	2.66	0.53
1	3	Plan010mudf	260.57	35.00	21.38	24.39	23.57	24.79	0.0065	2.79	93.52	42.19	2.16	0.58
1	3	plan005mudf	195.71	35.00	21.38	23.82	23.23	24.20	0.0080	2.74	71.52	36.80	1.90	0.63
1	3	plan002mudf	116.13	35.00	21.38	23.00	22.74	23.37	0.0129	2.70	42.97	32.50	1.30	0.75
1	2	Plan500mudf	750.69	30.00	20.16	25.63	25.63	27.63	0.0180	6.27	119.68	29.87	3.57	1.00
1	2	Plan250mudf	616.68	30.00	20.16	25.06	25.06	26.88	0.0185	5.99	103.03	28.33	3.27	1.00
1	2	plan100mudf	521.15	30.00	20.16	24.60	24.60	26.29	0.0190	5.76	90.46	27.10	3.02	1.01
1	2	plan050mudf	435.85	30.00	20.16	24.18	24.18	25.72	0.0194	5.50	79.18	25.95	2.78	1.01
1	2	plan025mudf	354.58	30.00	20.16	23.73	23.73	25.12	0.0199	5.22	67.92	24.75	2.51	1.01
1	2	Plan010mudf	260.57	30.00	20.16	23.16	23.16	24.34	0.0206	4.81	54.20	23.20	2.16	1.00
1	2	plan005mudf	195.71	30.00	20.16	22.73	22.70	23.72	0.0208	4.40	44.50	22.04	1.89	0.99
1	2	plan002mudf	116.13	30.00	20.16	22.21		22.83	0.0172	3.48	33.33	20.63	1.53	0.87
1	1	Plan500mudf	750.69		19.51	24.13	24.86	26.86	0.0309	7.32	102.54	32.14	3.00	1.31
1	1	Plan250mudf	616.68		19.51	23.74	24.30	26.12	0.0301	6.85	90.07	30.68	2.77	1.28
1	1	plan100mudf	521.15		19.51	23.42	23.90	25.55	0.0295	6.47	80.56	29.51	2.59	1.25
1	1	plan050mudf	435.85		19.51	23.12	23.51	24.99	0.0284	6.05	72.01	28.42	2.41	1.21
1	1	plan025mudf	354.58		19.51	22.82	23.09	24.41	0.0269	5.58	63.51	27.30	2.22	1.17
1	1	Plan010mudf	260.57		19.51	22.42	22.55	23.66	0.0249	4.94	52.77	25.81	1.96	1.10
1	1	plan005mudf	195.71		19.51	22.13	22.13	23.07	0.0214	4.29	45.67	24.77	1.77	1.01
1	1	plan002mudf	116.13		19.51	21.50	21.50	22.22	0.0231	3.77	30.80	21.61	1.38	1.01

HEC-RAS River: Aragon Reach: 1

Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl
1	35	Plan500mudf2	750.69	15.00	42.38	48.10	48.10	50.02	0.0147	6.26	128.21	36.79	3.00	0.90
1	35	Plan250mudf2	616.68	15.00	42.38	47.42	47.42	49.28	0.0169	6.12	105.14	29.97	2.96	0.95
1	35	Plan100mudf2	521.15	15.00	42.38	46.98	46.98	48.69	0.0173	5.83	92.23	28.81	2.72	0.95
1	35	Plan050mudf2	435.85	15.00	42.38	46.41	46.41	48.08	0.0200	5.75	77.04	24.41	2.66	1.00
1	35	Plan025mudf2	354.58	15.00	42.38	46.01	46.01	47.45	0.0198	5.32	67.37	24.02	2.40	0.98
1	35	Plan010mudf2	260.57	15.00	42.38	45.40	45.40	46.63	0.0215	4.92	52.94	21.83	2.13	1.00
1	35	Plan005mudf2	195.71	15.00	42.38	44.92	44.92	45.98	0.0228	4.56	42.93	20.57	1.86	1.01
1	35	Plan002mudf2	116.13	15.00	42.38	44.42	44.26	45.06	0.0180	3.53	32.94	19.74	1.51	0.87
1	34	Plan500mudf2	750.69	18.50	42.26	46.31	47.27	49.53	0.0413	7.95	94.45	31.73	2.73	1.47
1	34	Plan250mudf2	616.68	18.50	42.26	45.93	46.84	48.78	0.0416	7.48	82.50	30.89	2.48	1.46
1	34	Plan100mudf2	521.15	18.50	42.26	45.63	46.36	48.21	0.0424	7.12	73.23	30.23	2.27	1.46
1	34	Plan050mudf2	435.85	18.50	42.26	45.38	45.98	47.62	0.0408	6.62	65.86	29.69	2.10	1.42
1	34	Plan025mudf2	354.58	18.50	42.26	45.13	45.61	47.00	0.0354	6.06	58.52	27.23	2.05	1.32
1	34	Plan010mudf2	260.57	18.50	42.26	44.76	45.06	46.22	0.0327	5.34	48.80	26.17	1.79	1.25
1	34	Plan005mudf2	195.71	18.50	42.26	44.51	44.67	45.60	0.0281	4.63	42.29	25.17	1.62	1.14
1	34	Plan002mudf2	116.13	18.50	42.26	44.11	44.07	44.76	0.0217	3.57	32.49	23.57	1.34	0.97
1	33	Plan500mudf2	750.69	17.50	42.10	47.44	46.71	48.80	0.0111	5.17	145.09	32.22	3.84	0.78
1	33	Plan250mudf2	616.68	17.50	42.10	46.63	46.22	47.99	0.0135	5.17	119.27	31.66	3.32	0.85
1	33	Plan100mudf2	521.15	17.50	42.10	45.63	45.83	47.40	0.0235	5.90	88.31	30.16	2.67	1.10
1	33	Plan050mudf2	435.85	17.50	42.10	45.32	45.45	46.87	0.0229	5.51	79.17	29.71	2.45	1.08
1	33	Plan025mudf2	354.58	17.50	42.10	44.96	45.07	46.32	0.0236	5.18	68.46	29.16	2.19	1.08
1	33	Plan010mudf2	260.57	17.50	42.10	44.58	44.60	45.62	0.0217	4.53	57.55	28.60	1.91	1.02
1	33	Plan005mudf2	195.71	17.50	42.10	44.21	44.23	45.09	0.0227	4.15	47.14	28.05	1.62	1.02
1	33	Plan002mudf2	116.13	17.50	42.10	43.71	43.71	44.33	0.0238	3.51	33.13	26.79	1.21	1.01
1	32	Plan500mudf2	750.69	30.50	41.52	47.41		48.57	0.0087	4.76	157.82	32.58	4.08	0.69
1	32	Plan250mudf2	616.68	30.50	41.52	46.60		47.72	0.0098	4.67	131.93	31.42	3.62	0.73
1	32	Plan100mudf2	521.15	30.50	41.52	45.97	45.33	47.07	0.0112	4.64	112.41	30.52	3.24	0.77
1	32	Plan050mudf2	435.85	30.50	41.52	45.36	44.97	46.46	0.0133	4.63	94.08	29.65	2.85	0.83
1	32	Plan025mudf2	354.58	30.50	41.52	44.39	44.59	45.87	0.0259	5.39	65.81	28.25	2.17	1.13
1	32	Plan010mudf2	260.57	30.50	41.52	43.92	44.09	45.16	0.0278	4.95	52.62	27.58	1.81	1.14
1	32	Plan005mudf2	195.71	30.50	41.52	43.57	43.72	44.62	0.0292	4.54	43.09	27.08	1.53	1.15
1	32	Plan002mudf2	116.13	30.50	41.52	43.08	43.19	43.84	0.0313	3.86	30.06	25.83	1.14	1.14

HEC-RAS River: Aragon Reach: 1 (Continued)

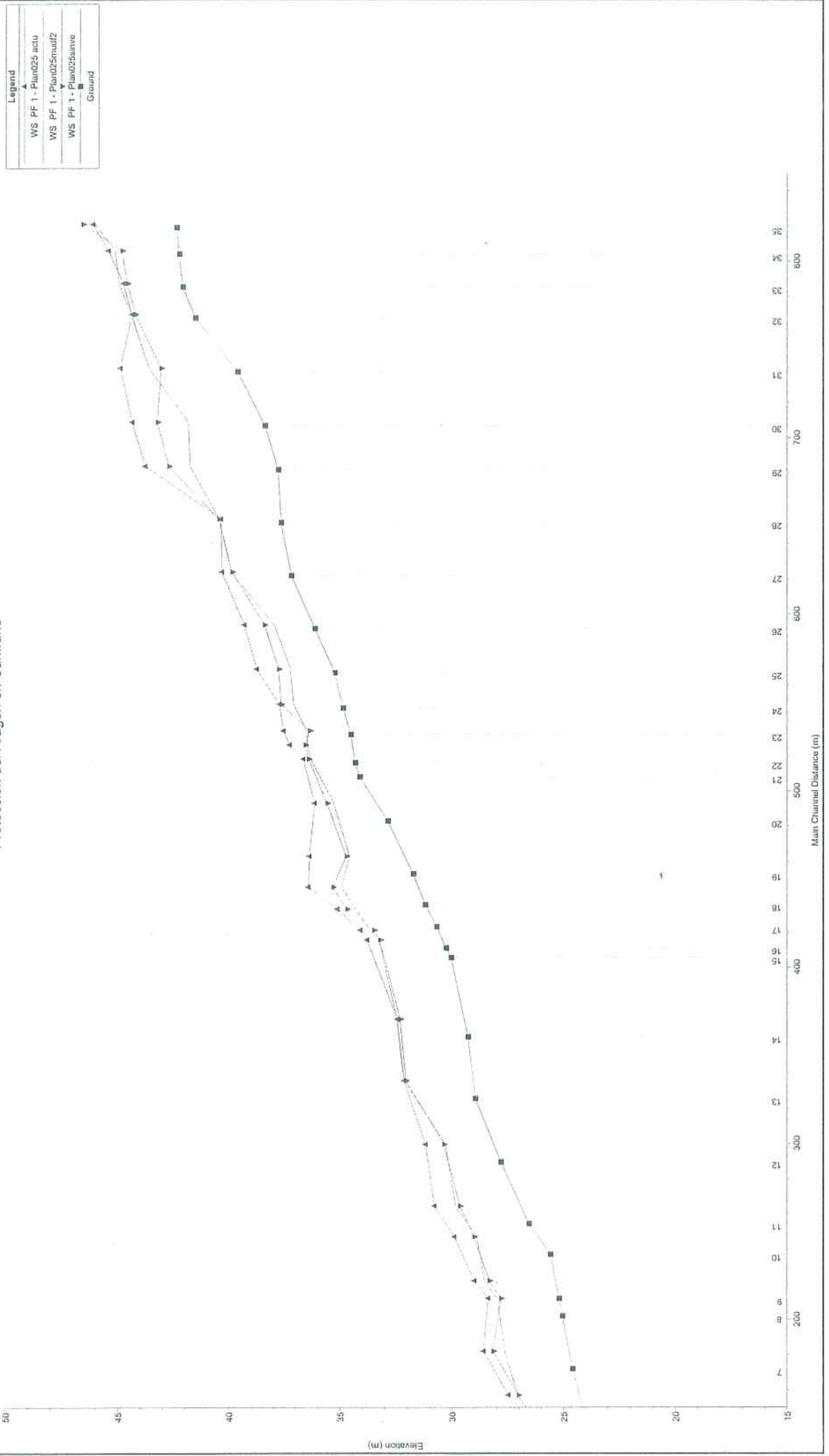
Reach	River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude #	Chi
1	31	Plan500mudf2	750.69	30.50	39.63	45.76	45.76	48.06	0.0205	6.72	111.73	24.30	3.60	1.00	1.00
1	31	Plan250mudf2	616.68	30.50	39.63	45.14	45.14	47.20	0.0206	6.37	96.84	23.33	3.31	1.00	1.00
1	31	Plan100mudf2	521.15	30.50	39.63	44.65	44.65	46.53	0.0207	6.08	85.69	22.57	3.07	1.00	1.00
1	31	Plan050mudf2	435.85	30.50	39.63	44.17	44.17	45.89	0.0211	5.81	75.05	21.82	2.83	1.00	1.00
1	31	Plan025mudf2	354.58	30.50	39.63	43.61	43.61	45.22	0.0228	5.62	63.14	20.96	2.53	1.03	1.03
1	31	Plan010mudf2	260.57	30.50	39.63	42.96	43.05	44.36	0.0245	5.23	49.81	19.94	2.16	1.06	1.06
1	31	Plan005mudf2	195.71	30.50	39.63	42.38	42.56	43.70	0.0296	5.08	38.50	19.04	1.80	1.14	1.14
1	31	Plan002mudf2	116.13	30.50	39.63	41.64	41.88	42.76	0.0395	4.69	24.75	17.88	1.28	1.27	1.27
1	30	Plan500mudf2	750.69	25.00	38.40	43.62	44.99	47.11	0.0375	8.28	90.64	23.63	3.13	1.35	1.35
1	30	Plan250mudf2	616.68	25.00	38.40	43.08	43.92	46.25	0.0380	7.88	78.27	22.55	2.87	1.35	1.35
1	30	Plan100mudf2	521.15	25.00	38.40	42.66	43.43	45.57	0.0388	7.56	68.90	21.71	2.66	1.36	1.36
1	30	Plan050mudf2	435.85	25.00	38.40	42.25	42.95	44.93	0.0398	7.25	60.13	20.88	2.45	1.36	1.36
1	30	Plan025mudf2	354.58	25.00	38.40	41.84	42.46	44.23	0.0404	6.86	51.72	20.06	2.23	1.36	1.36
1	30	Plan010mudf2	260.57	25.00	38.40	41.30	41.83	43.33	0.0417	6.31	41.28	18.99	1.92	1.37	1.37
1	30	Plan005mudf2	195.71	25.00	38.40	40.91	41.35	42.60	0.0414	5.76	34.01	18.20	1.68	1.34	1.34
1	30	Plan002mudf2	116.13	25.00	38.40	40.35	40.62	41.53	0.0404	4.81	24.13	17.08	1.31	1.29	1.29
1	29	Plan500mudf2	750.69	30.00	37.81	43.68	44.40	46.05	0.0224	6.84	113.23	55.36	1.84	1.05	1.05
1	29	Plan250mudf2	616.68	30.00	37.81	43.18	43.27	45.25	0.0218	6.38	96.72	24.81	3.17	1.03	1.03
1	29	Plan100mudf2	521.15	30.00	37.81	42.74	42.79	44.61	0.0217	6.07	85.92	23.93	2.96	1.02	1.02
1	29	Plan050mudf2	435.85	30.00	37.81	42.26	42.34	43.99	0.0224	5.83	74.71	22.97	2.72	1.03	1.03
1	29	Plan025mudf2	354.58	30.00	37.81	41.76	41.86	43.35	0.0236	5.59	63.48	21.97	2.45	1.05	1.05
1	29	Plan010mudf2	260.57	30.00	37.81	41.11	41.25	42.51	0.0259	5.25	49.61	20.66	2.09	1.08	1.08
1	29	Plan005mudf2	195.71	30.00	37.81	40.60	40.77	41.86	0.0288	4.98	39.31	19.64	1.78	1.12	1.12
1	29	Plan002mudf2	116.13	30.00	37.81	39.84	40.07	40.94	0.0389	4.63	25.06	18.13	1.27	1.26	1.26
1	28	Plan500mudf2	750.69	30.00	37.68	41.63	42.61	45.02	0.0440	8.15	92.12	30.49	2.71	1.50	1.50
1	28	Plan250mudf2	616.68	30.00	37.68	41.25	42.09	44.24	0.0444	7.67	80.43	29.72	2.46	1.49	1.49
1	28	Plan100mudf2	521.15	30.00	37.68	40.96	41.70	43.63	0.0441	7.24	71.99	29.14	2.26	1.47	1.47
1	28	Plan050mudf2	435.85	30.00	37.68	40.71	41.33	43.02	0.0426	6.74	64.65	28.64	2.09	1.43	1.43
1	28	Plan025mudf2	354.58	30.00	37.68	40.43	40.95	42.41	0.0414	6.22	56.97	28.10	1.89	1.40	1.40
1	28	Plan010mudf2	260.57	30.00	37.68	40.14	40.46	41.60	0.0362	5.35	48.68	27.50	1.67	1.28	1.28
1	28	Plan005mudf2	195.71	30.00	37.68	40.02	40.08	40.96	0.0253	4.31	45.38	27.26	1.58	1.07	1.07
1	28	Plan002mudf2	116.13	30.00	37.68	39.25	39.55	40.34	0.0570	4.63	25.09	25.73	0.95	1.50	1.50

**APÉNDICE N° 5**

**PERFILES COMPARATIVOS**

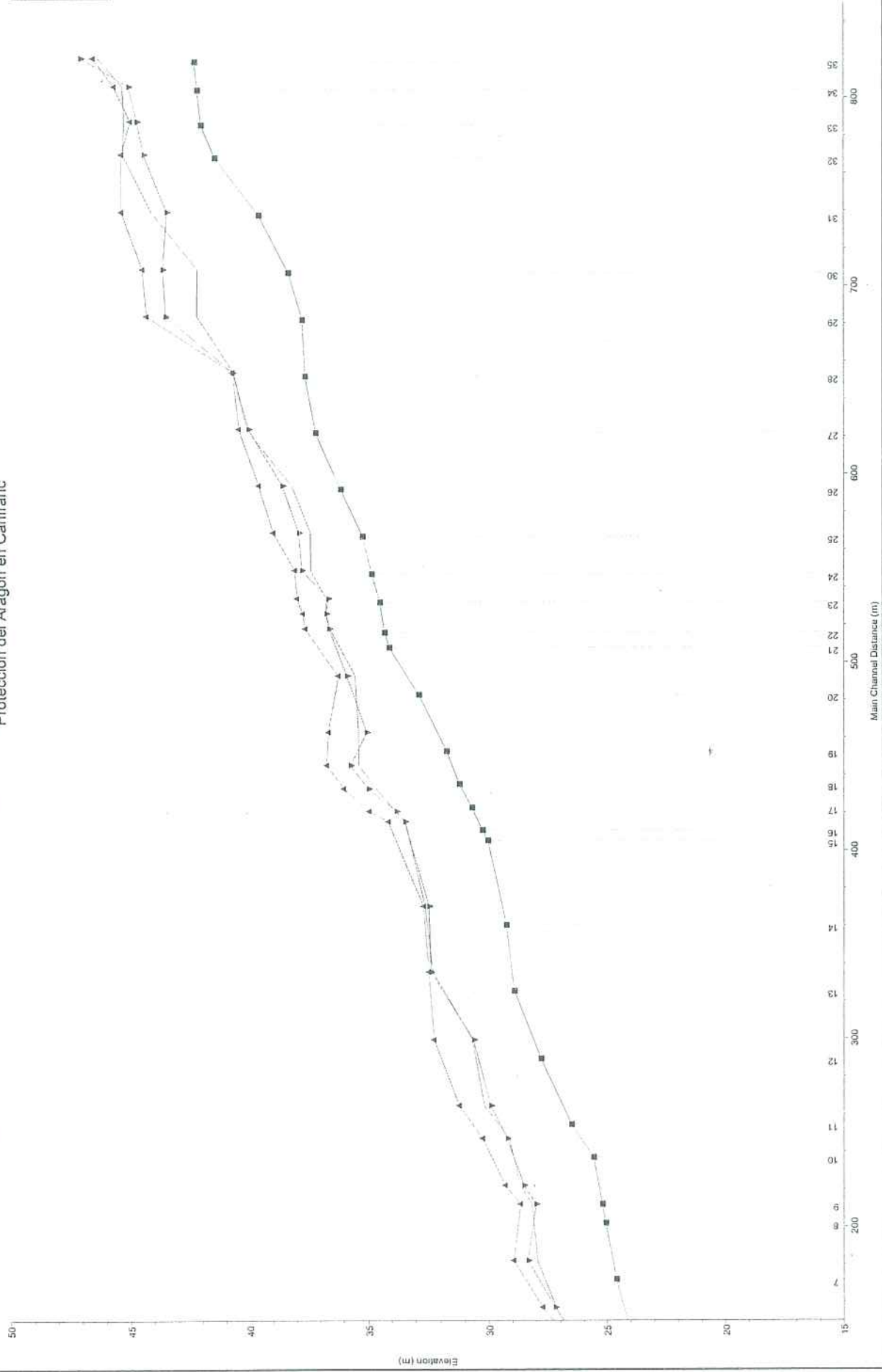


Proteccion del Aragon en Canfranc



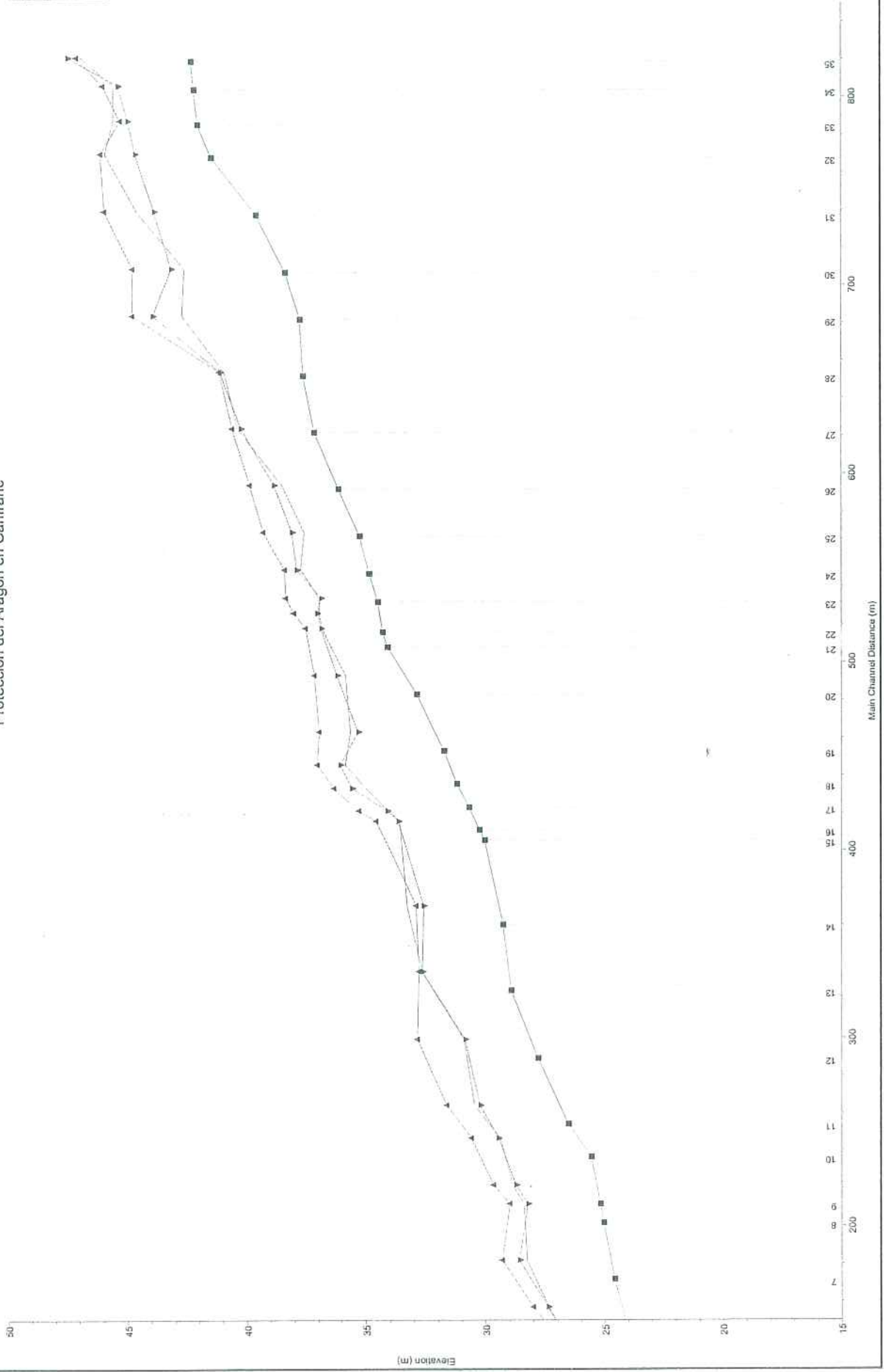
Proteccion del Aragon en Canfranc

Legend	
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▼	WS PF 1 - Plano050mud12
■	WS PF 1 - Plano050nave
□	Ground



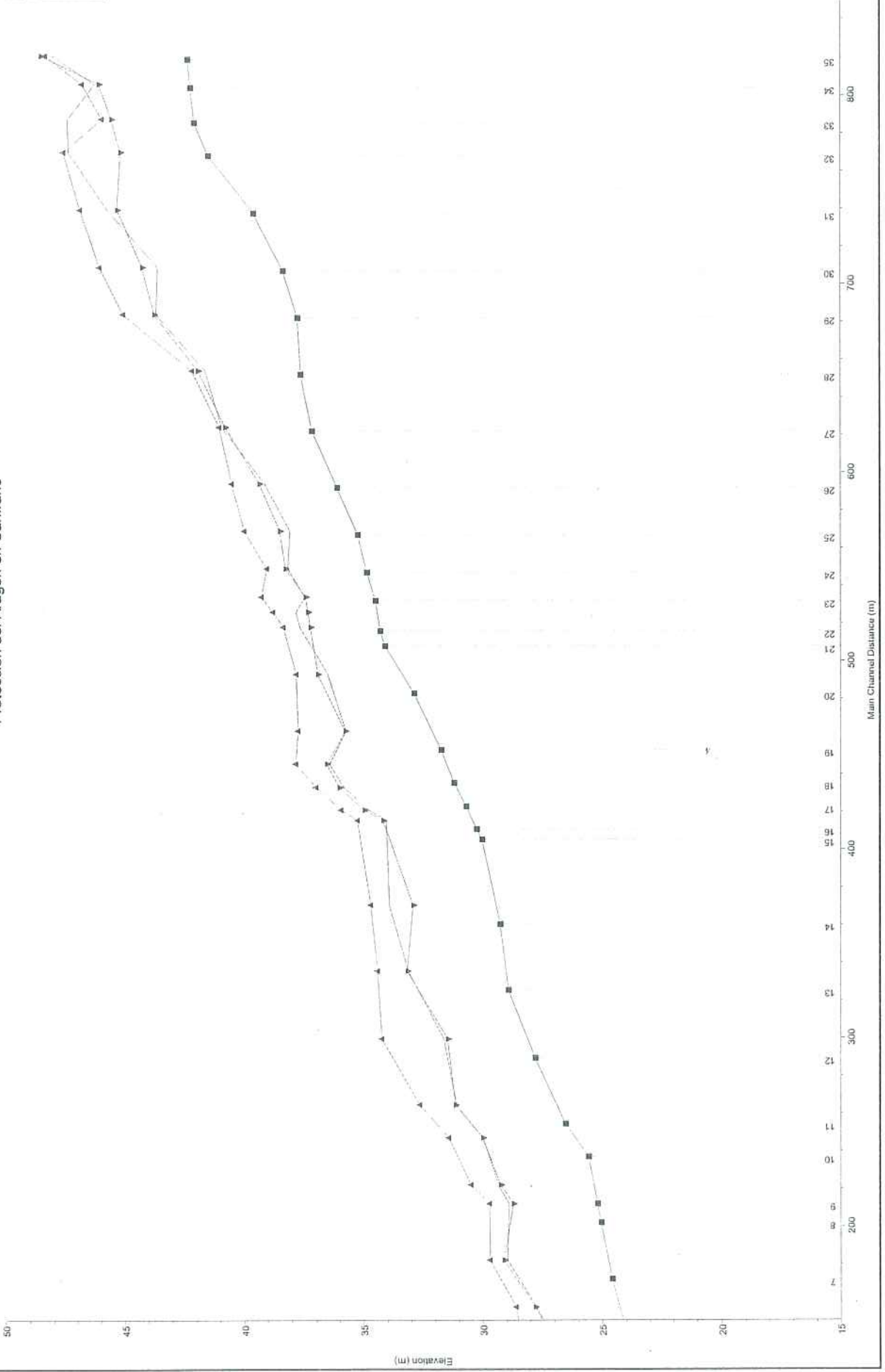
# Proteccion del Aragon en Canfranc

Legend	
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▼	WS PF 1 - Plan100mud/2
■	WS PF 1 - Plan100olive
□	Ground



# Proteccion del Aragon en Canfranc

Legend	
▲	WS PF 1 - Plan500 actu
▼	WS PF 1 - Plan500mudt2
■	WS PF 1 - Plan500olive
□	Ground



## APÉNDICE N° 6

### TABLA Y PERFILES DE LA ALTERNATIVA SELECCIONADA

River Sta	Plan	Q Total (m <sup>3</sup> /s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude #	Chl	Cota calle (m)	Coron. Muro (m)	Diferencia (m)
35	Plan500mudf2	750.69	15	42.38	48.1	48.1	50.02	0.0147	6.26	128.21	36.79	3	0.9			46.41	
35	Plan250mudf2	616.68	15	42.38	47.42	47.42	49.28	0.0169	6.12	105.14	29.97	2.96	0.95				
35	Plan100mudf2	521.15	15	42.38	46.98	46.98	48.69	0.0173	5.83	92.23	28.81	2.72	0.95				
35	Plan050mudf2	435.85	15	42.38	46.41	46.41	48.08	0.02	5.75	77.04	24.41	2.66	1				
35	Plan025mudf2	354.58	15	42.38	46.01	46.01	47.45	0.0198	5.32	67.37	24.02	2.4	0.98				
35	Plan010mudf2	260.57	15	42.38	45.4	45.4	46.63	0.0215	4.92	52.94	21.83	2.13	1				
35	Plan005mudf2	195.71	15	42.38	44.92	44.92	45.98	0.0228	4.56	42.93	20.57	1.86	1.01				
35	Plan002mudf2	116.13	15	42.38	44.42	44.42	45.06	0.018	3.53	32.94	19.74	1.51	0.87				
34	Plan500mudf2	750.69	18.5	42.26	46.31	47.27	49.53	0.0413	7.95	94.45	31.73	2.73	1.47			46.1	
34	Plan250mudf2	616.68	18.5	42.26	45.93	46.84	48.78	0.0416	7.48	82.5	30.89	2.48	1.46				
34	Plan100mudf2	521.15	18.5	42.26	45.63	46.36	48.21	0.0424	7.12	73.23	30.23	2.27	1.46				
34	Plan050mudf2	435.85	18.5	42.26	45.38	45.98	47.62	0.0408	6.62	65.86	29.69	2.1	1.42				
34	Plan025mudf2	354.58	18.5	42.26	45.13	45.61	47	0.0354	6.06	58.52	27.23	2.05	1.32				
34	Plan010mudf2	260.57	18.5	42.26	44.76	45.06	46.22	0.0327	5.34	48.8	26.17	1.79	1.25				
34	Plan005mudf2	195.71	18.5	42.26	44.51	44.67	45.6	0.0281	4.63	42.29	25.17	1.62	1.14				
34	Plan002mudf2	116.13	18.5	42.26	44.11	44.07	44.76	0.0217	3.57	32.49	23.57	1.34	0.97				
33	Plan500mudf2	750.69	17.5	42.1	47.44	46.71	48.8	0.0111	5.17	145.09	32.22	3.84	0.78			45.72	-1.72
33	Plan250mudf2	616.68	17.5	42.1	46.63	46.22	47.99	0.0135	5.17	119.27	31.66	3.32	0.85			45.72	-0.91
33	Plan100mudf2	521.15	17.5	42.1	45.63	45.83	47.4	0.0235	5.9	88.31	30.16	2.67	1.1			45.72	0.09
33	Plan050mudf2	435.85	17.5	42.1	45.32	45.45	46.87	0.0229	5.51	79.17	29.71	2.45	1.08			45.72	0.40
33	Plan025mudf2	354.58	17.5	42.1	44.96	45.07	46.32	0.0236	5.18	68.46	29.16	2.19	1.08			45.72	0.76
33	Plan010mudf2	260.57	17.5	42.1	44.58	44.6	45.62	0.0217	4.53	57.55	28.6	1.91	1.02			45.72	1.14
33	Plan005mudf2	195.71	17.5	42.1	44.21	44.23	45.09	0.0227	4.15	47.14	28.05	1.62	1.02			45.72	1.51
33	Plan002mudf2	116.13	17.5	42.1	43.71	43.71	44.33	0.0238	3.51	33.13	26.79	1.21	1.01			45.72	2.01
32	Plan500mudf2	750.69	30.5	41.52	47.41	47.41	48.57	0.0087	4.76	157.82	32.58	4.08	0.69			45.36	-2.05
32	Plan250mudf2	616.68	30.5	41.52	46.6	46.6	47.72	0.0098	4.67	131.93	31.42	3.62	0.73			45.36	-1.24
32	Plan100mudf2	521.15	30.5	41.52	45.97	45.33	47.07	0.0112	4.64	112.41	30.52	3.24	0.77			45.36	-0.61
32	Plan050mudf2	435.85	30.5	41.52	45.36	44.97	46.46	0.0133	4.63	94.08	29.65	2.85	0.83			45.36	0.00
32	Plan025mudf2	354.58	30.5	41.52	44.39	44.59	45.87	0.0259	5.39	65.81	28.25	2.17	1.13			45.36	0.97
32	Plan010mudf2	260.57	30.5	41.52	43.92	44.09	45.16	0.0278	4.95	52.62	27.58	1.81	1.14			45.36	1.44
32	Plan005mudf2	195.71	30.5	41.52	43.57	43.72	44.62	0.0292	4.54	43.09	27.08	1.53	1.15			45.36	1.79
32	Plan002mudf2	116.13	30.5	41.52	43.08	43.19	43.84	0.0313	3.86	30.06	25.83	1.14	1.14			45.36	2.28
31	Plan500mudf2	750.69	30.5	39.63	45.76	45.76	48.06	0.0205	6.72	111.73	24.3	3.6	1			44.43	-1.33
31	Plan250mudf2	616.68	30.5	39.63	45.14	45.14	47.2	0.0206	6.37	96.84	23.33	3.31	1			44.43	-0.71
31	Plan100mudf2	521.15	30.5	39.63	44.65	44.65	46.53	0.0207	6.08	85.69	22.57	3.07	1			44.43	-0.22
31	Plan050mudf2	435.85	30.5	39.63	44.17	44.17	45.89	0.0211	5.81	75.05	21.82	2.83	1			44.43	0.26
31	Plan025mudf2	354.58	30.5	39.63	43.61	43.69	45.22	0.0228	5.62	63.14	20.96	2.53	1.03			44.43	0.82
31	Plan010mudf2	260.57	30.5	39.63	42.96	43.05	44.36	0.0245	5.23	49.81	19.94	2.16	1.06			44.43	1.47
31	Plan005mudf2	195.71	30.5	39.63	42.38	42.56	43.7	0.0296	5.08	38.5	19.04	1.8	1.14			44.43	2.05
31	Plan002mudf2	116.13	30.5	39.63	41.64	41.88	42.76	0.0395	4.69	24.75	17.88	1.28	1.27			44.43	2.79
30	Plan500mudf2	750.69	25	38.4	43.62	44.99	47.11	0.0375	8.28	90.64	23.63	3.13	1.35			43.5	-0.12
30	Plan250mudf2	616.68	25	38.4	43.08	43.92	46.25	0.038	7.98	78.27	22.55	2.87	1.35			43.5	0.42
30	Plan100mudf2	521.15	25	38.4	42.66	43.43	45.57	0.0388	7.56	68.9	21.71	2.66	1.36			43.5	0.84
30	Plan050mudf2	435.85	25	38.4	42.25	42.95	44.93	0.0398	7.25	60.13	20.88	2.45	1.36			43.5	1.25
30	Plan025mudf2	354.58	25	38.4	41.84	42.46	44.23	0.0404	6.86	51.72	20.06	2.23	1.36			43.5	1.66

River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude #Chl	Cota calle (m)	Coron. Muro (m)	Diferencia (m)
30	Plan010mudf2	260.57	25	38.4	41.3	41.83	43.33	0.0417	6.31	41.28	18.99	1.92	1.37	42.40	43.5	2.20
30	Plan005mudf2	195.71	25	38.4	40.91	41.35	42.6	0.0414	5.76	34.01	18.2	1.68	1.34	42.40	43.5	2.59
30	Plan002mudf2	116.13	25	38.4	40.35	40.62	41.53	0.0404	4.81	24.13	17.08	1.31	1.29	42.40	43.5	3.15
29	Plan500mudf2	750.69	30	37.81	43.68	44.4	46.05	0.0224	6.84	113.23	55.36	1.84	1.05	41.92	42.74	-0.94
29	Plan250mudf2	616.68	30	37.81	43.18	43.27	45.25	0.0218	6.38	96.72	24.81	3.17	1.03	41.92	42.74	-0.44
29	Plan100mudf2	521.15	30	37.81	42.74	42.79	44.61	0.0217	6.07	85.92	23.93	2.96	1.02	41.92	42.74	0.00
29	Plan050mudf2	435.85	30	37.81	42.26	42.34	43.99	0.0224	5.83	74.71	22.97	2.72	1.03	41.92	42.74	0.48
29	Plan025mudf2	354.58	30	37.81	41.76	41.86	43.35	0.0236	5.59	63.48	21.97	2.45	1.05	41.92	42.74	0.98
29	Plan010mudf2	260.57	30	37.81	41.11	41.25	42.51	0.0259	5.25	49.61	20.66	2.09	1.08	41.92	42.74	1.63
29	Plan005mudf2	195.71	30	37.81	40.6	40.77	41.86	0.0288	4.98	39.31	19.64	1.78	1.12	41.92	42.74	2.14
29	Plan002mudf2	116.13	30	37.81	39.84	40.07	40.94	0.0389	4.63	25.06	18.13	1.27	1.26	41.92	42.74	2.90
28	Plan500mudf2	750.69	30	37.68	41.63	42.61	45.02	0.044	8.15	92.12	30.49	2.71	1.5	40.70	41.66	0.03
28	Plan250mudf2	616.68	30	37.68	41.25	42.09	44.24	0.0444	7.67	80.43	29.72	2.46	1.49	40.70	41.66	0.41
28	Plan100mudf2	521.15	30	37.68	40.96	41.7	43.63	0.0441	7.24	71.99	28.14	2.26	1.47	40.70	41.66	0.70
28	Plan050mudf2	435.85	30	37.68	40.71	41.33	43.02	0.0426	6.74	64.65	28.64	2.09	1.43	40.70	41.66	0.95
28	Plan025mudf2	354.58	30	37.68	40.43	40.95	42.41	0.0414	6.22	56.97	28.1	1.89	1.4	40.70	41.66	1.23
28	Plan010mudf2	260.57	30	37.68	40.14	40.46	41.6	0.0362	5.35	48.68	27.5	1.67	1.28	40.70	41.66	1.52
28	Plan005mudf2	195.71	30	37.68	40.02	40.08	40.96	0.0253	4.31	45.38	27.26	1.58	1.07	40.70	41.66	1.64
28	Plan002mudf2	116.13	30	37.68	39.25	39.55	40.34	0.057	4.63	25.09	25.73	0.95	1.5	40.70	41.66	2.41
27	Plan500mudf2	750.69	30	37.21	40.95	41.61	43.66	0.0339	7.29	103.01	33.99	2.78	1.34	39.90	40.58	-0.37
27	Plan250mudf2	616.68	30	37.21	40.65	41.14	42.9	0.0312	6.64	92.9	33.39	2.58	1.27	39.90	40.58	-0.07
27	Plan100mudf2	521.15	30	37.21	40.4	40.78	42.33	0.0295	6.16	84.65	32.89	2.4	1.23	39.90	40.58	0.18
27	Plan050mudf2	435.85	30	37.21	40.15	40.43	41.81	0.0282	5.71	76.35	32.39	2.22	1.19	39.90	40.58	0.43
27	Plan025mudf2	354.58	30	37.21	39.92	40.08	41.26	0.0254	5.14	68.96	31.93	2.05	1.12	39.90	40.58	0.66
27	Plan010mudf2	260.57	30	37.21	39.56	39.63	40.6	0.0239	4.52	57.62	31.21	1.77	1.06	39.90	40.58	1.02
27	Plan005mudf2	195.71	30	37.21	39.11	39.28	40.13	0.0318	4.48	43.7	30.3	1.41	1.19	39.90	40.58	1.47
27	Plan002mudf2	116.13	30	37.21	38.54	38.78	39.46	0.0447	4.26	27.23	26.51	1.01	1.34	39.90	40.58	2.04
26	Plan500mudf2	750.69	25	36.14	39.14	40.09	42.42	0.0479	8.03	93.49	34.47	2.48	1.56	38.94	39.5	0.36
26	Plan250mudf2	616.68	25	36.14	38.8	39.64	41.68	0.0482	7.52	81.98	33.81	2.24	1.54	38.94	39.5	0.70
26	Plan100mudf2	521.15	25	36.14	38.53	39.28	41.14	0.0495	7.16	72.83	33.29	2.04	1.54	38.94	39.5	0.97
26	Plan050mudf2	435.85	25	36.14	38.25	38.94	40.64	0.0523	6.84	63.69	32.75	1.83	1.57	38.94	39.5	1.25
26	Plan025mudf2	354.58	25	36.14	37.98	38.6	40.11	0.0554	6.48	54.74	32.22	1.61	1.59	38.94	39.5	1.52
26	Plan010mudf2	260.57	25	36.14	37.63	38.16	39.44	0.0606	5.96	43.72	31.55	1.33	1.62	38.94	39.5	1.87
26	Plan005mudf2	195.71	25	36.14	37.42	37.82	38.83	0.057	5.26	37.21	31.14	1.16	1.54	38.94	39.5	2.08
26	Plan002mudf2	116.13	25	36.14	37.11	37.35	38.01	0.0521	4.21	27.6	30.54	0.89	1.41	38.94	39.5	2.39
25	Plan500mudf2	750.69	20	35.25	38.11	38.99	41.16	0.0477	7.74	97.01	38.9	2.36	1.56	38.57	38.59	0.48
25	Plan250mudf2	616.68	20	35.25	37.84	38.57	40.42	0.0455	7.11	86.7	38.32	2.15	1.51	38.57	38.59	0.75
25	Plan100mudf2	521.15	20	35.25	37.63	38.24	39.86	0.0438	6.62	78.7	37.87	1.99	1.47	38.57	38.59	0.96
25	Plan050mudf2	435.85	20	35.25	37.43	37.93	39.34	0.0416	6.11	71.3	37.45	1.83	1.41	38.57	38.59	1.16
25	Plan025mudf2	354.58	20	35.25	37.23	37.62	38.8	0.0387	5.54	63.95	37.03	1.67	1.35	38.57	38.59	1.36
25	Plan010mudf2	260.57	20	35.25	36.98	37.21	38.14	0.0341	4.76	54.71	36.49	1.46	1.24	38.57	38.59	1.61
25	Plan005mudf2	195.71	20	35.25	36.77	36.91	37.66	0.0314	4.18	46.85	36.02	1.28	1.17	38.57	38.59	1.82
25	Plan002mudf2	116.13	20	35.25	36.65	36.47	37.03	0.0148	2.72	42.75	35.77	1.18	0.79	38.57	38.59	1.94
24	Plan500mudf2	750.69	15	34.88	38.18	38.52	40.15	0.026	6.22	120.8	43.75	2.63	1.19	37.64	37.85	-0.33

River Sta	Plan	Q Total (m <sup>3</sup> /s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m <sup>2</sup> )	Top Width (m)	Hydr Radius (m)	Froude #	Chl (m)	Cota calle (m)	Coron. Muro (m)	Diferencia (m)
24	Plan250mudf2	616.68	15	34.88	38.12	38.13	39.51	0.0188	5.22	118.22	43.65	2.59	1.01	37.64	37.85	-0.27	
24	Plan100mudf2	521.15	15	34.88	37.76	37.83	39.08	0.0209	5.08	102.64	43.08	2.3	1.05	37.64	37.85	0.09	
24	Plan050mudf2	435.85	15	34.88	37.43	37.54	38.67	0.0235	4.94	88.31	42.09	2.04	1.09	37.64	37.85	0.42	
24	Plan025mudf2	354.58	15	34.88	37.09	37.25	38.25	0.0264	4.76	74.43	41.02	1.77	1.13	37.64	37.85	0.76	
24	Plan010mudf2	260.57	15	34.88	36.68	36.86	37.72	0.0313	4.51	57.72	39.26	1.44	1.19	37.64	37.85	1.17	
24	Plan005mudf2	195.71	15	34.88	36.37	36.56	37.3	0.0359	4.26	45.96	37.97	1.19	1.24	37.64	37.85	1.48	
24	Plan002mudf2	116.13	15	34.88	36.13	36.13	36.64	0.0251	3.14	36.95	37.97	0.99	1	37.64	37.85	1.72	
23	Plan500mudf2	750.69	8	34.53	37.49	37.96	39.71	0.0326	6.61	114.49	46.02	2.38	1.32	37.3	37.3	-0.19	
23	Plan250mudf2	616.68	8	34.53	37.23	37.64	39.09	0.031	6.06	102.54	45.43	2.17	1.27	37.30	37.3	0.07	
23	Plan100mudf2	521.15	8	34.53	36.99	37.35	38.65	0.0315	5.73	91.48	44.88	1.97	1.26	37.30	37.3	0.31	
23	Plan050mudf2	435.85	8	34.53	36.75	37.07	38.23	0.032	5.39	81.13	44.37	1.78	1.25	37.30	37.3	0.55	
23	Plan025mudf2	354.58	8	34.53	36.5	36.78	37.8	0.033	5.04	70.33	41.93	1.63	1.24	37.30	37.3	0.80	
23	Plan010mudf2	260.57	8	34.53	36.21	36.39	37.24	0.033	4.5	57.93	41.23	1.38	1.21	37.30	37.3	1.09	
23	Plan005mudf2	195.71	8	34.53	36.31	36.11	36.81	0.0149	3.15	62.07	41.46	1.46	0.82	37.30	37.3	0.99	
23	Plan002mudf2	116.13	8	34.53	35.86	35.71	36.22	0.016	2.65	43.81	40.41	1.07	0.81	37.30	37.3	1.44	
22	Plan500mudf2	750.69	8	34.33	37.85	38.17	39.33	0.018	5.41	145.51	81.84	1.73	1.01	36.8	37.12	-0.73	
22	Plan250mudf2	616.68	8	34.33	37.26	37.56	38.87	0.0256	5.63	109.84	46.61	2.28	1.17	36.80	37.12	-0.14	
22	Plan100mudf2	521.15	8	34.33	36.99	37.22	38.45	0.0262	5.34	97.72	45.67	2.08	1.16	36.80	37.12	0.13	
22	Plan050mudf2	435.85	8	34.33	36.75	36.95	38.04	0.0267	5.05	86.46	44.78	1.89	1.15	36.80	37.12	0.37	
22	Plan025mudf2	354.58	8	34.33	36.47	36.65	37.63	0.0285	4.78	74.15	43.23	1.69	1.17	36.80	37.12	0.65	
22	Plan010mudf2	260.57	8	34.33	36.13	36.28	37.1	0.0299	4.36	59.81	41.88	1.41	1.16	36.80	37.12	0.99	
22	Plan005mudf2	195.71	8	34.33	36.12	36.67	36.67	0.0172	3.29	59.46	41.85	1.41	0.88	36.80	37.12	1.00	
22	Plan002mudf2	116.13	8	34.33	35.71	35.71	36.09	0.0164	2.72	42.73	38.85	1.09	0.83	36.80	37.12	1.41	
21	Plan500mudf2	750.69	25	34.13	37.71	38.05	39.18	0.0191	5.41	146.11	89.73	1.58	1.02	36.56	36.93	-0.78	
21	Plan250mudf2	616.68	25	34.13	37.13	37.38	38.73	0.026	5.61	109.92	45.85	2.3	1.16	36.56	36.93	-0.20	
21	Plan100mudf2	521.15	25	34.13	36.86	37.08	38.31	0.0263	5.33	97.82	44.77	2.1	1.15	36.56	36.93	0.07	
21	Plan050mudf2	435.85	25	34.13	36.59	36.8	37.9	0.0272	5.07	85.96	43.68	1.91	1.15	36.56	36.93	0.34	
21	Plan025mudf2	354.58	25	34.13	36.32	36.5	37.48	0.0281	4.77	74.28	42.59	1.7	1.15	36.56	36.93	0.61	
21	Plan010mudf2	260.57	25	34.13	35.99	36.12	36.94	0.0288	4.32	60.33	41.24	1.44	1.14	36.56	36.93	0.94	
21	Plan005mudf2	195.71	25	34.13	35.83	35.83	36.51	0.0231	3.64	53.81	40.59	1.31	1.01	36.56	36.93	1.10	
21	Plan002mudf2	116.13	25	34.13	35.41	35.41	35.91	0.0253	3.12	37.22	38.09	0.97	1.01	36.56	36.93	1.52	
20	Plan500mudf2	750.69	30	32.89	36.53	37.28	38.58	0.0274	6.33	118.55	42.2	2.65	1.21	36.32	36.93	0.40	
20	Plan250mudf2	616.68	30	32.89	36.12	36.51	38.01	0.0301	6.1	101.15	41.37	2.33	1.24	36.32	36.93	0.81	
20	Plan100mudf2	521.15	30	32.89	35.83	36.19	37.56	0.0317	5.84	89.27	40.79	2.1	1.26	36.32	36.93	1.10	
20	Plan050mudf2	435.85	30	32.89	35.56	35.9	37.14	0.0334	5.57	78.31	40.25	1.88	1.27	36.32	36.93	1.37	
20	Plan025mudf2	354.58	30	32.89	35.29	35.59	36.69	0.0353	5.26	67.42	39.7	1.65	1.29	36.32	36.93	1.64	
20	Plan010mudf2	260.57	30	32.89	34.97	35.21	36.12	0.0366	4.75	54.87	39.06	1.38	1.28	36.32	36.93	1.96	
20	Plan005mudf2	195.71	30	32.89	34.67	34.92	35.7	0.0427	4.49	43.56	38.12	1.13	1.34	36.32	36.93	2.26	
20	Plan002mudf2	116.13	30	32.89	34.28	34.48	35.07	0.0444	3.93	29.54	32.56	0.9	1.32	36.32	36.93	2.65	
19	Plan500mudf2	750.69	17.5	31.71	35.75	36.39	37.73	0.0279	6.49	134.24	83.13	1.53	1.18	36.29	36.56	0.81	
19	Plan250mudf2	616.68	17.5	31.71	35.67	36.11	37.14	0.0211	5.57	127.06	80.16	1.5	1.03	36.29	36.56	0.89	
19	Plan100mudf2	521.15	17.5	31.71	35.64	35.85	36.72	0.0157	4.78	124.65	79.13	1.49	0.88	36.29	36.56	0.92	
19	Plan050mudf2	435.85	17.5	31.71	35.43	35.49	36.39	0.0145	4.43	108.99	72.12	1.43	0.84	36.29	36.56	1.13	
19	Plan025mudf2	354.58	17.5	31.71	34.59	34.79	36.03	0.0299	5.31	66.76	31.88	1.9	1.17	36.29	36.56	1.97	
19	Plan010mudf2	260.57	17.5	31.71	34.24	34.37	35.36	0.0283	4.68	55.64	31.18	1.64	1.12	36.29	36.56	2.32	

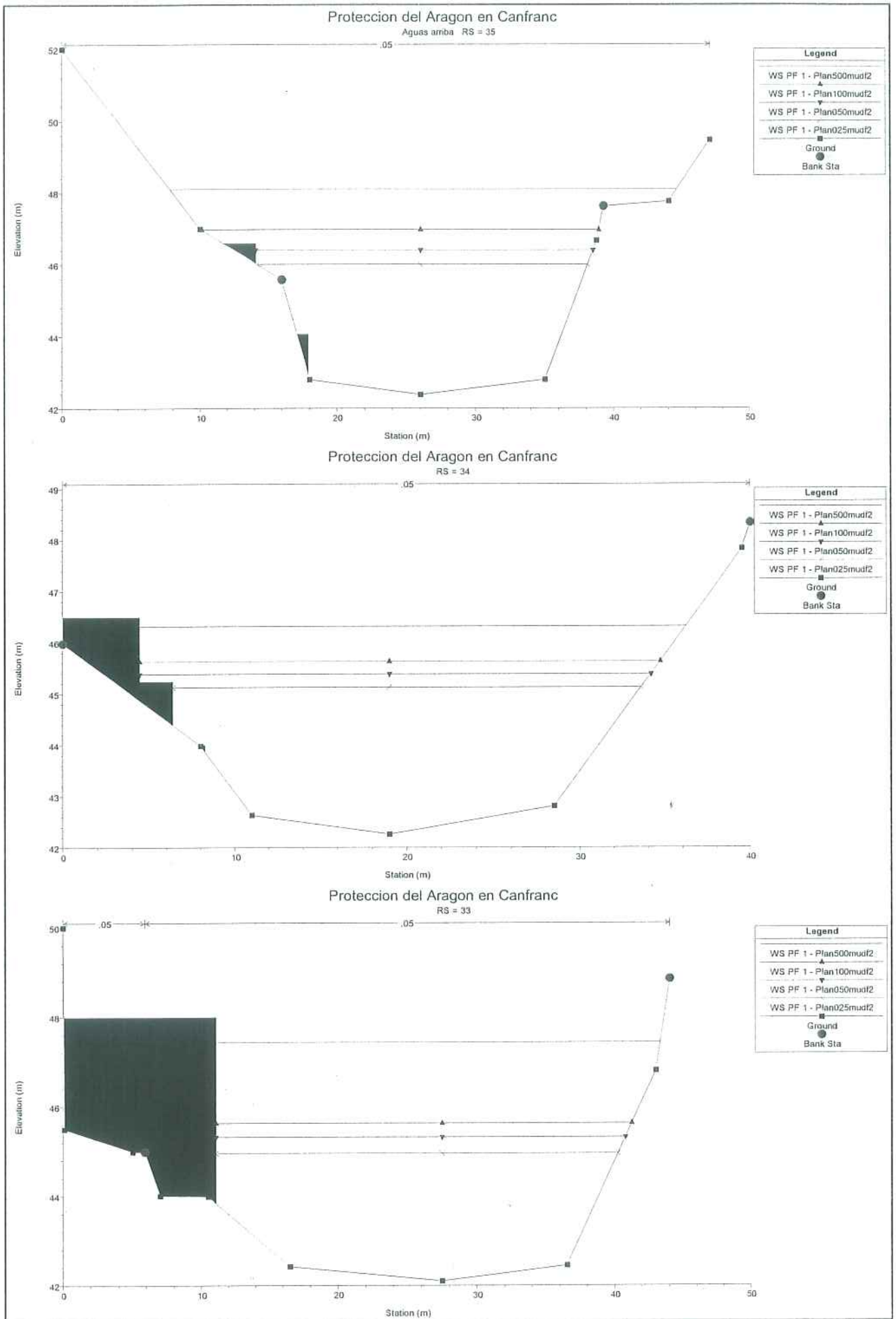


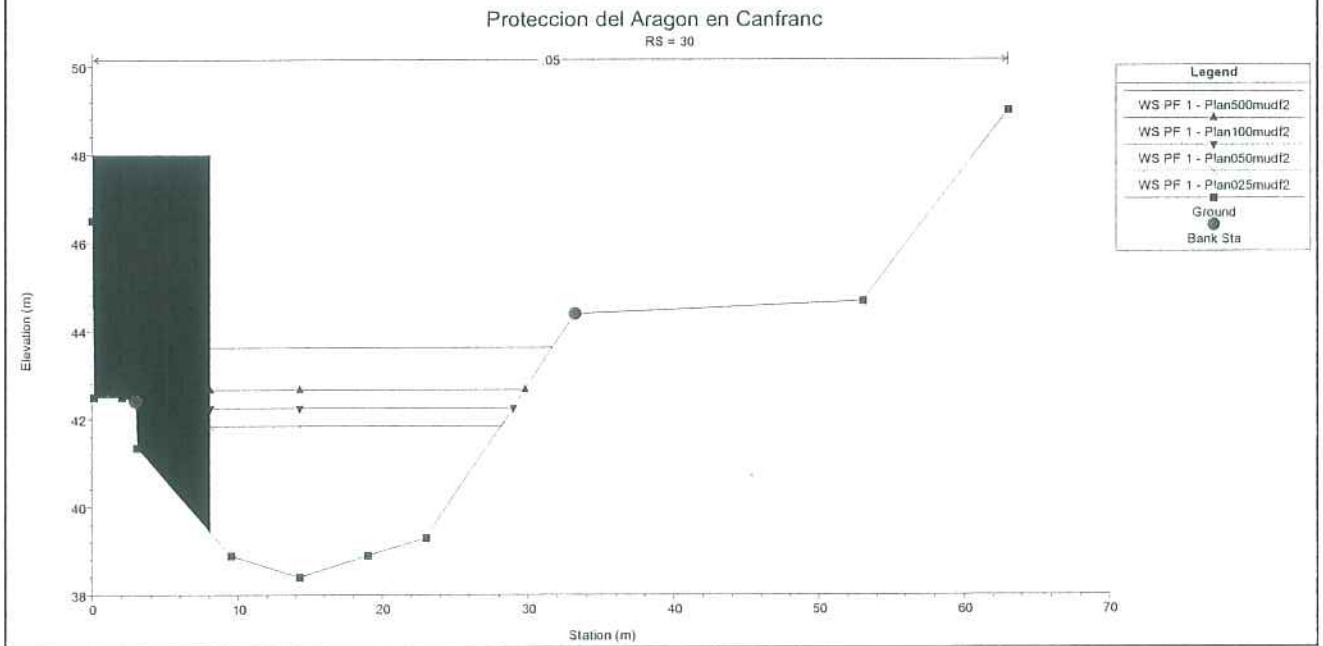
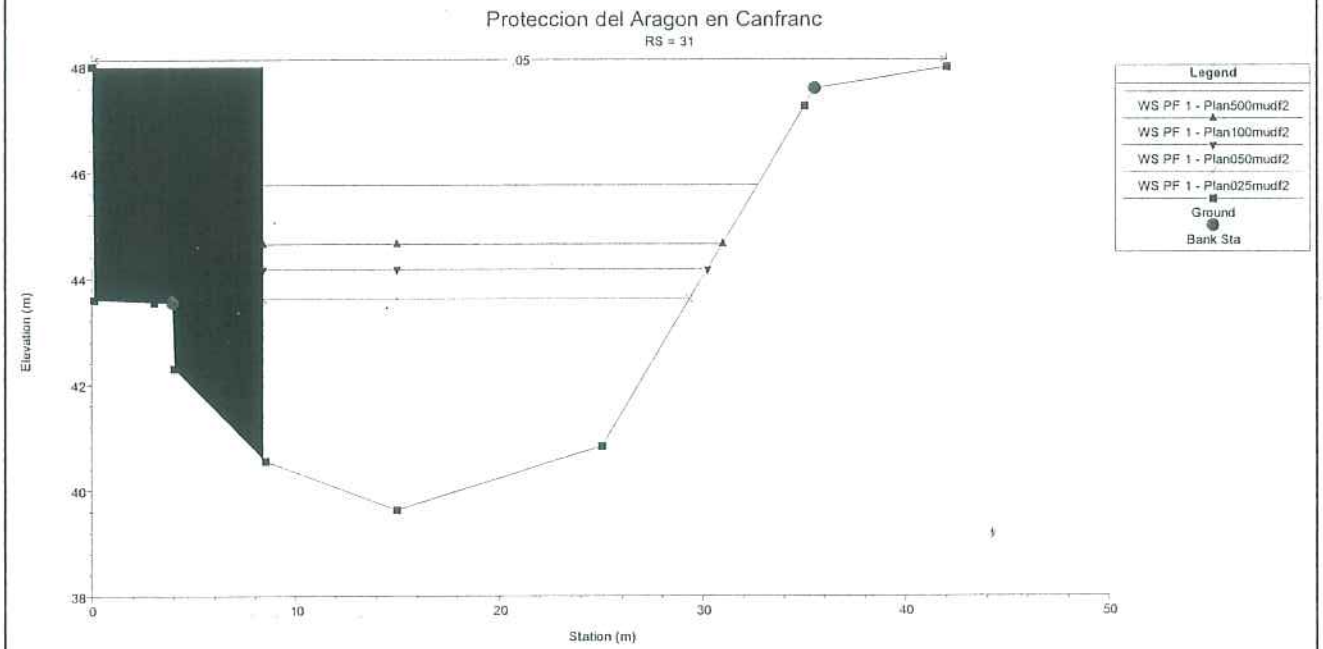
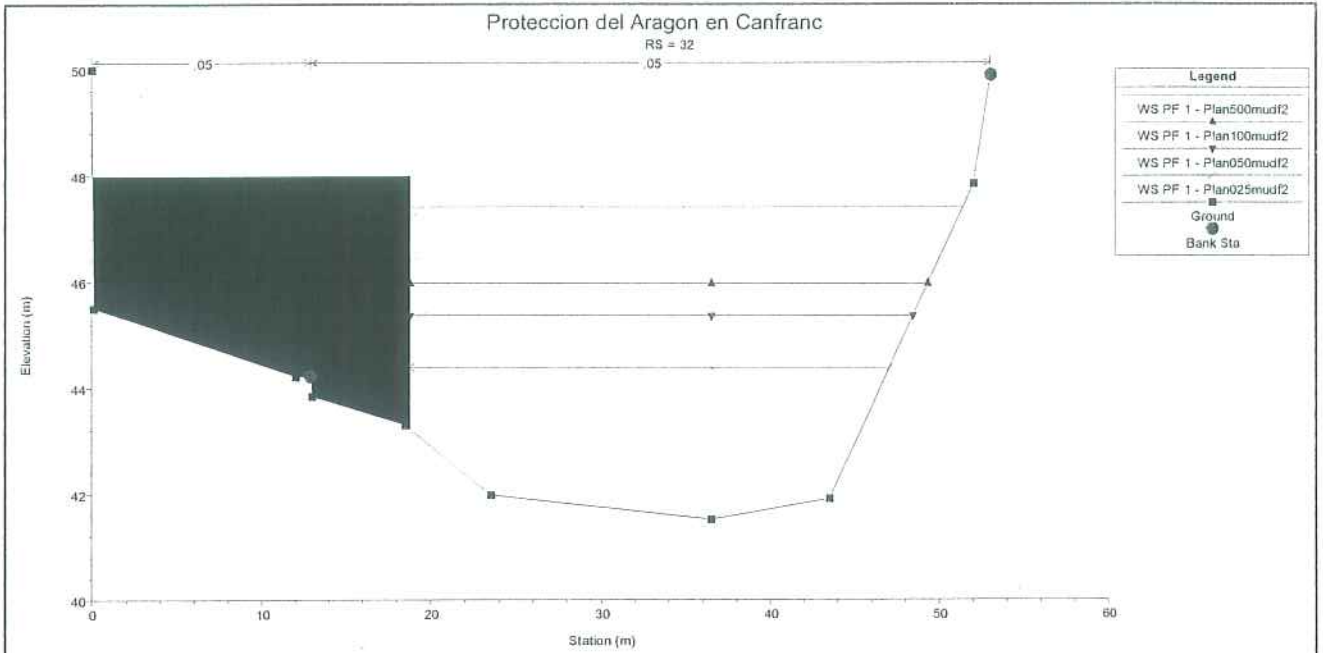
River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl	Cota calle (m)	Coron. Muro (m)	Diferencia (m)
19	Plan005mudf2	195.71	17.5	31.71	33.89	34.02	34.86	0.0314	4.37	44.81	30.47	1.37	1.15	36.29	36.56	2.67
19	Plan002mudf2	116.13	17.5	31.71	33.41	33.53	34.15	0.0364	3.8	30.6	29.13	0.99	1.18	36.29	36.56	3.15
18	Plan500mudf2	750.69	12.5	31.22	36.46	35.83	36.96	0.0057	3.51	255.69	97.18	2.47	0.55	35.47	35.84	-0.62
18	Plan250mudf2	616.68	12.5	31.22	36.14	35.5	36.59	0.0056	3.32	224.39	96.43	2.19	0.54	35.47	35.84	-0.30
18	Plan100mudf2	521.15	12.5	31.22	35.84	35.22	36.28	0.0058	3.23	195.93	95.75	1.93	0.55	35.47	35.84	0.00
18	Plan050mudf2	435.85	12.5	31.22	35.41	34.93	35.91	0.0073	3.37	155.24	89.27	1.65	0.61	35.47	35.84	0.43
18	Plan025mudf2	354.58	12.5	31.22	34.94	34.61	35.51	0.0092	3.49	117.03	74.34	1.49	0.67	35.47	35.84	0.90
18	Plan010mudf2	260.57	12.5	31.22	34.23	34.03	34.94	0.0144	3.76	72.5	51.77	1.32	0.82	35.47	35.84	1.61
18	Plan005mudf2	195.71	12.5	31.22	33.72	33.6	34.43	0.0192	3.75	52.25	30.66	1.57	0.92	35.47	35.84	2.12
18	Plan002mudf2	116.13	12.5	31.22	33.97	33.08	33.71	0.0333	3.83	30.32	26.43	1.08	1.14	35.47	35.84	2.87
17	Plan500mudf2	750.69	12	30.7	35.83	35.83	36.81	0.0312	4.76	187.47	94	1.86	0.78	35.45	35.33	-0.50
17	Plan250mudf2	616.68	12	30.7	35.51	35.51	36.44	0.012	4.55	157.44	92.86	1.59	0.78	35.45	35.33	-0.18
17	Plan100mudf2	521.15	12	30.7	35	35	36.1	0.0156	4.82	119.04	56.28	1.94	0.88	35.45	35.33	0.33
17	Plan050mudf2	435.85	12	30.7	34.68	34.68	35.72	0.016	4.63	101.8	52.26	1.79	0.88	35.45	35.33	0.65
17	Plan025mudf2	354.58	12	30.7	34.32	34.32	35.31	0.017	4.45	83.96	47.75	1.62	0.9	35.45	35.33	1.01
17	Plan010mudf2	260.57	12	30.7	33.7	33.7	34.7	0.0227	4.43	58.82	29.91	1.78	1.01	35.45	35.33	1.63
17	Plan005mudf2	195.71	12	30.7	33.49	33.17	34.19	0.0181	3.72	52.65	29.55	1.62	0.89	35.45	35.33	1.84
17	Plan002mudf2	116.13	12	30.7	32.97	32.8	33.46	0.018	3.09	37.54	28.17	1.24	0.86	35.45	35.33	2.36
16	Plan500mudf2	750.69	5.5	30.26	34.8	35.33	36.53	0.0259	6.15	136.11	85.2	1.5	1.13	35.56	34.83	0.03
16	Plan250mudf2	616.68	5.5	30.26	34.39	35.03	36.14	0.0295	6.09	110.21	54.16	1.87	1.19	35.56	34.83	0.44
16	Plan100mudf2	521.15	5.5	30.26	34.11	34.53	35.79	0.0313	5.92	95.3	52.06	1.69	1.22	35.56	34.83	0.72
16	Plan050mudf2	435.85	5.5	30.26	33.87	34.28	35.42	0.0319	5.65	82.79	50.24	1.53	1.22	35.56	34.83	0.96
16	Plan025mudf2	354.58	5.5	30.26	33.65	33.99	35	0.0308	5.24	71.76	48.57	1.38	1.18	35.56	34.83	1.18
16	Plan010mudf2	260.57	5.5	30.26	33.4	33.61	34.42	0.0261	4.5	59.95	45.26	1.24	1.07	35.56	34.83	1.43
16	Plan005mudf2	195.71	5.5	30.26	33.17	33.17	33.94	0.0225	3.9	50.57	36.68	1.28	0.98	35.56	34.83	1.66
16	Plan002mudf2	116.13	5.5	30.26	32.53	32.53	33.19	0.0248	3.58	32.42	24.68	1.21	1	35.56	34.83	2.30
15	Plan500mudf2	750.69	45	30.04	34.07	34.84	36.3	0.0425	7.09	122.97	77.05	1.52	1.44	35.59	34.61	0.54
15	Plan250mudf2	616.68	45	30.04	33.82	34.48	35.9	0.043	6.75	104.73	71.28	1.4	1.43	35.59	34.61	0.79
15	Plan100mudf2	521.15	45	30.04	33.62	34.26	35.59	0.0441	6.5	90.57	66.46	1.3	1.44	35.59	34.61	0.99
15	Plan050mudf2	435.85	45	30.04	33.45	34.02	35.21	0.0427	6.1	79.53	62.44	1.22	1.4	35.59	34.61	1.16
15	Plan025mudf2	354.58	45	30.04	33.28	33.75	34.79	0.0393	5.57	69.52	57.85	1.15	1.33	35.59	34.61	1.33
15	Plan010mudf2	260.57	45	30.04	33.01	33.4	34.24	0.0352	4.98	55.11	46.97	1.12	1.24	35.59	34.61	1.60
15	Plan005mudf2	195.71	45	30.04	32.74	33.04	33.77	0.0322	4.52	44.01	35.96	1.16	1.17	35.59	34.61	1.87
15	Plan002mudf2	116.13	45	30.04	32.19	32.32	33.01	0.0323	4.02	28.88	23.09	1.18	1.15	35.59	34.61	2.42
14	Plan500mudf2	750.69	35	29.28	33.95	33.52	34.57	0.0077	4.05	226.64	89.75	2.43	0.65	35.44	33.32	-0.63
14	Plan250mudf2	616.68	35	29.28	33.6	33.28	34.18	0.0082	3.95	195.15	89.18	2.12	0.67	35.44	33.32	-0.28
14	Plan100mudf2	521.15	35	29.28	33.31	33.09	33.88	0.0088	3.9	170.16	88.73	1.86	0.69	35.44	33.32	0.01
14	Plan050mudf2	435.85	35	29.28	32.64	32.93	33.72	0.0203	5.19	110.58	87.63	1.24	1.02	35.44	33.32	0.68
14	Plan025mudf2	354.58	35	29.28	32.47	32.74	33.45	0.0191	4.84	96.1	87.36	1.08	0.99	35.44	33.32	0.85
14	Plan010mudf2	260.57	35	29.28	32.04	32.13	33.13	0.0245	4.86	62.26	52.09	1.17	1.09	35.44	33.32	1.28
14	Plan005mudf2	195.71	35	29.28	32.08	32.05	32.66	0.0128	3.55	64.27	53.83	1.17	0.79	35.44	33.32	1.24
14	Plan002mudf2	116.13	35	29.28	31.17	31.36	32.05	0.0301	4.16	27.9	21.29	1.27	1.14	35.44	33.32	2.15
13	Plan500mudf2	750.69	36	28.94	33.14	33.14	34.18	0.0129	5.05	179.79	78.89	2.21	0.85	34.7	32.67	-0.47
13	Plan250mudf2	616.68	36	28.94	32.87	32.87	33.8	0.0124	4.72	158.92	78.32	1.97	0.83	34.70	32.67	-0.20

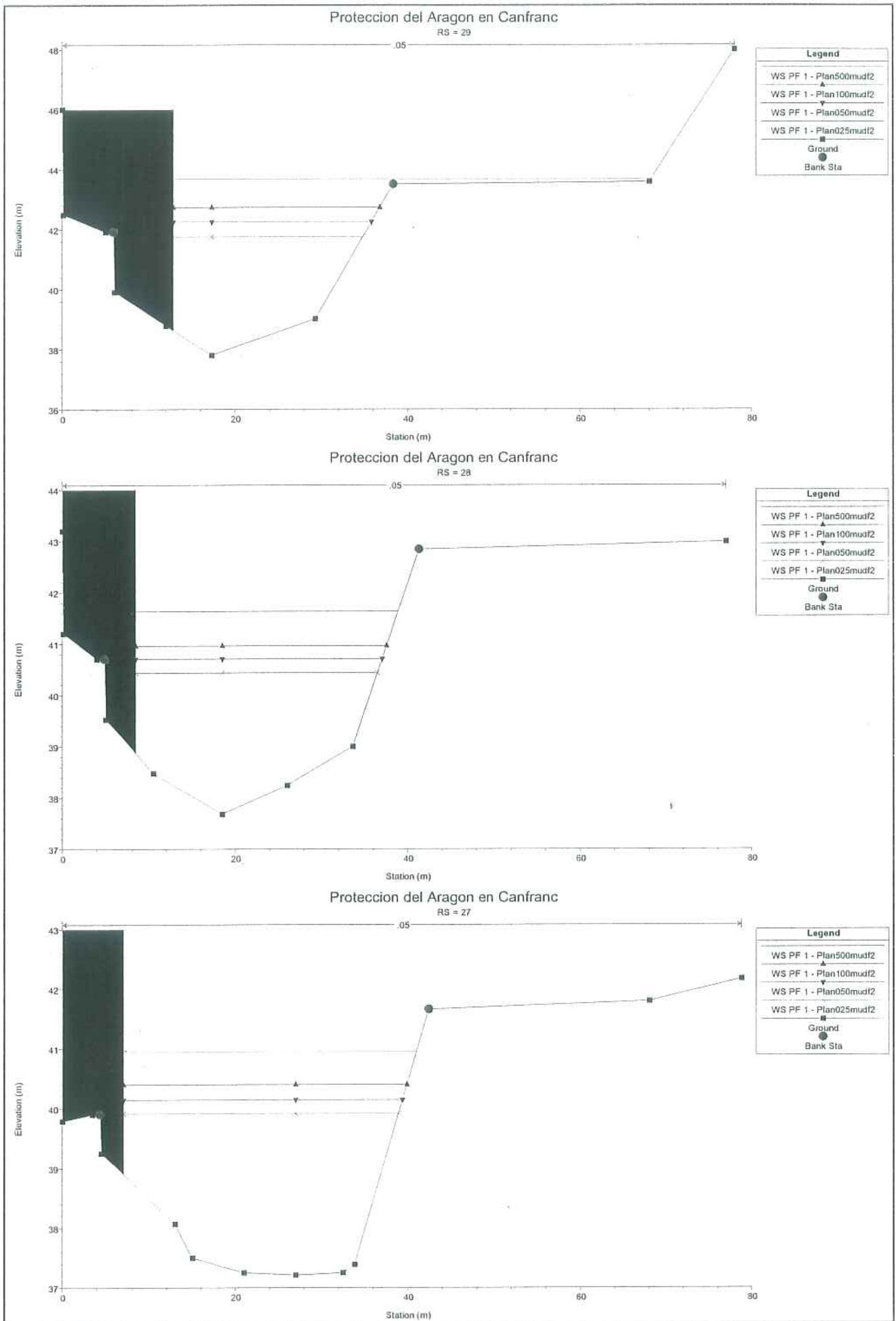
River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl	Cota calle (m)	Coron. Muro (m)	Diferencia (m)
13	Plan100mudf2	521.15	36	28.94	32.67	32.67	33.5	0.0118	4.44	143.11	77.89	1.79	0.8	34.70	32.67	0.00
13	Plan050mudf2	435.85	36	28.94	32.32	32.45	33.24	0.0144	4.57	115.98	77.15	1.47	0.88	34.70	32.67	0.35
13	Plan025mudf2	354.58	36	28.94	32.18	32.24	32.93	0.0122	4.08	104.93	76.85	1.34	0.8	34.70	32.67	0.49
13	Plan010mudf2	260.57	36	28.94	31.65	31.78	32.53	0.0171	4.21	67.06	57.8	1.14	0.92	34.70	32.67	1.02
13	Plan005mudf2	195.71	36	28.94	31.21	31.21	32.06	0.021	4.08	48.08	31.64	1.48	0.99	34.70	32.67	1.46
13	Plan002mudf2	116.13	36	28.94	30.41	30.63	31.36	0.041	4.32	26.89	23.9	1.1	1.3	34.70	32.67	2.26
12	Plan500mudf2	750.69	35	27.81	31.64	32.08	33.48	0.025	6.17	130.83	58.94	2.13	1.16	35.5	31.57	-0.07
12	Plan250mudf2	616.68	35	27.81	31.24	31.71	33.05	0.0292	6.06	107.69	55.6	1.87	1.23	35.50	31.57	0.33
12	Plan100mudf2	521.15	35	27.81	30.92	31.43	32.73	0.0342	6.01	90.27	52.95	1.65	1.31	35.50	31.57	0.65
12	Plan050mudf2	435.85	35	27.81	30.66	31.14	32.36	0.0376	5.8	76.63	50.78	1.47	1.35	35.50	31.57	0.91
12	Plan025mudf2	354.58	35	27.81	30.29	30.85	32.06	0.0501	5.9	60.15	38.8	1.51	1.51	35.50	31.57	1.28
12	Plan010mudf2	260.57	35	27.81	29.96	30.39	31.47	0.0538	5.44	47.89	37.08	1.27	1.53	35.50	31.57	1.61
12	Plan005mudf2	195.71	35	27.81	29.77	30.09	30.94	0.0498	4.81	40.72	36.04	1.12	1.44	35.50	31.57	1.80
12	Plan002mudf2	116.13	35	27.81	29.56	29.64	30.18	0.0328	3.5	33.18	34.74	0.95	1.14	35.50	31.57	2.01
11	Plan500mudf2	750.69	17.5	26.55	31.12	31.33	32.81	0.019	6	134.1	45.41	2.73	1.01	38.76	30.5	-0.62
11	Plan250mudf2	616.68	17.5	26.55	30.78	30.85	32.24	0.0183	5.54	118.78	44.19	2.5	0.98	38.76	30.5	-0.28
11	Plan100mudf2	521.15	17.5	26.55	30.47	30.53	31.79	0.0186	5.26	105.41	43.11	2.28	0.98	38.76	30.5	0.03
11	Plan050mudf2	435.85	17.5	26.55	30.19	30.23	31.37	0.0185	4.94	93.58	42.12	2.09	0.97	38.76	30.5	0.31
11	Plan025mudf2	354.58	17.5	26.55	29.84	29.92	30.93	0.0203	4.73	78.99	40.87	1.83	1	38.76	30.5	0.66
11	Plan010mudf2	260.57	17.5	26.55	29.36	29.47	30.37	0.0229	4.52	60.14	37.48	1.53	1.04	38.76	30.5	1.14
11	Plan005mudf2	195.71	17.5	26.55	29.02	29.14	29.91	0.0253	4.21	47.62	35.71	1.28	1.06	38.76	30.5	1.48
11	Plan002mudf2	116.13	17.5	26.55	28.57	28.6	29.2	0.0266	3.5	33.22	29.03	1.11	1.04	38.76	30.5	1.93
10	Plan500mudf2	750.69	25	25.58	29.99	30.64	32.33	0.0312	7.02	114.25	45.67	2.38	1.3	39.09	30	0.01
10	Plan250mudf2	616.68	25	25.58	29.65	30.2	31.75	0.0322	6.62	99.05	44.4	2.14	1.3	39.09	30	0.35
10	Plan100mudf2	521.15	25	25.58	29.39	29.9	31.31	0.0318	6.33	87.47	42.15	2	1.28	39.09	30	0.61
10	Plan050mudf2	435.85	25	25.58	29.14	29.61	30.87	0.0323	5.97	77.14	41.21	1.81	1.28	39.09	30	0.86
10	Plan025mudf2	354.58	25	25.58	28.86	29.26	30.43	0.0342	5.66	65.87	40.16	1.6	1.29	39.09	30	1.14
10	Plan010mudf2	260.57	25	25.58	28.52	28.86	29.85	0.0358	5.17	52.39	38.39	1.34	1.29	39.09	30	1.48
10	Plan005mudf2	195.71	25	25.58	28.25	28.55	29.38	0.0366	4.71	42.37	36.77	1.13	1.27	39.09	30	1.75
10	Plan002mudf2	116.13	25	25.58	27.81	27.98	28.64	0.0365	4.03	28.8	26.05	1.08	1.22	39.09	30	2.19
9	Plan500mudf2	750.69	10	25.2	29.35	29.94	31.49	0.032	6.74	118	48.34	2.3	1.29	39.93	29	-0.35
9	Plan250mudf2	616.68	10	25.2	29.14	29.48	30.87	0.0285	6.06	107.8	47.76	2.14	1.21	39.93	29	-0.14
9	Plan100mudf2	521.15	10	25.2	28.88	29.22	30.45	0.0284	5.77	95.82	46.17	1.97	1.19	39.93	29	0.12
9	Plan050mudf2	435.85	10	25.2	28.69	28.92	30.03	0.0267	5.31	87.06	45.64	1.82	1.15	39.93	29	0.31
9	Plan025mudf2	354.58	10	25.2	28.53	28.64	29.59	0.0232	4.72	79.7	45.19	1.69	1.06	39.93	29	0.47
9	Plan010mudf2	260.57	10	25.2	28.27	28.29	29.06	0.0205	4.06	68	44.47	1.47	0.98	39.93	29	0.73
9	Plan005mudf2	195.71	10	25.2	27.89	27.98	28.67	0.0258	4	51.77	42.56	1.18	1.07	39.93	29	1.11
9	Plan002mudf2	116.13	10	25.2	27.35	27.58	28.19	0.034	4.08	29.24	32.11	0.89	1.19	39.93	29	1.65
8	Plan500mudf2	750.69	30	25.05	28.92	29.49	31.16	0.0325	6.85	115.61	47.27	2.32	1.31	39.84	29	0.08
8	Plan250mudf2	616.68	30	25.05	28.65	29.13	30.56	0.0311	6.3	103.2	46.76	2.11	1.27	39.84	29	0.35
8	Plan100mudf2	521.15	30	25.05	28.4	28.81	30.14	0.0323	6	91.44	46.28	1.9	1.28	39.84	29	0.60
8	Plan050mudf2	435.85	30	25.05	28.19	28.55	29.71	0.0317	5.6	81.9	45.88	1.73	1.25	39.84	29	0.81
8	Plan025mudf2	354.58	30	25.05	27.96	28.26	29.29	0.0311	5.24	71.23	44.45	1.56	1.22	39.84	29	1.04
8	Plan010mudf2	260.57	30	25.05	28.2	27.9	28.74	0.0111	3.33	82.37	45.9	1.73	0.74	39.84	29	0.80
8	Plan005mudf2	195.71	30	25.05	27.87	27.61	28.33	0.0112	3.05	67.45	44.28	1.48	0.73	39.84	29	1.13

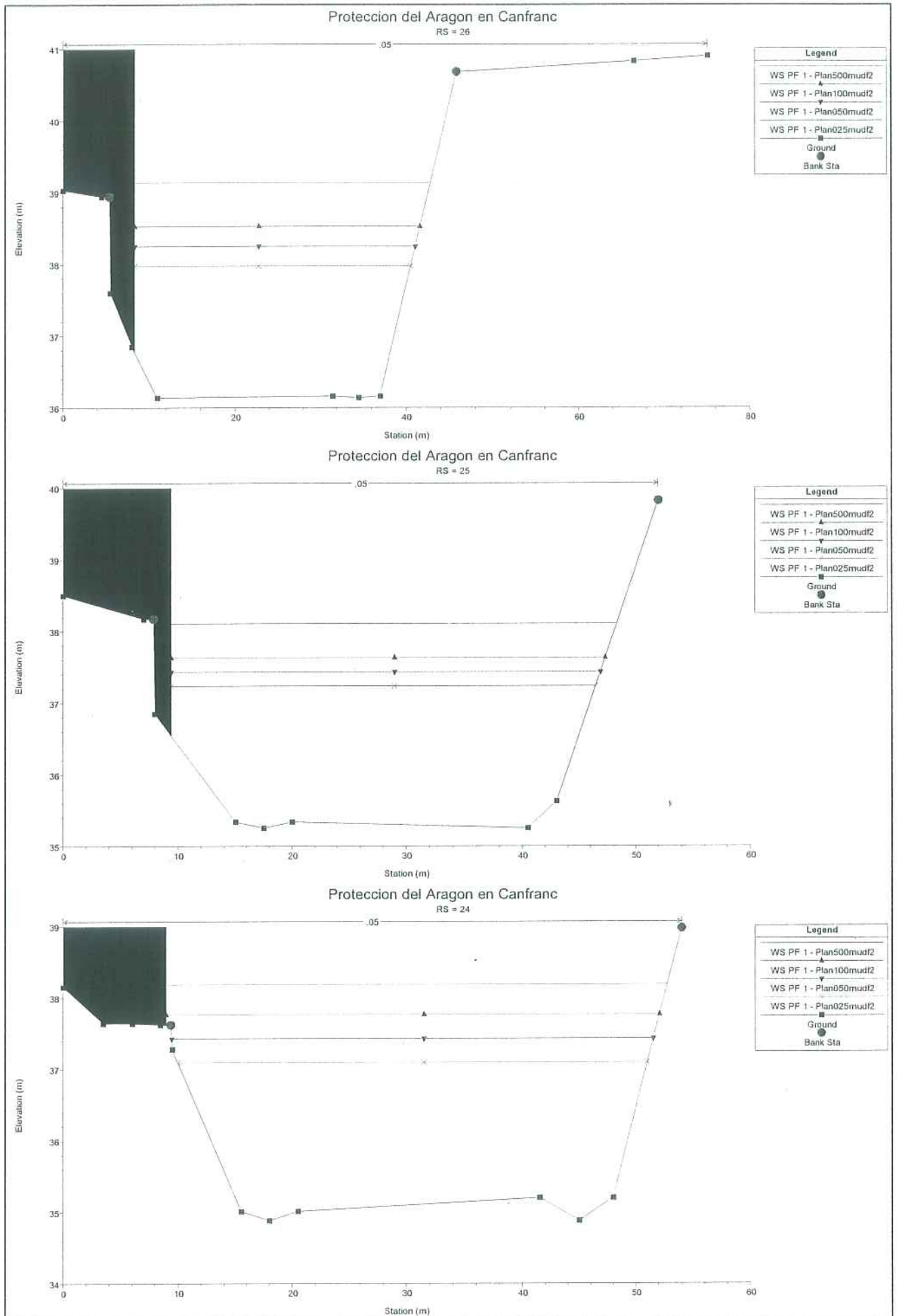
River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Chl El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude #	Chl (m)	Coron. Muro (m)	Diferencia (m)
8	Plan002mudf2	116.13	30	25.05	26.88	27.14	27.77	0.0472	4.18	27.77	29.06	0.94	1.37	39.84	29	2.12
7	Plans500mudf2	750.69	25	24.59	28.97	29.03	30.3	0.0158	5.29	153.88	61.7	2.42	0.96	38.03	28.5	-0.47
7	Plan250mudf2	616.68	25	24.59	28.58	28.71	29.84	0.0178	5.12	129.68	61.09	2.07	1	38.03	28.5	-0.08
7	Plan100mudf2	521.15	25	24.59	28.27	28.45	29.5	0.02	5.02	110.85	60.08	1.81	1.04	38.03	28.5	0.23
7	Plan050mudf2	435.85	25	24.59	27.95	28.19	29.18	0.0237	4.96	92	59.36	1.53	1.1	38.03	28.5	0.55
7	Plan025mudf2	354.58	25	24.59	27.63	27.92	28.83	0.0283	4.85	74.25	52.79	1.39	1.17	38.03	28.5	0.87
7	Plan010mudf2	260.57	25	24.59	27.46	27.46	28.26	0.0215	3.96	65.8	42.27	1.54	1	38.03	28.5	1.04
7	Plan005mudf2	195.71	25	24.59	27.14	27.14	27.84	0.0228	3.72	52.67	38.18	1.36	1.01	38.03	28.5	1.36
7	Plan002mudf2	116.13	25	24.59	26.76	26.67	27.21	0.0185	2.96	39.25	34.19	1.14	0.88	38.03	28.5	1.74
6	Plans500mudf2	750.69	24	24.07	27.75	28.28	29.69	0.0316	6.51	129.47	69.59	1.82	1.3		27.89	
6	Plan250mudf2	616.68	24	24.07	27.55	28	29.22	0.0301	6	115.05	69.13	1.63	1.25			
6	Plan100mudf2	521.15	24	24.07	27.38	27.76	28.86	0.0291	5.62	103.36	68.76	1.47	1.22			
6	Plan050mudf2	435.85	24	24.07	27.2	27.56	28.53	0.0287	5.27	91.12	67.14	1.33	1.19			
6	Plan025mudf2	354.58	24	24.07	27.06	27.33	28.14	0.0252	4.7	81.95	64.79	1.24	1.1			
6	Plan010mudf2	260.57	24	24.07	26.77	26.97	27.68	0.0257	4.25	64.07	59.94	1.05	1.08			
6	Plan005mudf2	195.71	24	24.07	26.56	26.61	27.27	0.0239	3.73	52.75	45.3	1.14	1.02			
6	Plan002mudf2	116.13	24	24.07	26.16	26.16	26.66	0.0261	3.14	36.95	37.84	0.96	1.02			
5	Plan500mudf2	750.69	28	23.56	26.72	27.33	28.86	0.0362	6.62	121.46	68.81	1.73	1.38			
5	Plan250mudf2	616.68	28	23.56	26.48	27.03	28.39	0.0367	6.21	104.83	67.44	1.53	1.36			
5	Plan100mudf2	521.15	28	23.56	26.27	26.81	28.04	0.0383	5.92	91.26	63.81	1.4	1.37			
5	Plan050mudf2	435.85	28	23.56	26.06	26.56	27.67	0.0406	5.63	78.36	55.05	1.39	1.38			
5	Plan025mudf2	354.58	28	23.56	25.81	26.28	27.29	0.0445	5.39	65.84	44.56	1.44	1.41			
5	Plan010mudf2	260.57	28	23.56	25.48	25.84	26.79	0.0527	5.08	51.26	43.26	1.16	1.49			
5	Plan005mudf2	195.71	28	23.56	25.25	25.56	26.38	0.0579	4.71	41.54	42.36	0.97	1.52			
5	Plan002mudf2	116.13	28	23.56	24.98	25.17	25.73	0.0556	3.83	30.36	41.31	0.73	1.42			
4	Plan500mudf2	750.69	40	22.72	27.61	26.39	28.19	0.0049	3.41	226.84	62.7	3.5	0.55			
4	Plan250mudf2	616.68	40	22.72	26.88	26.02	27.49	0.0066	3.49	181.67	61.37	2.9	0.62			
4	Plan100mudf2	521.15	40	22.72	26.3	25.75	26.97	0.0088	3.63	146.84	58.78	2.46	0.7			
4	Plan050mudf2	435.85	40	22.72	25.09	25.47	26.58	0.0353	5.41	80.62	46.22	1.73	1.31			
4	Plan025mudf2	354.58	40	22.72	24.88	25.16	26.14	0.033	4.96	71.48	44.42	1.59	1.25			
4	Plan010mudf2	260.57	40	22.72	24.6	24.78	25.59	0.0311	4.41	59.04	41.84	1.4	1.19			
4	Plan005mudf2	195.71	40	22.72	24.35	24.47	25.16	0.0303	3.99	49.03	39.65	1.23	1.15			
4	Plan002mudf2	116.13	40	22.72	23.96	24.03	24.55	0.0308	3.38	34.38	36.2	0.94	1.11			
3	Plan500mudf2	750.69	35	21.38	27.52		28	0.0032	3.13	246.07	54.52	4.28	0.46			
3	Plan250mudf2	616.68	35	21.38	26.8		27.26	0.0035	3.04	207.73	51.97	3.81	0.47			
3	Plan100mudf2	521.15	35	21.38	26.23		26.67	0.0039	2.97	178.97	49.88	3.44	0.49			
3	Plan050mudf2	435.85	35	21.38	25.68	24.34	26.11	0.0043	2.91	152.26	47.86	3.06	0.51			
3	Plan025mudf2	354.58	35	21.38	25.12	24	25.53	0.0051	2.86	125.76	45.77	2.66	0.53			
3	Plan010mudf2	260.57	35	21.38	24.39	23.57	24.79	0.0065	2.79	93.52	42.19	2.16	0.58			
3	Plan005mudf2	195.71	35	21.38	23.82	23.23	24.2	0.008	2.74	71.52	36.8	1.9	0.63			
3	Plan002mudf2	116.13	35	21.38	23	22.74	23.37	0.0129	2.7	42.97	32.5	1.3	0.75			
2	Plan500mudf2	750.69	30	20.16	25.62	25.62	27.63	0.0181	6.28	119.54	29.86	3.57	1			
2	Plan250mudf2	616.68	30	20.16	25.04	25.04	26.88	0.0187	6.01	102.64	28.29	3.26	1.01			
2	Plan100mudf2	521.15	30	20.16	24.6	24.6	26.29	0.019	5.76	90.46	27.1	3.02	1.01			

River Sta	Plan	Q Total (m3/s)	Length Chnl (m)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Hydr Radius (m)	Froude # Chl	Cota calle (m)	Coron. Muro (m)	Diferencia (m)
2	Plan050mudf2	435.85	30	20.16	24.18	24.18	25.72	0.0194	5.5	79.18	25.95	2.78	1.01			
2	Plan025mudf2	354.58	30	20.16	23.73	23.73	25.12	0.0199	5.22	67.92	24.75	2.51	1.01			
2	Plan010mudf2	260.57	30	20.16	23.16	23.16	24.34	0.0206	4.81	54.2	23.2	2.16	1			
2	Plan005mudf2	195.71	30	20.16	22.73	22.7	23.72	0.0208	4.4	44.5	22.04	1.89	0.99			
2	Plan002mudf2	116.13	30	20.16	22.21		22.83	0.0172	3.48	33.33	20.63	1.53	0.87			
1	Plan500mudf2	750.69		19.51	24.13	24.86	26.86	0.0309	7.32	102.56	32.15	3	1.31			
1	Plan250mudf2	616.68		19.51	23.74	24.32	26.12	0.03	6.84	90.13	30.69	2.77	1.27			
1	Plan100mudf2	521.15		19.51	23.42	23.9	25.55	0.0295	6.47	80.56	29.51	2.59	1.25			
1	Plan050mudf2	435.85		19.51	23.12	23.51	24.99	0.0284	6.05	72.01	28.42	2.41	1.21			
1	Plan025mudf2	354.58		19.51	22.82	23.09	24.41	0.0269	5.58	63.51	27.3	2.22	1.17			
1	Plan010mudf2	260.57		19.51	22.42	22.55	23.66	0.0249	4.94	52.77	25.81	1.96	1.1			
1	Plan005mudf2	195.71		19.51	22.13	22.13	23.07	0.0214	4.29	45.67	24.77	1.77	1.01			
1	Plan002mudf2	116.13		19.51	21.5	21.5	22.22	0.0231	3.77	30.8	21.61	1.38	1.01			

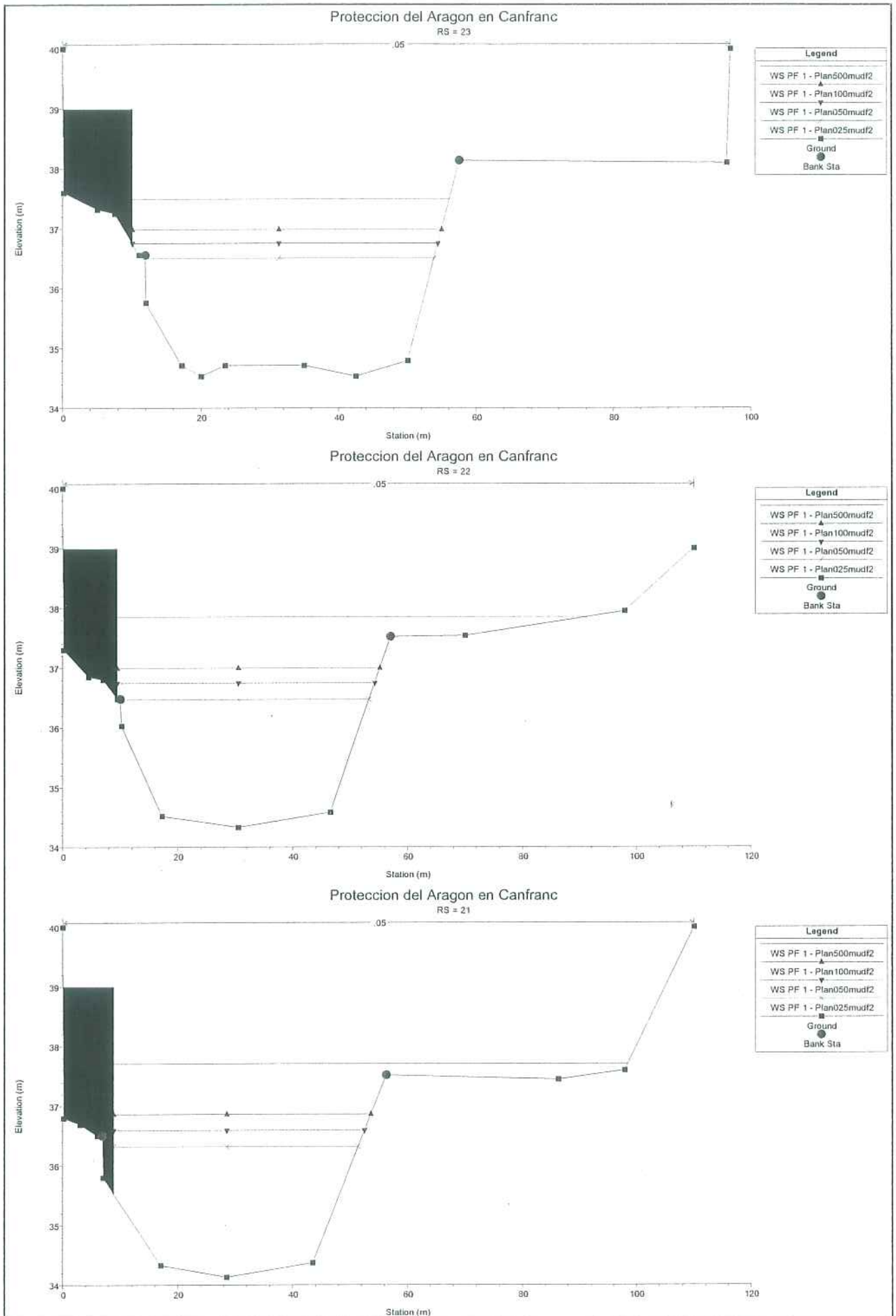


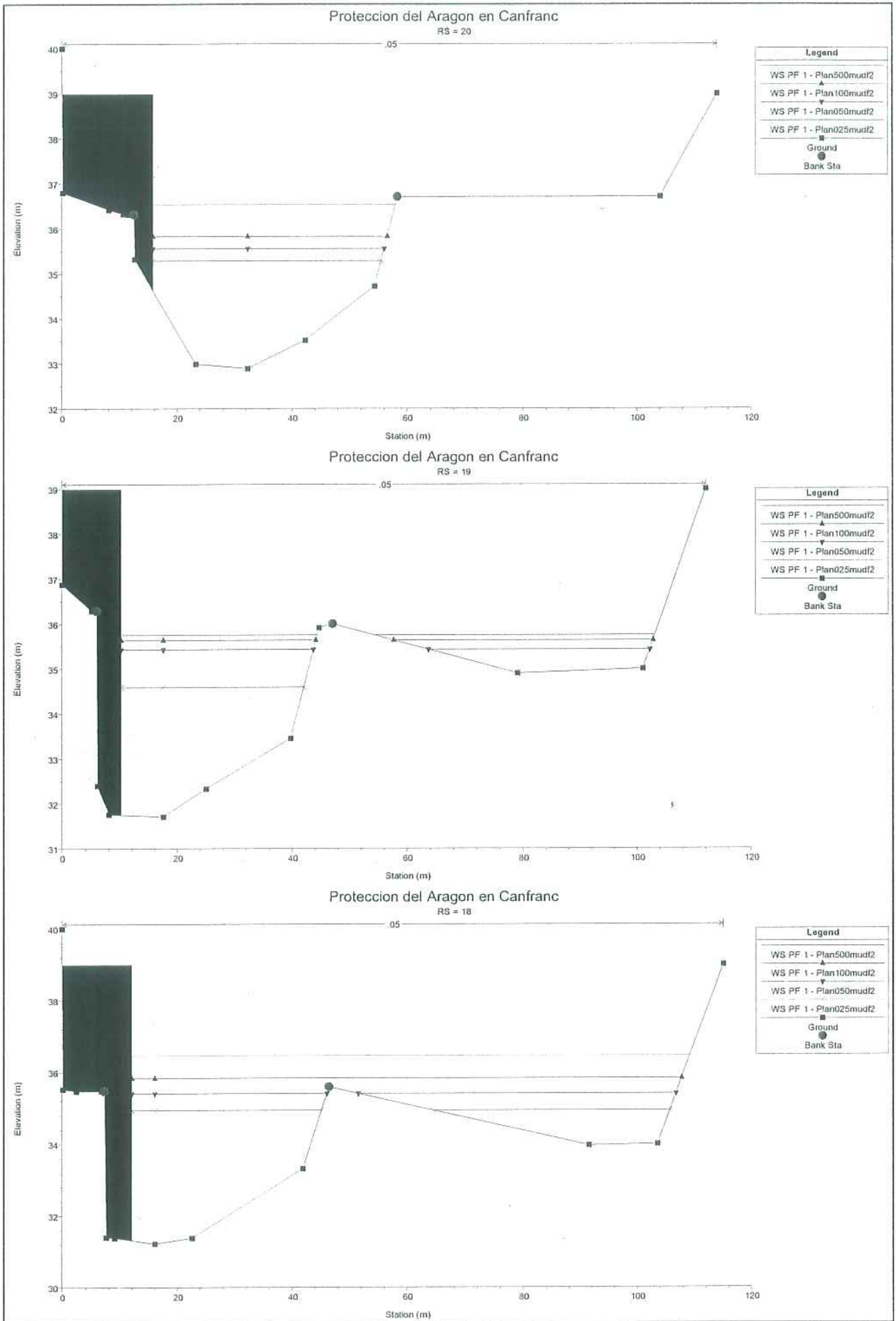


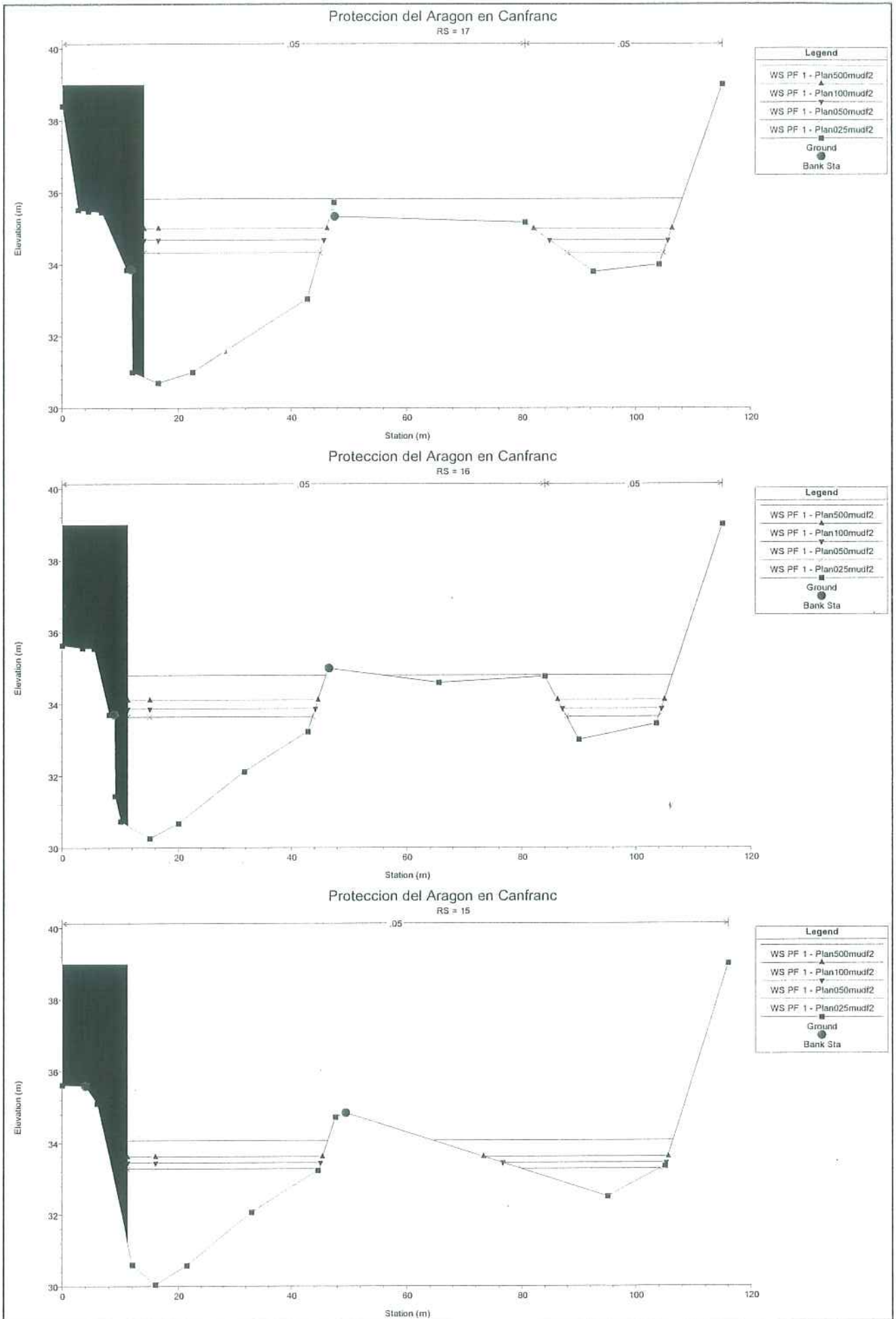


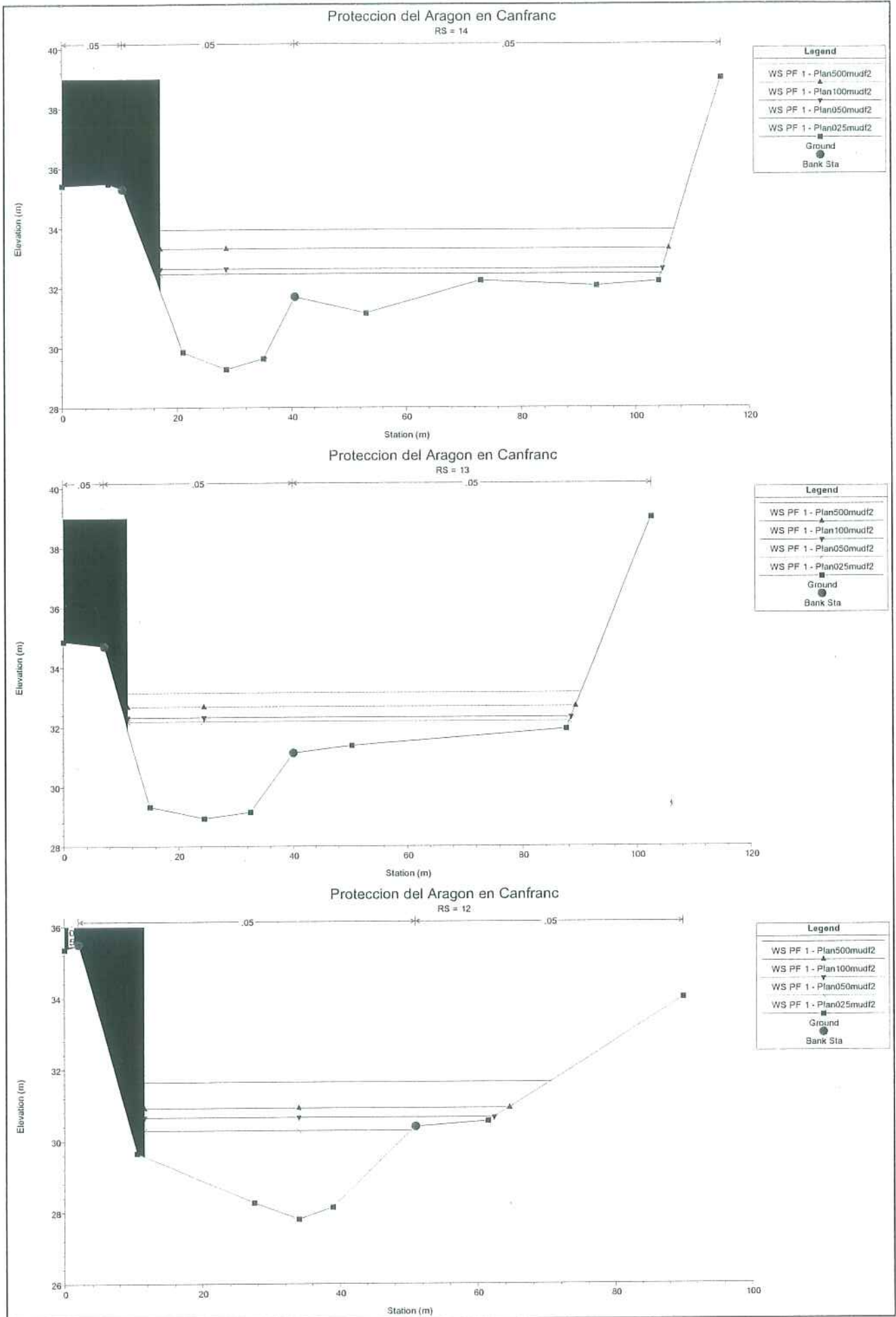


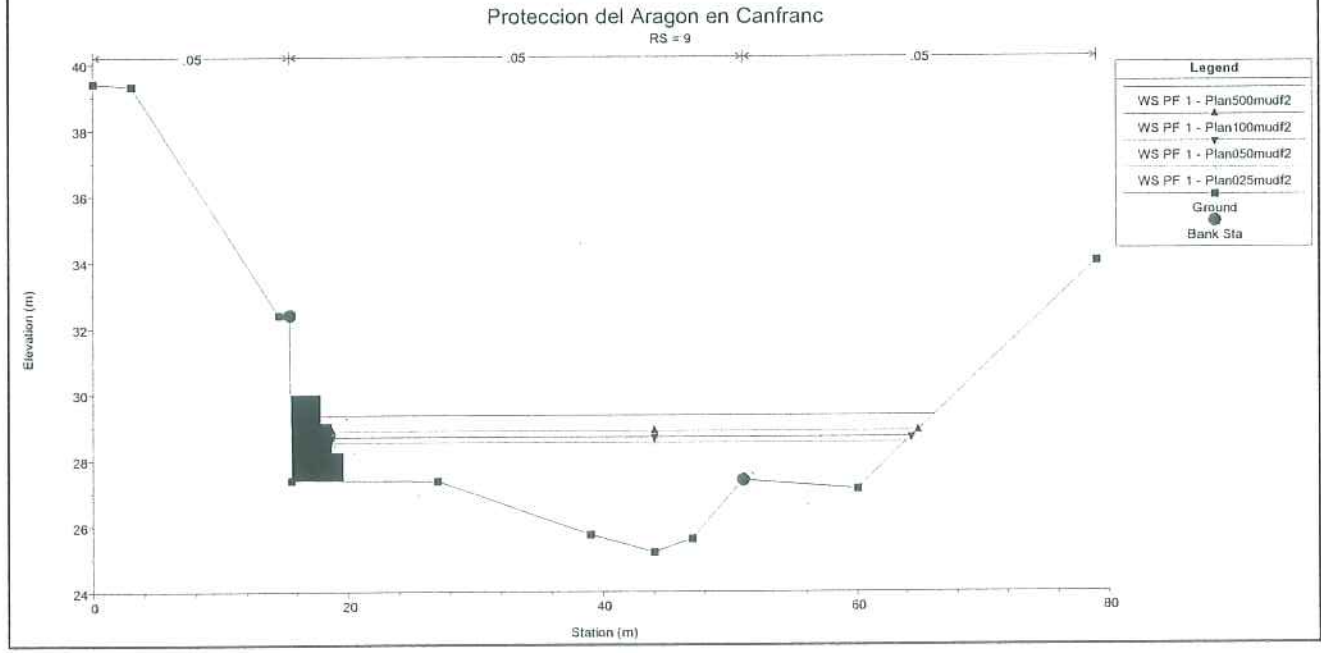
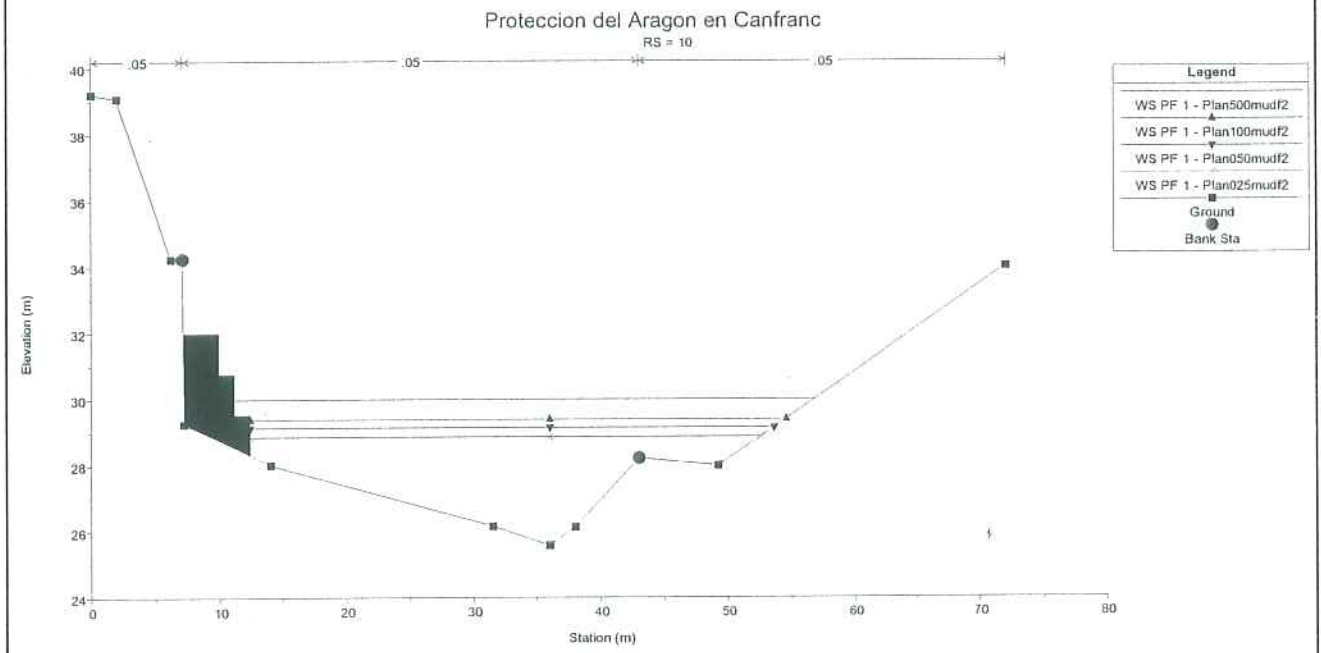
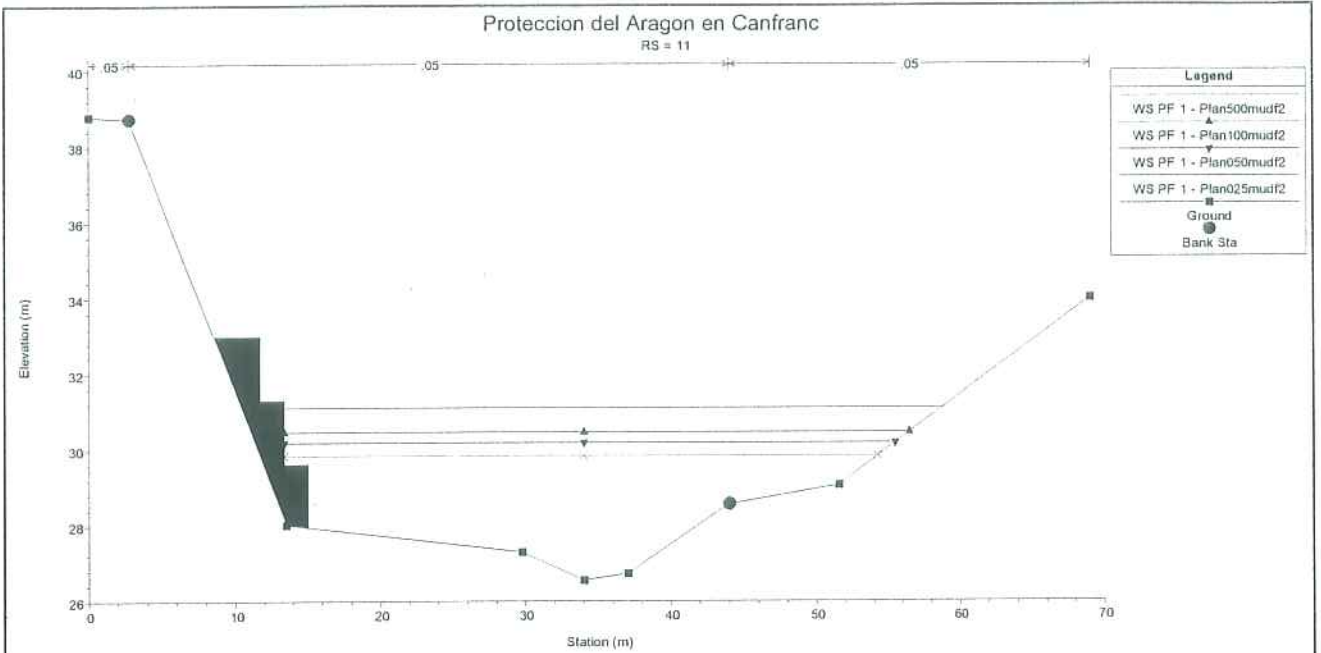


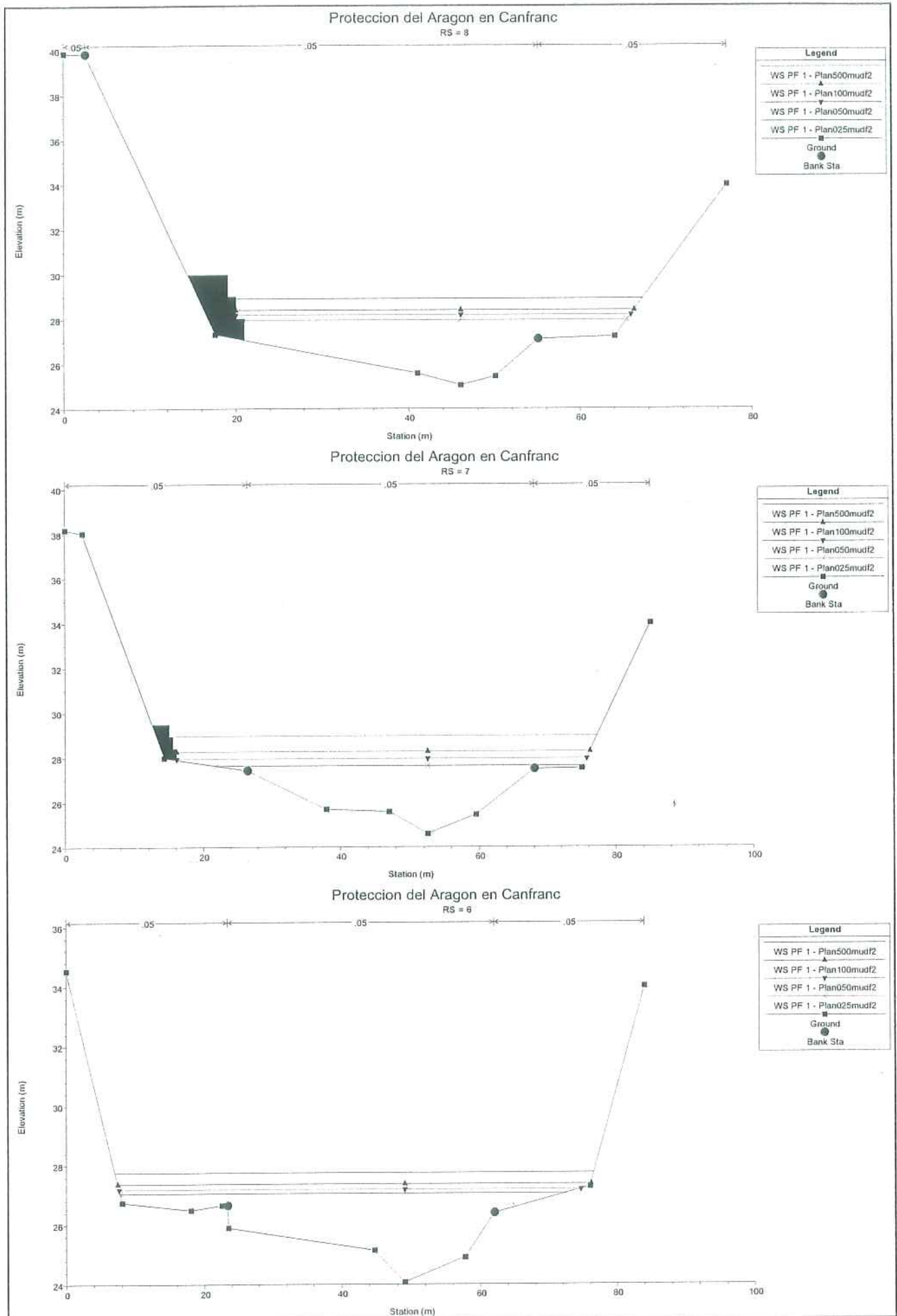


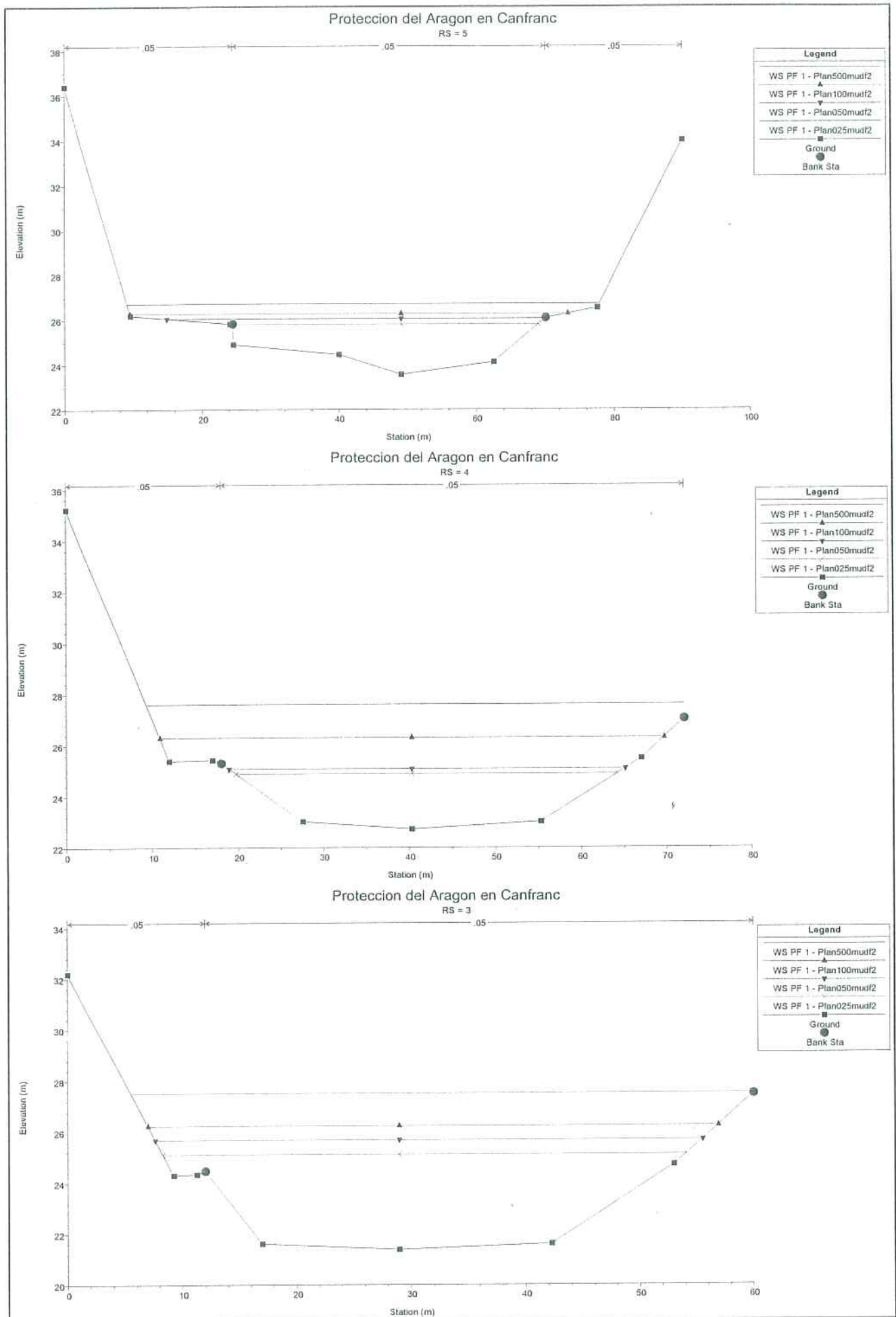


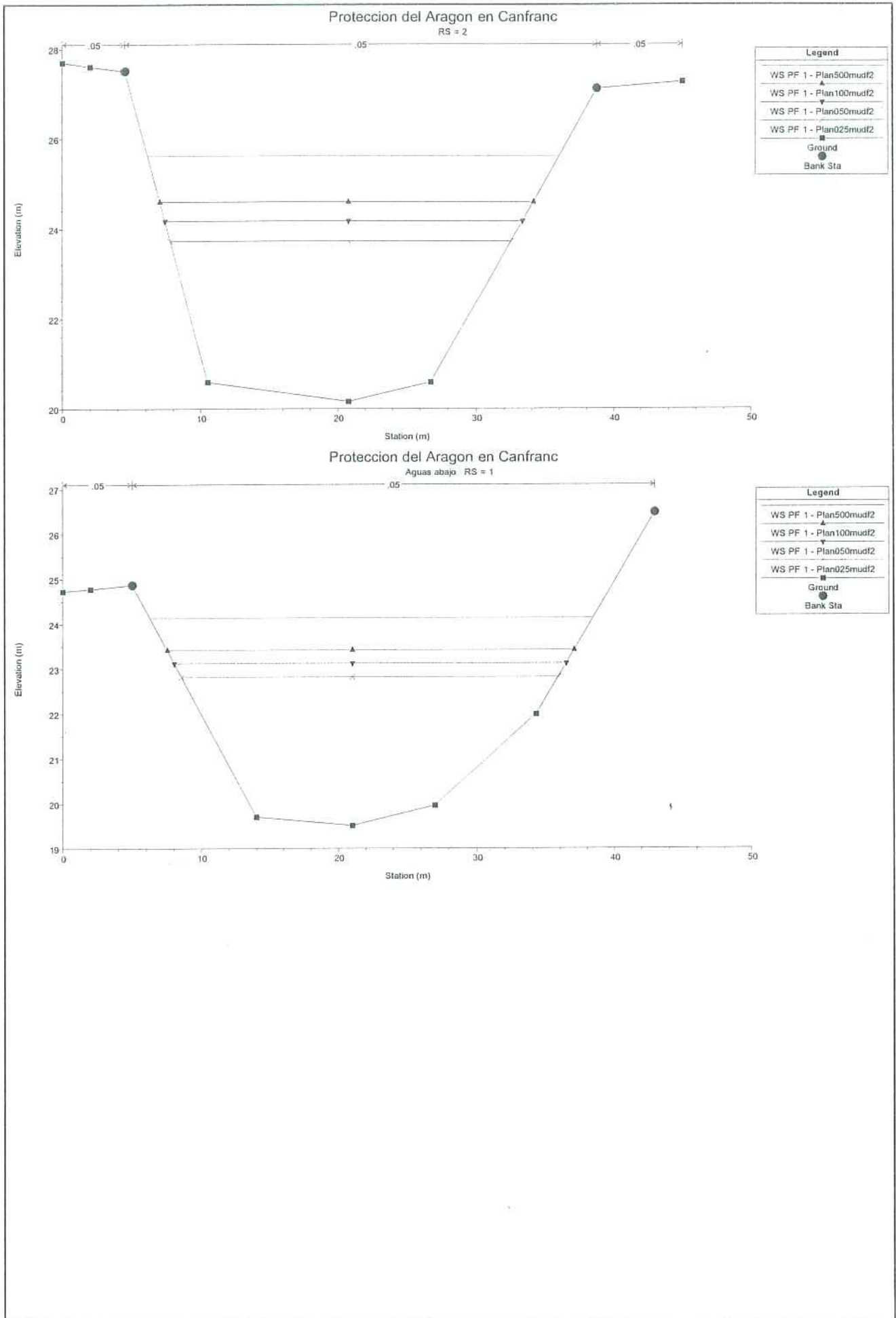














## APÉNDICE N° 7

### SOCAVACIÓN

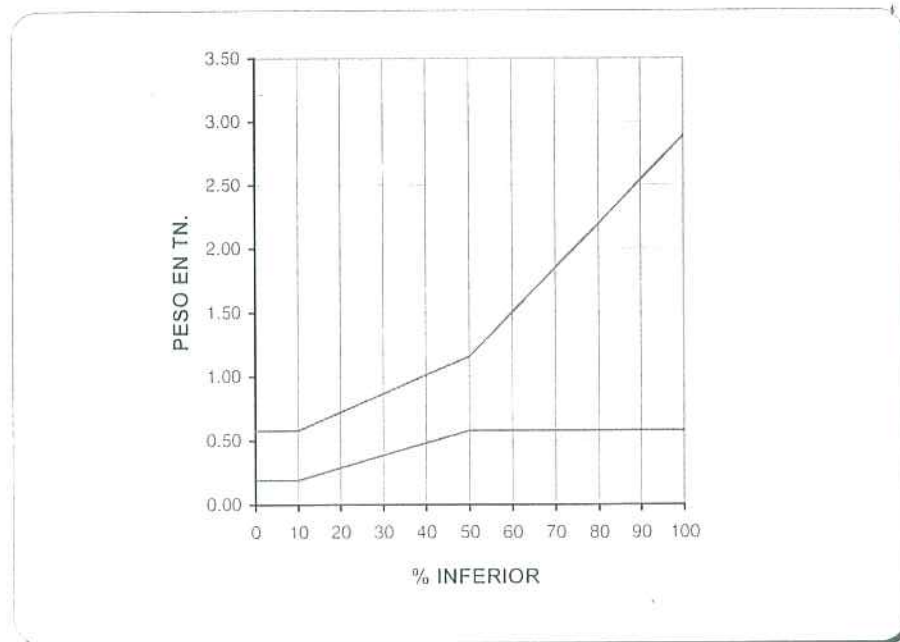
## TAMAÑO DE LOS BLOQUES DE ESCOLLERA

CANFRANC, ESCOLLERA TIPO (PERFIL 20,  $Q=435.85 \text{ M}^3/\text{S}$ )

VELOCIDAD (m/s)	R. HIDRAUL. (m)	DIAMETRO (m)	P. ESPEC. (Tn/m <sup>3</sup> )	PESO BLOQ. (Tn)	CUBO EQUIV. (m)
5.67	1.89	0.772	2.40	0.578	0.622

### LIMITES DE LA CURVA GRANULOMETRICA

% INFERIOR	PESO MINIMO	PESO MAXIMO
0	0.193	0.578
10	0.193	0.578
20	0.289	0.722
30	0.385	0.867
40	0.481	1.011
50	0.578	1.156
60	0.578	1.502
70	0.578	1.849
80	0.578	2.195
90	0.578	2.542
100	0.578	2.889



River Sta	Plan	Q Total (m <sup>3</sup> /s)	Calado critico		Diám. medio del mater. lecho (m)	$\alpha$	Calado regimen $y_r$ (m)	Diámetro para periodos retorno					Velocidad (m/s)	R. Hidraulico (m)	Peso espec. (Tn/m <sup>3</sup> )	Peso (Tn)	Cubo equiv. (m)
			$y_c$ (m)	$y_e$ (m)				500	100	50	25	10					
35	Plan500mudf2	750.69	5.72	8.58	0.40	1.50	8.58	0.825				6.26	3.00	2.40	0.704	0.665	
35	Plan250mudf2	616.68	5.04	7.56	0.40	1.50	7.56	0.776				6.12	2.96	2.40	0.586	0.625	
35	Plan100mudf2	521.15	4.60	6.90	0.40	1.50	6.90	0.699				5.83	2.72	2.40	0.430	0.564	
35	Plan050mudf2	435.85	4.03	6.04	0.40	1.50	6.04	0.679				5.75	2.66	2.40	0.393	0.547	
35	Plan025mudf2	354.58	3.63	5.44	0.40	1.50	5.44	0.566				5.32	2.40	2.40	0.228	0.456	
35	Plan010mudf2	260.57	3.02	4.53	0.40	1.50	4.53	0.475				4.92	2.13	2.40	0.135	0.383	
35	Plan005mudf2	195.71	2.54	3.81	0.40	1.50	3.81	0.405				4.56	1.86	2.40	0.083	0.326	
35	Plan002mudf2	116.13	1.88	2.82	0.40	1.50	2.82	0.208	0.82	0.70	0.68	0.57	1.51	2.40	0.011	0.168	
34	Plan500mudf2	750.69	5.01	7.52	0.40	1.50	7.52	1.770				7.95	2.73	2.40	6.970	1.427	
34	Plan250mudf2	616.68	4.58	6.87	0.40	1.50	6.87	1.547				7.48	2.48	2.40	4.652	1.247	
34	Plan100mudf2	521.15	4.10	6.15	0.40	1.50	6.15	1.395				7.12	2.27	2.40	3.408	1.124	
34	Plan050mudf2	435.85	3.72	5.58	0.40	1.50	5.58	1.165				6.62	2.10	2.40	1.989	0.939	
34	Plan025mudf2	354.58	3.35	5.03	0.40	1.50	5.03	0.905				6.06	2.05	2.40	0.931	0.729	
34	Plan010mudf2	260.57	2.80	4.20	0.40	1.50	4.20	0.663				5.34	1.79	2.40	0.365	0.534	
34	Plan005mudf2	195.71	2.41	3.62	0.40	1.50	3.62	0.454				4.63	1.62	2.40	0.118	0.366	
34	Plan002mudf2	116.13	1.81	2.72	0.40	1.50	2.72	0.229	1.77	1.39	1.17	0.90	1.34	2.40	0.015	0.184	
33	Plan500mudf2	750.69	4.61	6.92	0.40	1.50	6.92	0.411				5.17	3.84	2.40	0.087	0.331	
33	Plan250mudf2	616.68	4.12	6.18	0.40	1.50	6.18	0.442				5.17	3.32	2.40	0.108	0.356	
33	Plan100mudf2	521.15	3.73	5.60	0.40	1.50	5.60	0.732				5.90	2.67	2.40	0.492	0.590	
33	Plan050mudf2	435.85	3.35	5.03	0.40	1.50	5.03	0.622				5.51	2.45	2.40	0.303	0.501	
33	Plan025mudf2	354.58	2.97	4.46	0.40	1.50	4.46	0.547				5.18	2.19	2.40	0.205	0.441	
33	Plan010mudf2	260.57	2.50	3.75	0.40	1.50	3.75	0.392				4.53	1.91	2.40	0.075	0.316	
33	Plan005mudf2	195.71	2.13	3.19	0.40	1.50	3.19	0.327				4.15	1.62	2.40	0.044	0.263	
33	Plan002mudf2	116.13	1.61	2.42	0.40	1.50	2.42	0.229	0.73	0.73	0.62	0.55	1.21	2.40	0.015	0.184	
32	Plan500mudf2	750.69			0.40	1.50		0.311				4.76	4.08	2.40	0.038	0.251	
32	Plan250mudf2	616.68			0.40	1.50		0.312				4.67	3.62	2.40	0.038	0.251	
32	Plan100mudf2	521.15	3.81		0.40	1.50		0.323				4.64	3.24	2.40	0.042	0.260	
32	Plan050mudf2	435.85	3.45		0.40	1.50		0.342				4.63	2.85	2.40	0.050	0.276	
32	Plan025mudf2	354.58	3.07	4.61	0.40	1.50	4.61	0.619				5.39	2.17	2.40	0.298	0.499	
32	Plan010mudf2	260.57	2.57	3.86	0.40	1.50	3.86	0.525				4.95	1.81	2.40	0.182	0.423	
32	Plan005mudf2	195.71	2.20	3.30	0.40	1.50	3.30	0.440				4.54	1.53	2.40	0.107	0.355	
32	Plan002mudf2	116.13	1.67	2.50	0.40	1.50	2.50	0.314	0.62	0.62	0.62	0.52	1.14	2.40	0.039	0.253	
31	Plan500mudf2	750.69	6.13	9.19	0.40	1.50	9.19	0.931				6.72	3.60	2.40	1.014	0.750	
31	Plan250mudf2	616.68	5.51	8.27	0.40	1.50	8.27	0.827				6.37	3.31	2.40	0.711	0.667	
31	Plan100mudf2	521.15	5.02	7.53	0.40	1.50	7.53	0.747				6.08	3.07	2.40	0.523	0.602	
31	Plan050mudf2	435.85	4.54	6.81	0.40	1.50	6.81	0.679				5.81	2.83	2.40	0.393	0.547	
31	Plan025mudf2	354.58	4.06	6.09	0.40	1.50	6.09	0.650				5.62	2.53	2.40	0.344	0.524	
31	Plan010mudf2	260.57	3.42	5.13	0.40	1.50	5.13	0.567				5.23	2.16	2.40	0.229	0.457	
31	Plan005mudf2	195.71	2.93	4.40	0.40	1.50	4.40	0.569				5.08	1.80	2.40	0.231	0.458	

River Sta	Plan	Q Total (m <sup>3</sup> /s)	Calado crítico y <sub>c</sub> (m)	Diám. medio del mater. lecho (m)	α	Calado regimen y <sub>r</sub> (m)	Diámetro para periodos retorno					Velocidad (m/s)	R. Hidraulico (m)	Peso espec. (Tn/m <sup>3</sup> )	Peso (Tn)	Cubo equiv. (m)	
							500	100	50	25	10						
31	Plan002mudf2	116.13	2.25	0.40	1.50	3.38	0.531	0.93	0.75	0.68	0.65	0.57	4.69	1.28	2.40	0.188	0.428
30	Plan500mudf2	750.69	6.59	0.40	1.50	9.89	1.868					8.28	3.13	2.40	8.187	1.505	
30	Plan250mudf2	616.68	5.52	0.40	1.50	8.28	1.681					7.88	2.87	2.40	5.972	1.355	
30	Plan100mudf2	521.15	5.03	0.40	1.50	7.55	1.542					7.56	2.66	2.40	4.609	1.243	
30	Plan050mudf2	435.85	4.55	0.40	1.50	6.83	1.417					7.25	2.45	2.40	3.577	1.142	
30	Plan025mudf2	354.58	4.06	0.40	1.50	6.09	1.258					6.86	2.23	2.40	2.504	1.014	
30	Plan010mudf2	260.57	3.43	0.40	1.50	5.15	1.056					6.31	1.92	2.40	1.477	0.851	
30	Plan005mudf2	195.71	2.95	0.40	1.50	4.43	0.858					5.76	1.68	2.40	0.794	0.692	
30	Plan002mudf2	116.13	2.22	0.40	1.50	3.33	0.566	1.87	1.54	1.42	1.26	1.06	4.81	1.31	2.40	0.228	0.456
29	Plan500mudf2	750.69	6.59	0.40	1.50	9.88	1.373					6.84	1.84	2.40	3.254	1.107	
29	Plan250mudf2	616.68	5.46	0.40	1.50	8.19	0.849					6.38	3.17	2.40	0.769	0.684	
29	Plan100mudf2	521.15	4.98	0.40	1.50	7.47	0.757					6.07	2.96	2.40	0.544	0.610	
29	Plan050mudf2	435.85	4.53	0.40	1.50	6.80	0.699					5.83	2.72	2.40	0.430	0.564	
29	Plan025mudf2	354.58	4.05	0.40	1.50	6.08	0.650					5.59	2.45	2.40	0.344	0.524	
29	Plan010mudf2	260.57	3.44	0.40	1.50	5.16	0.583					5.25	2.09	2.40	0.249	0.470	
29	Plan005mudf2	195.71	2.96	0.40	1.50	4.44	0.539					4.98	1.78	2.40	0.197	0.434	
29	Plan002mudf2	116.13	2.26	0.40	1.50	3.39	0.513	1.37	0.76	0.70	0.65	0.58	4.63	1.27	2.40	0.169	0.413
28	Plan500mudf2	750.69	4.93	0.40	1.50	7.40	1.914					8.15	2.71	2.40	8.814	1.543	
28	Plan250mudf2	616.68	4.41	0.40	1.50	6.62	1.675					7.67	2.46	2.40	5.901	1.350	
28	Plan100mudf2	521.15	4.02	0.40	1.50	6.03	1.470					7.24	2.26	2.40	3.987	1.184	
28	Plan050mudf2	435.85	3.65	0.40	1.50	5.48	1.233					6.74	2.09	2.40	2.355	0.994	
28	Plan025mudf2	354.58	3.27	0.40	1.50	4.91	1.019					6.22	1.89	2.40	1.329	0.821	
28	Plan010mudf2	260.57	2.78	0.40	1.50	4.17	0.690					5.35	1.67	2.40	0.412	0.556	
28	Plan005mudf2	195.71	2.40	0.40	1.50	3.60	0.371					4.31	1.58	2.40	0.064	0.299	
28	Plan002mudf2	116.13	1.87	0.40	1.50	2.81	0.593	1.91	1.47	1.23	1.02	0.69	4.63	0.95	2.40	0.262	0.478
27	Plan500mudf2	750.69	4.40	0.40	1.50	6.60	1.353					7.29	2.78	2.40	3.109	1.090	
27	Plan250mudf2	616.68	3.93	0.40	1.50	5.90	1.061					6.64	2.58	2.40	1.501	0.855	
27	Plan100mudf2	521.15	3.57	0.40	1.50	5.36	0.878					6.16	2.40	2.40	0.851	0.708	
27	Plan050mudf2	435.85	3.22	0.40	1.50	4.83	0.727					5.71	2.22	2.40	0.483	0.586	
27	Plan025mudf2	354.58	2.87	0.40	1.50	4.31	0.552					5.14	2.05	2.40	0.211	0.445	
27	Plan010mudf2	260.57	2.42	0.40	1.50	3.63	0.404					4.52	1.77	2.40	0.083	0.326	
27	Plan005mudf2	195.71	2.07	0.40	1.50	3.11	0.441					4.48	1.41	2.40	0.108	0.355	
27	Plan002mudf2	116.13	1.57	0.40	1.50	2.36	0.448	1.35	0.88	0.73	0.55	0.45	4.26	1.01	2.40	0.113	0.361
26	Plan500mudf2	750.69	3.95	0.40	1.50	5.93	1.914					8.03	2.48	2.40	8.810	1.543	
26	Plan250mudf2	616.68	3.50	0.40	1.50	5.25	1.654					7.52	2.24	2.40	5.686	1.333	
26	Plan100mudf2	521.15	3.14	0.40	1.50	4.71	1.496					7.16	2.04	2.40	4.207	1.206	
26	Plan050mudf2	435.85	2.80	0.40	1.50	4.20	1.377					6.84	1.83	2.40	3.281	1.110	
26	Plan025mudf2	354.58	2.46	0.40	1.50	3.69	1.248					6.48	1.61	2.40	2.444	1.006	

River Sta	Plan	Q Total (m <sup>3</sup> /s)	Calado crítico y <sub>c</sub> (m)	Diám. medio del mater. lecho (m)	α	Calado regimen y <sub>r</sub> (m)	Diámetro para periodos retorno					Velocidad (m/s)	R. Hidraulico (m)	Peso espec. (Tn/m <sup>3</sup> )	Peso (Tn)	Cubo equiv. (m)
							500	100	50	25	10					
26	Plan010mudf2	260.57	2.02	0.40	1.50	3.03	1.069					5.96	1.33	2.40	1.533	0.861
26	Plan005mudf2	195.71	1.68	0.40	1.50	2.52	0.787					5.26	1.16	2.40	0.611	0.634
26	Plan002mudf2	116.13	1.21	0.40	1.50		0.460	1.91	1.50	1.38	1.25	1.07	0.89	2.40	0.123	0.371
25	Plan500mudf2	750.69	3.74	0.40	1.50	5.61	1.757					7.74	2.36	2.40	6.815	1.416
25	Plan250mudf2	616.68	3.32	0.40	1.50	4.98	1.427					7.11	2.15	2.40	3.651	1.150
25	Plan100mudf2	521.15	2.99	0.40	1.50	4.49	1.197					6.62	1.99	2.40	2.156	0.965
25	Plan050mudf2	435.85	2.68	0.40	1.50	4.02	0.982					6.11	1.83	2.40	1.188	0.791
25	Plan025mudf2	354.58	2.37	0.40	1.50	3.56	0.766					5.54	1.67	2.40	0.565	0.617
25	Plan010mudf2	260.57	1.96	0.40	1.50	2.94	0.520					4.76	1.46	2.40	0.176	0.419
25	Plan005mudf2	195.71	1.66	0.40	1.50	2.49	0.376					4.18	1.28	2.40	0.067	0.303
25	Plan002mudf2	116.13	1.22	0.40	1.50	1.83	0.108	1.76	1.20	0.98	0.77	0.52	1.18	2.40	0.002	0.087
24	Plan500mudf2	750.69	3.64	0.40	1.50	5.46	0.864					6.22	2.63	2.40	0.810	0.696
24	Plan250mudf2	616.68	3.25	0.40	1.50	4.88	0.515					5.22	2.59	2.40	0.171	0.415
24	Plan100mudf2	521.15	2.95	0.40	1.50	4.42	0.503					5.08	2.30	2.40	0.160	0.406
24	Plan050mudf2	435.85	2.66	0.40	1.50	3.99	0.491					4.94	2.04	2.40	0.149	0.396
24	Plan025mudf2	354.58	2.37	0.40	1.50	3.56	0.472					4.76	1.77	2.40	0.132	0.380
24	Plan010mudf2	260.57	1.98	0.40	1.50	2.97	0.445					4.51	1.44	2.40	0.111	0.359
24	Plan005mudf2	195.71	1.68	0.40	1.50	2.52	0.413					4.26	1.19	2.40	0.088	0.333
24	Plan002mudf2	116.13	1.25	0.40	1.50	1.88	0.181	0.86	0.50	0.49	0.47	0.45	0.99	2.40	0.007	0.146
23	Plan500mudf2	750.69	3.43	0.40	1.50	5.15	1.090					6.61	2.38	2.40	1.626	0.878
23	Plan250mudf2	616.68	3.11	0.40	1.50	4.67	0.879					6.06	2.17	2.40	0.855	0.709
23	Plan100mudf2	521.15	2.82	0.40	1.50	4.23	0.780					5.73	1.97	2.40	0.597	0.629
23	Plan050mudf2	435.85	2.54	0.40	1.50	3.81	0.683					5.39	1.78	2.40	0.401	0.551
23	Plan025mudf2	354.58	2.25	0.40	1.50	3.38	0.584					5.04	1.63	2.40	0.250	0.470
23	Plan010mudf2	260.57	1.86	0.40	1.50	2.79	0.452					4.50	1.38	2.40	0.116	0.364
23	Plan005mudf2	195.71	1.58	0.40	1.50	2.37	0.151					3.15	1.46	2.40	0.004	0.121
23	Plan002mudf2	116.13	1.18	0.40	1.50	1.77	0.105	1.09	0.78	0.68	0.58	0.45	1.07	2.40	0.001	0.084
22	Plan500mudf2	750.69	3.84	0.40	1.50	5.76	0.701					5.41	1.73	2.40	0.432	0.565
22	Plan250mudf2	616.68	3.23	0.40	1.50	4.85	0.688					5.63	2.28	2.40	0.409	0.555
22	Plan100mudf2	521.15	2.89	0.40	1.50	4.34	0.615					5.34	2.08	2.40	0.292	0.495
22	Plan050mudf2	435.85	2.62	0.40	1.50	3.93	0.545					5.05	1.89	2.40	0.204	0.440
22	Plan025mudf2	354.58	2.32	0.40	1.50	3.48	0.489					4.78	1.69	2.40	0.147	0.394
22	Plan010mudf2	260.57	1.95	0.40	1.50	2.93	0.406					4.36	1.41	2.40	0.084	0.328
22	Plan005mudf2	195.71	1.66	0.40	1.50	2.52	0.175					3.29	1.41	2.40	0.007	0.141
22	Plan002mudf2	116.13	1.22	0.40	1.50	1.83	0.112	0.70	0.61	0.55	0.49	0.41	1.09	2.40	0.002	0.090
21	Plan500mudf2	750.69	3.92	0.40	1.50	5.88	0.733					5.41	1.58	2.40	0.495	0.591
21	Plan250mudf2	616.68	3.25	0.40	1.50	4.88	0.678					5.61	2.30	2.40	0.391	0.546
21	Plan100mudf2	521.15	2.95	0.40	1.50	4.42	0.608					5.33	2.10	2.40	0.283	0.490

River Sta	Plan	Q Total (m <sup>3</sup> /s)	Calado crítico y <sub>c</sub> (m)	Diám. medio del mater. lecho (m)	α	Calado regimen y <sub>r</sub> (m)	Diámetro para periodos retorno					Velocidad (m/s)	R. Hidraulico (m)	Peso espec. (Tn/m <sup>3</sup> )	Peso (Tn)	Cubo equiv. (m)	
							500	100	50	25	10						
21	Plan050mudf2	435.85	2.67	0.40	1.50	4.00	0.549	0.73	0.61	0.55	0.48	0.39	5.07	1.91	2.40	0.208	0.442
21	Plan025mudf2	354.58	2.37	0.40	1.50	3.56	0.485					4.77	1.70	2.40	0.143	0.391	
21	Plan010mudf2	260.57	1.99	0.40	1.50	2.98	0.391					4.32	1.44	2.40	0.075	0.315	
21	Plan005mudf2	195.71	1.70	0.40	1.50	2.55	0.245					3.64	1.31	2.40	0.019	0.198	
21	Plan002mudf2	116.13	1.28	0.40	1.50	1.92	0.180	0.73	0.61	0.55	0.48	0.39	0.97	2.40	0.007	0.145	
20	Plan500mudf2	750.69	4.39	0.40	1.50	6.59	0.907					6.33	2.65	2.40	0.937	0.731	
20	Plan250mudf2	616.68	3.62	0.40	1.50	5.43	0.866					6.10	2.33	2.40	0.815	0.698	
20	Plan100mudf2	521.15	3.30	0.40	1.50	4.95	0.800					5.84	2.10	2.40	0.644	0.645	
20	Plan050mudf2	435.85	3.01	0.40	1.50	4.52	0.734					5.57	1.88	2.40	0.496	0.591	
20	Plan025mudf2	354.58	2.70	0.40	1.50	4.05	0.660					5.26	1.65	2.40	0.360	0.532	
20	Plan010mudf2	260.57	2.32	0.40	1.50	3.48	0.531					4.75	1.38	2.40	0.188	0.428	
20	Plan005mudf2	195.71	2.03	0.40	1.50	3.05	0.496					4.49	1.13	2.40	0.153	0.400	
20	Plan002mudf2	116.13	1.59	0.40	1.50	2.38	0.372	0.91	0.80	0.73	0.66	0.53	0.90	2.40	0.065	0.300	
19	Plan500mudf2	750.69	4.68	0.40	1.50	7.02	1.287					6.49	1.53	2.40	2.675	1.037	
19	Plan250mudf2	616.68	4.40	0.40	1.50	6.60	0.821					5.57	1.50	2.40	0.696	0.662	
19	Plan100mudf2	521.15	4.14	0.40	1.50	6.21	0.521					4.78	1.49	2.40	0.178	0.420	
19	Plan050mudf2	435.85	3.78	0.40	1.50	5.67	0.423					4.43	1.43	2.40	0.095	0.341	
19	Plan025mudf2	354.58	3.08	0.40	1.50	4.62	0.632					5.31	1.90	2.40	0.318	0.510	
19	Plan010mudf2	260.57	2.66	0.40	1.50	3.99	0.466					4.68	1.64	2.40	0.127	0.376	
19	Plan005mudf2	195.71	2.31	0.40	1.50	3.47	0.415					4.37	1.37	2.40	0.090	0.335	
19	Plan002mudf2	116.13	1.82	0.40	1.50	2.73	0.321	1.29	0.63	0.63	0.63	0.47	0.99	2.40	0.042	0.259	
18	Plan500mudf2	750.69	4.61	0.40	1.50	6.92	0.160					3.51	2.47	2.40	0.005	0.129	
18	Plan250mudf2	616.68	4.28	0.40	1.50	6.42	0.144					3.32	2.19	2.40	0.004	0.116	
18	Plan100mudf2	521.15	4.00	0.40	1.50	6.00	0.141					3.23	1.93	2.40	0.004	0.114	
18	Plan050mudf2	435.85	3.71	0.40	1.50	5.57	0.173					3.37	1.65	2.40	0.007	0.140	
18	Plan025mudf2	354.58	3.39	0.40	1.50	5.09	0.203					3.49	1.49	2.40	0.010	0.163	
18	Plan010mudf2	260.57	2.81	0.40	1.50	4.22	0.269					3.76	1.32	2.40	0.025	0.217	
18	Plan005mudf2	195.71	2.38	0.40	1.50	3.57	0.245					3.75	1.57	2.40	0.018	0.197	
18	Plan002mudf2	116.13	1.86	0.40	1.50	2.79	0.315	0.31	0.31	0.31	0.31	0.31	1.08	2.40	0.039	0.254	
17	Plan500mudf2	750.69	5.13	0.40	1.50	7.70	0.460					4.76	1.86	2.40	0.123	0.371	
17	Plan250mudf2	616.68	4.81	0.40	1.50	7.22	0.435					4.55	1.59	2.40	0.103	0.351	
17	Plan100mudf2	521.15	4.30	0.40	1.50	6.45	0.468					4.82	1.94	2.40	0.129	0.377	
17	Plan050mudf2	435.85	3.98	0.40	1.50	5.97	0.432					4.63	1.79	2.40	0.101	0.348	
17	Plan025mudf2	354.58	3.62	0.40	1.50	5.43	0.403					4.45	1.62	2.40	0.082	0.325	
17	Plan010mudf2	260.57	3.00	0.40	1.50	4.50	0.379					4.43	1.78	2.40	0.069	0.306	
17	Plan005mudf2	195.71	2.60	0.40	1.50	0.00	0.235					3.72	1.62	2.40	0.016	0.190	
17	Plan002mudf2	116.13	2.10	0.40	1.50	3.15	0.154	0.47	0.47	0.43	0.40	0.38	1.24	2.40	0.005	0.124	
16	Plan500mudf2	750.69	5.07	0.40	1.50	7.61	1.106					6.15	1.50	2.40	1.698	0.891	

River Sta	Plan	Q Total (m <sup>3</sup> /s)	Calado crítico y <sub>c</sub> (m)	Diám. medio del mater. lecho (m)	α	Calado regimen y <sub>r</sub> (m)	Diámetro para periodos retorno					Velocidad (m/s)	R. Hidraulico (m)	Peso espec. (Tn/m <sup>3</sup> )	Peso (Tn)	Cubo equiv. (m)
							500	100	50	25	10					
16	Plan250mudf2	616.68	4.77	0.40	1.50	7.16	0.962				6.09	1.87	2.40	1.117	0.775	
16	Plan100mudf2	521.15	4.27	0.40	1.50	6.41	0.929				5.92	1.69	2.40	1.008	0.749	
16	Plan050mudf2	435.85	4.02	0.40	1.50	6.03	0.849				5.65	1.53	2.40	0.768	0.684	
16	Plan025mudf2	354.58	3.73	0.40	1.50	5.60	0.713				5.24	1.38	2.40	0.455	0.575	
16	Plan010mudf2	260.57	3.35	0.40	1.50	5.03	0.476				4.50	1.24	2.40	0.136	0.384	
16	Plan005mudf2	195.71	2.91	0.40	1.50	4.37	0.305				3.90	1.28	2.40	0.036	0.246	
16	Plan002mudf2	116.13	2.27	0.40	1.50	3.41	0.243	1.11	0.93	0.85	0.71	1.21	2.40	0.018	0.196	
15	Plan500mudf2	750.69	4.80	0.40	1.50	7.20	1.683				7.09	1.52	2.40	5.987	1.356	
15	Plan250mudf2	616.68	4.44	0.40	1.50	6.66	1.513				6.75	1.40	2.40	4.352	1.219	
15	Plan100mudf2	521.15	4.22	0.40	1.50	6.33	1.402				6.50	1.30	2.40	3.463	1.130	
15	Plan050mudf2	435.85	3.98	0.40	1.50	5.97	1.196				6.10	1.22	2.40	2.151	0.964	
15	Plan025mudf2	354.58	3.71	0.40	1.50	5.57	0.938				5.57	1.15	2.40	1.037	0.756	
15	Plan010mudf2	260.57	3.36	0.40	1.50	5.04	0.679				4.98	1.12	2.40	0.394	0.548	
15	Plan005mudf2	195.71	3.00	0.40	1.50	4.50	0.499				4.52	1.16	2.40	0.156	0.402	
15	Plan002mudf2	116.13	2.28	0.40	1.50	3.42	0.348	1.68	1.40	1.20	0.94	1.18	2.40	0.053	0.281	
14	Plan500mudf2	750.69	4.24	0.40	1.50	6.36	0.248				4.05	2.43	2.40	0.019	0.200	
14	Plan250mudf2	616.68	4.00	0.40	1.50	6.00	0.246				3.95	2.12	2.40	0.019	0.199	
14	Plan100mudf2	521.15	3.81	0.40	1.50	5.72	0.253				3.90	1.86	2.40	0.020	0.204	
14	Plan050mudf2	435.85	3.65	0.40	1.50	5.48	0.731				5.19	1.24	2.40	0.490	0.589	
14	Plan025mudf2	354.58	3.46	0.40	1.50	5.19	0.635				4.84	1.08	2.40	0.322	0.512	
14	Plan010mudf2	260.57	2.85	0.40	1.50	4.28	0.618				4.86	1.17	2.40	0.296	0.498	
14	Plan005mudf2	195.71	2.77	0.40	1.50	4.15	0.241				3.55	1.17	2.40	0.018	0.194	
14	Plan002mudf2	116.13	2.08	0.40	1.50	3.12	0.372	0.73	0.73	0.73	0.64	1.27	2.40	0.065	0.300	
13	Plan500mudf2	750.69	4.20	0.40	1.50	6.30	0.504				5.05	2.21	2.40	0.161	0.406	
13	Plan250mudf2	616.68	3.93	0.40	1.50	5.89	0.436				4.72	1.97	2.40	0.104	0.352	
13	Plan100mudf2	521.15	3.73	0.40	1.50	5.60	0.381				4.44	1.79	2.40	0.069	0.307	
13	Plan050mudf2	435.85	3.51	0.40	1.50	5.27	0.458				4.57	1.47	2.40	0.121	0.369	
13	Plan025mudf2	354.58	3.30	0.40	1.50	4.95	0.342				4.08	1.34	2.40	0.050	0.275	
13	Plan010mudf2	260.57	2.84	0.40	1.50	4.26	0.407				4.21	1.14	2.40	0.085	0.328	
13	Plan005mudf2	195.71	2.27	0.40	1.50	3.41	0.325				4.08	1.48	2.40	0.043	0.262	
13	Plan002mudf2	116.13	1.69	0.40	1.50	2.54	0.447	0.50	0.46	0.46	0.45	1.10	2.40	0.113	0.361	
12	Plan500mudf2	750.69	4.27	0.40	1.50	6.41	0.937				6.17	2.13	2.40	1.033	0.755	
12	Plan250mudf2	616.68	3.90	0.40	1.50	5.85	0.947				6.06	1.87	2.40	1.068	0.764	
12	Plan100mudf2	521.15	3.62	0.40	1.50	5.43	0.984				6.01	1.65	2.40	1.196	0.793	
12	Plan050mudf2	435.85	3.33	0.40	1.50	5.00	0.937				5.80	1.47	2.40	1.033	0.755	
12	Plan025mudf2	354.58	3.04	0.40	1.50	4.56	0.973				5.90	1.51	2.40	1.157	0.784	
12	Plan010mudf2	260.57	2.58	0.40	1.50	3.87	0.832				5.44	1.27	2.40	0.723	0.670	
12	Plan005mudf2	195.71	2.28	0.40	1.50	3.42	0.612				4.81	1.12	2.40	0.288	0.493	
12	Plan002mudf2	116.13	1.83	0.40	1.50	2.75	0.256	0.98	0.98	0.97	0.83	0.95	2.40	0.021	0.206	

River Sta	Plan	Q Total (m <sup>3</sup> /s)	Calado crítico Y <sub>c</sub> (m)	Diám. medio del mater. lecho (m)	α	Calado regimen Y <sub>r</sub> (m)	Diámetro para periodos retorno					Velocidad (m/s)	R. Hidráulico (m)	Peso espec. (Tn/m <sup>3</sup> )	Peso (Tn)	Cubo equiv. (m)
							500	100	50	25	10					
11	Plan500mudf2	750.69	4.78	0.40	1.50	7.17	0.761					6.00	2.73	2.40	0.554	0.613
11	Plan250mudf2	616.68	4.30	0.40	1.50	6.45	0.626				5.54	2.50	2.40	2.40	0.308	0.505
11	Plan100mudf2	521.15	3.98	0.40	1.50	5.97	0.561				5.26	2.28	2.40	2.40	0.222	0.452
11	Plan050mudf2	435.85	3.68	0.40	1.50	5.52	0.485				4.94	2.09	2.40	2.40	0.144	0.391
11	Plan025mudf2	354.58	3.37	0.40	1.50	5.06	0.455				4.73	1.83	2.40	2.40	0.119	0.367
11	Plan010mudf2	260.57	2.92	0.40	1.50	4.38	0.435				4.52	1.53	2.40	2.40	0.103	0.350
11	Plan005mudf2	195.71	2.59	0.40	1.50	3.89	0.384				4.21	1.28	2.40	2.40	0.071	0.309
11	Plan002mudf2	116.13	2.05	0.40	1.50	3.08	0.237	0.76	0.56	0.49	0.46	0.43	1.11	2.40	0.017	0.191
10	Plan500mudf2	750.69	5.06	0.40	1.50	7.59	1.305				7.02	2.38	2.40	2.40	2.795	1.052
10	Plan250mudf2	616.68	4.62	0.40	1.50	6.93	1.155				6.62	2.14	2.40	2.40	1.933	0.930
10	Plan100mudf2	521.15	4.32	0.40	1.50	6.48	1.044				6.33	2.00	2.40	2.40	1.430	0.841
10	Plan050mudf2	435.85	4.03	0.40	1.50	6.05	0.921				5.97	1.81	2.40	2.40	0.980	0.742
10	Plan025mudf2	354.58	3.68	0.40	1.50	5.52	0.834				5.66	1.60	2.40	2.40	0.730	0.673
10	Plan010mudf2	260.57	3.28	0.40	1.50	4.92	0.695				5.17	1.34	2.40	2.40	0.422	0.560
10	Plan005mudf2	195.71	2.97	0.40	1.50	4.46	0.572				4.71	1.13	2.40	2.40	0.235	0.461
10	Plan002mudf2	116.13	2.40	0.40	1.50	3.60	0.367	1.31	1.04	0.92	0.83	0.69	1.08	2.40	0.062	0.296
9	Plan500mudf2	750.69	4.74	0.40	1.50	7.11	1.175				6.74	2.30	2.40	2.40	2.040	0.947
9	Plan250mudf2	616.68	4.28	0.40	1.50	6.42	0.886				6.06	2.14	2.40	2.40	0.873	0.714
9	Plan100mudf2	521.15	4.02	0.40	1.50	6.03	0.797				5.77	1.97	2.40	2.40	0.635	0.642
9	Plan050mudf2	435.85	3.72	0.40	1.50	5.58	0.646				5.31	1.82	2.40	2.40	0.339	0.521
9	Plan025mudf2	354.58	3.44	0.40	1.50	5.16	0.471				4.72	1.69	2.40	2.40	0.131	0.380
9	Plan010mudf2	260.57	3.09	0.40	1.50	4.64	0.321				4.06	1.47	2.40	2.40	0.042	0.259
9	Plan005mudf2	195.71	2.78	0.40	1.50	4.17	0.343				4.00	1.18	2.40	2.40	0.051	0.276
9	Plan002mudf2	116.13	2.38	0.40	1.50	3.57	0.419	1.18	0.80	0.65	0.47	0.42	0.89	2.40	0.092	0.338
8	Plan500mudf2	750.69	4.44	0.40	1.50	6.66	1.228				6.85	2.32	2.40	2.40	2.329	0.990
8	Plan250mudf2	616.68	4.08	0.40	1.50	6.12	1.002				6.30	2.11	2.40	2.40	1.264	0.808
8	Plan100mudf2	521.15	3.76	0.40	1.50	5.64	0.912				6.00	1.90	2.40	2.40	0.954	0.735
8	Plan050mudf2	435.85	3.50	0.40	1.50	5.25	0.777				5.60	1.73	2.40	2.40	0.590	0.626
8	Plan025mudf2	354.58	3.21	0.40	1.50	4.82	0.671				5.24	1.56	2.40	2.40	0.379	0.540
8	Plan010mudf2	260.57	2.85	0.40	1.50	4.28	0.163				3.33	1.73	2.40	2.40	0.005	0.132
8	Plan005mudf2	195.71	2.56	0.40	1.50	3.84	0.136				3.05	1.48	2.40	2.40	0.003	0.109
8	Plan002mudf2	116.13	2.09	0.40	1.50	3.14	0.439	1.23	0.91	0.78	0.67	0.44	0.94	2.40	0.106	0.353
7	Plan500mudf2	750.69	4.44	0.40	1.50	6.66	0.554				5.29	2.42	2.40	2.40	0.214	0.447
7	Plan250mudf2	616.68	4.12	0.40	1.50	6.18	0.543				5.12	2.07	2.40	2.40	0.201	0.438
7	Plan100mudf2	521.15	3.86	0.40	1.50	5.79	0.547				5.02	1.81	2.40	2.40	0.206	0.441
7	Plan050mudf2	435.85	3.60	0.40	1.50	5.40	0.574				4.96	1.53	2.40	2.40	0.238	0.463
7	Plan025mudf2	354.58	3.33	0.40	1.50	5.00	0.563				4.85	1.39	2.40	2.40	0.225	0.454
7	Plan010mudf2	260.57	2.87	0.40	1.50	4.31	0.291				3.96	1.54	2.40	2.40	0.031	0.235



River Sta	Plan	Q Total (m <sup>3</sup> /s)	Calado crítico		Diám. medio del mater. lecho (m)	α	Calado regimen y <sub>r</sub> (m)	Diámetro para periodos retorno					Velocidad (m/s)	R. Hidraulico (m)	Peso espec. (Tn/m3)	Peso (Tn)	Cubo equiv. (m)
			y <sub>c</sub> (m)	Diám. crítico				500	100	50	25	10					
7	Plan005mudf2	195.71	2.55	0.40	0.40	1.50	3.83	0.257									
7	Plan002mudf2	116.13	2.08	0.40	0.40	1.50	3.12	0.141	0.57	0.57	0.56	0.29	3.72	1.36	2.40	0.021	0.207
6	Plan500mudf2	750.69	4.21	0.40	0.40	1.50	6.32	1.191					6.51	1.82	2.40	2.120	0.959
6	Plan250mudf2	616.68	3.93	0.40	0.40	1.50	5.90	0.985					6.00	1.63	2.40	1.200	0.794
6	Plan100mudf2	521.15	3.69	0.40	0.40	1.50	5.54	0.852					5.62	1.47	2.40	0.778	0.687
6	Plan050mudf2	435.85	3.49	0.40	0.40	1.50	5.24	0.739					5.27	1.33	2.40	0.507	0.595
6	Plan025mudf2	354.58	3.26	0.40	0.40	1.50	4.89	0.543					4.70	1.24	2.40	0.201	0.437
6	Plan010mudf2	260.57	2.90	0.40	0.40	1.50	4.35	0.436					4.25	1.05	2.40	0.104	0.352
6	Plan005mudf2	195.71	2.54	0.40	0.40	1.50	3.81	0.283					3.73	1.14	2.40	0.028	0.228
6	Plan002mudf2	116.13	2.09	0.40	0.40	1.50	3.14	0.184	1.19	0.85	0.74	0.54	3.14	0.96	2.40	0.008	0.148
5	Plan500mudf2	750.69	3.77	0.40	0.40	1.50	5.66	1.284					6.62	1.73	2.40	2.660	1.035
5	Plan250mudf2	616.68	3.47	0.40	0.40	1.50	5.21	1.127					6.21	1.53	2.40	1.799	0.908
5	Plan100mudf2	521.15	3.25	0.40	0.40	1.50	4.88	1.021					5.92	1.40	2.40	1.336	0.823
5	Plan050mudf2	435.85	3.00	0.40	0.40	1.50	4.50	0.881					5.63	1.39	2.40	0.860	0.710
5	Plan025mudf2	354.58	2.72	0.40	0.40	1.50	4.08	0.760					5.39	1.44	2.40	0.551	0.612
5	Plan010mudf2	260.57	2.28	0.40	0.40	1.50	3.42	0.709					5.08	1.16	2.40	0.447	0.571
5	Plan005mudf2	195.71	2.00	0.40	0.40	1.50	3.00	0.618					4.71	0.97	2.40	0.296	0.498
5	Plan002mudf2	116.13	1.61	0.40	0.40	1.50	2.42	0.383	1.28	1.02	0.88	0.76	3.83	0.73	2.40	0.070	0.309
4	Plan500mudf2	750.69	3.67	0.40	0.40	1.50	5.51	1.123					3.41	3.50	2.40	0.002	0.099
4	Plan250mudf2	616.68	3.30	0.40	0.40	1.50	4.95	0.745					3.49	2.90	2.40	0.004	0.117
4	Plan100mudf2	521.15	3.03	0.40	0.40	1.50	4.55	0.178					3.63	2.46	2.40	0.007	0.143
4	Plan050mudf2	435.85	2.75	0.40	0.40	1.50	4.13	0.701					5.41	1.73	2.40	0.432	0.565
4	Plan025mudf2	354.58	2.44	0.40	0.40	1.50	3.66	0.563					4.96	1.59	2.40	0.225	0.454
4	Plan010mudf2	260.57	2.06	0.40	0.40	1.50	3.09	0.422					4.41	1.40	2.40	0.094	0.340
4	Plan005mudf2	195.71	1.75	0.40	0.40	1.50	2.63	0.333					3.99	1.23	2.40	0.047	0.269
4	Plan002mudf2	116.13	1.31	0.40	0.40	1.50	1.97	0.232	0.70	0.70	0.70	0.56	3.38	0.94	2.40	0.016	0.187
3	Plan500mudf2	750.69		0.40	0.40	1.50		0.086					3.13	4.28	2.40	0.001	0.070
3	Plan250mudf2	616.68		0.40	0.40	1.50		0.084					3.04	3.81	2.40	0.001	0.068
3	Plan100mudf2	521.15		0.40	0.40	1.50		0.082					2.97	3.44	2.40	0.001	0.066
3	Plan050mudf2	435.85	2.96	0.40	0.40	1.50		0.082					2.91	3.06	2.40	0.001	0.066
3	Plan025mudf2	354.58	2.62	0.40	0.40	1.50	3.93	0.084					2.86	2.66	2.40	0.001	0.067
3	Plan010mudf2	260.57	2.19	0.40	0.40	1.50	3.29	0.086					2.79	2.16	2.40	0.001	0.069
3	Plan005mudf2	195.71	1.85	0.40	0.40	1.50	2.78	0.087					2.74	1.90	2.40	0.001	0.070
3	Plan002mudf2	116.13	1.36	0.40	0.40	1.50	2.04	0.100	0.10	0.10	0.10	0.10	2.70	1.30	2.40	0.001	0.081
2	Plan500mudf2	750.69	5.46	0.40	0.40	1.50	8.19	0.763					6.28	3.57	2.40	0.558	0.615
2	Plan250mudf2	616.68	4.88	0.40	0.40	1.50	7.32	0.700					6.01	3.26	2.40	0.431	0.564
2	Plan100mudf2	521.15	4.44	0.40	0.40	1.50	6.66	0.640					5.76	3.02	2.40	0.330	0.516
2	Plan050mudf2	435.85	4.02	0.40	0.40	1.50	6.03	0.581					5.50	2.78	2.40	0.246	0.468

River Sta	Plan	Q Total (m <sup>3</sup> /s)	Calado crítico y <sub>c</sub> (m)	Diám. medio del mater. lecho (m)	α	Calado regimen y <sub>r</sub> (m)	Diámetro (m)	500	100	50	25	10	Velocidad (m/s)	R. Hidraulico (m)	Peso espec. (Tn/m3)	Peso (Tn)	Cubo equiv. (m)
2	Plan025mudf2	354.58	3.57	0.40	1.50	5.36	0.523						5.22	2.51	2.40	0.179	0.421
2	Plan010mudf2	260.57	3.00	0.40	1.50	4.50	0.441						4.81	2.16	2.40	0.108	0.355
2	Plan005mudf2	195.71	2.54	0.40	1.50	3.81	0.361						4.40	1.89	2.40	0.059	0.291
2	Plan002mudf2	116.13		0.40	1.50		0.198	0.76	0.64	0.58	0.52	0.44	3.48	1.53	2.40	0.010	0.160
1	Plan500mudf2	750.69	5.35	0.40	1.50	8.03	1.318						7.32	3.00	2.40	2.878	1.062
1	Plan250mudf2	616.68	4.81	0.40	1.50	7.22	1.119						6.84	2.77	2.40	1.762	0.902
1	Plan100mudf2	521.15	4.39	0.40	1.50	6.59	0.980						6.47	2.59	2.40	1.181	0.790
1	Plan050mudf2	435.85	4.00	0.40	1.50	6.00	0.830						6.05	2.41	2.40	0.719	0.669
1	Plan025mudf2	354.58	3.58	0.40	1.50	5.37	0.679						5.58	2.22	2.40	0.393	0.547
1	Plan010mudf2	260.57	3.04	0.40	1.50	4.56	0.501						4.94	1.96	2.40	0.158	0.404
1	Plan005mudf2	195.71	2.62	0.40	1.50	3.93	0.345						4.29	1.77	2.40	0.052	0.278
1	Plan002mudf2	116.13	1.99	0.40	1.50	2.99	0.266	1.32	0.98	0.83	0.68	0.50	3.77	1.38	2.40	0.024	0.214

T =

500 100 50 25 10  
 MAXIMO 1.91 1.54 1.42 1.26 1.07  
 MEDIO 1.05 0.83 0.74 0.65 0.52  
 MINIMO 0.10 0.10 0.10 0.10 0.10

Diametros (m)

PERC. 80 1.36 1.03 0.93 0.78 0.67  
 PERC. 60 1.18 0.82 0.73 0.65 0.51  
 PERC. 50 0.98 0.76 0.70 0.62 0.47  
 PERC. 40 0.85 0.72 0.67 0.56 0.45  
 PERC. 20 0.70 0.60 0.55 0.48 0.42

ANEJO N° 5

CÁLCULOS MECÁNICOS

## CÁLCULOS MECÁNICOS

1.- CONSIDERACIONES GENERALES

2.- ACCIONES

3.- ESTABILIDAD

4.- TABLA RESUMEN

APÉNDICE.- TABLA DE RESULTADOS

## **1.- CONSIDERACIONES GENERALES**

Los cálculos que se incluyen en este anejo consisten en analizar las condiciones de estabilidad bajo diferentes hipótesis de carga, de los muros propuestos junto al casco urbano.

Los muros propuestos son con junta cada 7,00 m.

## **2.- ACCIONES**

Las acciones que se consideran pueden actuar sobre los muros propuestos son las siguientes:

- Peso propio, considerando un peso específico de  $25 \text{ KN/m}^3$ .
- Empuje de tierras. Se considera el empuje activo con un ángulo de rozamiento interno de  $35^\circ$  y densidad  $18 \text{ KN/m}^3$ .
- Sobrecarga de tráfico. Dado que se trata de un vial cuya única función es servir de acceso a garajes particulares, se considera el caso de vehículos de menos de 30 KN.
- Empuje hidrostático y subpresión. El peso específico del relleno sumergido se ha considerado de  $11 \text{ KN/m}^3$ .
- Efecto sísmico. La aceleración sísmica es de 0,065. Se le afecta de un coeficiente de 1,3 (vida útil 100 años) resultando 0,085.

## **3.- ESTABILIDAD**

Se ha calculado la estabilidad al deslizamiento y al vuelco en diferentes hipótesis.

Para estimar el coeficiente de rozamiento muro – terreno se ha considerado un ángulo igual al 90% del de rozamiento interno del terreno, es decir,  $31,5^\circ$ .

Las hipótesis analizadas son:

A.- Empuje de tierras

Sobrecarga de tráfico de  $10 \text{ KN/m}^3$ . Es algo superior al caso de tráfico considerado pero resulta más conservador.

B.- Empuje de tierras

Sobrecarga de tráfico de  $5 \text{ KN/m}^3$ .

El nivel de agua está en coronación de muro, en ambas caras, con la subpresión correspondiente.

C.- Empuje de tierras

Sobrecarga del 90% de  $10 \text{ KN/m}^3$ .

El nivel de agua alcanza el 90% de la altura, en ambas caras, con la subpresión correspondiente.

D.- Empuje de tierras

Sobrecarga del 70% de  $10 \text{ KN/m}^3$ .

El nivel de agua alcanza el 70% de la altura, en ambas caras, con la subpresión correspondiente.

Empuje debido al sismo,  $a = 0,085$ .

#### **4.- TABLA RESUMEN**

A continuación se incluye una tabla con las dimensiones de los muros y los coeficientes de seguridad obtenidos.

ALTURA TOTAL (m)	ALTURA ALZADO (m)	ESPESOR ZAPATA (m)	LONGITUD TALON (m)	COEFICIENTES DE SEGURIDAD							
				HIP. A		HIP. B		HIP. C		HIP. D	
				DESLIZ.	VUELCO	DESLIZ.	VUELCO	DESLIZ.	VUELCO		DESLIZ.
5.50	4.30	1.20	3.15	5.13	8.77	1.38	1.62	1.44	1.74	1.50	1.94
5.25	4.15	1.10	3.00							1.50	1.95
5.00	3.90	1.10	2.80	5.07	8.60	1.38	1.62	1.44	1.74	1.50	1.94
4.75	3.65	1.10	2.60							1.50	1.95
4.50	3.50	1.00	2.40	4.93	8.16	1.38	1.61	1.43	1.73	1.50	1.92
4.25	3.25	1.00	2.25							1.50	1.93
4.00	3.00	1.00	2.05	5.07	8.21	1.38	1.62	1.45	1.73	1.50	1.92
3.75	2.75	1.00	1.95							1.50	1.91
3.50	2.60	0.90	1.70	4.97	7.91	1.38	1.62	1.43	1.74	1.50	1.93
3.25	2.35	0.90	1.55							1.50	1.94
3.00	2.10	0.90	1.35	5.12	7.89	1.38	1.62	1.43	1.74	1.50	1.93

## APÉNDICE

### TABLAS DE RESULTADOS



## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

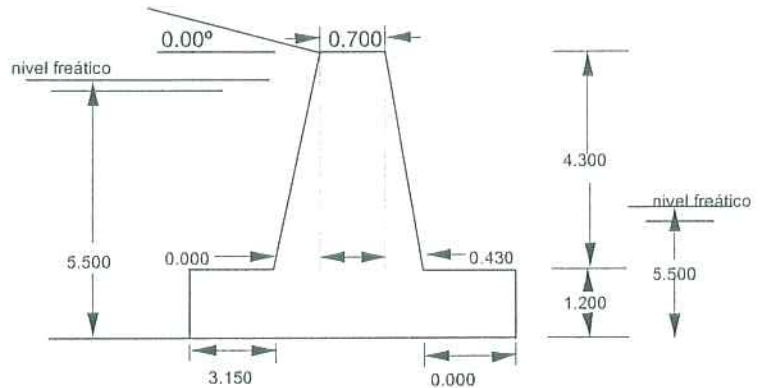
Muro de altura total (sobre base de cimiento) 5.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreeancho trasdós (m):	0.000
Sobreeancho intradós (m):	0.430
Altura muro (m):	4.300
Longitud puntera (m):	0.000
Longitud talón (m):	3.150
Espesor zapata (m):	1.200
Peso específico (kN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	A
A=activo, P=pasivo, R=reposo	
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	5.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	5.500
Altura agua intradós (m):	5.500

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	45.086
Sobrecarga (kN/m):	7.452
Agua en trasdós (kN/m):	151.250
Subpresión (kN/m):	235.400
Total horizontal (kN/m):	203.788
Total vertical (kN/m):	144.300
Total (kN/m):	348.088

#### Favorables

Peso muro (kN/m):	226.763
Peso tierras (kN/m):	148.995
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	151.250
Peso agua trasdós (kN/m):	135.450
Peso agua intradós (kN/m):	9.245
Sobrecarga (kN/m):	15.750
Total vertical (kN/m):	328.692
Total horizontal (kN/m):	151.250
Total (kN/m):	479.942

Coefficiente seguridad: 1.38

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	82.658
Sobrecarga (kN*m/m):	20.494
Agua trasdós (kN*m/m):	277.292
Subpresión (kN*m/m):	503.756

Total (kN\*m/m): 884.199

#### Favorables

Peso muro (kN*m/m):	340.097
Peso tierras (kN*m/m):	403.031
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	277.292
Peso agua trasdós (kN*m/m):	366.392
Peso agua intradós (kN*m/m):	1.325
Sobrecarga (kN*m/m):	42.604

Total (kN\*m/m): 1430.741

Coefficiente seguridad: 1.62

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	-176.240	1.60	-281.985
Axil (kN/m):	98.363	1.00	98.363
Cortante (kN/m):	-126.684	1.60	-202.695
Tensión intradós (kN/m <sup>2</sup> ):	-741.086		(-7.41 kg/cm <sup>2</sup> )
Tensión trasdós (kN/m <sup>2</sup> ):	915.179		(9.15 kg/cm <sup>2</sup> )

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	102.110	(1.02 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	70.281	(0.70 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	38.452	(0.38 kg/cm <sup>2</sup> )
Long. bajo presión (m):	4.280	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

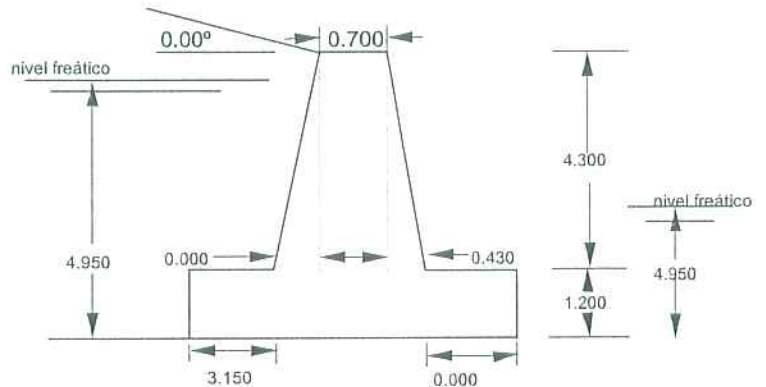
Muro de altura total (sobre base de cimiento) 5.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreancho trasdós (m):	0.000
Sobreancho intradós (m):	0.430
Altura muro (m):	4.300
Longitud puntera (m):	0.000
Longitud talón (m):	3.150
Espesor zapata (m):	1.200
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k:
Sobrecarga (kN/m <sup>2</sup> ):	9.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	4.950
Altura agua intradós (m):	4.950

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	50.537
Sobrecarga (kN/m):	13.414
Agua en trasdós (kN/m):	122.513
Subpresión (kN/m):	211.860
Total horizontal (KN/m):	186.464
Total vertical (KN/m):	129.870
Total (kN/m):	316.334

#### Favorables

Peso muro (kN/m):	226.763
Peso tierras (kN/m):	161.123
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	122.513
Peso agua trasdós (KN/m):	118.125
Peso agua intradós (KN/m):	7.031
Sobrecarga (kN/m):	28.350
Total vertical (KN/m):	331.873
Total horizontal (KN/m):	122.513
Total (kN/m):	454.385

Coeficiente seguridad: 1.44

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	96.912
Sobrecarga (kN*m/m):	36.889
Agua trasdós (kN*m/m):	202.146
Subpresión (kN*m/m):	453.380

Total (kN\*m/m): 789.327

#### Favorables

Peso muro (kN*m/m):	340.097
Peso tierras (kN*m/m):	435.836
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	202.146
Peso agua trasdós (KN*m/m):	319.528
Peso agua intradós (KN*m/m):	0.879
Sobrecarga (kN*m/m):	76.687

Total (kN\*m/m): 1375.172

Coeficiente seguridad: 1.74

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	-38.002	1.60	-60.804
Axil (kN/m):	98.363	1.00	98.363
Cortante (kN/m):	-46.674	1.60	-74.678
Tensión intradós (KN/m <sup>2</sup> )	-91.522	-(0.92 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> )	265.615	(2.66 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	116.086 (1.16 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	76.993 (0.77 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	37.901 (0.38 kg/cm <sup>2</sup> )
Long. bajo presión (m):	4.280

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

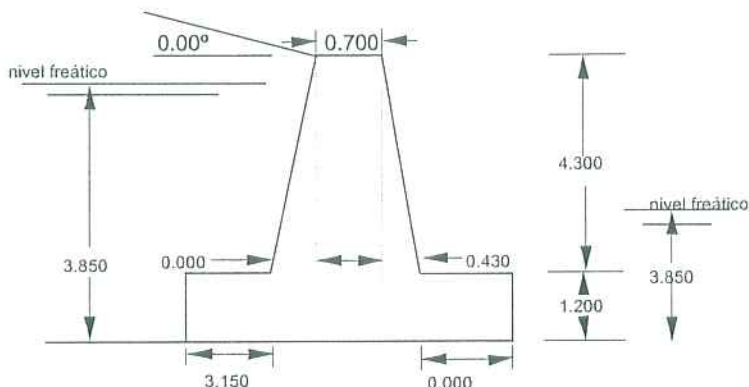
Muro de altura total (sobre base de cimiento) 5.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreeancho trasdós (m):	0.000
Sobreeancho intradós (m):	0.430
Altura muro (m):	4.300
Longitud puntera (m):	0.000
Longitud talón (m):	3.150
Espesor zapata (m):	1.200
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (KN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	3.850
Altura agua intradós (m):	3.850

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (KN/m):	70.302
Sobrecarga (KN/m):	10.433
Agua en trasdós (KN/m):	80.412
Subpresión (KN/m):	164.780
Total horizontal (KN/m):	161.147
Total vertical (KN/m):	101.010
Total (KN/m):	262.157

#### Favorables

Peso muro (KN/m):	226.763
Peso tierras (KN/m):	185.378
Empuje pasivo en punta (KN/m):	0.000
Empuje agua intradós (KN/m):	74.113
Peso agua trasdós (KN/m):	83.475
Peso agua intradós (KN/m):	3.511
Sobrecarga (KN/m):	22.050
Total vertical (KN/m):	319.481
Total horizontal (KN/m):	74.113
Total (KN/m):	393.594

Coefficiente seguridad: 1.50

### Estabilidad al vuelco

#### Desfavorables

Tierras (KN*m/m):	137.990
Sobrecarga (KN*m/m):	28.691
Agua trasdós (KN*m/m):	111.967
Subpresión (KN*m/m):	352.629

Total (KN\*m/m): 631.277

#### Favorables

Peso muro (KN*m/m):	340.097
Peso tierras (KN*m/m):	501.446
Empuje pasivo en punta (KN*m/m):	0.000
Empuje agua intradós (KN*m/m):	95.111
Peso agua trasdós (KN*m/m):	225.800
Peso agua intradós (KN*m/m):	0.310
Sobrecarga (KN*m/m):	59.645

Total (KN\*m/m): 1222.409

Coefficiente seguridad: 1.94

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (KN*m/m):	72.918	1.60	116.668
Axil (KN/m):	98.363	1.00	98.363
Cortante (KN/m):	30.988	1.60	49.581

Tensión intradós (KN/m <sup>2</sup> )	429.678	(4.30 kg/cm <sup>2</sup> )
Tensión trasdós (KN/m <sup>2</sup> )	-255.585	-(2.56 kg/cm <sup>2</sup> )

### Tensión en el terreno

Puntera (KN/m <sup>2</sup> ):	139.461	(1.39 kg/cm <sup>2</sup> )
Media (KN/m <sup>2</sup> ):	83.270	(0.83 kg/cm <sup>2</sup> )
Talón (KN/m <sup>2</sup> ):	27.079	(0.27 kg/cm <sup>2</sup> )
Long. bajo presión (m):	4.280	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

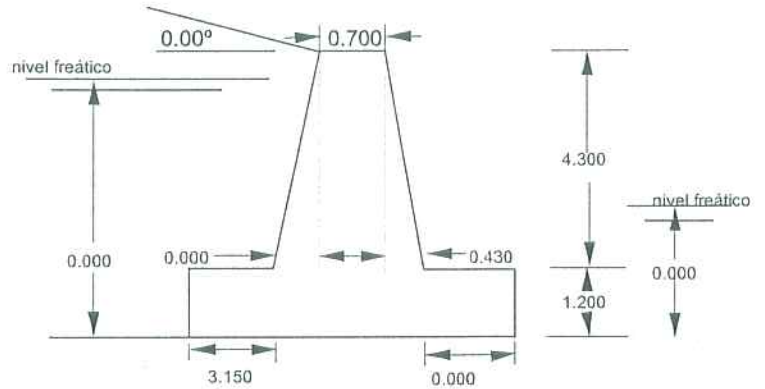
Muro de altura total (sobre base de cimiento) 5.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecarga trasdós (m):	0.000
Sobrecarga intradós (m):	0.430
Altura muro (m):	4.300
Longitud puntera (m):	0.000
Longitud talón (m):	3.150
Espesor zapata (m):	1.200
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	10.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	0.000
Altura agua intradós (m):	0.000

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	45.095
Sobrecarga (kN/m):	14.904
Agua en trasdós (kN/m):	0.000
Subpresión (kN/m):	0.000
Total horizontal (KN/m):	60.000
Total vertical (KN/m):	0.000
Total (kN/m):	60.000

#### Favorables

Peso muro (kN/m):	226.763
Peso tierras (kN/m):	243.810
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	0.000
Peso agua trasdós (KN/m):	0.000
Peso agua intradós (KN/m):	0.000
Sobrecarga (kN/m):	31.500
Total vertical (KN/m):	307.770
Total horizontal (KN/m):	0.000
Total (kN/m):	307.770

Coefficiente seguridad: 5.13

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	82.675
Sobrecarga (kN*m/m):	40.987
Agua trasdós (kN*m/m):	0.000
Subpresión (kN*m/m):	0.000

Total (kN\*m/m): 123.662

#### Favorables

Peso muro (kN*m/m):	340.097
Peso tierras (kN*m/m):	659.506
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	0.000
Peso agua trasdós (KN*m/m):	0.000
Peso agua intradós (KN*m/m):	0.000
Sobrecarga (kN*m/m):	85.208

Total (kN\*m/m): 1084.810

Coefficiente seguridad: 8.77

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	96.681	1.60	154.690
Axil (kN/m):	98.363	1.00	98.363
Cortante (kN/m):	60.000	1.60	96.000
Tensión intradós (KN/m <sup>2</sup> )	541.341	(5.41 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> )	-367.248	-(3.67 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	154.413 (1.54 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	117.307 (1.17 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	80.201 (0.80 kg/cm <sup>2</sup> )
Long. bajo presión (m):	4.280

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

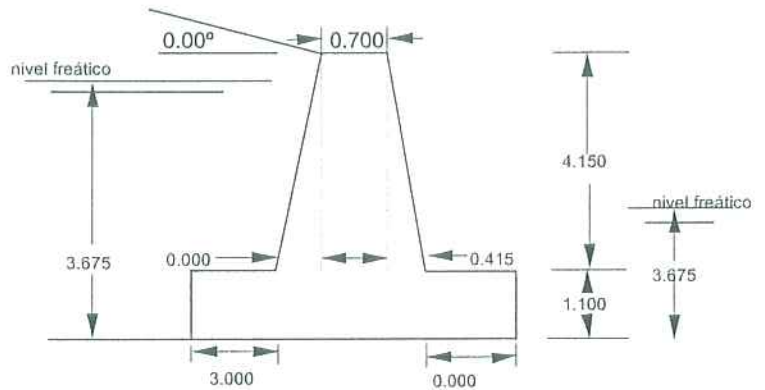
Muro de altura total (sobre base de cimiento) 5.25 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreebanco trasdós (m):	0.000
Sobreebanco intradós (m):	0.415
Altura muro (m):	4.150
Longitud puntera (m):	0.000
Longitud talón (m):	3.000
Espesor zapata (m):	1.100
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	3.675
Altura agua intradós (m):	3.675

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	64.056
Sobrecarga (kN/m):	9.959
Agua en trasdós (kN/m):	73.268
Subpresión (kN/m):	151.226
Total horizontal (KN/m):	147.283
Total vertical (KN/m):	92.702
Total (kN/m):	239.985

#### Favorables

Peso muro (kN/m):	207.316
Peso tierras (kN/m):	170.025
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	67.528
Peso agua trasdós (KN/m):	77.250
Peso agua intradós (KN/m):	3.315
Sobrecarga (kN/m):	21.000
Total vertical (KN/m):	293.569
Total horizontal (KN/m):	67.528
Total (kN/m):	361.097

Coeficiente seguridad: 1.50

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	120.015
Sobrecarga (kN*m/m):	26.142
Agua trasdós (kN*m/m):	97.382
Subpresión (kN*m/m):	311.148

Total (kN\*m/m): 554.688

#### Favorables

Peso muro (kN*m/m):	294.346
Peso tierras (kN*m/m):	444.615
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	82.722
Peso agua trasdós (KN*m/m):	202.009
Peso agua intradós (KN*m/m):	0.285
Sobrecarga (kN*m/m):	54.915

Total (kN\*m/m): 1078.892

Coeficiente seguridad: 1.95

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	66.691	1.60	106.705
Axil (kN/m):	94.153	1.00	94.153
Cortante (kN/m):	30.043	1.60	48.068

Tensión intradós (KN/m <sup>2</sup> )	406.303	(4.06 kg/cm <sup>2</sup> )
Tensión trasdós (KN/m <sup>2</sup> )	-237.418	-(2.37 kg/cm <sup>2</sup> )

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	132.779	(1.33 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	79.631	(0.80 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	26.482	(0.26 kg/cm <sup>2</sup> )
Long. bajo presión (m):	4.115	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

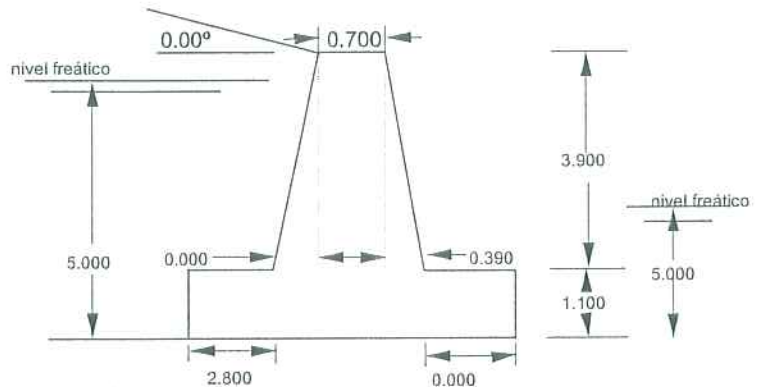
Muro de altura total (sobre base de cimiento) 5.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreancho trasdós (m):	0.000
Sobreancho intradós (m):	0.390
Altura muro (m):	3.900
Longitud puntera (m):	0.000
Longitud talón (m):	2.800
Espesor zapata (m):	1.100
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	5.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	5.000
Altura agua intradós (m):	5.000

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	37.261
Sobrecarga (kN/m):	6.775
Agua en trasdós (kN/m):	125.000
Subpresión (kN/m):	194.500
Total horizontal (KN/m):	169.036
Total vertical (KN/m):	119.229
Total (kN/m):	288.264

#### Favorables

Peso muro (kN/m):	194.238
Peso tierras (kN/m):	120.120
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	125.000
Peso agua trasdós (KN/m):	109.200
Peso agua intradós (KN/m):	7.605
Sobrecarga (kN/m):	14.000
Total vertical (KN/m):	272.885
Total horizontal (KN/m):	125.000
Total (kN/m):	397.885

Coefficiente seguridad: 1.38

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	62.102
Sobrecarga (kN*m/m):	16.937
Agua trasdós (kN*m/m):	208.333
Subpresión (kN*m/m):	378.303

Total (kN\*m/m): 665.675

#### Favorables

Peso muro (kN*m/m):	263.515
Peso tierras (kN*m/m):	299.099
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	208.333
Peso agua trasdós (KN*m/m):	271.908
Peso agua intradós (KN*m/m):	0.989
Sobrecarga (kN*m/m):	34.860

Total (kN\*m/m): 1078.703

Coefficiente seguridad: 1.62

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	-97.806	1.60	-156.489
Axil (kN/m):	87.263	1.00	87.263
Cortante (kN/m):	-78.623	1.60	-125.796
Tensión intradós (KN/m <sup>2</sup> ):	-413.870		(-4.14 kg/cm <sup>2</sup> )
Tensión trasdós (KN/m <sup>2</sup> ):	573.985		(5.74 kg/cm <sup>2</sup> )

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	93.981	(0.94 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	64.438	(0.64 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	34.894	(0.35 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.890	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

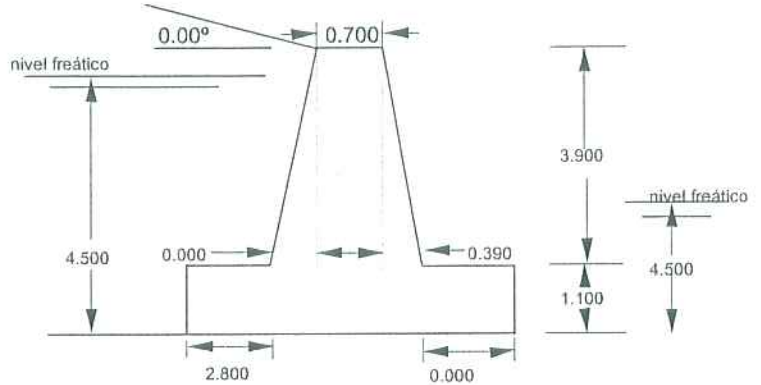
Muro de altura total (sobre base de cimiento) 5.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecarga trasdós (m):	0.000
Sobrecarga intradós (m):	0.390
Altura muro (m):	3.900
Longitud puntera (m):	0.000
Longitud talón (m):	2.800
Espesor zapata (m):	1.100
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	A
A=activo, P=pasivo, R=reposo	
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	9.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	4.500
Altura agua intradós (m):	4.500
<u>Coef. Sísmico básico:</u>	0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	41.766
Sobrecarga (kN/m):	12.195
Agua en trasdós (kN/m):	101.250
Subpresión (kN/m):	175.050
Total horizontal (KN/m):	155.211
Total vertical (KN/m):	107.306
Total (kN/m):	262.517

#### Favorables

Peso muro (kN/m):	194.238
Peso tierras (kN/m):	129.920
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	101.250
Peso agua trasdós (KN/m):	95.200
Peso agua intradós (KN/m):	5.780
Sobrecarga (kN/m):	25.200
Total vertical (KN/m):	276.057
Total horizontal (KN/m):	101.250
Total (kN/m):	377.307

**Coefficiente seguridad: 1.44**

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	72.812
Sobrecarga (kN*m/m):	30.486
Agua trasdós (kN*m/m):	151.875
Subpresión (kN*m/m):	340.472

**Total (kN\*m/m): 595.645**

#### Favorables

Peso muro (kN*m/m):	263.515
Peso tierras (kN*m/m):	323.501
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	151.875
Peso agua trasdós (KN*m/m):	237.048
Peso agua intradós (KN*m/m):	0.655
Sobrecarga (kN*m/m):	62.748

**Total (kN\*m/m): 1039.341**

**Coefficiente seguridad: 1.74**

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	-9.597	1.60	-15.356
Axil (kN/m):	87.263	1.00	87.263
Cortante (kN/m):	-22.711	1.60	-36.337
<b>Tensión intradós (KN/m<sup>2</sup>)</b>	<b>31.590</b>	(0.32 kg/cm <sup>2</sup> )	
<b>Tensión trasdós (KN/m<sup>2</sup>)</b>	<b>128.524</b>	(1.29 kg/cm <sup>2</sup> )	

### Tensión en el terreno

<b>Puntera (kN/m<sup>2</sup>):</b>	<b>107.143</b>	(1.07 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	70.768	(0.71 kg/cm <sup>2</sup> )
<b>Talón (kN/m<sup>2</sup>):</b>	<b>34.393</b>	(0.34 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.890	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

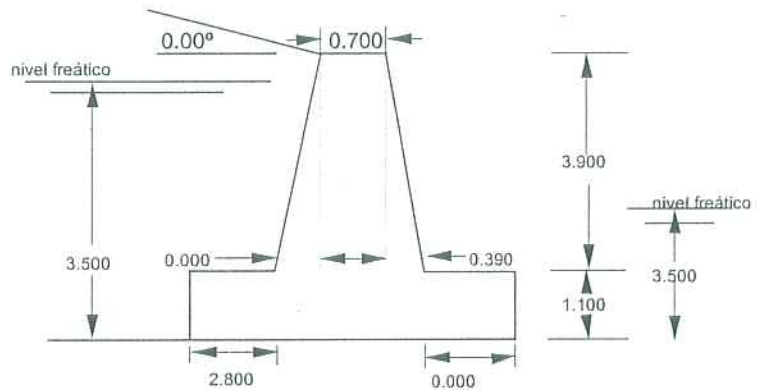
Muro de altura total (sobre base de cimiento) 5.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreeancho trasdós (m):	0.000
Sobreeancho intradós (m):	0.390
Altura muro (m):	3.900
Longitud puntera (m):	0.000
Longitud talón (m):	2.800
Espesor zapata (m):	1.100
Peso específico (kN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	3.500
Altura agua intradós (m):	3.500

**Coeff. Sísmico básico:** 0.085

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	58.101
Sobrecarga (kN/m):	9.485
Agua en trasdós (kN/m):	66.456
Subpresión (kN/m):	136.150
Total horizontal (KN/m):	134.042
Total vertical (KN/m):	83.460
Total (kN/m):	217.502

#### Favorables

Peso muro (kN/m):	194.238
Peso tierras (kN/m):	149.520
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	61.250
Peso agua trasdós (KN/m):	67.200
Peso agua intradós (KN/m):	2.880
Sobrecarga (kN/m):	19.600
Total vertical (KN/m):	265.697
Total horizontal (KN/m):	61.250
Total (kN/m):	326.947

**Coefficiente seguridad:** 1.50

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	103.674
Sobrecarga (kN*m/m):	23.712
Agua trasdós (kN*m/m):	84.123
Subpresión (kN*m/m):	264.812

**Total (kN\*m/m):** 476.320

#### Favorables

Peso muro (kN*m/m):	263.515
Peso tierras (kN*m/m):	372.305
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	71.458
Peso agua trasdós (KN*m/m):	167.328
Peso agua intradós (KN*m/m):	0.230
Sobrecarga (kN*m/m):	48.804

**Total (kN\*m/m):** 923.640

**Coefficiente seguridad:** 1.94

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	59.154	1.60	94.647
Axil (kN/m):	87.263	1.00	87.263
Cortante (kN/m):	30.097	1.60	48.156
<b>Tensión intradós (KN/m<sup>2</sup>)</b>	<b>378.790</b>	(3.79 kg/cm <sup>2</sup> )	
<b>Tensión trasdós (KN/m<sup>2</sup>)</b>	<b>-218.676</b>	-(2.19 kg/cm <sup>2</sup> )	

### Tensión en el terreno

<b>Puntera (kN/m<sup>2</sup>):</b>	<b>128.328</b>	(1.28 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	76.424	(0.76 kg/cm <sup>2</sup> )
<b>Talón (kN/m<sup>2</sup>):</b>	<b>24.519</b>	(0.25 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.890	

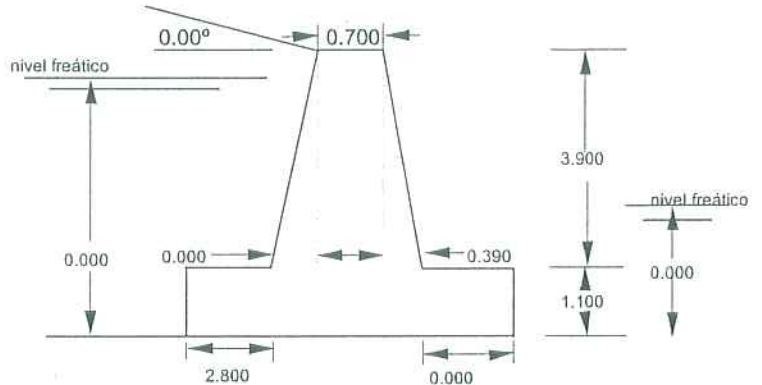


## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

Muro de altura total (sobre base de cimiento) 5.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecancho trasdós (m):	0.000
Sobrecancho intradós (m):	0.390
Altura muro (m):	3.900
Longitud puntera (m):	0.000
Longitud talón (m):	2.800
Espesor zapata (m):	1.100
Peso específico (KN/m <sup>3</sup> ):	25.00



### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (KN/m <sup>2</sup> ):	10.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000

### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	0.000
Altura agua intradós (m):	0.000

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (KN/m):	37.096
Sobrecarga (KN/m):	13.550
Agua en trasdós (KN/m):	0.000
Subpresión (KN/m):	0.000
Total horizontal (KN/m):	50.645
Total vertical (KN/m):	0.000
Total (KN/m):	50.645

#### Favorables

Peso muro (KN/m):	194.238
Peso tierras (KN/m):	196.560
Empuje pasivo en punta (KN/m):	0.000
Empuje agua intradós (KN/m):	0.000
Peso agua trasdós (KN/m):	0.000
Peso agua intradós (KN/m):	0.000
Sobrecarga (KN/m):	28.000
Total vertical (KN/m):	256.723
Total horizontal (KN/m):	0.000
Total (KN/m):	256.723

Coefficiente seguridad: 5.07

### Estabilidad al vuelco

#### Desfavorables

Tierras (KN*m/m):	61.826
Sobrecarga (KN*m/m):	33.874
Agua trasdós (KN*m/m):	0.000
Subpresión (KN*m/m):	0.000

Total (KN\*m/m): 95.700

#### Favorables

Peso muro (KN*m/m):	263.515
Peso tierras (KN*m/m):	489.434
Empuje pasivo en punta (KN*m/m):	0.000
Empuje agua intradós (KN*m/m):	0.000
Peso agua trasdós (KN*m/m):	0.000
Peso agua intradós (KN*m/m):	0.000
Sobrecarga (KN*m/m):	69.720

Total (KN\*m/m): 822.669

Coefficiente seguridad: 8.60

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (KN*m/m):	74.646	1.60	119.434
Axil (KN/m):	87.263	1.00	87.263
Cortante (KN/m):	50.645	1.60	81.033

Tensión intradós (KN/m<sup>2</sup>) 457.026 (4.57 kg/cm<sup>2</sup>)  
 Tensión trasdós (KN/m<sup>2</sup>) -296.911 (-2.97 kg/cm<sup>2</sup>)

### Tensión en el terreno

Puntera (KN/m <sup>2</sup> ):	142.391 (1.42 kg/cm <sup>2</sup> )
Media (KN/m <sup>2</sup> ):	107.660 (1.08 kg/cm <sup>2</sup> )
Talón (KN/m <sup>2</sup> ):	72.929 (0.73 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.890

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

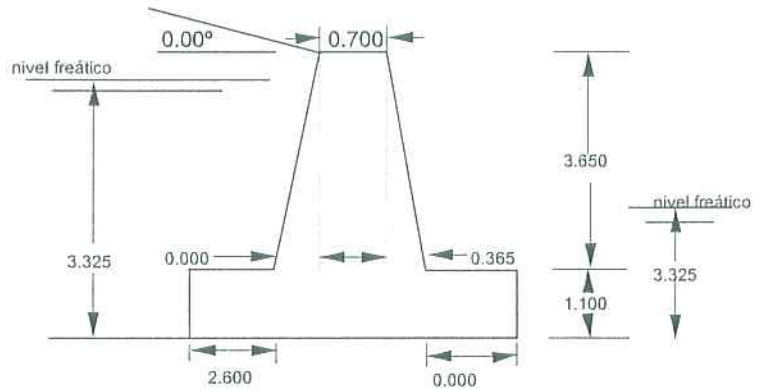
Muro de altura total (sobre base de cimiento) 4.75 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreebancho trasdós (m):	0.000
Sobreebancho intradós (m):	0.365
Altura muro (m):	3.650
Longitud puntera (m):	0.000
Longitud talón (m):	2.600
Espesor zapata (m):	1.100
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (KN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	3.325
Altura agua intradós (m):	3.325

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

Desfavorables	
Tierras (kN/m):	52.436
Sobrecarga (kN/m):	9.010
Agua en trasdós (kN/m):	59.977
Subpresión (kN/m):	121.861
Total horizontal (KN/m):	121.423
Total vertical (KN/m):	74.701
Total (kN/m):	196.124
Favorables	
Peso muro (kN/m):	181.316
Peso tierras (kN/m):	130.325
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	55.278
Peso agua trasdós (KN/m):	57.850
Peso agua intradós (KN/m):	2.475
Sobrecarga (kN/m):	18.200
Total vertical (KN/m):	239.172
Total horizontal (KN/m):	55.278
Total (kN/m):	294.450
Coefficiente seguridad:	1.50

### Estabilidad al vuelco

Desfavorables	
Tierras (kN*m/m):	88.887
Sobrecarga (kN*m/m):	21.400
Agua trasdós (kN*m/m):	72.125
Subpresión (kN*m/m):	223.311
Total (kN*m/m):	405.722
Favorables	
Peso muro (kN*m/m):	234.416
Peso tierras (kN*m/m):	308.219
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	61.267
Peso agua trasdós (KN*m/m):	136.815
Peso agua intradós (KN*m/m):	0.184
Sobrecarga (kN*m/m):	43.043
Total (kN*m/m):	783.943
Coefficiente seguridad:	1.93

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	51.630	1.60	82.608
Axil (kN/m):	80.528	1.00	80.528
Cortante (kN/m):	29.391	1.60	47.026
Tensión intradós (KN/m <sup>2</sup> )	348.734	(3.49 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> )	-197.508	-(1.98 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	123.883 (1.24 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	73.207 (0.73 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	22.532 (0.23 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.665

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

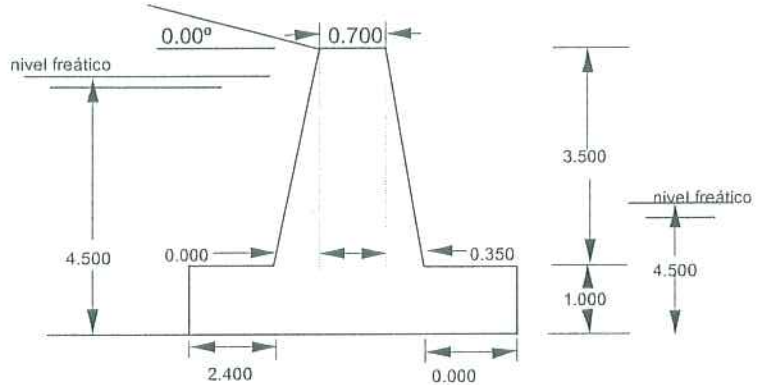
Muro de altura total (sobre base de cimiento) 4.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecarga trasdós (m):	0.000
Sobrecarga intradós (m):	0.350
Altura muro (m):	3.500
Longitud puntera (m):	0.000
Longitud talón (m):	2.400
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	A
A=activo, P=pasivo, R=reposo	
M>manual	k: 0.271
Sobrecarga (KN/m <sup>2</sup> ):	5.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	4.500
Altura agua intradós (m):	4.500

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (KN/m):	30.182
Sobrecarga (KN/m):	6.097
Agua en trasdós (KN/m):	101.250
Subpresión (KN/m):	155.250
Total horizontal (KN/m):	137.529
Total vertical (KN/m):	95.168
Total (KN/m):	232.697

#### Favorables

Peso muro (KN/m):	162.813
Peso tierras (KN/m):	92.400
Empuje pasivo en punta (KN/m):	0.000
Empuje agua intradós (KN/m):	101.250
Peso agua trasdós (KN/m):	84.000
Peso agua intradós (KN/m):	6.125
Sobrecarga (KN/m):	12.000
Total vertical (KN/m):	219.048
Total horizontal (KN/m):	101.250
Total (KN/m):	320.298

Coefficiente seguridad: 1.38

### Estabilidad al vuelco

#### Desfavorables

Tierras (KN*m/m):	45.272
Sobrecarga (KN*m/m):	13.719
Agua trasdós (KN*m/m):	151.875
Subpresión (KN*m/m):	267.806

Total (KN\*m/m): 478.672

#### Favorables

Peso muro (KN*m/m):	195.229
Peso tierras (KN*m/m):	207.900
Empuje pasivo en punta (KN*m/m):	0.000
Empuje agua intradós (KN*m/m):	151.875
Peso agua trasdós (KN*m/m):	189.000
Peso agua intradós (KN*m/m):	0.715
Sobrecarga (KN*m/m):	27.000

Total (KN\*m/m): 771.719

Coefficiente seguridad: 1.61

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (KN*m/m):	-48.419	1.60	-77.471
Axil (KN/m):	76.563	1.00	76.563
Cortante (KN/m):	-44.551	1.60	-71.282
Tensión intradós (KN/m <sup>2</sup> )	-190.591		-(1.91 kg/cm <sup>2</sup> )
Tensión trasdós (KN/m <sup>2</sup> )	336.424		(3.36 kg/cm <sup>2</sup> )

### Tensión en el terreno

Puntera (KN/m <sup>2</sup> ):	86.581	(0.87 kg/cm <sup>2</sup> )
Media (KN/m <sup>2</sup> ):	58.576	(0.59 kg/cm <sup>2</sup> )
Talón (KN/m <sup>2</sup> ):	30.571	(0.31 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.450	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

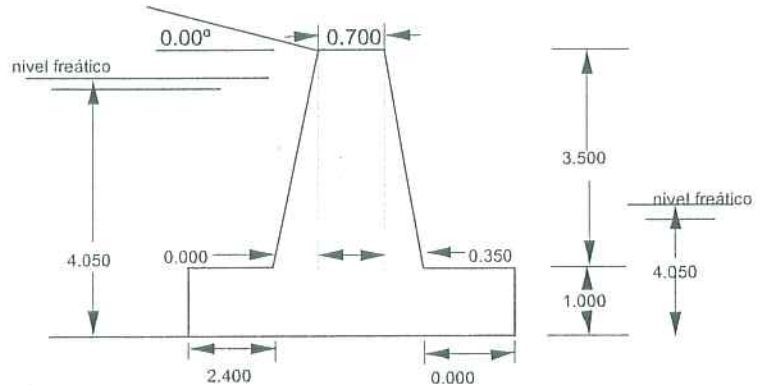
Muro de altura total (sobre base de cimiento) 4.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecarga trasdós (m):	0.000
Sobrecarga intradós (m):	0.350
Altura muro (m):	3.500
Longitud puntera (m):	0.000
Longitud talón (m):	2.400
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	A
A=activo, P=pasivo, R=reposo	
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	9.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	4.050
Altura agua intradós (m):	4.050

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	33.831
Sobrecarga (kN/m):	10.975
Agua en trasdós (kN/m):	82.013
Subpresión (kN/m):	139.725
Total horizontal (KN/m):	126.818
Total vertical (KN/m):	85.651
Total (kN/m):	212.470

#### Favorables

Peso muro (kN/m):	162.813
Peso tierras (kN/m):	99.960
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	82.013
Peso agua trasdós (KN/m):	73.200
Peso agua intradós (KN/m):	4.651
Sobrecarga (kN/m):	21.600
Total vertical (KN/m):	222.043
Total horizontal (KN/m):	82.013
Total (kN/m):	304.056

Coefficiente seguridad: 1.43

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	53.080
Sobrecarga (kN*m/m):	24.694
Agua trasdós (kN*m/m):	110.717
Subpresión (kN*m/m):	241.026

Total (kN\*m/m): 429.516

#### Favorables

Peso muro (kN*m/m):	195.229
Peso tierras (kN*m/m):	224.910
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	110.717
Peso agua trasdós (KN*m/m):	164.700
Peso agua intradós (KN*m/m):	0.473
Sobrecarga (kN*m/m):	48.600

Total (kN\*m/m): 744.629

Coefficiente seguridad: 1.73

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	5.832	1.60	9.331
Axil (kN/m):	76.563	1.00	76.563
Cortante (kN/m):	-6.588	1.60	-10.541
Tensión intradós (KN/m <sup>2</sup> )	104.654	(1.05 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> )	41.179	(0.41 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	99.123 (0.99 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	64.492 (0.64 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	29.862 (0.30 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.450

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

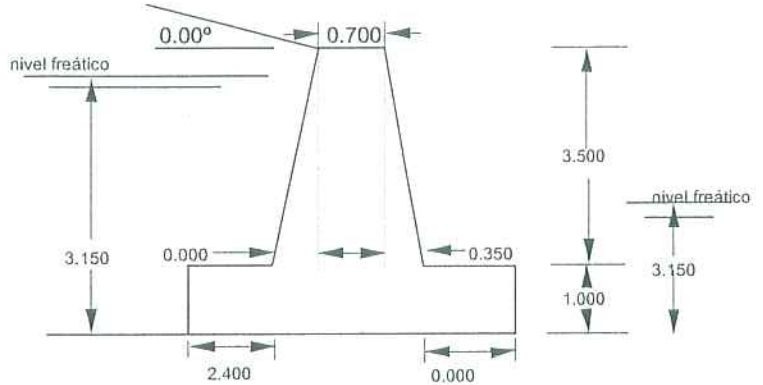
Muro de altura total (sobre base de cimiento) 4.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreeancho trasdós (m):	0.000
Sobreeancho intradós (m):	0.350
Altura muro (m):	3.500
Longitud puntera (m):	0.000
Longitud talón (m):	2.400
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	A
A=activo, P=pasivo, R=reposo	
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	3.150
Altura agua intradós (m):	3.150

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	47.062
Sobrecarga (kN/m):	8.536
Agua en trasdós (kN/m):	53.830
Subpresión (kN/m):	108.675
Total horizontal (KN/m):	109.427
Total vertical (KN/m):	66.618
Total (kN/m):	176.045

#### Favorables

Peso muro (kN/m):	162.813
Peso tierras (kN/m):	115.080
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	49.613
Peso agua trasdós (KN/m):	51.600
Peso agua intradós (KN/m):	2.311
Sobrecarga (kN/m):	16.800
Total vertical (KN/m):	213.694
Total horizontal (KN/m):	49.613
Total (kN/m):	263.307

Coefficiente seguridad: 1.50

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	75.578
Sobrecarga (kN*m/m):	19.206
Agua trasdós (kN*m/m):	61.325
Subpresión (kN*m/m):	187.464

Total (kN\*m/m): 343.574

#### Favorables

Peso muro (kN*m/m):	195.229
Peso tierras (kN*m/m):	258.930
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	52.093
Peso agua trasdós (KN*m/m):	116.100
Peso agua intradós (KN*m/m):	0.166
Sobrecarga (kN*m/m):	37.800

Total (kN\*m/m): 660.318

Coefficiente seguridad: 1.92

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	46.273	1.60	74.036
Axil (kN/m):	76.563	1.00	76.563
Cortante (kN/m):	27.823	1.60	44.517

Tensión intradós (KN/m <sup>2</sup> )	324.740	(3.25 kg/cm <sup>2</sup> )
Tensión trasdós (KN/m <sup>2</sup> )	-178.907	(-1.79 kg/cm <sup>2</sup> )

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	118.509	(1.19 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	69.545	(0.70 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	20.580	(0.21 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.450	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

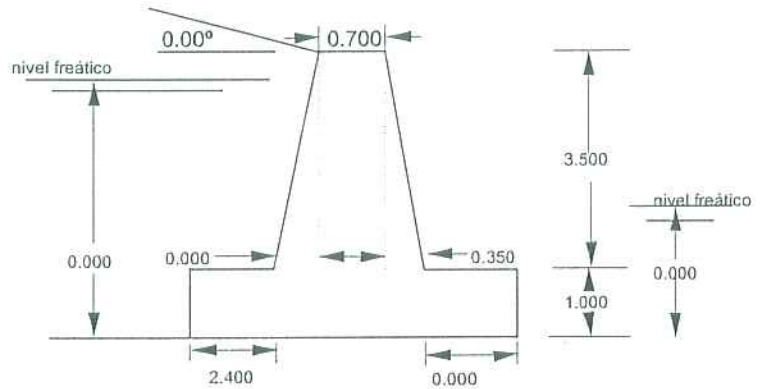
Muro de altura total (sobre base de cimiento) 4.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreeancho trasdós (m):	0.000
Sobreeancho intradós (m):	0.350
Altura muro (m):	3.500
Longitud puntera (m):	0.000
Longitud talón (m):	2.400
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (KN/m <sup>2</sup> ):	10.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	0.000
Altura agua intradós (m):	0.000

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (KN/m):	29.877
Sobrecarga (KN/m):	12.195
Agua en trasdós (KN/m):	0.000
Subpresión (KN/m):	0.000
Total horizontal (KN/m):	42.071
Total vertical (KN/m):	0.000
Total (KN/m):	42.071

#### Favorables

Peso muro (KN/m):	162.813
Peso tierras (KN/m):	151.200
Empuje pasivo en punta (KN/m):	0.000
Empuje agua intradós (KN/m):	0.000
Peso agua trasdós (KN/m):	0.000
Peso agua intradós (KN/m):	0.000
Sobrecarga (KN/m):	24.000
Total vertical (KN/m):	207.202
Total horizontal (KN/m):	0.000
Total (KN/m):	207.202

Coefficiente seguridad: 4.93

### Estabilidad al vuelco

#### Desfavorables

Tierras (KN*m/m):	44.815
Sobrecarga (KN*m/m):	27.438
Agua trasdós (KN*m/m):	0.000
Subpresión (KN*m/m):	0.000

Total (KN\*m/m): 72.253

#### Favorables

Peso muro (KN*m/m):	195.229
Peso tierras (KN*m/m):	340.200
Empuje pasivo en punta (KN*m/m):	0.000
Empuje agua intradós (KN*m/m):	0.000
Peso agua trasdós (KN*m/m):	0.000
Peso agua intradós (KN*m/m):	0.000
Sobrecarga (KN*m/m):	54.000

Total (KN\*m/m): 589.429

Coefficiente seguridad: 8.16

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (KN*m/m):	56.197	1.60	89.914
Axil (KN/m):	76.563	1.00	76.563
Cortante (KN/m):	42.071	1.60	67.314
Tensión intradós (KN/m <sup>2</sup> ):	378.748	(3.79 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> ):	-232.915	(-2.33 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (KN/m <sup>2</sup> ):	131.192 (1.31 kg/cm <sup>2</sup> )
Media (KN/m <sup>2</sup> ):	97.975 (0.98 kg/cm <sup>2</sup> )
Talón (KN/m <sup>2</sup> ):	64.757 (0.65 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.450

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

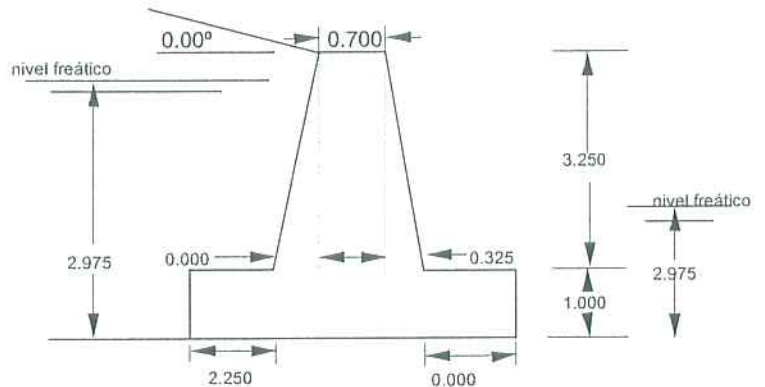
Muro de altura total (sobre base de cimiento) 4.25 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreebanco trasdós (m):	0.000
Sobreebanco intradós (m):	0.325
Altura muro (m):	3.250
Longitud puntera (m):	0.000
Longitud talón (m):	2.250
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	2.975
Altura agua intradós (m):	2.975

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

Desfavorables	
Tierras (kN/m):	41.978
Sobrecarga (kN/m):	8.062
Agua en trasdós (kN/m):	48.015
Subpresión (kN/m):	97.431
Total horizontal (KN/m):	98.054
Total vertical (KN/m):	59.725
Total (kN/m):	157.780

Favorables	
Peso muro (kN/m):	151.953
Peso tierras (kN/m):	100.519
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	44.253
Peso agua trasdós (KN/m):	44.438
Peso agua intradós (KN/m):	1.950
Sobrecarga (kN/m):	15.750
Total vertical (KN/m):	192.856
Total horizontal (KN/m):	44.253
Total (kN/m):	237.109

Coefficiente seguridad: 1.50

### Estabilidad al vuelco

Desfavorables	
Tierras (kN*m/m):	63.669
Sobrecarga (kN*m/m):	17.132
Agua trasdós (kN*m/m):	51.662
Subpresión (kN*m/m):	159.544
Total (kN*m/m):	292.006

Favorables	
Peso muro (kN*m/m):	175.322
Peso tierras (kN*m/m):	216.115
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	43.884
Peso agua trasdós (KN*m/m):	95.541
Peso agua intradós (KN*m/m):	0.128
Sobrecarga (kN*m/m):	33.863
Total (kN*m/m):	564.853

Coefficiente seguridad: 1.93

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	39.363	1.60	62.981
Axil (kN/m):	70.078	1.00	70.078
Cortante (kN/m):	26.341	1.60	42.146
Tensión intradós (KN/m <sup>2</sup> )	293.166	(2.93 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> )	-156.428	(-1.56 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	112.623 (1.13 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	66.314 (0.66 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	20.005 (0.20 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.275

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

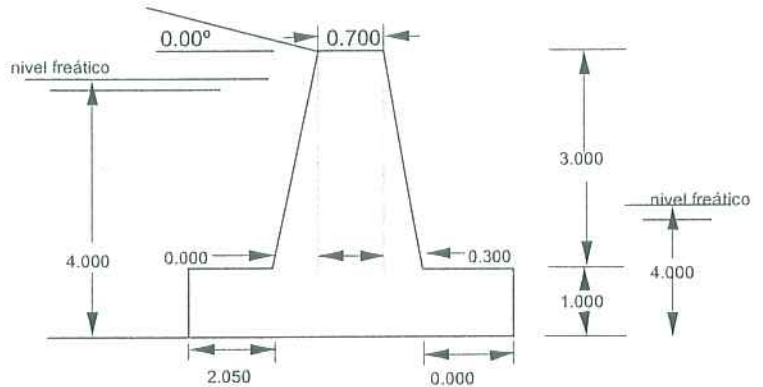
Muro de altura total (sobre base de cimiento) 4.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreebanco trasdós (m):	0.000
Sobreebanco intradós (m):	0.300
Altura muro (m):	3.000
Longitud puntera (m):	0.000
Longitud talón (m):	2.050
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000	
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000	
Rozamiento interno (°):	35.000	
Rozamiento con zapata (°):	31.500	
Coefficiente rozamiento:	0.613	
Angulo inclin. superficie (°):	0.000	
Coefficiente de empuje a aplicar:		
A=activo, P=pasivo, R=reposo	A	
M>manual	k:	0.271
Sobrecarga (kN/m <sup>2</sup> ):	5.000	
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000	



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	4.000
Altura agua intradós (m):	4.000

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	23.847
Sobrecarga (kN/m):	5.420
Agua en trasdós (kN/m):	80.000
Subpresión (kN/m):	122.000
Total horizontal (KN/m):	109.267
Total vertical (KN/m):	74.786
Total (kN/m):	184.053

#### Favorables

Peso muro (kN/m):	140.000
Peso tierras (kN/m):	67.650
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	80.000
Peso agua trasdós (KN/m):	61.500
Peso agua intradós (KN/m):	4.500
Sobrecarga (kN/m):	10.250
Total vertical (KN/m):	174.031
Total horizontal (KN/m):	80.000
Total (kN/m):	254.031

Coeficiente seguridad: 1.38

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	31.796
Sobrecarga (kN*m/m):	10.840
Agua trasdós (kN*m/m):	106.667
Subpresión (kN*m/m):	186.050

Total (kN\*m/m): 335.352

#### Favorables

Peso muro (kN*m/m):	152.656
Peso tierras (kN*m/m):	136.991
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	106.667
Peso agua trasdós (KN*m/m):	124.538
Peso agua intradós (KN*m/m):	0.450
Sobrecarga (kN*m/m):	20.756

Total (kN\*m/m): 542.058

Coeficiente seguridad: 1.62

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	-14.456	1.60	-23.130
Axil (kN/m):	63.750	1.00	63.750
Cortante (kN/m):	-17.166	1.60	-27.466
Tensión intradós (KN/m <sup>2</sup> ):	-22.988	(-0.23 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> ):	150.488	(1.50 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	79.005 (0.79 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	53.082 (0.53 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	27.159 (0.27 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.050



## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

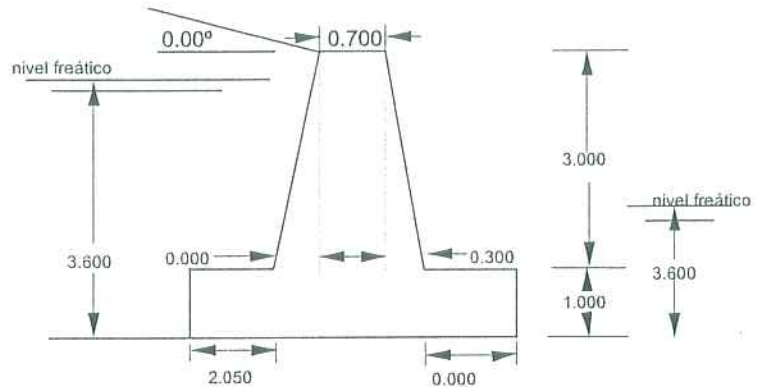
Muro de altura total (sobre base de cimiento) 4.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreancho trasdós (m):	0.000
Sobreancho intradós (m):	0.300
Altura muro (m):	3.000
Longitud puntera (m):	0.000
Longitud talón (m):	2.050
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000	
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000	
Rozamiento interno (°):	35.000	
Rozamiento con zapata (°):	31.500	
Coefficiente rozamiento:	0.613	
Angulo inclin. superficie (°):	0.000	
Coefficiente de empuje a aplicar:		
A=activo, P=pasivo, R=reposo	A	
M>manual	k:	0.271
Sobrecarga (KN/m <sup>2</sup> ):	0.900	
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000	



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	3.600
Altura agua intradós (m):	3.600

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (KN/m):	26.730
Sobrecarga (KN/m):	0.976
Agua en trasdós (KN/m):	64.800
Subpresión (KN/m):	109.800
Total horizontal (KN/m):	92.506
Total vertical (KN/m):	67.307
Total (KN/m):	159.813

#### Favorables

Peso muro (KN/m):	140.000
Peso tierras (KN/m):	73.390
Empuje pasivo en punta (KN/m):	0.000
Empuje agua intradós (KN/m):	64.800
Peso agua trasdós (KN/m):	53.300
Peso agua intradós (KN/m):	3.380
Sobrecarga (KN/m):	1.845
Total vertical (KN/m):	166.684
Total horizontal (KN/m):	64.800
Total (KN/m):	231.484

Coefficiente seguridad: 1.45

### Estabilidad al vuelco

#### Desfavorables

Tierras (KN*m/m):	37.280
Sobrecarga (KN*m/m):	1.951
Agua trasdós (KN*m/m):	77.760
Subpresión (KN*m/m):	167.445

Total (KN\*m/m): 284.436

#### Favorables

Peso muro (KN*m/m):	152.656
Peso tierras (KN*m/m):	148.615
Empuje pasivo en punta (KN*m/m):	0.000
Empuje agua intradós (KN*m/m):	77.760
Peso agua trasdós (KN*m/m):	107.933
Peso agua intradós (KN*m/m):	0.293
Sobrecarga (KN*m/m):	3.736

Total (KN\*m/m): 490.993

Coefficiente seguridad: 1.73

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (KN*m/m):	0.984	1.60	1.574
Axil (KN/m):	63.750	1.00	63.750
Cortante (KN/m):	-2.955	1.60	-4.727
Tensión intradós (KN/m <sup>2</sup> ):	69.653	(0.70 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> ):	57.847	(0.58 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (KN/m <sup>2</sup> ):	79.383 (0.79 kg/cm <sup>2</sup> )
Media (KN/m <sup>2</sup> ):	53.152 (0.53 kg/cm <sup>2</sup> )
Talón (KN/m <sup>2</sup> ):	26.922 (0.27 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.050

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

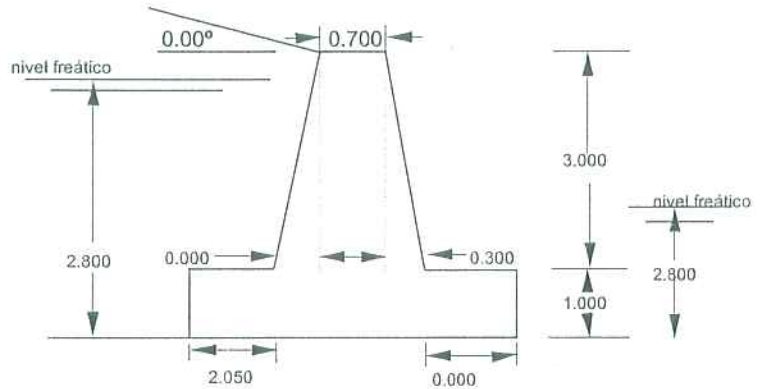
Muro de altura total (sobre base de cimiento) 4.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecarga trasdós (m):	0.000
Sobrecarga intradós (m):	0.300
Altura muro (m):	3.000
Longitud puntera (m):	0.000
Longitud talón (m):	2.050
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	2.800
Altura agua intradós (m):	2.800

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	37.185
Sobrecarga (kN/m):	7.588
Agua en trasdós (kN/m):	42.532
Subpresión (kN/m):	85.400
Total horizontal (KN/m):	87.304
Total vertical (KN/m):	52.350
Total (kN/m):	139.654

#### Favorables

Peso muro (kN/m):	140.000
Peso tierras (kN/m):	84.870
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	39.200
Peso agua trasdós (KN/m):	36.900
Peso agua intradós (KN/m):	1.620
Sobrecarga (kN/m):	14.350
Total vertical (KN/m):	170.255
Total horizontal (KN/m):	39.200
Total (kN/m):	209.455

Coeficiente seguridad: 1.50

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	53.081
Sobrecarga (kN*m/m):	15.175
Agua trasdós (kN*m/m):	43.071
Subpresión (kN*m/m):	130.235

Total (kN\*m/m): 241.562

#### Favorables

Peso muro (kN*m/m):	152.656
Peso tierras (kN*m/m):	171.862
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	36.587
Peso agua trasdós (KN*m/m):	74.723
Peso agua intradós (KN*m/m):	0.097
Sobrecarga (kN*m/m):	29.059

Total (kN\*m/m): 464.983

Coeficiente seguridad: 1.92

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	32.874	1.60	52.598
Axil (kN/m):	63.750	1.00	63.750
Cortante (kN/m):	24.441	1.60	39.105
Tensión intradós (KN/m <sup>2</sup> )	260.994	(2.61 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> )	-133.494	-(1.33 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	108.145 (1.08 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	63.062 (0.63 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	17.979 (0.18 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.050

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

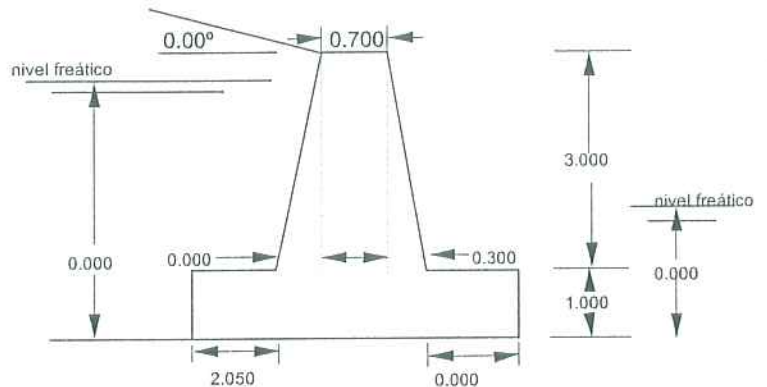
Muro de altura total (sobre base de cimiento) 4.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecarga trasdós (m):	0.000
Sobrecarga intradós (m):	0.300
Altura muro (m):	3.000
Longitud puntera (m):	0.000
Longitud talón (m):	2.050
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k:
Sobrecarga (KN/m <sup>2</sup> ):	10.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	0.000
Altura agua intradós (m):	0.000

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

Desfavorables	
Tierras (kN/m):	21.950
Sobrecarga (kN/m):	10.840
Agua en trasdós (kN/m):	0.000
Subpresión (kN/m):	0.000
Total horizontal (KN/m):	32.790
Total vertical (KN/m):	0.000
Total (kN/m):	32.790

Favorables	
Peso muro (kN/m):	140.000
Peso tierras (kN/m):	110.700
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	0.000
Peso agua trasdós (KN/m):	0.000
Peso agua intradós (KN/m):	0.000
Sobrecarga (kN/m):	20.500
Total vertical (KN/m):	166.246
Total horizontal (KN/m):	0.000
Total (kN/m):	166.246

Coefficiente seguridad: 5.07

### Estabilidad al vuelco

Desfavorables	
Tierras (kN*m/m):	29.267
Sobrecarga (kN*m/m):	21.679
Agua trasdós (kN*m/m):	0.000
Subpresión (kN*m/m):	0.000
Total (kN*m/m):	50.946

Favorables	
Peso muro (kN*m/m):	152.656
Peso tierras (kN*m/m):	224.168
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	0.000
Peso agua trasdós (KN*m/m):	0.000
Peso agua intradós (KN*m/m):	0.000
Sobrecarga (kN*m/m):	41.513
Total (kN*m/m):	418.336

Coefficiente seguridad: 8.21

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura		
Momento (kN*m/m):	38.210	1.60	61.135		
Axil (kN/m):	63.750	1.00	63.750		
Cortante (kN/m):	32.790	1.60	52.464		
Tensión intradós (KN/m <sup>2</sup> )	293.008	(2.93 kg/cm <sup>2</sup> )			
Tensión trasdós (KN/m <sup>2</sup> )	-165.508	(-1.66 kg/cm <sup>2</sup> )			

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	118.710 (1.19 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	88.918 (0.89 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	59.126 (0.59 kg/cm <sup>2</sup> )
Long. bajo presión (m):	3.050

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

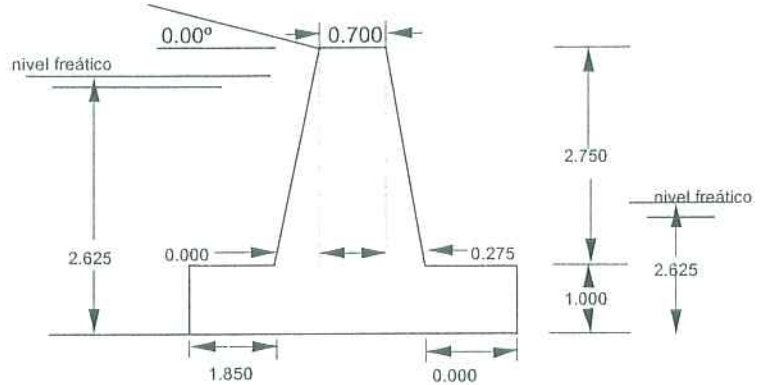
Muro de altura total (sobre base de cimiento) 3.75 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreeancho trasdós (m):	0.000
Sobreeancho intradós (m):	0.275
Altura muro (m):	2.750
Longitud puntera (m):	0.000
Longitud talón (m):	1.850
Espesor zapata (m):	1.000
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	A
A=activo, P=pasivo, R=reposo	
M>manual	k: 0.271
Sobrecarga (KN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	2.625
Altura agua intradós (m):	2.625

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (KN/m):	32.682
Sobrecarga (KN/m):	7.113
Agua en trasdós (KN/m):	37.382
Subpresión (KN/m):	74.156
Total horizontal (KN/m):	77.177
Total vertical (KN/m):	45.458
Total (KN/m):	122.635

#### Favorables

Peso muro (KN/m):	128.203
Peso tierras (KN/m):	70.531
Empuje pasivo en punta (KN/m):	0.000
Empuje agua intradós (KN/m):	34.453
Peso agua trasdós (KN/m):	30.063
Peso agua intradós (KN/m):	1.320
Sobrecarga (KN/m):	12.950
Total vertical (KN/m):	149.000
Total horizontal (KN/m):	34.453
Total (KN/m):	183.453

Coefficiente seguridad: 1.50

### Estabilidad al vuelco

#### Desfavorables

Tierras (KN*m/m):	43.737
Sobrecarga (KN*m/m):	13.338
Agua trasdós (KN*m/m):	35.489
Subpresión (KN*m/m):	104.746

Total (KN\*m/m): 197.310

#### Favorables

Peso muro (KN*m/m):	131.569
Peso tierras (KN*m/m):	134.009
Empuje pasivo en punta (KN*m/m):	0.000
Empuje agua intradós (KN*m/m):	30.146
Peso agua trasdós (KN*m/m):	57.119
Peso agua intradós (KN*m/m):	0.072
Sobrecarga (KN*m/m):	24.605

Total (KN\*m/m): 377.520

Coefficiente seguridad: 1.91

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (KN*m/m):	26.914	1.60	43.063
Axil (KN/m):	57.578	1.00	57.578
Cortante (KN/m):	22.242	1.60	35.587

Tensión intradós (KN/m <sup>2</sup> )	228.928	(2.29 kg/cm <sup>2</sup> )
Tensión trasdós (KN/m <sup>2</sup> )	-110.819	-(1.11 kg/cm <sup>2</sup> )

### Tensión en el terreno

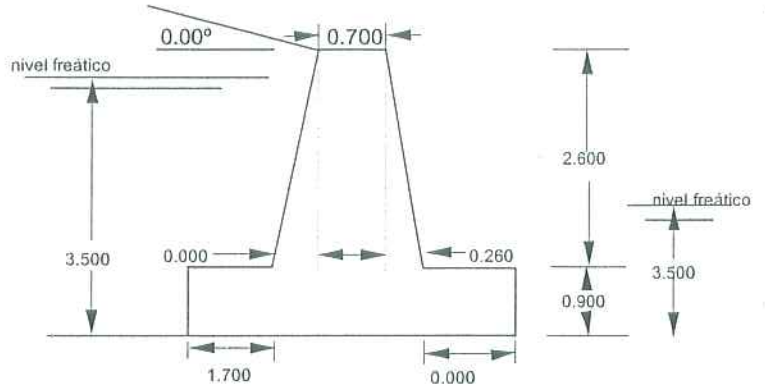
Puntera (KN/m <sup>2</sup> ):	103.680	(1.04 kg/cm <sup>2</sup> )
Media (KN/m <sup>2</sup> ):	59.791	(0.60 kg/cm <sup>2</sup> )
Talón (KN/m <sup>2</sup> ):	15.903	(0.16 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.825	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

Muro de altura total (sobre base de cimiento) 3.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecarga trasdós (m):	0.000
Sobrecarga intradós (m):	0.260
Altura muro (m):	2.600
Longitud puntera (m):	0.000
Longitud talón (m):	1.700
Espesor zapata (m):	0.900
Peso específico (kN/m <sup>3</sup> ):	25.00



### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual k:	0.271
Sobrecarga (kN/m <sup>2</sup> ):	5.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000

### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	3.500
Altura agua intradós (m):	3.500

Coef. Sísmico básico:	0.000
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### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	18.258
Sobrecarga (kN/m):	4.742
Agua en trasdós (kN/m):	61.250
Subpresión (kN/m):	93.100
Total horizontal (kN/m):	84.250
Total vertical (kN/m):	57.070
Total (kN/m):	141.321

#### Favorables

Peso muro (kN/m):	113.800
Peso tierras (kN/m):	48.620
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	61.250
Peso agua trasdós (kN/m):	44.200
Peso agua intradós (kN/m):	3.380
Sobrecarga (kN/m):	8.500
Total vertical (kN/m):	133.941
Total horizontal (kN/m):	61.250
Total (kN/m):	195.191

Coefficiente seguridad: 1.38

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	21.301
Sobrecarga (kN*m/m):	8.299
Agua trasdós (kN*m/m):	71.458
Subpresión (kN*m/m):	123.823

Total (kN\*m/m): 224.881

#### Favorables

Peso muro (kN*m/m):	108.820
Peso tierras (kN*m/m):	88.002
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	71.458
Peso agua trasdós (kN*m/m):	80.002
Peso agua intradós (kN*m/m):	0.293
Sobrecarga (kN*m/m):	15.385

Total (kN\*m/m): 363.961

Coefficiente seguridad: 1.62

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	-1.976	1.60	-3.161
Axil (kN/m):	53.950	1.00	53.950
Cortante (kN/m):	-4.651	1.60	-7.442

Tensión intradós (kN/m <sup>2</sup> )	43.334	(0.43 kg/cm <sup>2</sup> )
Tensión trasdós (kN/m <sup>2</sup> )	69.062	(0.69 kg/cm <sup>2</sup> )

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	70.634	(0.71 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	47.143	(0.47 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	23.651	(0.24 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.660	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

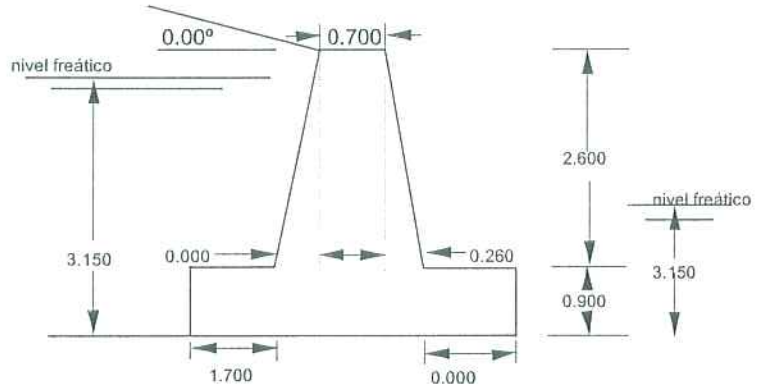
Muro de altura total (sobre base de cimiento) 3.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecarga trasdós (m):	0.000
Sobrecarga intradós (m):	0.260
Altura muro (m):	2.600
Longitud puntera (m):	0.000
Longitud talón (m):	1.700
Espesor zapata (m):	0.900
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual k:	0.271
Sobrecarga (KN/m <sup>2</sup> ):	9.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	3.150
Altura agua intradós (m):	3.150

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (KN/m):	20.466
Sobrecarga (KN/m):	8.536
Agua en trasdós (KN/m):	49.613
Subpresión (KN/m):	83.790
Total horizontal (KN/m):	78.614
Total vertical (KN/m):	51.363
Total (KN/m):	129.977

#### Favorables

Peso muro (KN/m):	113.800
Peso tierras (KN/m):	52.785
Empuje pasivo en punta (KN/m):	0.000
Empuje agua intradós (KN/m):	49.613
Peso agua trasdós (KN/m):	38.250
Peso agua intradós (KN/m):	2.531
Sobrecarga (KN/m):	15.300
Total vertical (KN/m):	136.494
Total horizontal (KN/m):	49.613
Total (KN/m):	186.107

Coefficiente seguridad: 1.43

### Estabilidad al vuelco

#### Desfavorables

Tierras (KN*m/m):	24.974
Sobrecarga (KN*m/m):	14.938
Agua trasdós (KN*m/m):	52.093
Subpresión (KN*m/m):	111.441

Total (KN\*m/m): 203.447

#### Favorables

Peso muro (KN*m/m):	108.820
Peso tierras (KN*m/m):	95.541
Empuje pasivo en punta (KN*m/m):	0.000
Empuje agua intradós (KN*m/m):	52.093
Peso agua trasdós (KN*m/m):	69.233
Peso agua intradós (KN*m/m):	0.190
Sobrecarga (KN*m/m):	27.693

Total (KN\*m/m): 353.569

Coefficiente seguridad: 1.74

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (KN*m/m):	14.072	1.60	22.516
Axil (KN/m):	53.950	1.00	53.950
Cortante (KN/m):	9.938	1.60	15.901

Tensión intradós (KN/m <sup>2</sup> ):	147.814	(1.48 kg/cm <sup>2</sup> )
Tensión trasdós (KN/m <sup>2</sup> ):	-35.418	(-0.35 kg/cm <sup>2</sup> )

### Tensión en el terreno

Puntera (KN/m <sup>2</sup> ):	81.535	(0.82 kg/cm <sup>2</sup> )
Media (KN/m <sup>2</sup> ):	52.209	(0.52 kg/cm <sup>2</sup> )
Talón (KN/m <sup>2</sup> ):	22.884	(0.23 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.660	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

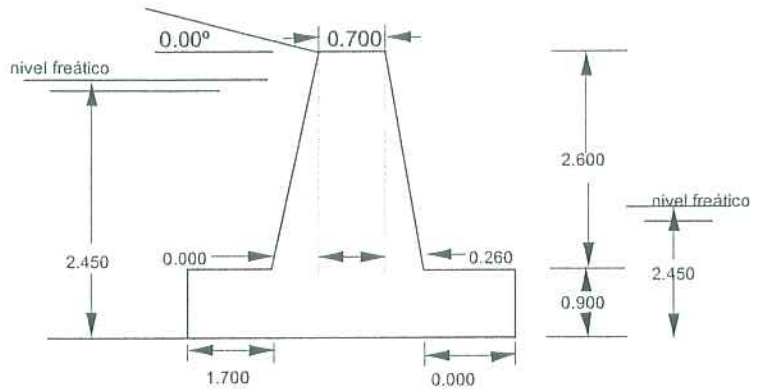
Muro de altura total (sobre base de cimiento) 3.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobrecarga trasdós (m):	0.000
Sobrecarga intradós (m):	0.260
Altura muro (m):	2.600
Longitud puntera (m):	0.000
Longitud talón (m):	1.700
Espesor zapata (m):	0.900
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (KN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	2.450
Altura agua intradós (m):	2.450

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	28.469
Sobrecarga (kN/m):	6.639
Agua en trasdós (kN/m):	32.564
Subpresión (kN/m):	65.170
Total horizontal (KN/m):	67.672
Total vertical (KN/m):	39.949
Total (kN/m):	107.621

#### Favorables

Peso muro (kN/m):	113.800
Peso tierras (kN/m):	61.115
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	30.013
Peso agua trasdós (KN/m):	26.350
Peso agua intradós (KN/m):	1.201
Sobrecarga (kN/m):	11.900
Total vertical (KN/m):	131.407
Total horizontal (KN/m):	30.013
Total (kN/m):	161.419

**Coefficiente seguridad: 1.50**

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	35.560
Sobrecarga (kN*m/m):	11.619
Agua trasdós (kN*m/m):	28.854
Subpresión (kN*m/m):	86.676

**Total (kN\*m/m): 162.709**

#### Favorables

Peso muro (kN*m/m):	108.820
Peso tierras (kN*m/m):	110.618
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	24.510
Peso agua trasdós (KN*m/m):	47.694
Peso agua intradós (KN*m/m):	0.062
Sobrecarga (kN*m/m):	21.539

**Total (kN\*m/m): 313.243**

**Coefficiente seguridad: 1.93**

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	23.196	1.60	37.113
Axil (kN/m):	53.950	1.00	53.950
Cortante (kN/m):	20.371	1.60	32.593
Tensión intradós (KN/m <sup>2</sup> ):	207.212	(2.07 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> ):	-94.816	-(0.95 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	96.705 (0.97 kg/cm <sup>2</sup> )
Medía (kN/m <sup>2</sup> ):	56.089 (0.56 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	15.473 (0.15 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.660

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

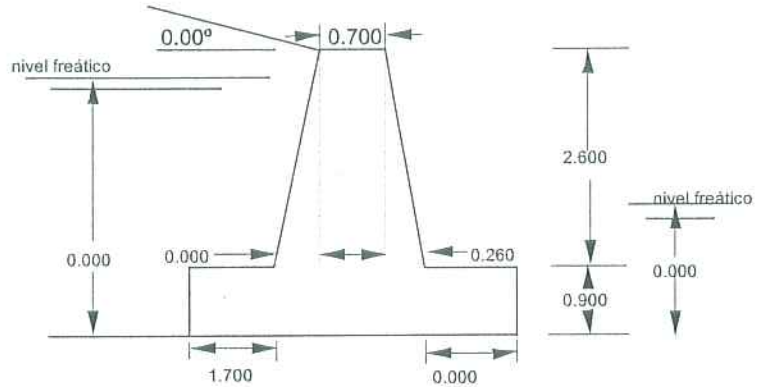
Muro de altura total (sobre base de cimiento) 3.50 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreebanco trasdós (m):	0.000
Sobreebanco intradós (m):	0.260
Altura muro (m):	2.600
Longitud puntera (m):	0.000
Longitud talón (m):	1.700
Espesor zapata (m):	0.900
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	10.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	0.000
Altura agua intradós (m):	0.000

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	16.487
Sobrecarga (kN/m):	9.485
Agua en trasdós (kN/m):	0.000
Subpresión (kN/m):	0.000
Total horizontal (KN/m):	25.972
Total vertical (KN/m):	0.000
Total (kN/m):	25.972

#### Favorables

Peso muro (kN/m):	113.800
Peso tierras (kN/m):	79.560
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	0.000
Peso agua trasdós (KN/m):	0.000
Peso agua intradós (KN/m):	0.000
Sobrecarga (kN/m):	17.000
Total vertical (KN/m):	128.951
Total horizontal (KN/m):	0.000
Total (kN/m):	128.951

Coefficiente seguridad: 4.97

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	19.235
Sobrecarga (kN*m/m):	16.598
Agua trasdós (kN*m/m):	0.000
Subpresión (kN*m/m):	0.000

Total (kN\*m/m): 35.833

#### Favorables

Peso muro (kN*m/m):	108.820
Peso tierras (kN*m/m):	144.004
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	0.000
Peso agua trasdós (KN*m/m):	0.000
Peso agua intradós (KN*m/m):	0.000
Sobrecarga (kN*m/m):	30.770

Total (kN\*m/m): 283.594

Coefficiente seguridad: 7.91

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	26.619	1.60	42.590
Axil (kN/m):	53.950	1.00	53.950
Cortante (kN/m):	25.972	1.60	41.555

Tensión intradós (KN/m<sup>2</sup>) 229.497 (2.29 kg/cm<sup>2</sup>)  
Tensión trasdós (KN/m<sup>2</sup>) -117.102 (-1.17 kg/cm<sup>2</sup>)

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	106.234 (1.06 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	79.083 (0.79 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	51.932 (0.52 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.660



## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

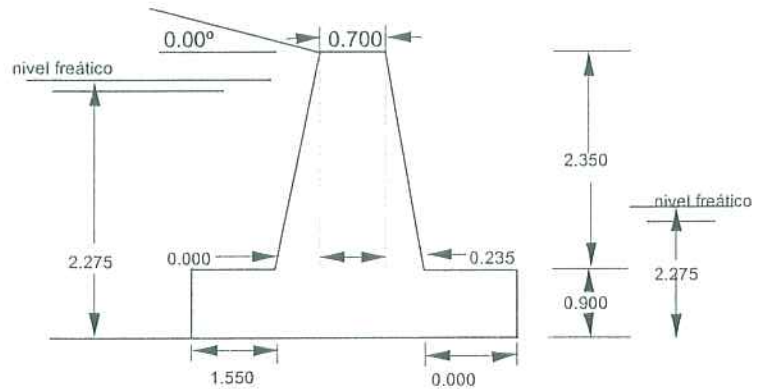
Muro de altura total (sobre base de cimiento) 3.25 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreebanco trasdós (m):	0.000
Sobreebanco intradós (m):	0.235
Altura muro (m):	2.350
Longitud puntera (m):	0.000
Longitud talón (m):	1.550
Espesor zapata (m):	0.900
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata(°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	7.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	2.275
Altura agua intradós (m):	2.275

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	24.548
Sobrecarga (kN/m):	6.165
Agua en trasdós (kN/m):	28.078
Subpresión (kN/m):	56.534
Total horizontal (KN/m):	58.790
Total vertical (KN/m):	34.655
Total (kN/m):	93.446

#### Favorables

Peso muro (kN/m):	103.941
Peso tierras (kN/m):	50.646
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	25.878
Peso agua trasdós (KN/m):	21.313
Peso agua intradós (KN/m):	0.945
Sobrecarga (kN/m):	10.850
Total vertical (KN/m):	115.057
Total horizontal (KN/m):	25.878
Total (kN/m):	140.935

Coefficiente seguridad: 1.51

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	28.471
Sobrecarga (kN*m/m):	10.018
Agua trasdós (kN*m/m):	23.102
Subpresión (kN*m/m):	70.243

Total (kN\*m/m): 131.835

#### Favorables

Peso muro (kN*m/m):	94.611
Peso tierras (kN*m/m):	86.605
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	19.624
Peso agua trasdós (KN*m/m):	36.444
Peso agua intradós (KN*m/m):	0.043
Sobrecarga (kN*m/m):	18.554

Total (kN\*m/m): 255.881

Coefficiente seguridad: 1.94

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	18.311	1.60	29.298
Axil (kN/m):	48.028	1.00	48.028
Cortante (kN/m):	17.991	1.60	28.786

Tensión intradós (KN/m <sup>2</sup> )	177.039	(1.77 kg/cm <sup>2</sup> )
Tensión trasdós (KN/m <sup>2</sup> )	-74.305	-(0.74 kg/cm <sup>2</sup> )

### Tensión en el terreno

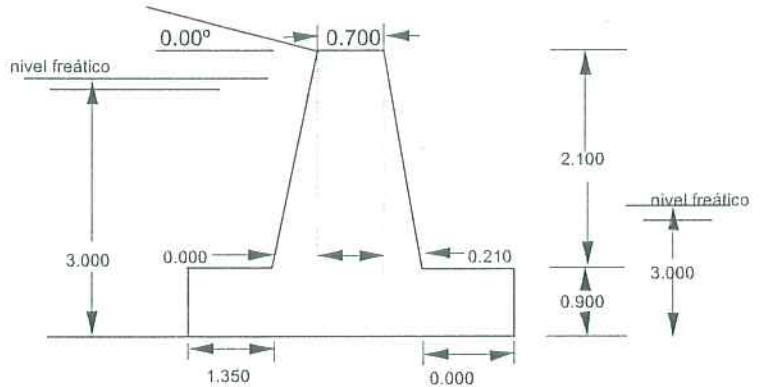
Puntera (kN/m <sup>2</sup> ):	90.598	(0.91 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	52.781	(0.53 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	14.965	(0.15 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.485	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

Muro de altura total (sobre base de cimiento) 3.00 m

**Características geométricas:**

Ancho superior (m):	0.700
Sobreebancho trasdós (m):	0.000
Sobreebancho intradós (m):	0.210
Altura muro (m):	2.100
Longitud puntera (m):	0.000
Longitud talón (m):	1.350
Espesor zapata (m):	0.900
Peso específico (KN/m <sup>3</sup> ):	25.00



**Características del terreno:**

Peso específico (kN/m <sup>3</sup> ):	18.000	
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000	
Rozamiento interno (°):	35.000	
Rozamiento con zapata(°):	31.500	
Coefficiente rozamiento:	0.613	
Angulo inclin. superficie (°):	0.000	
Coefficiente de empuje a aplicar:		
A=activo, P=pasivo, R=reposo	A	
M>manual	k:	0.271
Sobrecarga (kN/m <sup>2</sup> ):	5.000	
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000	

**Altura de agua (medida sobre base cimiento):**

Altura agua trasdós (m):	3.000
Altura agua intradós (m):	3.000

**Coef. Sísmico básico:** 0.000

**Estabilidad al deslizamiento**

**Desfavorables**

Tierras (kN/m):	13.414
Sobrecarga (kN/m):	4.065
Agua en trasdós (kN/m):	45.000
Subpresión (kN/m):	67.800
Total horizontal (KN/m):	62.479
Total vertical (KN/m):	41.561
Total (kN/m):	104.040

**Favorables**

Peso muro (kN/m):	93.113
Peso tierras (kN/m):	31.185
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	45.000
Peso agua trasdós (KN/m):	28.350
Peso agua intradós (KN/m):	2.205
Sobrecarga (kN/m):	6.750
Total vertical (KN/m):	99.062
Total horizontal (KN/m):	45.000
Total (kN/m):	144.062

**Coefficiente seguridad:** 1.38

**Estabilidad al vuelco**

**Desfavorables**

Tierras (kN*m/m):	13.414
Sobrecarga (kN*m/m):	6.097
Agua trasdós (kN*m/m):	45.000
Subpresión (kN*m/m):	76.614

**Total (kN\*m/m):** 141.125

**Favorables**

Peso muro (kN*m/m):	78.812
Peso tierras (kN*m/m):	49.428
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	45.000
Peso agua trasdós (KN*m/m):	44.935
Peso agua intradós (KN*m/m):	0.154
Sobrecarga (kN*m/m):	10.699

**Total (kN\*m/m):** 229.028

**Coefficiente seguridad:** 1.62

**Esfuerzos y tensiones en la base del alzado**

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	3.606	1.60	5.769
Axil (kN/m):	42.263	1.00	42.263
Cortante (kN/m):	3.119	1.60	4.990
<b>Tensión intradós (KN/m<sup>2</sup>)</b>	<b>72.568</b>	(0.73 kg/cm <sup>2</sup> )	
<b>Tensión trasdós (KN/m<sup>2</sup>)</b>	<b>20.317</b>	(0.20 kg/cm <sup>2</sup> )	

**Tensión en el terreno**

<b>Puntera (kN/m<sup>2</sup>):</b>	<b>62.761</b>	(0.63 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	41.506	(0.42 kg/cm <sup>2</sup> )
<b>Talón (kN/m<sup>2</sup>):</b>	<b>20.250</b>	(0.20 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.260	

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

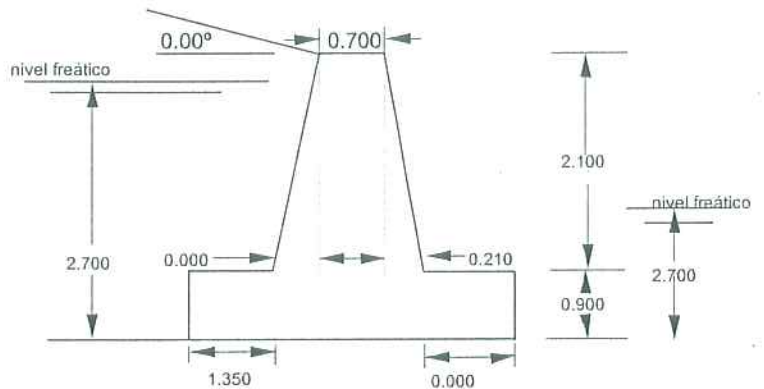
Muro de altura total (sobre base de cimiento) 3.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreancho trasdós (m):	0.000
Sobreancho intradós (m):	0.210
Altura muro (m):	2.100
Longitud puntera (m):	0.000
Longitud talón (m):	1.350
Espesor zapata (m):	0.900
Peso específico (kN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k:
Sobrecarga (kN/m <sup>2</sup> ):	9.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	2.700
Altura agua intradós (m):	2.700
Coef. Sísmico básico:	0.000

### Estabilidad al deslizamiento

Desfavorables	
Tierras (kN/m):	15.036
Sobrecarga (kN/m):	7.317
Agua en trasdós (kN/m):	36.450
Subpresión (kN/m):	61.020
Total horizontal (KN/m):	58.803
Total vertical (KN/m):	37.405
Total (kN/m):	96.208
Favorables	
Peso muro (kN/m):	93.113
Peso tierras (kN/m):	34.020
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	36.450
Peso agua trasdós (KN/m):	24.300
Peso agua intradós (KN/m):	1.620
Sobrecarga (kN/m):	12.150
Total vertical (KN/m):	101.269
Total horizontal (KN/m):	36.450
Total (kN/m):	137.719
Coefficiente seguridad:	1.43

### Estabilidad al vuelco

Desfavorables	
Tierras (kN*m/m):	15.727
Sobrecarga (kN*m/m):	10.975
Agua trasdós (kN*m/m):	32.805
Subpresión (kN*m/m):	68.953
Total (kN*m/m):	128.460
Favorables	
Peso muro (kN*m/m):	78.812
Peso tierras (kN*m/m):	53.922
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	32.805
Peso agua trasdós (KN*m/m):	38.516
Peso agua intradós (KN*m/m):	0.097
Sobrecarga (kN*m/m):	19.258
Total (kN*m/m):	223.409
Coefficiente seguridad:	1.74

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	11.190	1.60	17.905
Axil (kN/m):	42.263	1.00	42.263
Cortante (kN/m):	11.370	1.60	18.193
Tensión intradós (KN/m <sup>2</sup> ):	127.522	(1.28 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> ):	-34.638	(-0.35 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	72.855 (0.73 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	46.098 (0.46 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	19.342 (0.19 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.260

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

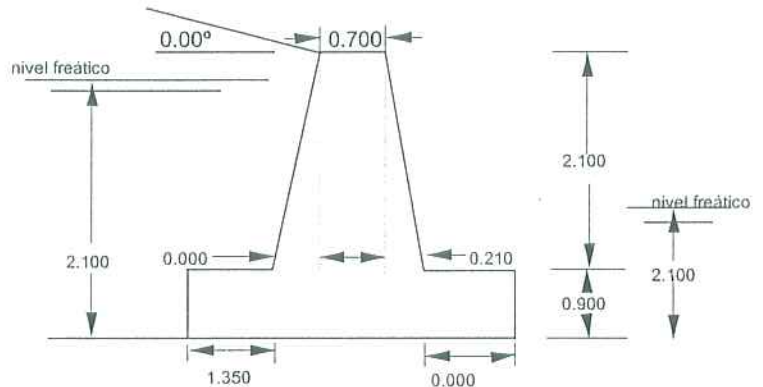
Muro de altura total (sobre base de cimiento) 3.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreebanco trasdós (m):	0.000
Sobreebanco intradós (m):	0.210
Altura muro (m):	2.100
Longitud puntera (m):	0.000
Longitud talón (m):	1.350
Espesor zapata (m):	0.900
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (KN/m <sup>3</sup> ):	18.000	
Peso específico sumergido (KN/m <sup>3</sup> ):	11.000	
Rozamiento interno (°):	35.000	
Rozamiento con zapata (°):	31.500	
Coefficiente rozamiento:	0.613	
Angulo inclin. superficie (°):	0.000	
Coefficiente de empuje a aplicar:		
A=activo, P=pasivo, R=reposo	A	
M>manual	k:	0.271
Sobrecarga (KN/m <sup>2</sup> ):	7.000	
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000	



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	2.100
Altura agua intradós (m):	2.100

Coef. Sísmico básico: 0.085

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (KN/m):	20.916
Sobrecarga (KN/m):	5.691
Agua en trasdós (KN/m):	23.924
Subpresión (KN/m):	47.460
Total horizontal (KN/m):	50.531
Total vertical (KN/m):	29.093
Total (KN/m):	79.624

#### Favorables

Peso muro (KN/m):	93.113
Peso tierras (KN/m):	39.690
Empuje pasivo en punta (KN/m):	0.000
Empuje agua intradós (KN/m):	22.050
Peso agua trasdós (KN/m):	16.200
Peso agua intradós (KN/m):	0.720
Sobrecarga (KN/m):	9.450
Total vertical (KN/m):	97.573
Total horizontal (KN/m):	22.050
Total (KN/m):	119.623

Coeficiente seguridad: 1.50

### Estabilidad al vuelco

#### Desfavorables

Tierras (KN*m/m):	22.394
Sobrecarga (KN*m/m):	8.536
Agua trasdós (KN*m/m):	18.170
Subpresión (KN*m/m):	53.630

Total (KN\*m/m): 102.730

#### Favorables

Peso muro (KN*m/m):	78.812
Peso tierras (KN*m/m):	62.909
Empuje pasivo en punta (KN*m/m):	0.000
Empuje agua intradós (KN*m/m):	15.435
Peso agua trasdós (KN*m/m):	25.677
Peso agua intradós (KN*m/m):	0.029
Sobrecarga (KN*m/m):	14.978

Total (KN\*m/m): 197.840

Coeficiente seguridad: 1.93

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (KN*m/m):	14.069	1.60	22.510
Axil (KN/m):	42.263	1.00	42.263
Cortante (KN/m):	15.562	1.60	24.899
Tensión intradós (KN/m <sup>2</sup> ):	148.377	(1.48 kg/cm <sup>2</sup> )	
Tensión trasdós (KN/m <sup>2</sup> ):	-55.492	(-0.55 kg/cm <sup>2</sup> )	

### Tensión en el terreno

Puntera (KN/m <sup>2</sup> ):	85.994 (0.86 kg/cm <sup>2</sup> )
Media (KN/m <sup>2</sup> ):	49.430 (0.49 kg/cm <sup>2</sup> )
Talón (KN/m <sup>2</sup> ):	12.867 (0.13 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.260

## CALCULO DE MUROS: ESTABILIDAD Y TENSIONES EN EL CIMIENTO

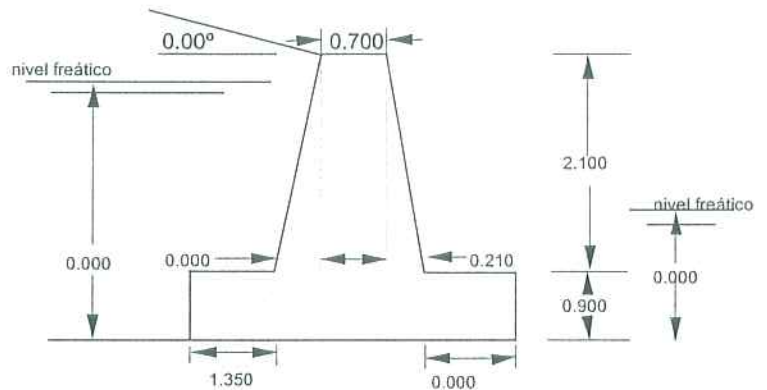
Muro de altura total (sobre base de cimiento) 3.00 m

### Características geométricas:

Ancho superior (m):	0.700
Sobreebanco trasdós (m):	0.000
Sobreebanco intradós (m):	0.210
Altura muro (m):	2.100
Longitud puntera (m):	0.000
Longitud talón (m):	1.350
Espesor zapata (m):	0.900
Peso específico (KN/m <sup>3</sup> ):	25.00

### Características del terreno:

Peso específico (kN/m <sup>3</sup> ):	18.000
Peso específico sumergido (kN/m <sup>3</sup> ):	11.000
Rozamiento interno (°):	35.000
Rozamiento con zapata (°):	31.500
Coefficiente rozamiento:	0.613
Angulo inclin. superficie (°):	0.000
Coefficiente de empuje a aplicar:	
A=activo, P=pasivo, R=reposo	A
M>manual	k: 0.271
Sobrecarga (kN/m <sup>2</sup> ):	10.000
Altura eficaz tierras intradós, medida sobre la base del cimiento (m):	0.000



### Altura de agua (medida sobre base cimiento):

Altura agua trasdós (m):	0.000
Altura agua intradós (m):	0.000

Coef. Sísmico básico: 0.000

### Estabilidad al deslizamiento

#### Desfavorables

Tierras (kN/m):	10.756
Sobrecarga (kN/m):	8.130
Agua en trasdós (kN/m):	0.000
Subpresión (kN/m):	0.000
Total horizontal (KN/m):	18.885
Total vertical (KN/m):	0.000
Total (kN/m):	18.885

#### Favorables

Peso muro (kN/m):	93.113
Peso tierras (kN/m):	51.030
Empuje pasivo en punta (kN/m):	0.000
Empuje agua intradós (kN/m):	0.000
Peso agua trasdós (KN/m):	0.000
Peso agua intradós (KN/m):	0.000
Sobrecarga (kN/m):	13.500
Total vertical (KN/m):	96.635
Total horizontal (KN/m):	0.000
Total (kN/m):	96.635

Coefficiente seguridad: 5.12

### Estabilidad al vuelco

#### Desfavorables

Tierras (kN*m/m):	10.756
Sobrecarga (kN*m/m):	12.195
Agua trasdós (kN*m/m):	0.000
Subpresión (kN*m/m):	0.000

Total (kN\*m/m): 22.950

#### Favorables

Peso muro (kN*m/m):	78.812
Peso tierras (kN*m/m):	80.883
Empuje pasivo en punta (kN*m/m):	0.000
Empuje agua intradós (kN*m/m):	0.000
Peso agua trasdós (KN*m/m):	0.000
Peso agua intradós (KN*m/m):	0.000
Sobrecarga (kN*m/m):	21.398

Total (kN\*m/m): 181.092

Coefficiente seguridad: 7.89

### Esfuerzos y tensiones en la base del alzado

	Servicio	C. mayorac.	Rotura
Momento (kN*m/m):	16.065	1.60	25.704
Axil (kN/m):	42.263	1.00	42.263
Cortante (kN/m):	18.885	1.60	30.216

Tensión intradós (KN/m <sup>2</sup> )	162.842	(1.63 kg/cm <sup>2</sup> )
Tensión trasdós (KN/m <sup>2</sup> )	-69.957	-(0.70 kg/cm <sup>2</sup> )

### Tensión en el terreno

Puntera (kN/m <sup>2</sup> ):	93.241	(0.93 kg/cm <sup>2</sup> )
Media (kN/m <sup>2</sup> ):	69.753	(0.70 kg/cm <sup>2</sup> )
Talón (kN/m <sup>2</sup> ):	46.266	(0.46 kg/cm <sup>2</sup> )
Long. bajo presión (m):	2.260	

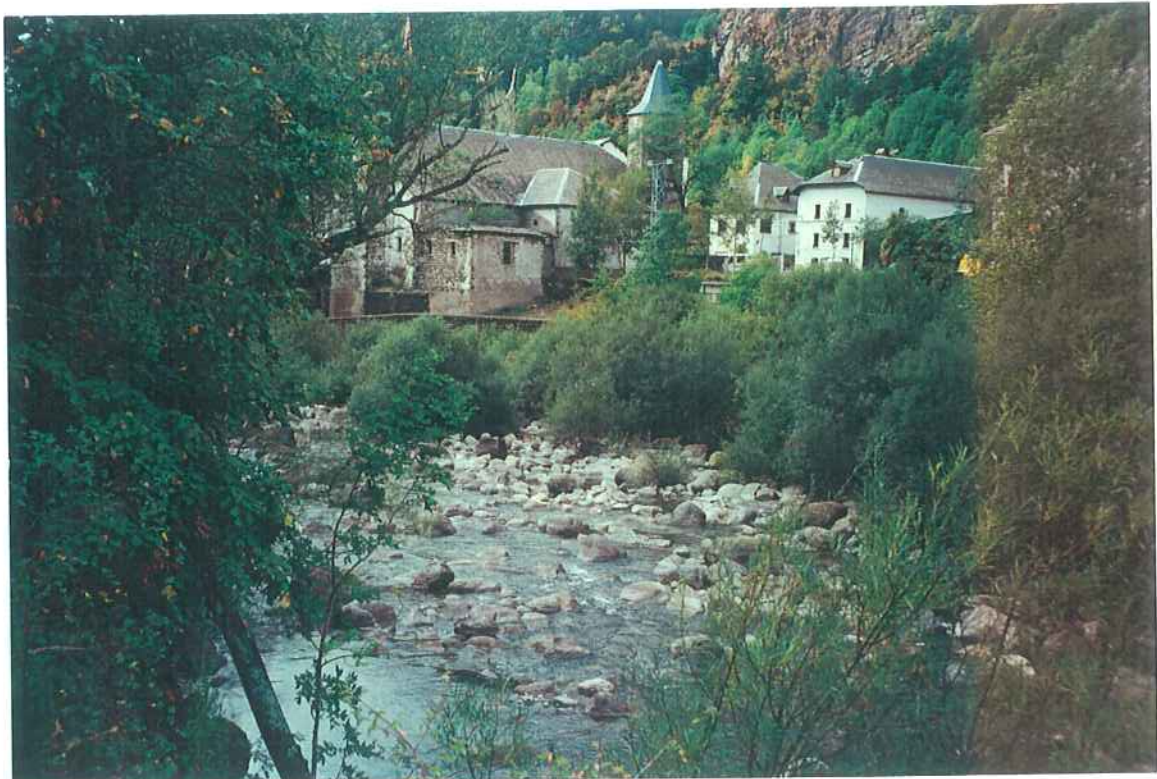
ANEJO N° 6

REPORTAJE FOTOGRÁFICO

**A.- FOTOGRAFÍAS REALIZADAS EL 20 - SEPTIEMBRE - 2000**



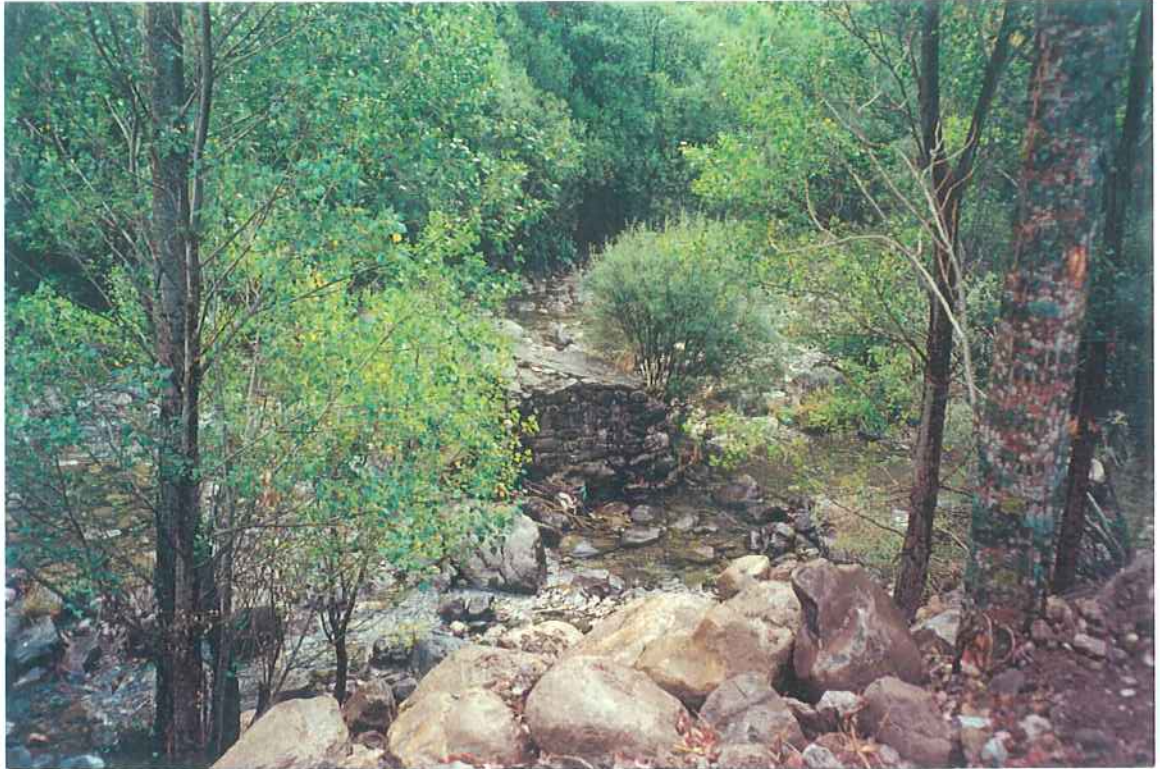
**DETALLES DEL CAUCE**





**DETALLES MURO  
EXISTENTE**





**SE APRECIA UN BLOQUE DE MURO ANTIGUO EN EL CAUCE**



**PERFIL 20**





**TUBERÍA EN P-29**

**PERFIL 27**





**PERFIL 26**



**PERFIL 25**



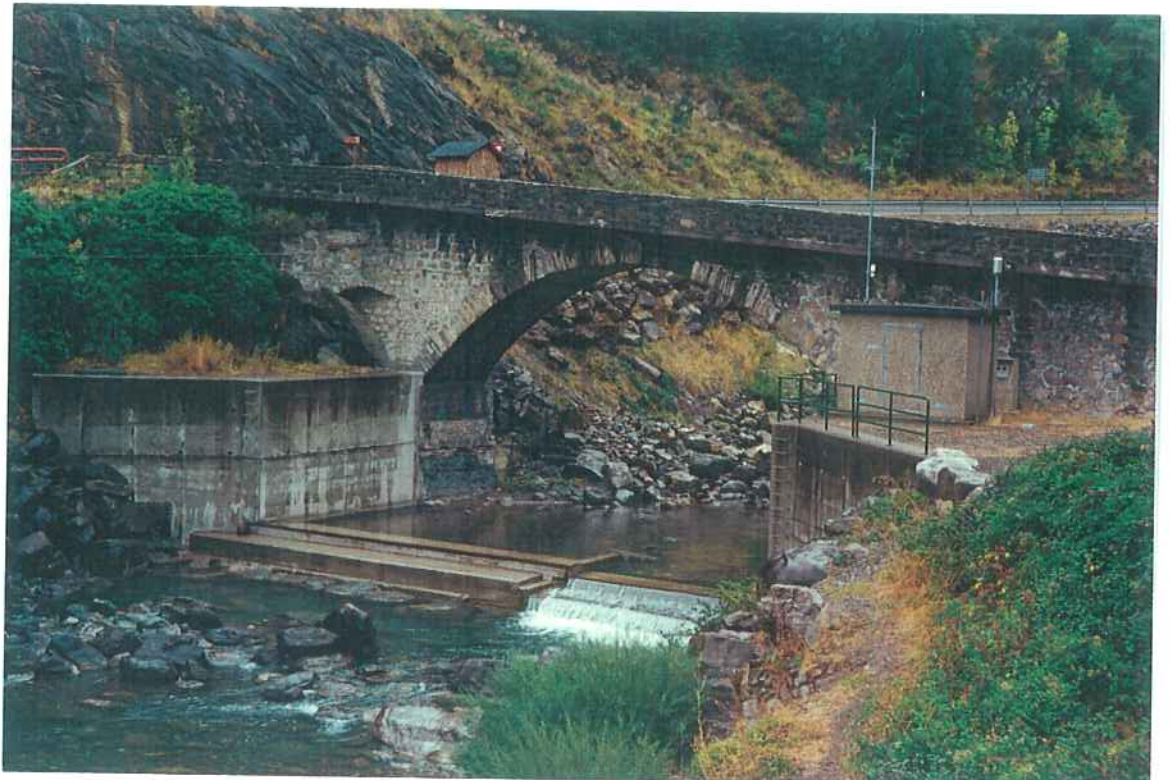
**PERFIL 30**



**PERFIL 31**



**FOTO DESDE PUENTE ESTACIÓN AFOROS (P-35)**



**ESTACIÓN DE AFOROS**

**B.- FOTOGRAFÍAS REALIZADAS EL 7 – DICIEMBRE - 2000**





**CAUCE AGUAS ABAJO DEL CASCO URBANO**



**LINEA ELÉCTRICA EN MARGEN EZQUIERDA**



**POSTE EN P-20**

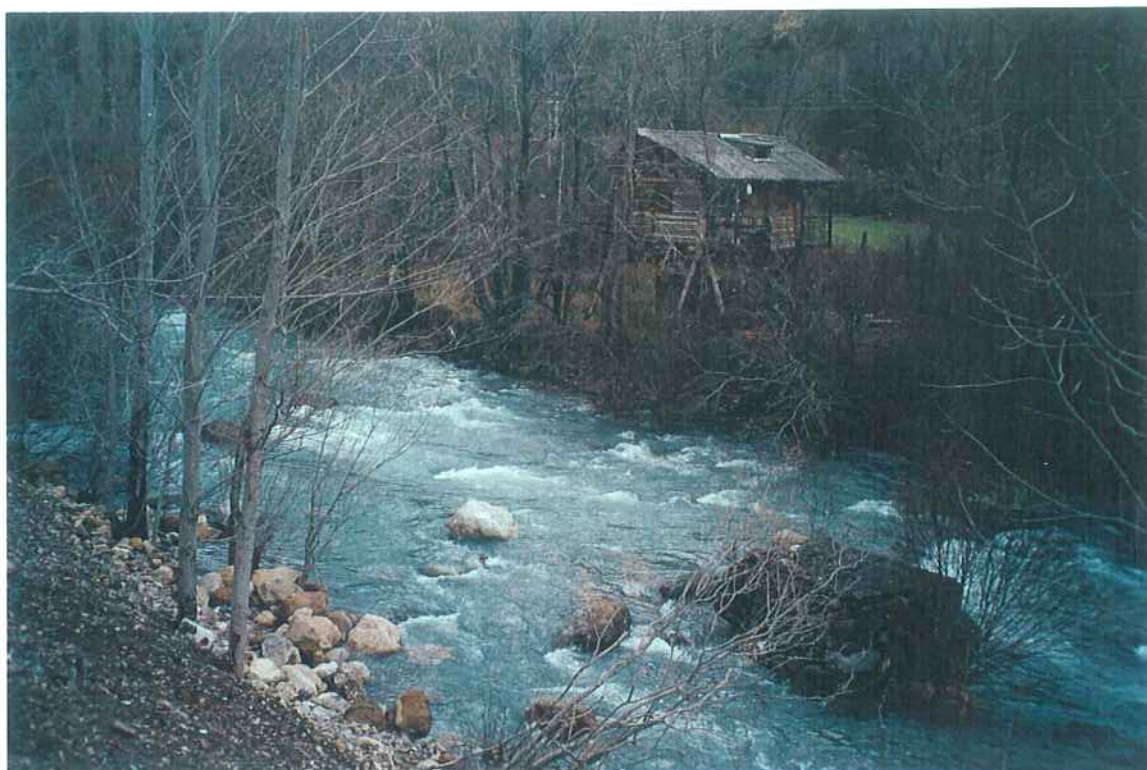


**TUBERÍA EN P-29**

**MURO Y BARANDILLA**



**FIN MURO ACTUAL**



CABAÑA EN P-14





**PERFIL 27**