

DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo.to de Tarifa en sesión celebrada el día..... **29 MAYO 2012**.....

EL SECRETARIO DEL AYUNTAMIENTO



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ANEXO: ESTUDIO HIDROLÓGICO-HIDRÁULICO DEL ARROYO FATES

1.- MÉTODO HIDROMETEREOLÓGICO DE ESTIMACIÓN DE AVENIDAS.

La finalidad de este estudio es la determinación del caudal de avenida, en la sección más desfavorable, del punto vertiente de la cuenca del arroyo del río Fates, que se ubica próximo al límite oeste del sector, en los distintos períodos de retorno considerados. Para ello se estudiarán las características físicas de la cuenca vertiente y las intensidades de lluvia esperada.

Los métodos hidrometeorológicos utilizan modelos hidrológicos para simular el proceso de lluvia-escorrentía. Estos modelos pueden ser conceptuales, de balance continuo de humedad con parámetros agregados o distribuidos, o bien de simulación de suceso en los que sólo se considera la parte de precipitación que provoca escorrentía superficial y que están basados habitualmente en el hidrograma unitario o en el método racional.

La organización que se va a seguir es:

- Obtención de datos pluviométricos (Intensidades máximas de lluvia) mediante el método de las Isolíneas.
- Caudal máximo en una cuenca unitaria mediante el Método Racional.

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1.1.- DATOS CLIMÁTICOS.

Metodología.

Para la obtención de la intensidad de precipitación esperada para los distintos periodos de retorno se utilizará el método de las Isolíneas, cuyos resultados serán analizados hasta obtener un caudal para un periodo de retorno con una duración del aguacero determinada.

Obtención de la lluvia en un punto para diferentes duraciones.

El proceso de análisis puede llevarse a cabo para duraciones distintas de la diaria en el caso de disponer de registros pluviográficos que permitan obtener las correspondientes series de máximos anuales.

Se denominan curvas de intensidad-duración aquellas que resultan de unir los puntos representativos de la intensidad media en intervalos de diferente duración, para un mismo periodo de retorno. Evidentemente son curvas que decrecen con la longitud del intervalo considerado, puesto que se trata de intensidades medias.

En la actual normativa: Instrucción 5.2.- IC de Drenaje Superficial de Carreteras (MOPU, 1990) en su capítulo 2 se propone una nueva familia de curvas de intensidad-duración, basadas en un trabajo de J.R. Témez (1987) que permite considerar explícitamente la situación geográfica objeto de estudio.

Esta publicación propone la caracterización de la ley intensidad-duración mediante el parámetro (Ii/I_d), cociente entre la intensidad horaria y la diaria, que ha sido regionalizado a nivel nacional según se muestra en la Figura siguiente:



Para la zona en estudio se adopta un valor de $I_t/I_d = 7.5$.

La expresión analítica propuesta en la mencionada normativa responde a la siguiente formulación:

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$$\frac{I_t}{I_d} = \left(\frac{I_1}{I_d} \right)^{\frac{28^{0.1} - 1}{28^{0.1} - 1.83}}$$

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Siendo:

I_t (mm/h): intensidad media correspondiente al intervalo de duración deseado

I_d (mm/h): intensidad media diaria de precipitación, correspondiente al período de retorno considerado. Es igual a $P_d/24$.

P_d (mm): precipitación total diaria correspondiente a dicho período de retorno.

I_t/I_d : cociente entre la intensidad horaria y la diaria, independiente del período de retorno y que puede obtenerse, para el territorio nacional, de la figura anterior.

t (h): Duración de la lluvia asociada al período de retorno considerado.

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Obtención de la lluvia areal sobre la cuenca celebrada el día... 29 MAYO 2012.....

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Para la obtención de la lluvia areal se empleará el método de las Isolíneas.

Se realiza la estimación de cuantiles para distintos periodos de retorno mediante el uso de la aplicación MAXPLU, del Ministerio de Fomento, para el análisis de máximas lluvias diarias en la España Peninsular:

La aplicación MAXPLU dispone de las siguientes posibilidades generales para el análisis de máximas lluvias diarias en la España peninsular:

- Obtención del valor medio de la máxima precipitación diaria anual P y del Coeficiente de Variación Cv
- Estimación de la precipitación diaria máxima correspondiente a diferentes periodos de retorno, partiendo del valor de su media y su coeficiente de variación, asumiendo una distribución SQRT-ET max.

Para ambas posibilidades se parte de coordenadas geográficas o coordenadas UTM referidas a los husos 29, 30 ó 31.

Así con el mencionado programa se obtiene el valor medio de la máxima precipitación diaria anual Pt (mm/día) y el Coeficiente de variación Cv en función de la situación geográfica considerada.

Se han usado las coordenadas U.T.M. referidas al Huso 30 de un punto central del área ocupada por las cuencas.

Coordenadas U.T.M.	Tr (años)	5	10	25	50	100	200	500
X= 259550	P_{med} (mm/d)	74	74	74	74	74	74	74
Y= 3997219	Cv	0,4	0,4	0,4	0,4	0,4	0,4	0,4
Z= 140	P_d (mm/d)	92	111	136	156	177	200	231

Determinación de la duración de la tormenta.

Previamente a todo lo indicado en apartados anteriores es preciso determinar la duración (D) de la tormenta a considerar.

La duración de la lluvia debe obtenerse de un análisis estadístico de las tormentas de la zona y reflejar un valor característico de un aguacero completo que viene condicionado por el clima de la zona y no por el tamaño de la cuenca objeto de estudio. Sin embargo, puesto que no se tienen datos específicos de duración de chubascos, es recomendable el empleo de tormentas con duración igual al tiempo de concentración (T_c) de la cuenca.

Respecto a este tiempo de concentración cabe destacar que se deberá tener en cuenta los tiempos de recorrido del caudal correspondientes a la longitud hasta la salida del arroyo por el extremo inferior del sector.

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1.2.- CAUDAL MÁXIMO DE UNA CUENCA UNITARIA

Método racional.

En un aguacero ideal, de duración indefinida, con intensidad de lluvia neta E constante, el caudal Q en el punto de desagüe de la cuenca, que al principio sólo acusará presencia de agua caída en sus proximidades, irá creciendo hasta alcanzar una situación de equilibrio. En este momento, la intensidad de salida de agua se igualará con la de entrada en la cuenca y por tanto:

$$Q = E \times A$$

Siendo A la superficie total de la cuenca, estabilizándose el caudal a partir de entonces.

La intensidad de la lluvia neta E será igual a la lluvia total I, si el terreno es totalmente impermeable. En los casos reales:

$$\frac{E}{I} = C < 1$$

Siendo C el coeficiente de escorrentía.

El caudal máximo será el de equilibrio y valdrá por tanto:

$$Q = E \times A = C \times I \times A$$

Siendo las unidades empleadas:

Q: m³/s

I: mm/h

A: km2

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La ecuación adopta la expresión clásica del método racional:

$$Q = \frac{CIA}{3}$$

Esta es la formulación según la instrucción 5.2 IC vigente, cuyo denominador es inferior al 3,6 que se usaba en la antigua instrucción, para tener en cuenta el efecto de las puntas de precipitación.

Suponiendo un aguacero de duración indefinida, sería suficiente un determinado tiempo T_c para alcanzar un máximo igual al caudal de equilibrio. Este tiempo T_c o tiempo de concentración, se define en el método racional como el transcurrido desde el final del aguacero hasta el final de su hidrograma superficial.

De este modo, el máximo caudal originado por un aguacero estará constituido por agua precipitada exclusivamente dentro de un mismo intervalo de duración T_c . Si la lluvia neta ($C \times I$) en este lapso tiene lugar con intensidad constante, el caudal punta se podrá calcular por la fórmula racional ya mencionada.

Entre todos los lapsos del aguacero de duración T_c , el suministrador del caudal punta será aquél que proporcione la máxima lluvia neta ($C \times I$). Se suele admitir que coincide con el máximo valor de I y por tanto, el cálculo de caudales punta en el método racional se reduce al de los valores extremos de la intensidad media (I) de precipitación en los intervalos de duración T_c y al valor del coeficiente de escorrentía (C) que cabe esperar en esos mismos intervalos.

Para la aplicación del método racional en subcuencas se deben evitar los siguientes errores:

- Calcular los caudales individualmente para cada subcuenca y sumarlos aguas abajo. Esto no sería correcto, puesto que el tiempo de concentración de cada subcuenca no es el mismo y

tampoco igual al tiempo de concentración de la cuenca completa, lo que implicaría que los caudales de cada subcuenca estarían calculados con una lluvia diferente, es decir que:

$$Q = I_{Tcg} \sum_{i=1}^N C_i \times A_i \neq \sum_{i=1}^N I_{Tci} \times C_i \times A_i$$

Donde I_{Tcg} es la intensidad correspondiente al tiempo de concentración global o de toda la cuenca e I_{Tci} es la intensidad correspondiente al tiempo de concentración de la subcuenca i .

- Elección inadecuada del tiempo de concentración para cada punto de cálculo, que debe ser el valor máximo entre todos los posibles caminos de escorrentia. Este error tiende a sobrevalorar los caudales, ya que se suelen tomar tiempos de escorrentia inferiores a los reales.

Formulación propuesta.

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La hipótesis de lluvia neta constante admitida en la expresión anterior no es real y en la práctica existen variaciones en su reparto temporal, que favorecen el desarrollo de los caudales punta.

El fenómeno se hace en estas circunstancias más complejo y resulta difícil obtener directamente de su análisis una fórmula que dé los máximos de caudal.

Sin embargo, esta influencia de la variación de la lluvia neta dentro de la duración de su tiempo de concentración se puede reflejar globalmente refiriendo los caudales punta de estos casos al homólogo en la hipótesis de intensidad de lluvia neta constante. Si se denomina K al cociente entre ambos, resulta la ley:

$$Q = \frac{CIA}{3} K$$

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En la que:

Q (m3/s): caudal punta

I (mm/h): máxima intensidad media en el intervalo de duración T_c

A (km2): superficie de la cuenca

C : coeficiente de escorrentía del intervalo donde se produce I

K : coeficiente de uniformidad

El coeficiente de uniformidad K varía de unos episodios a otros, pero su valor medio en una cuenca concreta depende fundamentalmente del valor de su tiempo de concentración, y de forma tan prevalente que a efectos prácticos puede despreciarse la influencia de las restantes variables, como la torrencialidad del clima, etc.

Todos los condicionantes enumerados anteriormente se hacen más patentes cuando los fenómenos meteorológicos se reproducen sobre grandes extensiones de terreno. Así pues existen unos límites de aplicación que si se superan deberán ser corregidos mediante la aplicación del factor de corrección K.

En la versión del método racional de la Dirección General de Carreteras se recomienda el uso del coeficiente de homogeneidad K siempre que se supere una extensión de 1Km2.

Para su estimación, en valores medios, se propone la siguiente expresión obtenida por Témez (1996) realizando un análisis a una quincena de cuencas españolas cuya extensión se encontraba entre los 38 Km2 y los 3300 Km2:

$$K = 1 + \frac{T_c^{1,25}}{T_c^{1,25} + 14}$$

Atendiendo a lo anterior se aplicará este coeficiente si la superficie de la cuenca en estudio supera la extensión de 1 Km2.

La intensidad I se refiere a un valor medio a lo largo del intervalo pésimo de duración igual al tiempo de concentración de la cuenca.

En cuencas en las que todo el recorrido de la escorrentía se produce por cauces naturales el tiempo de concentración coincide con el de escorrentía (T_c), este tiempo, también llamado tiempo de entrada, es el tiempo que tarda una gota de agua caída en un punto de la cuenca en llegar al medio receptor o sección de proyecto.

El tiempo de concentración puede ser calculado según la siguiente expresión:

$$T_c = 0,3 \left(\frac{L}{J} \right)^{0,76}$$

Siendo:

T_c (h): tiempo de concentración

L (Km): la longitud del cauce principal

J (m/m): pendiente media del cauce principal

Aplicando la formulación anterior se obtiene:

Características de la Cuenca

CUENCA	Superficie	Longitud Cauce Ppal.	Desnivel	Pendiente	K	T_c
Arroyo FATES	3,346 km ²	3,919 km	522 m	0,133 m/m	1,085	1,24 h

Coefficiente de escorrentía

El coeficiente de escorrentía C define la proporción de la intensidad de lluvia I que genera escorrentía superficial y obviamente está relacionado con el concepto de lluvia neta expuesto en apartados anteriores. El método racional aquí expuesto, obtiene la expresión C basándose en la formulación de la Soil Conservation Service, función del parámetro P_0 o umbral de escorrentía, corregido por un coeficiente corrector que tiene en cuenta la variación regional de la humedad del suelo al comienzo de aguaceros significativos, "MOPU (1990)".

El coeficiente instantáneo de escorrentía C , en un instante dado hasta el cual ha precipitado P y se ha provocado una escorrentía E , se podrá obtener de la siguiente expresión.

$$C = \frac{\partial E}{\partial P} = \frac{\partial \left(\frac{E}{P_0} \right)}{\partial \left(\frac{P}{P_0} \right)} = \frac{\left\{ \left(\frac{P}{P_0} - 1 \right) \times \left(\frac{P}{P_0} + 9 \right) \right\}}{\left(\frac{P}{P_0} + 4 \right)^2}$$

El coeficiente instantáneo de escorrentía C va creciendo a lo largo de un aguacero y su valor medio será mayor que el correspondiente a su origen y menor que el del final. El intervalo objeto de estudio es aquel que proporciona mayor escorrentía y se admite que corresponde a la duración igual al tiempo de concentración y que contiene el máximo del hietograma.

Se ha comprobado en distintas estaciones pluviométricas españolas que en valores medios puede admitirse una ley lineal del tipo:

$$P_{\max} = b \times P_d$$

En donde el parámetro b , que refleja la posición relativa del intervalo de máxima intensidad dentro del pluviograma diario, puede admitirse que toma un valor de 0,5, con lo que quedaría fijado el valor del coeficiente de escorrentía a utilizar, en función exclusivamente de la lluvia diaria P_d .

Esta formulación debe ser corregida en el caso de aguaceros de pequeña magnitud, puesto que en estos casos no se cumple sistemáticamente la hipótesis básica: el máximo caudal no está asociado al intervalo de máxima intensidad y duración T_c , ya que dicha precipitación quedará absorbida íntegramente por el terreno al ser menor que el umbral de escorrentía.

En estos casos, el intervalo generador del máximo caudal, y con él, el punto intermedio indicativo del coeficiente de escorrentía, se desplazan en el tiempo hacia la zona final del aguacero, en espera de condiciones más favorables de la humedad del suelo que las correspondientes al intervalo de máxima intensidad.

Este problema se resuelve modificando la ley anterior, en el entorno de los pequeños valores, haciéndola despegar del eje $C=0$ para $P_d=P_0$, para tender posteriormente a confundirse con la curva primitiva, proponiéndose finalmente la siguiente expresión definitiva, suficientemente ajustada:

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$$C = \frac{\left(\left(\frac{P}{P_0} - 1 \right) \times \left(\frac{P}{P_0} + 23 \right) \right)}{\left(\frac{P}{P_0} + 11 \right)^2}$$

Usando las expresiones anteriores y en función de los tipos y usos del suelo en los que se encuentra repartida la superficie de la cuenca se ofrecen los siguientes resultados:

- Tipo de Suelo considerado: Según el Estudio Geotécnico realizado por Codexsa en septiembre de 2005 se trata de suelos constituidos por arenas arcillosas (SC) de plasticidad media sobre arcillas de plasticidad media-alta (CL-CH).

Esta descripción se corresponde con un suelo Tipo B de textura Franco-arcillo-arenosa del Diagrama Triangular para la determinación de la textura del MOPU (1990).

-Usos del suelo: El uso de la tierra preponderantemente es pradera, con una pendiente > del 3% con infiltración moderada.

Según estas características en valor del umbral de escorrentía Po que se propone el método del MOPU es de 23. Este valor puede ser corregido por un factor regional que tiene en cuenta la variación de la humedad del suelo, no obstante, y por recomendación de la Agencia Andaluza del Agua, dicho factor no será tenido en cuenta, ya que no se aceptan umbrales de escorrentía corregidos (Po) mayores de 25.

De esta forma los coeficientes de escorrentía para los distintos periodos de retorno son:

T (años)	5	10	25	50	100	200	500
Pd (mm/d)	92	111	136	156	177	200	231
Umbral Esc. Corregido Po	23*1=23						
Coeficiente de Escorrentía.	0,360	0,425	0,497	0,545	0,588	0,629	0,675

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Resultados

EL SECRETARIO DEL AYUNTAMIENTO

A partir de estos datos se puede ofrecer lo siguientes resultados de los caudales obtenidos según el método RACIONAL .

CUENCA	Área (km ²)	Periodo Retorno (años)	Pd (mm/d)	Id (mm)	Po (mm)	Factor Corr. Reg.	Po Corrg (mm)	Tc (h)	Factor Zonal Ii/Iid	I (mm/h)	C	K	Q (m ³ /s)
Arroyo FATES	3,346	5	92	3,833	23	1	23	1,242	7,5	25,735	0,360	1,085	11,211
		10	111	4,625						31,050	0,425		16,862
		25	136	5,667						38,043	0,497		22,862
		50	156	6,500						43,637	0,545		28,760
		100	177	7,375						49,512	0,588		35,231
		200	200	8,333						55,945	0,629		42,570
		500	231	9,625						64,617	0,675		52,768

El Caudal de cálculo considerado para un periodo de retorno de 10 años es por tanto de 16,862 m³/s.

2.- COMPROBACIÓN HIDRÁULICA DE LAS SECCIONES

Para la determinación de la altura de la lámina de agua y llanura de inundación así como las líneas límite del Dominio Público Hidráulico, se estudian las secciones transversales del Arroyo Fates en el tramo afectado por el sector. Para determinar ambos puntos se ha utilizado el programa informático HEC-RAS 3.1.3. (Hydrologic Engineering Centers River Analysis System), que es capaz de modelar ríos en régimen permanente en una dimensión.

El modelo HEC-RAS ha sido desarrollado para simular flujos tanto en canales artificiales como naturales. El cálculo se define unidimensional, al reducir la formulación general del movimiento (tridimensional) a un movimiento unidimensional. No obstante, HEC-RAS también puede ser empleado para movimientos transitorios unidimensionales.

A continuación se adjuntan los resultados obtenidos al utilizar dicho modelo:

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Def.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```

X      X  XXXXXX  XXXX      XXXX      XX      XXXX
X      X  X      X      X      X      X      X
X      X  X      X      X      X      X      X
XXXXXXX XXXX      X      XXX XXXX      XXXXX      XXXX
X      X  X      X      X      X      X      X
X      X  X      X      X      X      X      X
X      X  XXXXXX  XXXX      X      X      X      XXXXX

```

PROJECT DATA

Project Title: ARROYOFATES_04_03_2010

Project File : Def.prj

Run Date and Time: 08/03/2010 10:11:58

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Project in SI units

PLAN DATA

Plan Title: Plan 02

Plan File : e:\MIGUE\PROYECTOS\INGENIERIA\0433-IC-5 ESTUDIO HIDROLÓGICO ARROYO
FATES\Def.p02

Geometry Title: GEOMETRÍA 07_03_2010

Geometry File : e:\MIGUE\PROYECTOS\INGENIERIA\0433-IC-5 ESTUDIO
HIDROLÓGICO ARROYO FATES\Def.g03

Flow Title : FLUJO

Flow File : e:\MIGUE\PROYECTOS\INGENIERIA\0433-IC-5 ESTUDIO
HIDROLÓGICO ARROYO FATES\Def.f01

Plan Summary Information:

Number of:	Cross Sections =	29	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance	=	0.003
Critical depth calculation tolerance	=	0.003
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.1
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary	
Conveyance Calculation Method:	At breaks in n values only
Friction Slope Method:	Average Conveyance
Computational Flow Regime:	Mixed Flow

FLOW DATA

Flow Title: FLUJO

Flow File : e:\MIGUE\PROYECTOS\INGENIERIA\0433-IC-5 ESTUDIO HIDROLÓGICO ARROYO
FATES\Def.f01

Def.rep

Flow Data (m3/s)

```

*****
*****
* River      Reach      RS      *      PF 1      PF 2
* PF 3      PF 4      PF 5      PF 6      PF 7 *
* FATES      ARROYO      528      *      11.211      16.862
* 22.862      28.76      35.231      42.57      52.768 *
*****
*****

```

Boundary Conditions

```

*****
*****
* River      Reach      Profile      *      Upstream
* Downstream *
*****
* FATES      ARROYO      PF 1      *      Critical
* Normal S = 0.1332 *
* FATES      ARROYO      PF 2      *      Critical
* Normal S = 0.1332 *
* FATES      ARROYO      PF 3      *      Critical
* Normal S = 0.1332 *
* FATES      ARROYO      PF 4      *      Critical
* Normal S = 0.1332 *
* FATES      ARROYO      PF 5      *      Critical
* Normal S = 0.1332 *
* FATES      ARROYO      PF 6      *      Critical
* Normal S = 0.1332 *
* FATES      ARROYO      PF 7      *      Critical
* Normal S = 0.1332 *
*****
*****

```

GEOMETRY DATA

Geometry Title: GEOMETRIA 07_03_2010
 Geometry File : e:\MIGUE\PROYECTOS\INGENIERIA\0433-IC-5 ESTUDIO HIDROLOGICO
 ARROYO FATES\Def.g03

CROSS SECTION

RIVER: FATES
 REACH: ARROYO RS: 528

INPUT

Description: 0+528.785

Station Elevation Data		num= 22		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-52.049	21.287	-50.212	21.313	-49.828	21.313	-41.765	21.368	-39.61	21.365		
-33.318	21.418	-29.393	21.446	-23.388	21.348	-19.176	21.358	-16.424	21.149		
-.091	20.501	-.059	20.5	-.05	20.5	-.044	20.5	0	20.513		
1.621	20.992	3.108	21.046	3.457	21.043	3.924	21.041	4.118	21.039		
4.569	21.037	8.817	21.02								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-52.049	.045	-29.393	.045	3.457	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-29.393	3.457	18.77	18.77	18.77	.1 .3

DILIGENCIA.- El presente Plan..... ha sido aprobado
 definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión
 celebrada el día 29 MAYO 2012



Blocked Obstructions num=
Sta L Sta R Elev

90 135 14

Def.rep
DIRECCION: El presente Plan..... ha sido aprobado
definitivamente por el Concejo Municipal de Tarifa en sesión
celebrada el día 29 MAYO 2012

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m) * 21.42 * Element * Left OB * Channel *
Right OB *
* Vel Head (m) * 0.17 * wt. n-val. * 0.045 *
0.045 *
* W.S. Elev (m) * 21.25 * Reach Len. (m) * 18.77 * 18.77 *
18.77 *
* Crit W.S. (m) * 21.25 * Flow Area (m2) * 8.20 *
1.15 *
* E.G. Slope (m/m) * 0.025531 * Area (m2) * 8.20 *
1.15 *
* Q Total (m3/s) * 16.86 * Flow (m3/s) * 15.44 *
1.42 *
* Top width (m) * 26.51 * Top width (m) * 21.15 *
5.36 *
* Vel Total (m/s) * 1.80 * Avg. vel. (m/s) * 1.88 *
1.24 *
* Max Chl Dpth (m) * 0.75 * Hydr. Depth (m) * 0.39 *
0.21 *
* Conv. Total (m3/s) * 105.5 * Conv. (m3/s) * 96.6 *
8.9 *
* Length Wtd. (m) * 18.77 * Wetted Per. (m) * 21.24 *
5.59 *
* Min Ch El (m) * 20.50 * Shear (N/m2) * 96.67 *
51.51 *
* Alpha * 1.04 * Stream Power (N/m s) * 182.01 *
63.74 *
* Frctn Loss (m) * 0.51 * Cum Volume (1000 m3) * 0.14 * 5.76 *
0.01 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.86 * 16.90 *
0.05 *

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m) * 21.82 * Element * Left OB * Channel *
Right OB *
* Vel Head (m) * 0.21 * wt. n-val. * 0.045 * 0.045 *
0.045 *
* W.S. Elev (m) * 21.61 * Reach Len. (m) * 18.77 * 18.77 *
18.77 *
* Crit W.S. (m) * 21.61 * Flow Area (m2) * 5.39 * 18.64 *
3.09 *

* E.G. Slope (m/m)	* 0.019968	Def.rep	* Area (m2)	* 5.39	* 18.64	*
3.09 *						
* Q Total (m3/s)	* 52.77	* Flow (m3/s)	* 6.44	* 40.06	*	
6.27 *						
* Top width (m)	* 60.87	* Top Width (m)	* 22.66	* 32.85	*	
5.36 *						
* Vel Total (m/s)	* 1.95	* Avg. Vel. (m/s)	* 1.19	* 2.15	*	
2.03 *						
* Max Chl Dpth (m)	* 1.11	* Hydr. Depth (m)	* 0.24	* 0.57	*	
0.58 *						
* Conv. Total (m3/s)	* 373.4	* Conv. (m3/s)	* 45.6	* 283.5	*	
44.4 *						
* Length Wtd. (m)	* 18.77	* Wetted Per. (m)	* 22.98	* 32.94	*	
5.95 *						
* Min Ch El (m)	* 20.50	* Shear (N/m2)	* 45.95	* 110.82	*	
101.72 *						
* Alpha	* 1.10	* Stream Power (N/m s)	* 54.90	* 238.10	*	
206.41 *						
* Frctn Loss (m)	* 0.44	* Cum Volume (1000 m3)	* 0.88	* 17.29	*	
0.42 *						
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 2.62	* 32.47	*	
1.21 *						

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 510

DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día..... 29 MAYO 2012.....

INPUT

Description: 0+510

Station Elevation Data

num=

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
-61.697	20.616	-59.601	20.638	-56.109	20.659	-54.042	20.663	-45.892	20.622
-45.595	20.622	-44.178	20.615	-37.147	20.585	-35.674	20.584	-28.7	20.6
-25.457	20.615	-20.495	20.492	-15.24	20.427	-7.701	20.128	-.05	19.763
0	19.765	3.403	19.961	3.537	19.964	6.746	20.353	18.668	21.653
21.076	21.786	24.069	22.057	28.053	22.447	31.139	22.718	37.445	23.387
39.659	23.784	42.61	24.154						

Manning's n values

num=

Sta	n Val	Sta	n Val	Sta	n Val
*****	*****	*****	*****	*****	*****
-61.697	.045	-61.697	.045	42.61	.045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.

DILIGENCIA. El presente Plan..... ha sido aprobado definitivamente por el Excmo. Sr. Alcalde en sesión celebrada el día..... 29 MAYO 2012

Expan. 81.697 42.61 Def.rep 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 20.70	* Element	* Left OB	* channel
* Right OB				
* Vel Head (m)	* 0.32	* wt. n-Val.		* 0.045
* W.S. Elev (m)	* 20.38	* Reach Len. (m)	* 20.00	* 20.00
* 20.00				
* Crit W.S. (m)	* 20.49	* Flow Area (m2)		* 6.70
* E.G. slope (m/m)	* 0.059289	* Area (m2)		* 6.70
* Q Total (m3/s)	* 16.86	* Flow (m3/s)		* 16.86
* Top width (m)	* 21.07	* Top width (m)		* 21.07
* Vel Total (m/s)	* 2.52	* Avg. Vel. (m/s)		* 2.52
* Max chl Dpth (m)	* 0.62	* Hydr. Depth (m)		* 0.32
* Conv. Total (m3/s)	* 69.3	* Conv. (m3/s)		* 69.3
* Length wtd. (m)	* 20.00	* wetted Per. (m)		* 21.11
* Min Ch El (m)	* 19.76	* Shear (N/m2)		* 184.46
* Alpha	* 1.00	* Stream Power (N/m s)		* 464.31
* Frctn Loss (m)	* 0.70	* Cum Volume (1000 m3)	* 0.14	* 5.62
* C & E Loss (m)	* 0.02	* Cum SA (1000 m2)	* 0.86	* 16.50

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 21.10	* Element	* Left OB	* channel
* Right OB				
* Vel Head (m)	* 0.40	* wt. n-Val.		* 0.045
* W.S. Elev (m)	* 20.69	* Reach Len. (m)	* 20.00	* 20.00
* 20.00				
* Crit W.S. (m)	* 20.81	* Flow Area (m2)		* 18.81
* E.G. slope (m/m)	* 0.094987	* Area (m2)		* 18.81
* Q Total (m3/s)	* 52.77	* Flow (m3/s)		* 52.77
* Top width (m)	* 71.58	* Top width (m)		* 71.58
* Vel Total (m/s)	* 2.81	* Avg. Vel. (m/s)		* 2.81
* Max chl Dpth (m)	* 0.93	* Hydr. Depth (m)		* 0.26

* Conv. Total (m3/s)	*	171.2	* Conv. (m3/s)	*	171.2	*
* Length Wtd. (m)	*	20.00	* Wetted Per. (m)	*	71.72	*
* Min Ch El (m)	*	19.76	* Shear (N/m2)	*	244.25	*
* Alpha	*	1.00	* Stream Power (N/m s)	*	685.33	*
* Frctn Loss (m)	*	0.70	* Cum Volume (1000 m3)	*	0.83	* 16.94 *
0.39 *			* Cum SA (1000 m2)	*	2.41	* 31.49 *
* C & E Loss (m)	*	0.02				
1.16 *						

Warning: The cross-section end points had to be extended vertically for the computed water surface.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FATES
 REACH: ARROYO

RS: 490

INPUT

Description: 0+490

Sta	Elev	Data	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-63.238	20.276	-62.825	20.279	-61.802	20.281	-55.059	20.233	-53.593	20.226	
-46.156	20.167	-42.973	20.142	-38.333	20.123	-32.353	20.152	-30.51	20.157	
-25.355	20.179	-22.687	20.186	-21.733	20.155	-19.718	20.078	-11.114	19.668	
-6.297	19.3	0	19.142	10.912	19.141	11.385	19.166	14.961	19.744	
21.336	21.069	23.216	21.536	24.242	21.879	26.56	22.346	38.273	24.902	
41.395	25.8	47.873	26.763	54.123	27.912	62.985	29.502	68.22	30.249	
79.636	32.616	83.74	33.393	86.579	33.603	88.59	33.091			

Sta	n Val	Sta	n Val	Sta	n Val
-63.238	.045	-63.238	.045	86.579	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-63.238	86.579	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	*	19.79	* Element	*	Left OB	* Channel *
Right OB *						
* Vel Head (m)	*	0.21	* Wt. n-Val.	*		* 0.045 *
* W.S. Elev (m)	*	19.58	* Reach Len. (m)	*	20.00	* 20.00 *
20.00 *						
* Crit W.S. (m)	*	19.60	* Flow Area (m2)	*		* 8.33 *
* E.G. slope (m/m)	*	0.034002	* Area (m2)	*		* 8.33 *

DILIGENCIA: El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día... 29 Mayo 2016...

Def.rep

EL SECRETARIO DEL AYUNTAMIENTO

* Q Total (m3/s)	* 16.86	* Flow (m3/s)	* 16.86
* Top width (m)	* 23.94	* Top width (m)	* 23.94
* Vel Total (m/s)	* 2.02	* Avg. Vel. (m/s)	* 2.02
* Max Chl Dpth (m)	* 0.44	* Hydr. Depth (m)	* 0.35
* Conv. Total (m3/s)	* 91.4	* Conv. (m3/s)	* 91.4
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 23.99
* Min Ch El (m)	* 19.14	* Shear (N/m2)	* 115.79
* Alpha	* 1.00	* Stream Power (N/m s)	* 234.41
* Frctn Loss (m)	* 0.88	* Cum Volume (1000 m3)	* 0.14 * 5.47
* C & E Loss (m)	* 0.03	* Cum SA (1000 m2)	* 0.86 * 16.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 20.34	* Element	* Left OB	* Channel
* Right OB				
* Vel Head (m)	* 0.31	* Wt. n-Val.		* 0.045
* W.S. Elev (m)	* 20.03	* Reach Len. (m)	* 20.00	* 20.00
* 20.00				
* Crit W.S. (m)	* 20.03	* Flow Area (m2)		* 21.37
* E.G. Slope (m/m)	* 0.023895	* Area (m2)		* 21.37
* Q Total (m3/s)	* 52.77	* Flow (m3/s)		* 52.77
* Top width (m)	* 34.98	* Top width (m)		* 34.98
* Vel Total (m/s)	* 2.47	* Avg. Vel. (m/s)		* 2.47
* Max Chl Dpth (m)	* 0.89	* Hydr. Depth (m)		* 0.61
* Conv. Total (m3/s)	* 341.4	* Conv. (m3/s)		* 341.4
* Length wtd. (m)	* 20.00	* Wetted Per. (m)		* 35.08
* Min Ch El (m)	* 19.14	* Shear (N/m2)		* 142.76
* Alpha	* 1.00	* Stream Power (N/m s)		* 352.44
* Frctn Loss (m)	* 0.22	* Cum Volume (1000 m3)	* 0.83	* 16.54
* 0.39				
* C & E Loss (m)	* 0.05	* Cum SA (1000 m2)	* 2.41	* 30.43
* 1.16				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Def.rep
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 470

INPUT

Description: 0+470

Station Elevation Data		num=		41							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-77.751	21.153	-71.313	21.078	-65.983	20.929	-64.05	20.891	-60.935	20.804		
-56.788	20.702	-54.215	20.621	-49.525	20.489	-42.447	20.318	-42.262	20.315		
-41.966	20.311	-35	20.221	-30.679	20.171	-27.737	20.125	-22.997	19.874		
-18.911	19.643	-13.212	19.315	-7.269	18.821	-1.745	18.285	0	18.317		
2.731	18.343	9.019	18.551	11.489	18.675	17.303	20.327	25.314	22.986		
27.113	23.482	27.369	23.568	27.724	23.667	37.232	25.59	40.002	26.053		
53.848	29.392	62.636	31.558	63.623	31.772	66.165	31.893	79.097	32.072		
84.588	32.126	94.706	32.224	102.909	32.419	109.369	32.585	119.453	32.593		
120	32.621										

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-77.751	.045	-77.751	.045	66.165	.045

Bank Sta:	Left	Right	Lengths:	Left channel	Right	Coeff Contr.	
Expan.	-77.751	66.165	20	20	20	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	*	19.26	* Element	*	Left OB	*	Channel	*			
Right OB *											
* Vel Head (m)	*	0.06	* wt. n-val.	*		*	0.045	*			
* W.S. Elev (m)	*	19.20	* Reach Len. (m)	*	20.00	*	20.00	*			
20.00 *											
* Crit W.S. (m)	*	18.91	* Flow Area (m2)	*		*	15.03	*			
* E.G. slope (m/m)	*	0.005093	* Area (m2)	*		*	15.03	*			
* Q Total (m3/s)	*	16.86	* Flow (m3/s)	*		*	16.86	*			
* Top width (m)	*	25.15	* Top width (m)	*		*	25.15	*			
* Vel Total (m/s)	*	1.12	* Avg. vel. (m/s)	*		*	1.12	*			
* Max chl Dpth (m)	*	0.91	* Hydr. Depth (m)	*		*	0.60	*			

DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo. Sr. Alcalde en sesión celebrada el día 29 Mayo

* Conv. Total (m3/s)	* 236.3	* Def. rep	* Conv. (m3/s)	* 236.3
* Length Wtd. (m)	* 20.00	* Wetted Per. (m)	* 25.28	*
* Min Ch El (m)	* 18.28	* Shear (N/m2)	* 29.70	*
* Alpha	* 1.00	* Stream Power (N/m s)	* 33.32	*
* Frctn Loss (m)	* 0.20	* Cum Volume (1000 m3)	* 0.14	* 5.23 *
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.86	* 15.56 *

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 19.91	* Element	* Left OB	* Channel *
* Right OB	*	* wt. n-Val.	*	* 0.045 *
* Vel Head (m)	* 0.13	* Reach Len. (m)	* 20.00	* 20.00 *
* W.S. Elev (m)	* 19.77	* Flow Area (m2)	*	* 32.51 *
* 20.00 *		* Area (m2)	*	* 32.51 *
* Crit W.S. (m)	* 19.39	* Flow (m3/s)	*	* 52.77 *
* E.G. slope (m/m)	* 0.006281	* Top width (m)	*	* 36.52 *
* Q Total (m3/s)	* 52.77	* Avg. vel. (m/s)	*	* 1.62 *
* Top width (m)	* 36.52	* Hydr. Depth (m)	*	* 0.89 *
* Vel Total (m/s)	* 1.62	* Conv. Total (m3/s)	*	* 665.8 *
* Max Chl Dpth (m)	* 1.49	* Wetted Per. (m)	*	* 36.74 *
* Conv. Total (m3/s)	* 665.8	* Shear (N/m2)	*	* 54.51 *
* Length Wtd. (m)	* 20.00	* Stream Power (N/m s)	*	* 88.48 *
* Min Ch El (m)	* 18.28	* Cum Volume (1000 m3)	* 0.83	* 16.00 *
* Alpha	* 1.00	* Cum SA (1000 m2)	* 2.41	* 29.71 *
* Frctn Loss (m)	* 0.22			
* 0.39 *				
* C & E Loss (m)	* 0.02			
* 1.16 *				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

Def.rep

CROSS SECTION

RIVER: FATES
REACH: ARROYO

DILIGENCIA. El presente Plan..... ha sido aprobado
RS: 450 definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión
celebrada el día 2-9-2013

INPUT

Description: 0+450

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-62.534	20.395	-61.39	20.379	-59.369	20.344	-54.842	20.221	-47.698	20.064
-44.844	19.997	-43.074	19.955	-37.582	19.821	-31.306	19.65	-30.319	19.61
-28.729	19.53	-23.057	19.321	-19.537	19.139	-15.794	18.881	-6.316	18.51
0	18.173	2.638	17.784	7.166	19.476	7.17	19.477	7.177	19.477
10.414	19.527	14.385	19.798	22.027	20.727	22.481	20.779	27.766	22
34.811	23.108	41.199	24.154	47.014	25.755	57.142	28.266	61.307	29.019
64.44	29.492	74.967	29.989	78.071	30.227	82.573	30.303	92.98	30.262
106.923	30.475	110.493	30.365	112.742	30.367	118.132	30.343	120	30.296

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-62.534	.045	-62.534	.045	78.071	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-62.534	78.071	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 19.05	* Element	* Left OB	* Channel *
Right OB *	* 0.21	* wt. n-Val.	* 0.045	*
* Vel Head (m)	* 18.84	* Reach Len. (m)	* 20.00	* 20.00 *
* W.S. Elev (m)	* 18.84	* Flow Area (m2)	* 8.38	*
20.00 *	* 0.027126	* Area (m2)	* 8.38	*
* Crit W.S. (m)	* 16.86	* Flow (m3/s)	* 16.86	*
* E.G. slope (m/m)	* 20.31	* Top Width (m)	* 20.31	*
* Q Total (m3/s)	* 2.01	* Avg. Vel. (m/s)	* 2.01	*
* Top Width (m)	* 1.06	* Hydr. Depth (m)	* 0.41	*
* Vel Total (m/s)	* 102.4	* Conv. (m3/s)	* 102.4	*
* Max Chl Dpth (m)	* 20.00	* Wetted Per. (m)	* 20.55	*
* Conv. Total (m3/s)	* 17.78	* Shear (N/m2)	* 108.48	*
* Length Wtd. (m)	* 1.00	* Stream Power (N/m s)	* 218.32	*
* Min Ch El (m)	* 0.54	* Cum Volume (1000 m3)	* 0.14	* 5.00 *
* Alpha	* 0.00	* Cum SA (1000 m2)	* 0.86	* 15.10 *
* Frctn Loss (m)				
* C & E Loss (m)				

warning: The energy equation could not be balanced within the specified number
of iterations. The
program used critical depth for the water surface and continued on with

Def.rep

the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth.

This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 7

```
*****
* E.G. Elev (m)      * 19.67 * Element      * Left OB * Channel *
Right OB *
* Vel Head (m)       * 0.35 * Wt. n-Val.   *      * 0.045 *
*
* W.S. Elev (m)      * 19.32 * Reach Len. (m) * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m)      * 19.32 * Flow Area (m2) *      * 20.19 *
*
* E.G. slope (m/m)   * 0.023515 * Area (m2)      *      * 20.19 *
*
* Q Total (m3/s)     * 52.77 * Flow (m3/s)    *      * 52.77 *
*
* Top width (m)      * 29.73 * Top width (m)   *      * 29.73 *
*
* Vel Total (m/s)    * 2.61 * Avg. Vel. (m/s) *      * 2.61 *
*
* Max chl Dpth (m)   * 1.53 * Hydr. Depth (m) *      * 0.68 *
*
* Conv. Total (m3/s) * 344.1 * Conv. (m3/s)    *      * 344.1 *
*
* Length wtd. (m)    * 20.00 * Wetted Per. (m) *      * 30.06 *
*
* Min Ch El (m)      * 17.78 * Shear (N/m2)    *      * 154.88 *
*
* Alpha              * 1.00 * Stream Power (N/m s) *      * 404.77 *
*
* Frctn Loss (m)     * 0.46 * Cum volume (1000 m3) * 0.83 * 15.47 *
0.39 *
* C & E Loss (m)     * 0.01 * Cum SA (1000 m2) * 2.41 * 29.05 *
1.16 *
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The

program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth.

This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

INPUT

RS: 430

EL SECRETARIO DEL AYUNTAMIENTO

Página 11

DILIGENCIA. The program defaulted to critical
definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión
celebrada el día 29 MAYO 2012



Def.rep

Description: 0+430

Station Elevation Data		num=		43							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-58.125	20.129	-57.979	20.127	-57.708	20.124	-57.037	20.113	-52.518	19.994		
-48.023	19.865	-45.617	19.805	-37.432	19.559	-29.357	19.241	-26.842	19.116		
-22.145	18.518	-17.775	17.901	-16.252	17.805	-2.571	17.057	-1.972	17.042		
-.905	17.5	-.582	17.612	0	17.781	2.401	18.465	4.347	18.983		
7.488	18.854	8.675	18.862	10.817	18.781	19.804	18.47	24.164	18.686		
24.467	18.712	25.465	18.855	34.22	20.111	36.252	20.263	37.383	20.444		
47.179	21.365	51.053	21.698	56.757	22.322	64.271	23.244	68.898	23.649		
76.446	24.132	81.366	24.369	88.867	24.064	98.991	23.202	102.85	22.887		
111.548	22.488	116.972	22.381	120	22.3						

DILIGENCIA: El presente Plan..... ha sido aprobado

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-58.125	.045	-37.432	.045	81.366	.045

definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión

9 MAYO 2012

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.
 Expan. -37.432 81.366 20 20.1 20.2 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

*****		*****		*****		*****		*****	
* E.G. Elev (m)	* 18.21	* Element		* Left OB	* Channel				
Right OB *									
* Vel Head (m)	* 0.44	* Wt. n-val.			* 0.045				
* W.S. Elev (m)	* 17.77	* Reach Len. (m)		* 20.00	* 20.00				
20.00 *									
* Crit W.S. (m)	* 17.91	* Flow Area (m2)			* 5.73				
* E.G. Slope (m/m)	* 0.067424	* Area (m2)			* 5.73				
* Q Total (m3/s)	* 16.86	* Flow (m3/s)			* 16.86				
* Top width (m)	* 15.58	* Top Width (m)			* 15.58				
* Vel Total (m/s)	* 2.94	* Avg. Vel. (m/s)			* 2.94				
* Max chl Dpth (m)	* 0.73	* Hydr. Depth (m)			* 0.37				
* Conv. Total (m3/s)	* 64.9	* Conv. (m3/s)			* 64.9				
* Length Wtd. (m)	* 20.00	* Wetted Per. (m)			* 15.74				
* Min Ch El (m)	* 17.04	* Shear (N/m2)			* 240.78				
* Alpha	* 1.00	* Stream Power (N/m s)			* 708.49				
* Frctn Loss (m)	* 0.81	* Cum Volume (1000 m3)		* 0.14	* 4.86				
* C & E Loss (m)	* 0.02	* Cum SA (1000 m2)		* 0.86	* 14.74				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

Note: Def.rep
 section. This may indicate the need for additional cross sections.
 Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #PF 7

```

*****
* E.G. Elev (m)      * 18.94 * Element      * Left OB * Channel *
Right OB *
* Vel Head (m)      * 0.75 * wt. n-val.    *      * 0.045 *
*
* W.S. Elev (m)      * 18.20 * Reach Len. (m) * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m)      * 18.42 * Flow Area (m2) *      * 13.78 *
*
* E.G. Slope (m/m)    * 0.053982 * Area (m2)      *      * 13.78 *
*
* Q Total (m3/s)      * 52.77 * Flow (m3/s)     *      * 52.77 *
*
* Top Width (m)       * 21.32 * Top Width (m)   *      * 21.32 *
*
* Vel Total (m/s)      * 3.83 * Avg. vel. (m/s) *      * 3.83 *
*
* Max chl Dpth (m)    * 1.15 * Hydr. Depth (m) *      * 0.65 *
*
* Conv. Total (m3/s)  * 227.1 * Conv. (m3/s)    *      * 227.1 *
*
* Length Wtd. (m)     * 20.00 * Wetted Per. (m) *      * 21.56 *
*
* Min ch El (m)       * 17.04 * Shear (N/m2)    *      * 338.23 *
*
* Alpha              * 1.00 * Stream Power (N/m s) *      * 1295.45 *
*
* Frctn Loss (m)      * 0.68 * Cum Volume (1000 m3) * 0.83 * 15.13 *
0.39 *
* C & E Loss (m)      * 0.04 * Cum SA (1000 m2) * 2.41 * 28.54 *
1.16 *
*****
  
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.
 Note: Program found supercritical flow starting at this cross section.

CROSS SECTION DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día..... 29 MAYO 2012.....

RIVER: FATES
 REACH: ARROYO

RS: 410

INPUT
 Description: 0+410
 Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-60.416	19.5	-58.763	19.477	-55.698	19.444	-55.372	19.438	-54.21	19.396
-44.802	19.095	-38.141	18.768	-34.233	18.588	-26.722	18.094	-24.443	17.949
-23.663	17.859	-16.569	17.019	-13.094	16.991	-3.926	16.92	0	17.103
.125	17.136	4.997	18.492	5.725	18.528	6.753	18.5	9.263	18.611
15.945	18.558	19.651	18.504	20.993	18.485	30.279	18.046	37.259	17.712
40.921	17.796	43.231	17.838	48.366	18.767	53.709	19.209	59.885	19.665

Def. rep

65.421	20.09	69.971	20.552	73.885	20.794	83.985	21.072	85.675	20.997
97.636	20.246	102.485	20.001	111.658	19.702	113	19.714	120	19.629

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-60.416	.045	-38.141	.045	83.985	.045

Bank Sta: Left Right Lengths: Left channel Right Coeff Contr.

Expan. -38.141 83.985 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 17.72	* Element	* Left OB	* Channel
Right OB				
* Vel Head (m)	* 0.09	* Wt. n-Val.	* 0.045	*
* W.S. Elev (m)	* 17.63	* Reach Len. (m)	* 20.00	* 20.00
20.00				
* Crit W.S. (m)	* 17.43	* Flow Area (m2)	* 12.89	*
* E.G. slope (m/m)	* 0.007834	* Area (m2)	* 12.89	*
* Q Total (m3/s)	* 16.86	* Flow (m3/s)	* 16.86	*
* Top width (m)	* 23.64	* Top width (m)	* 23.64	*
* Vel Total (m/s)	* 1.31	* Avg. Vel. (m/s)	* 1.31	*
* Max chl Dpth (m)	* 0.71	* Hydr. Depth (m)	* 0.55	*
* Conv. Total (m3/s)	* 190.5	* Conv. (m3/s)	* 190.5	*
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 23.75	*
* Min ch El (m)	* 16.92	* Shear (N/m2)	* 41.68	*
* Alpha	* 1.00	* Stream Power (N/m-s)	* 54.53	*
* Frctn Loss (m)	* 0.26	* Cum Volume (1000 m3)	* 0.14	* 4.67
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.86	* 14.35

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 18.25	* Element	* Left OB	* channel
Right OB				
* Vel Head (m)	* 0.19	* Wt. n-Val.	* 0.045	*
* W.S. Elev (m)	* 18.06	* Reach Len. (m)	* 20.00	* 20.00
20.00				
* Crit W.S. (m)	* 17.94	* Flow Area (m2)	* 27.22	*
* E.G. slope (m/m)	* 0.014554	* Area (m2)	* 27.22	*

* Q Total (m3/s)	* 52.77	* Def.rep Flow (m3/s)	* 52.77
* Top width (m)	* 44.06	* Top width (m)	* 44.06
* Vel Total (m/s)	* 1.94	* Avg. Vel. (m/s)	* 1.94
* Max Chl Dpth (m)	* 1.14	* Hydr. Depth (m)	* 0.62
* Conv. Total (m3/s)	* 437.4	* Conv. (m3/s)	* 437.4
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 44.29
* Min Ch El (m)	* 16.92	* Shear (N/m2)	* 87.74
* Alpha	* 1.00	* Stream Power (N/m s)	* 170.06
* Frctn Loss (m)	* 0.38	* Cum Volume (1000 m3)	* 0.83
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 2.41

Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día..... 29 MAYO 2012..

CROSS SECTION

RIVER: FATES
 REACH: ARROYO

RS: 390

EL SECRETARIO DEL AYUNTAMIENTO

INPUT

Description: 0+390

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-62.029	18.858	-61.889	18.854	-60.932	18.829	-54.014	18.667	-51.647	18.602
-46.14	18.468	-41.077	18.286	-38.266	18.215	-30.508	17.86	-30.391	17.856
-30.049	17.837	-22.517	17.469	-19.939	17.271	-14.642	16.829	-9.369	16.59
-5.917	16.73	0	17.121	6.48	17.645	6.517	17.653	6.54	17.654
7.078	17.685	10.682	17.897	12.198	17.914	21.116	17.936	33.708	17.866
33.79	17.866	34.179	17.864	45.223	17.799	46.865	17.779	48.853	17.699
57.684	17.111	64.878	17.403	67.519	17.422	72.339	17.426	81.363	17.964
86.158	18.139	93.828	18.184	97.691	17.967	108.578	17.665	109.072	17.649
110.67	17.664	120	17.895						

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-62.029	.045	-38.266	.045	120	.045

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.
Expan.	-38.266	120	20	20	20	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 17.45	* Element	* Left OB	* Channel
* Right OB				
* Vel Head (m)	* 0.15	* wt. n-Val.	* 0.045	
* W.S. Elev (m)	* 17.31	* Reach Len. (m)	* 20.00	* 20.00

* Flow Area (m ²)	89.96
* Area (m ²)	9.96
* Flow (m ³ /s)	16.86
* Top width (m)	30.42
* Avg. Vel. (m/s)	1.69
* Hydr. Depth (m)	0.33
* Conv. (m ³ /s)	105.0
* Wetted Per. (m)	30.48
* Shear (N/m ²)	82.68
* Stream Power (N/m.s)	140.01

CROSS SECTION OUTPUT Profile #PF 7

Def.rep

Warning: The energy equation could not be balanced within the specified number of iterations. The

program selected the water surface that had the least amount of error between computed and assumed values.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth.

This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día.....

29 MAYO 2012

RIVER: FATES
REACH: ARROYO

RS: 370

EL SECRETARIO DEL AYUNTAMIENTO

INPUT

Description: 0+370

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-59.77	18.192	-59.613	18.185	-59.231	18.169	-56.925	18.112	-51.53	17.958
-49.386	17.91	-43.828	17.746	-38.627	17.652	-36.127	17.584	-29.835	17.413
-27.867	17.349	-26.569	17.263	-17.107	16.684	-13.024	16.377	-3.44	16.268
-0.05	16.233	0	16.234	3.756	16.337	6.116	16.477	8.194	16.831
9.515	16.962	14.461	17.317	14.951	17.379	15.704	17.408	23.978	17.42
27.564	17.398	42.809	17.44	42.822	17.439	55.92	17.293	70.737	16.699
71.989	16.614	73.048	16.661	77.034	16.698	81.89	16.804	87.094	16.857
93.88	16.906	100.484	16.917	106.892	16.996	118.318	16.939	120	16.986

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-59.77	.045	-36.127	.045	120	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-36.127	120	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 16.89	* Element	* Left OB * Channel *
Right OB *			
* Vel Head (m)	* 0.14	* Wt. n-Val.	* * 0.045 *
* W.S. Elev (m)	* 16.75	* Reach Len. (m)	* 20.00 * 20.00 *
20.00 *			
* Crit W.S. (m)	* 16.75	* Flow Area (m2)	* * 10.07 *
* E.G. slope (m/m)	* 0.030716	* Area (m2)	* * 10.07 *
* Q Total (m3/s)	* 16.86	* Flow (m3/s)	* * 16.86 *
* Top Width (m)	* 35.70	* Top width (m)	* * 35.70 *
* Vel Total (m/s)	* 1.67	* Avg. Vel. (m/s)	* * 1.67 *
* Max chl dpth (m)	* 0.52	* Hydr. Depth (m)	* * 0.28 *
* Conv. Total (m3/s)	* 96.2	* Conv. (m3/s)	* * 96.2 *

Def.rep

* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 35.75
* Min Ch El (m)	* 16.23	* Shear (N/m2)	* 84.88
* Alpha	* 1.00	* Stream Power (N/m s)	* 142.08
* Frctn Loss (m)	* 0.57	* Cum Volume (1000 m3)	* 0.14 * 4.24
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.86 * 13.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

DILIGENCIA.- El presente Plan..... ha sido aprobado
 definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día 29 MAYO 2012.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 17.23	* Element	* Left OB	* Channel
Right OB				
* Vel Head (m)	* 0.19	* Wt. n-val.	* 0.045	
* W.S. Elev (m)	* 17.03	* Reach Len. (m)	* 20.00	* 20.00
20.00				
* Crit W.S. (m)	* 17.06	* Flow Area (m2)	* 27.20	
* E.G. Slope (m/m)	* 0.038155	* Area (m2)	* 27.20	
* Q Total (m3/s)	* 52.77	* Flow (m3/s)	* 52.77	
* Top Width (m)	* 90.94	* Top Width (m)	* 90.94	
* vel Total (m/s)	* 1.94	* Avg. Vel. (m/s)	* 1.94	
* Max Chl Dpth (m)	* 0.80	* Hydr. Depth (m)	* 0.30	
* Conv. Total (m3/s)	* 270.1	* Conv. (m3/s)	* 270.1	
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 91.07	
* Min Ch El (m)	* 16.23	* Shear (N/m2)	* 111.77	
* Alpha	* 1.00	* Stream Power (N/m s)	* 216.79	
* Frctn Loss (m)	* 0.63	* Cum volume (1000 m3)	* 0.83 * 13.67	
0.39				
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 2.41 * 25.35	
1.16				

Warning: Divided flow computed for this cross-section.
 Warning: The cross-section end points had to be extended vertically for the computed water surface.

Def.rep
warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

DILIGENCIA: El presente Plan.....ha sido aprobado definitivamente por el EXCMO. Ayuntamiento de Tarifa en sesión RS: c350rada el día.....2-9 MAYO 2012.....

INPUT

Description: 0+350

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-60.898	17.679	-57.897	17.547	-57.33	17.524	-50.602	17.251	-46.571	17.103
-42.901	16.986	-35.811	16.713	-35.2	16.692	-33.662	16.644	-27.499	16.506
-25.051	16.391	-19.798	16.178	-14.291	15.847	-12.096	15.732	-9.077	15.424
-.05	14.772	0	14.782	2.514	15.291	4.415	15.827	6.317	15.626
6.582	15.689	8.344	16.522	8.912	16.792	9.1	16.804	11.672	16.937
12.729	17.011	23.773	16.956	25.349	16.962	39.471	16.818	40.342	16.809
40.461	16.808	40.789	16.808	58.348	16.809	69.797	16.392	71.105	16.346
71.299	16.334	81.833	15.824	89.178	16.113	90.557	16.206	104.957	16.232
107.153	16.258	112.071	16.169	120	16.139				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-60.898	.045	-35.811	.045	120	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.
Expan.					
-35.811	120	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 16.01	* Element	* Left OB	* Channel
Right OB				
* Vel Head (m)	* 0.46	* wt. n-Val.	* 0.045	*
* w.s. Elev (m)	* 15.55	* Reach Len. (m)	* 20.00	* 20.00 *
20.00				
* Crit W.S. (m)	* 15.69	* Flow Area (m2)	* 5.58	*
* E.G. Slope (m/m)	* 0.061954	* Area (m2)	* 5.58	*
* Q Total (m3/s)	* 16.86	* Flow (m3/s)	* 16.86	*
* Top Width (m)	* 13.72	* Top Width (m)	* 13.72	*
* Vel Total (m/s)	* 3.02	* Avg. Vel. (m/s)	* 3.02	*
* Max chl Dpth (m)	* 0.78	* Hydr. Depth (m)	* 0.41	*
* Conv. Total (m3/s)	* 67.7	* Conv. (m3/s)	* 67.7	*
* Length wtd. (m)	* 20.00	* wetted Per. (m)	* 13.84	*
* Min ch El (m)	* 14.77	* Shear (N/m2)	* 245.10	*
* Alpha	* 1.00	* Stream Power (N/m s)	* 740.20	*
* Frctn Loss (m)	* 0.85	* Cum Volume (1000 m3)	* 0.14	* 4.09 *
* C & E Loss (m)	* 0.03	* Cum SA (1000 m2)	* 0.86	* 12.66 *

DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Consejo de Ayuntamiento de Tarifa en sesión celebrada el día..... 2-9 MAYO 2012..

def.rep

***** EL SECRETARIO DEL AYUNTAMIENTO *****

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 16.47	* Element	* Left OB	* Channel *
Right OB *				
* Vel Head (m)	* 0.29	* Wt. n-Val.	* *	* 0.045 *
* W.S. Elev (m)	* 16.19	* Reach Len. (m)	* 20.00	* 20.00 *
20.00 *				
* Crit W.S. (m)	* 16.27	* Flow Area (m2)	* *	* 22.30 *
* E.G. slope (m/m)	* 0.036036	* Area (m2)	* *	* 22.30 *
* Q Total (m3/s)	* 52.77	* Flow (m3/s)	* *	* 52.77 *
* Top Width (m)	* 52.71	* Top Width (m)	* *	* 52.71 *
* Vel Total (m/s)	* 2.37	* Avg. Vel. (m/s)	* *	* 2.37 *
* Max Chl Dpth (m)	* 1.42	* Hydr. Depth (m)	* *	* 0.42 *
* Conv. Total (m3/s)	* 278.0	* Conv. (m3/s)	* *	* 278.0 *
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* *	* 53.09 *
* Min Ch El (m)	* 14.77	* Shear (N/m2)	* *	* 148.45 *
* Alpha	* 1.00	* Stream Power (N/m s)	* *	* 351.26 *
* Frctn Loss (m)	* 0.74	* Cum Volume (1000 m3)	* 0.83	* 13.17 *
0.39 *				
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 2.41	* 23.92 *
1.16 *				

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FATES
REACH: ARROYO RS: 330

INPUT

Description: 0+330

Station	Elevation	Data	num=	37	Sta	Elev	Sta	Elev	Sta	Elev
---------	-----------	------	------	----	-----	------	-----	------	-----	------

Def.rep

 -60.671 17.136 -57.375 16.992 -54.515 16.892 -49.674 16.742 -43.755 16.542
 -41.973 16.486 -37.489 16.401 -32.995 16.27 -30.033 16.244 -22.235 15.997
 -12.183 15.37 -11.475 15.344 -11.169 15.327 -10.12 15.197 -1.882 14.307
 -.05 14.089 0 14.095 4.195 14.687 7.144 15.517 9.108 16.114
 11.31 16.325 13.224 16.46 20.907 16.427 27.73 16.411 34.897 16.34
 47.068 16.224 50.923 16.195 61.949 16.163 69.804 15.986 77.797 15.705
 85.422 15.242 90.517 14.995 94.07 15.135 100.242 15.551 105.055 15.56
 112.766 15.652 120 15.52

Manning's n Values

Sta n Val Sta n Val Sta n Val Sta n Val

 -60.671 .045 -32.995 .045 120 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.
 Expan. -32.995 120 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

 * E.G. Elev (m) * 15.32 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (m) * 0.21 * Wt. n-Val. * 0.045 *
 * W.S. Elev (m) * 15.11 * Reach Len. (m) * 20.00 * 20.00 *
 20.00 *
 * Crit W.S. (m) * 15.11 * Flow Area (m2) * 8.35 *
 * E.G. Slope (m/m) * 0.027284 * Area (m2) * 8.35 *
 * Q Total (m3/s) * 16.86 * Flow (m3/s) * 16.86 *
 * Top width (m) * 20.33 * Top width (m) * 20.33 *
 * Vel Total (m/s) * 2.02 * Avg. Vel. (m/s) * 2.02 *
 * Max chl Dpth (m) * 1.02 * Hydr. Depth (m) * 0.41 *
 * Conv. Total (m3/s) * 102.1 * Conv. (m3/s) * 102.1 *
 * Length wtd. (m) * 20.00 * Wetted Per. (m) * 20.49 *
 * Min Ch El (m) * 14.09 * Shear (N/m2) * 109.09 *
 * Alpha * 1.00 * Stream Power (N/m s) * 220.16 *
 * Frctn Loss (m) * 0.39 * Cum Volume (1000 m3) * 0.14 * 3.95 *
 * C & E Loss (m) * 0.02 * Cum SA (1000 m2) * 0.86 * 12.32 *

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
 Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there

Def.rep
is not a valid subcritical answer. The program defaulted to critical
depth.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m) * 15.83 * Element * Left OB * Channel *
Right OB *
* Vel Head (m) * 0.22 * Wt. n-Val. * 0.045 *
*
* W.S. Elev (m) * 15.61 * Reach Len. (m) * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m) * 15.61 * Flow Area (m2) * 25.22 *
*
* E.G. slope (m/m) * 0.027287 * Area (m2) * 25.22 *
*
* Q Total (m3/s) * 52.77 * Flow (m3/s) * 52.77 *
* Top width (m) * 58.23 * Top width (m) * 58.23 *
* Vel Total (m/s) * 2.09 * Avg. Vel. (m/s) * 2.09 *
* Max Chl Dpth (m) * 1.52 * Hydr. Depth (m) * 0.43 *
* Conv. Total (m3/s) * 319.4 * Conv. (m3/s) * 319.4 *
* Length wtd. (m) * 20.00 * Wetted Per. (m) * 58.60 *
* Min Ch El (m) * 14.09 * Shear (N/m2) * 115.16 *
* Alpha * 1.00 * Stream Power (N/m s) * 240.96 *
* Frctn Loss (m) * 0.62 * Cum Volume (1000 m3) * 0.83 * 12.70 *
0.39 *
* C & E Loss (m) * 0.02 * Cum SA (1000 m2) * 2.41 * 22.81 *
1.16 *

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the
computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current
and previous cross
section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FATES
REACH: ARROYO RS: 310

INPUT

Description: 0+310

Station Elevation Data		num= 41		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-59.56	16.845	-55.261	16.52	-54.826	16.498	-53.476	16.449	-43.589	16.069
-34.182	15.699	-32.352	15.643	-30.429	15.553	-21.116	15.154	-12.255	14.681
-10.684	14.623	-9.879	14.596	-9.33	14.453	0	13.548	4.039	14.101
5.459	14.574	7.609	15.117	8.041	15.243	9.191	15.378	10.434	15.418
15.832	15.898	17.024	15.939	18.708	15.938	20.878	15.91	42.547	15.762
49.179	15.719	59.749	15.671	64.776	15.674	78.993	15.395	81.432	15.314
92.872	14.636	94.873	14.543	96.328	14.608	104.733	15.225	104.764	15.225
105.172	15.231	105.184	15.231	112.041	15.231	115.175	15.374	116.297	15.355
120	15.296								

Manning's n values num= 3
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Sta	n Val	Sta	n Val	Def.rep	Sta	n Val
-59.56	.045	-43.589	.045	120	.045	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-43.589	120	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

		Element	Left OB	Channel
* E.G. Elev (m)	14.79			
Right OB *				
* Vel Head (m)	0.14	* Wt. n-Val.		* 0.045 *
* w.s. Elev (m)	14.66	* Reach Len. (m)	20.00	* 20.00 *
20.00 *				
* Crit w.s. (m)	14.49	* Flow Area (m2)		* 10.35 *
* E.G. slope (m/m)	*0.014728	* Area (m2)		* 10.35 *
* Q Total (m3/s)	* 16.86	* Flow (m3/s)		* 16.86 *
* Top width (m)	* 21.86	* Top width (m)		* 21.86 *
* Vel Total (m/s)	* 1.63	* Avg. Vel. (m/s)		* 1.63 *
* Max chl Dpth (m)	* 1.11	* Hydr. Depth (m)		* 0.47 *
* Conv. Total (m3/s)	* 138.9	* Conv. (m3/s)		* 138.9 *
* Length wtd. (m)	* 20.00	* Wetted Per. (m)		* 22.06 *
* Min ch El (m)	* 13.55	* Shear (N/m2)		* 67.79 *
* Alpha	* 1.00	* Stream Power (N/m s)		* 110.42 *
* Frctn Loss (m)	* 0.31	* Cum Volume (1000 m3)	0.14	* 3.76 *
* C & E Loss (m)	* 0.02	* Cum SA (1000 m2)	0.86	* 11.89 *

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #PF 7

		Element	Left OB	Channel
* E.G. Elev (m)	15.32			
Right OB *				
* Vel Head (m)	0.29	* Wt. n-Val.		* 0.045 *
* w.s. Elev (m)	15.03	* Reach Len. (m)	20.00	* 20.00 *
20.00 *				
* Crit w.s. (m)	15.04	* Flow Area (m2)		* 22.20 *
* E.G. Slope (m/m)	*0.026826	* Area (m2)		* 22.20 *
* Q Total (m3/s)	* 52.77	* Flow (m3/s)		* 52.77 *
* Top width (m)	* 41.80	* Top width (m)		* 41.80 *

* Vel Total (m/s)	*	2.38	* Def.rep Avg. Vel. (m/s)	*	*	2.38	*
* Max Chl Dpth (m)	*	1.48	* Hydr. Depth (m)	*	*	0.53	*
* Conv. Total (m3/s)	*	322.2	* Conv. (m3/s)	*	*	322.2	*
* Length wtd. (m)	*	20.00	* Wetted Per. (m)	*	*	42.08	*
* Min ch El (m)	*	13.55	* Shear (N/m2)	*	*	138.81	*
* Alpha	*	1.00	* Stream Power (N/m s)	*	*	329.90	*
* Frctn Loss (m)	*	0.53	* Cum Volume (1000 m3)	*	0.83	* 12.22	*
0.39	*		* Cum SA (1000 m2)	*	2.41	* 21.81	*
* C & E Loss (m)	*	0.01					
1.16	*						

warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

warning: Divided flow computed for this cross-section.

warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 290

DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día 29 MAYO 2012

EL SECRETARIO DEL AYUNTAMIENTO

INPUT

Description: 0+290

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-59.758	17.028	-56.243	16.782	-53.838	16.63	-48.814	16.219	-42.602	15.903
-41.384	15.828	-39.009	15.682	-33.955	15.364	-31.365	15.257	-26.525	15.013
-20.128	14.536	-19.096	14.438	-17.082	14.353	-8.892	14.154	0	13.686
1.937	13.504	3.496	14.023	7.118	14.735	8.612	14.958	14.491	15.202
15.172	15.276	18.123	15.34	20.549	15.318	31.241	15.313	50.153	15.07
50.631	15.067	50.777	15.066	51.783	15.061	51.787	15.06	67.42	15.01
71.503	14.979	84.462	14.788	93.852	14.231	101.287	13.909	110.75	14.314
120	14.737								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-59.758	.045	-33.955	.045	120	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-33.955	120	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	*	14.47	* Element	*	Left OB	* Channel *
Right OB *						
* Vel Head (m)	*	0.08	* wt. n-Val.	*		* 0.045 *
* w.s. Elev (m)	*	14.39	* Reach Len. (m)	*	20.00	* 20.00 *
20.00 *						
* Crit W.S. (m)	*		* Flow Area (m2)	*		* 13.38 *

DILIGENCIA.- El presente Plan..... ha sido aprobado
definitivamente por de Tarifa en sesión
celebrada el día.....

Def rep 29 MAYO 2012

EL SECRETARIO DEL AYUNTAMIENTO

* E.G. Slope (m/m)	* 0.016008	* Area (m2)	* 13.38
* Q Total (m3/s)	* 16.86	* Flow (m3/s)	* 16.86
* Top Width (m)	* 44.44	* Top Width (m)	* 44.44
* Vel Total (m/s)	* 1.26	* Avg. Vel. (m/s)	* 1.26
* Max Chl Dpth (m)	* 0.88	* Hydr. Depth (m)	* 0.30
* Conv. Total (m3/s)	* 133.3	* Conv. (m3/s)	* 133.3
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 44.60
* Min Ch El (m)	* 13.50	* Shear (N/m2)	* 47.10
* Alpha	* 1.00	* Stream Power (N/m s)	* 59.35
* Frctn Loss (m)	* 0.43	* Cum Volume (1000 m3)	* 0.14 * 3.52
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.86 * 11.23

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current
and previous cross
section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 14.86	* Element	* Left OB	* Channel
* Right OB				
* Vel Head (m)	* 0.15	* wt. n-Val.	* 0.045	
* W.S. Elev (m)	* 14.71	* Reach Len. (m)	* 20.00	* 20.00
* 20.00				
* Crit W.S. (m)	* 14.62	* Flow Area (m2)	* 30.88	
* E.G. slope (m/m)	* 0.015449	* Area (m2)	* 30.88	
* Q Total (m3/s)	* 52.77	* Flow (m3/s)	* 52.77	
* Top Width (m)	* 63.21	* Top Width (m)	* 63.21	
* Vel Total (m/s)	* 1.71	* Avg. Vel. (m/s)	* 1.71	
* Max Chl Dpth (m)	* 1.21	* Hydr. Depth (m)	* 0.49	
* Conv. Total (m3/s)	* 424.5	* Conv. (m3/s)	* 424.5	
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 63.44	
* Min Ch El (m)	* 13.50	* Shear (N/m2)	* 73.74	
* Alpha	* 1.00	* Stream Power (N/m s)	* 126.02	
* Frctn Loss (m)	* 0.39	* Cum Volume (1000 m3)	* 0.83	* 11.69
* 0.39				
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 2.41	* 20.76
* 1.16				

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: FATES
 REACH: ARROYO

INPUT

Description: 0+270

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-58.037	16.325	-57.048	16.196	-53.289	15.936	-47.445	15.633	-36.075	15.08
-35.541	15.051	-35.16	15.025	-30	14.715	-28.372	14.617	-22.874	13.973
-21.203	13.764	-18.86	13.598	-14.033	13.32	-10.589	13.607	-5.37	13.771
-.05	13.223	0	13.229	4.025	13.467	8.486	14.369	12.21	14.665
12.242	14.665	12.302	14.668	22.579	14.908	26.257	14.985	32.431	14.912
38.936	14.812	50.227	14.683	57.324	14.718	67.388	14.727	76.579	14.693
84.395	14.605	90.94	14.237	102.11	13.78	113.771	14.34	120	14.661

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-58.037	.045	-30	.045	120	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-30	120	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 14.03	* Element	* Left OB	* Channel *
Right OB *	* 0.15	* Wt. n-Val.	* 0.045	*
* Vel Head (m)	* 13.88	* Reach Len. (m)	* 20.00	* 20.00 *
* W.S. Elev (m)	* 13.88	* Flow Area (m2)	* 9.69	*
20.00 *	* 0.030846	* Area (m2)	* 9.69	*
* Crit W.S. (m)	* 16.86	* Flow (m3/s)	* 16.86	*
* E.G. slope (m/m)	* 32.46	* Top width (m)	* 32.46	*
* Q Total (m3/s)	* 1.74	* Avg. Vel. (m/s)	* 1.74	*
* Top width (m)	* 0.65	* Hydr. Depth (m)	* 0.30	*
* Vel Total (m/s)	* 96.0	* Conv. (m3/s)	* 96.0	*
* Max chl Dpth (m)	* 20.00	* Wetted Per. (m)	* 32.57	*
* Conv. Total (m3/s)	* 13.22	* Shear (N/m2)	* 90.02	*
* Length wtd. (m)	* 1.00	* Stream Power (N/m s)	* 156.60	*
* Min ch El (m)	* 0.57	* Cum Volume (1000 m3)	* 0.14	* 3.29 *
* Alpha	* 0.01	* Cum SA (1000 m2)	* 0.86	* 10.46 *
* Frctn Loss (m)				
* C & E Loss (m)				

Def. rep
EL SECRETARIO DEL AYUNTAMIENTO

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections. Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth. This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 14.46	* Element	* Left OB	* Channel
Right OB *				
* Vel Head (m)	* 0.23	* Wt. n-Val.	*	* 0.045 *
*				
* W.S. Elev (m)	* 14.23	* Reach Len. (m)	* 20.00	* 20.00 *
20.00 *				
* Crit W.S. (m)	* 14.23	* Flow Area (m2)	*	* 24.64 *
*				
* E.G. Slope (m/m)	* 0.025898	* Area (m2)	*	* 24.64 *
*				
* Q Total (m3/s)	* 52.77	* Flow (m3/s)	*	* 52.77 *
*				
* Top width (m)	* 52.97	* Top width (m)	*	* 52.97 *
*				
* Vel Total (m/s)	* 2.14	* Avg. Vel. (m/s)	*	* 2.14 *
*				
* Max chl dpth (m)	* 1.00	* Hydr. Depth (m)	*	* 0.47 *
*				
* Conv. Total (m3/s)	* 327.9	* Conv. (m3/s)	*	* 327.9 *
*				
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	*	* 53.16 *
*				
* Min Ch El (m)	* 13.22	* Shear (N/m2)	*	* 117.71 *
*				
* Alpha	* 1.00	* Stream Power (N/m s)	*	* 252.11 *
*				
* Frctn Loss (m)	* 0.42	* Cum volume (1000 m3)	* 0.83	* 11.14 *
0.39 *				
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 2.41	* 19.60 *
1.16 *				

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections. Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth. This indicates that there

is not a valid subcritical answer. The program defaulted to critical

Def.rep

depth.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 250

DILIGENCIA: El presente Plan....., ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tardá en sesión celebrada el día... 29 MAYO 2012.....

INPUT

Description: 0+250

Station Elevation Data				num=	34			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-60.902	16.713	-57.198	16.403	-53.771	15.993	-51.133	15.814	
-40.803	15.153	-38.514	15.01	-30.867	14.525	-30	14.467	
-24.407	14.052	-13.276	13	-10.987	12.866	-8.255	12.67	
0	12.452	6.671	13.611	8.052	13.891	9.217	13.984	
11.607	14.17	12.473	14.22	23.213	14.436	37.677	14.275	
48.329	14.127	65.848	14.231	66.421	14.232	71.901	14.218	
84.653	14.182	103.487	13.437	105.397	13.37	120	14.082	

Manning's n values				num=	3	
Sta	n Val	Sta	n Val	Sta	n Val	
-60.902	.045	-30	.045	120	.045	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-30	120	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 13.38	* Element	* Left OB * channel *
Right OB *			
* Vel Head (m)	* 0.25	* Wt. n-Val.	* 0.045 *
* W.S. Elev (m)	* 13.13	* Reach Len. (m)	* 20.00 * 20.00 *
20.00 *			
* Crit W.S. (m)	* 13.16	* Flow Area (m2)	* 7.59 *
* E.G. Slope (m/m)	* 0.033058	* Area (m2)	* 7.59 *
* Q Total (m3/s)	* 16.86	* Flow (m3/s)	* 16.86 *
* Top Width (m)	* 18.56	* Top Width (m)	* 18.56 *
* Vel Total (m/s)	* 2.22	* Avg. Vel. (m/s)	* 2.22 *
* Max chl Dpth (m)	* 0.69	* Hydr. Depth (m)	* 0.41 *
* Conv. Total (m3/s)	* 92.7	* Conv. (m3/s)	* 92.7 *
* Length Wtd. (m)	* 20.00	* Wetted Per. (m)	* 18.64 *
* Min Ch El (m)	* 12.44	* Shear (N/m2)	* 132.08 *
* Alpha	* 1.00	* Stream Power (N/m s)	* 293.30 *
* Frctn Loss (m)	* 0.64	* Cum Volume (1000 m3)	* 0.14 * 3.12 *
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.86 * 9.95 *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

Def.rep

Note: section. This may indicate the need for additional cross sections.
Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #PF 7

```

*****
* E.G. Elev (m)      * 13.97 * Element      * Left OB * channel *
Right OB *
* Vel Head (m)      * 0.20 * Wt. n-Val.    *      * 0.045 *
*
* W.S. Elev (m)      * 13.77 * Reach Len. (m) * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m)      * 13.69 * Flow Area (m2) *      * 26.62 *
*
* E.G. Slope (m/m)    *0.017309 * Area (m2)      *      * 26.62 *
*
* Q Total (m3/s)      * 52.77 * Flow (m3/s)    *      * 52.77 *
*
* Top Width (m)       * 47.52 * Top Width (m)   *      * 47.52 *
*
* Vel Total (m/s)     * 1.98 * Avg. Vel. (m/s) *      * 1.98 *
*
* Max Chl Dpth (m)    * 1.33 * Hydr. Depth (m) *      * 0.56 *
*
* Conv. Total (m3/s)  * 401.1 * Conv. (m3/s)    *      * 401.1 *
*
* Length Wtd. (m)     * 20.00 * Wetted Per. (m) *      * 47.70 *
*
* Min Ch El (m)       * 12.44 * Shear (N/m2)    *      * 94.74 *
*
* Alpha              * 1.00 * Stream Power (N/m s) *      * 187.76 *
*
* Frctn Loss (m)      * 0.29 * Cum Volume (1000 m3) * 0.83 * 10.62 *
0.39 *
* C & E Loss (m)      * 0.00 * Cum SA (1000 m2)  * 2.41 * 18.59 *
1.16 *
*****

```

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 230

INPUT

Description: 0+230

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-61.389	15.461	-56.168	15.152	-52.763	14.921	-47.156	14.518	-40.116	14.14
-40.04	14.137	-39.979	14.135	-32.924	13.784	-30	13.675	-27.195	13.571
-25.807	13.52	-24.065	13.411	-22.57	13.33	-18.691	13.12	-14.411	12.881
-11.575	12.643	-5.401	12.356	-5.313	12.352	-5.123	12.344	-4.914	12.336
-4.297	12.312	-3.147	12.269	-3.19	12.161	0	12.149	2.2	11.854
2.513	11.761	3.972	12.043	5.387	12.979	6.401	13.344	6.543	13.323
7.849	13.465	10.267	13.691	13.001	13.823	44.515	13.897	46.956	13.887
49.186	13.891	65.205	14.108	66.243	14.126	83.018	14.197	83.745	14.196
101.379	13.582	103.668	13.503	119.635	14.386	120	14.408		

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-61.389	.045	-22.57	.045	119.635	.045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.

DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día..... 29 MAYO 2012.....

Def.rep

SECRETARIO DEL AYUNTAMIENTO

Expan.

-22.57 119.635

20

20

20

.1

.3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 13.09	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (m)	* 0.09	* Wt. n-Val.	*	* 0.045	*
* W.S. Elev (m)	* 13.00	* Reach Len. (m)	* 20.00	* 20.00	*
20.00 *					
* Crit W.S. (m)	* 12.76	* Flow Area (m2)	*	* 12.85	*
* E.G. slope (m/m)	* 0.007322	* Area (m2)	*	* 12.85	*
* Q Total (m3/s)	* 16.86	* Flow (m3/s)	*	* 16.86	*
* Top width (m)	* 22.03	* Top width (m)	*	* 22.03	*
* Vel Total (m/s)	* 1.31	* Avg. Vel. (m/s)	*	* 1.31	*
* Max chl Dpth (m)	* 1.24	* Hydr. Depth (m)	*	* 0.58	*
* Conv. Total (m3/s)	* 197.1	* Conv. (m3/s)	*	* 197.1	*
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	*	* 22.40	*
* Min Ch El (m)	* 11.76	* Shear (N/m2)	*	* 41.18	*
* Alpha	* 1.00	* Stream Power (N/m s)	*	* 54.04	*
* Frctn Loss (m)	* 0.25	* Cum Volume (1000 m3)	* 0.14	* 2.91	*
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.86	* 9.55	*

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 13.68	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (m)	* 0.23	* Wt. n-Val.	* 0.045	* 0.045	*
* W.S. Elev (m)	* 13.46	* Reach Len. (m)	* 20.00	* 20.00	*
20.00 *					
* Crit W.S. (m)	*	* Flow Area (m2)	* 0.14	* 24.95	*
* E.G. slope (m/m)	* 0.011963	* Area (m2)	* 0.14	* 24.95	*
* Q Total (m3/s)	* 52.77	* Flow (m3/s)	* 0.06	* 52.71	*
* Top width (m)	* 32.56	* Top width (m)	* 2.22	* 30.34	*
* Vel Total (m/s)	* 2.10	* Avg. Vel. (m/s)	* 0.39	* 2.11	*
* Max chl Dpth (m)	* 1.70	* Hydr. Depth (m)	* 0.07	* 0.82	*
* Conv. Total (m3/s)	* 482.4	* Conv. (m3/s)	* 0.5	* 481.9	*

D. INGENIERIA. El presente Plan.....ha sido aprobado
definitivamente por el Comité de T. nía en sesión
celebrada el día.....29 MAYO 2012

EL SECRETARIO DEL AYUNTAMIENTO

Def.rep

* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 2.22	* 30.78	*
* Min Ch El (m)	* 11.76	* Shear (N/m2)	* 7.63	* 95.08	*
* Alpha	* 1.01	* Stream Power (N/m s)	* 3.00	* 200.87	*
* Frctn Loss (m)	* 0.32	* Cum Volume (1000 m3)	* 0.83	* 10.11	*
0.39		* Cum SA (1000 m2)	* 2.38	* 17.81	*
* C & E Loss (m)	* 0.00				
1.16					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 210

INPUT

Description: 0+210

Station Elevation Data		num= 40									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-63.655	14.933	-60.599	14.411	-58.636	14.189	-56.539	14.066	-49.618	13.701		
-49.177	13.677	-36.834	13.308	-35.19	13.26	-33.125	13.182	-30	13.086		
-28.074	13.027	-24.05	12.881	-20.957	12.764	-19.92	12.717	-17.074	12.589		
-13.841	12.458	-11.266	12.462	-1.691	12.224	0	12.162	2.271	11.733		
2.388	11.698	2.584	11.673	3.134	11.766	5.39	12.078	5.649	12.294		
6.71	12.918	15.037	13.098	19.831	13.33	33.998	13.363	44.222	13.324		
53.559	13.34	61.16	13.443	69.516	13.592	78.304	13.629	86.501	13.625		
97.271	13.25	104.82	13.02	114.885	13.593	118.575	13.896	120	13.888		

Manning's n values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-63.655	.045	-19.92	.045	114.885	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-19.92	114.885	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

*****		*****		*****	
* E.G. Elev (m)	* 12.83	* Element	* Left OB	* Channel	*
Right OB					
* Vel Head (m)	* 0.17	* Wt. n-Val.	* 0.045		*
* W.S. Elev (m)	* 12.66	* Reach Len. (m)	* 20.00	* 20.00	*
20.00					
* Crit W.S. (m)	* 12.64	* Flow Area (m2)	* 9.25		*
* E.G. slope (m/m)	* 0.025720	* Area (m2)	* 9.25		*
* Q Total (m3/s)	* 16.86	* Flow (m3/s)	* 16.86		*
* Top width (m)	* 24.99	* Top width (m)	* 24.99		*
* Vel Total (m/s)	* 1.82	* Avg. vel. (m/s)	* 1.82		*
* Max Chl Dpth (m)	* 0.99	* Hydr. Depth (m)	* 0.37		*

DILIGENCIA. El presente Plan..... ha sido aprobado
definitivamente por el Comité de Riego en sesión
celebrada el día 29 MAYO 2012

		Def.rep		
* Conv. Total (m3/s)	105.1	* Conv. (m3/s)	105.1	*
* Length Wtd. (m)	20.00	* Wetted Per. (m)	25.26	*
* Min Ch El (m)	11.67	* Shear (N/m2)	92.33	*
* Alpha	1.00	* Stream Power (N/m s)	168.38	*
* Frctn Loss (m)	0.55	* Cum Volume (1000 m3)	0.14	2.69 *
* C & E Loss (m)	0.00	* Cum SA (1000 m2)	0.86	9.08 *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 7

		Left OB	Channel
* E.G. Elev (m)	13.37	* Element	
Right OB *			
* Vel Head (m)	0.24	* Wt. n-val.	0.045 * 0.045 *
* W.S. Elev (m)	13.13	* Reach Len. (m)	20.00 * 20.00 *
20.00 *			
* Crit W.S. (m)	13.13	* Flow Area (m2)	2.21 * 22.83 *
* E.G. Slope (m/m)	0.021737	* Area (m2)	2.21 * 22.83 *
* Q Total (m3/s)	52.77	* Flow (m3/s)	2.42 * 50.35 *
* Top width (m)	52.41	* Top Width (m)	11.43 * 40.98 *
* Vel Total (m/s)	2.11	* Avg. Vel. (m/s)	1.09 * 2.21 *
* Max chl dpth (m)	1.45	* Hydr. Depth (m)	0.19 * 0.56 *
* Conv. Total (m3/s)	357.9	* Conv. (m3/s)	16.4 * 341.5 *
* Length Wtd. (m)	20.00	* Wetted Per. (m)	11.44 * 41.32 *
* Min Ch El (m)	11.67	* Shear (N/m2)	41.14 * 117.75 *
* Alpha	1.06	* Stream Power (N/m s)	45.01 * 259.73 *
* Frctn Loss (m)	0.43	* Cum Volume (1000 m3)	0.81 * 9.63 *
0.39 *			
* C & E Loss (m)	0.00	* Cum SA (1000 m2)	2.25 * 17.10 *
1.16 *			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical

Def.rep

depth.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

DILIGENCIA.- El presente Plan..... ha sido aprobado
definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión
celebrada el día..... 7-9 MAYO 2012.....
RS: 190

INPUT

Description: 0+190

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-67.324	14.392	-61.348	13.403	-60.08	13.251	-55.124	13.057	-52.835	12.983
-49.233	12.885	-45.59	12.812	-43.276	12.772	-38.346	12.771	-31.428	12.596
-30.587	12.576	-30	12.547	-19.86	12.042	-19.58	12.028	-16.612	11.853
-11.941	11.88	-9.367	11.943	-5.62	11.866	0	11.558	4.006	11.549
4.444	11.601	6.045	11.692	7.257	11.775	7.914	11.978	11.003	12.438
23.868	12.872	25.67	12.894	31.661	12.895	42.129	12.888	56.721	12.955
58.495	12.985	71.734	13.262	75.207	13.29	88.251	13.322	94.385	13.125
105.73	12.808	112.223	13.195	117.845	13.664				

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-67.324 .045 -19.86 .045 112.223 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.
Expan. -19.86 112.223 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

*****		*****	
* E.G. Elev (m)	* 12.29	* Element	* Left OB * Channel *
* Right OB *			
* Vel Head (m)	* 0.16	* Wt. n-val.	* 0.045 * 0.045 *
* W.S. Elev (m)	* 12.12	* Reach Len. (m)	* 20.00 * 20.00 *
* 20.00 *			
* Crit W.S. (m)	* 12.12	* Flow Area (m2)	* 0.06 * 9.40 *
* E.G. slope (m/m)	* 0.028955	* Area (m2)	* 0.06 * 9.40 *
* Q Total (m3/s)	* 16.86	* Flow (m3/s)	* 0.03 * 16.83 *
* Top Width (m)	* 30.34	* Top Width (m)	* 1.60 * 28.74 *
* Vel Total (m/s)	* 1.78	* Avg. Vel. (m/s)	* 0.44 * 1.79 *
* Max chl Dpth (m)	* 0.57	* Hydr. Depth (m)	* 0.04 * 0.33 *
* Conv. Total (m3/s)	* 99.1	* Conv. (m3/s)	* 0.2 * 98.9 *
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 1.61 * 28.81 *
* Min Ch El (m)	* 11.55	* Shear (N/m2)	* 11.32 * 92.61 *
* Alpha	* 1.01	* Stream Power (N/m s)	* 5.00 * 165.94 *
* Frctn Loss (m)	* 0.27	* Cum Volume (1000 m3)	* 0.14 * 2.51 *
* C & E Loss (m)	* 0.03	* Cum SA (1000 m2)	* 0.85 * 8.54 *
*****		*****	

Warning: The energy equation could not be balanced within the specified number

Def.rep

of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 7

```

*****
* E.G. Elev (m)      * 12.81 * Element      * Left OB * Channel *
Right OB *
* Vel Head (m)      * 0.41 * Wt. n-Val.    * 0.045 * 0.045 *
* W.S. Elev (m)      * 12.41 * Reach Len. (m) * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m)      * 12.51 * Flow Area (m2)  * 1.33 * 17.83 *
* E.G. Slope (m/m)   * 0.034241 * Area (m2)      * 1.33 * 17.83 *
* Q Total (m3/s)     * 52.77 * Flow (m3/s)    * 1.76 * 51.01 *
* Top Width (m)      * 37.96 * Top Width (m)   * 7.31 * 30.65 *
* Vel Total (m/s)    * 2.75 * Avg. Vel. (m/s) * 1.32 * 2.86 *
* Max Chl Dpth (m)   * 0.86 * Hydr. Depth (m) * 0.18 * 0.58 *
* Conv. Total (m3/s) * 285.2 * Conv. (m3/s)   * 9.5 * 275.7 *
* Length Wtd. (m)    * 20.00 * Wetted Per. (m) * 7.32 * 30.73 *
* Min Ch El (m)      * 11.55 * Shear (N/m2)    * 61.04 * 194.83 *
* Alpha              * 1.05 * Stream Power (N/m s) * 80.54 * 557.33 *
* Frctn Loss (m)     * 0.54 * Cum Volume (1000 m3) * 0.77 * 9.22 *
0.39 *
* C & E Loss (m)     * 0.02 * Cum SA (1000 m2) * 2.06 * 16.38 *
1.16 *
*****
  
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: FATES
 REACH: ARROYO

RS: 170

INPUT

DILIGENCIA.- El presente Plan..... ha sido aprobado
delmivamente por el Concejo de Tarifa en sesión
celebrada el día 29 MAYO 2012

Def.rep

Description: 0+170

Station Elevation Data

num=

39

EL SECRETARIO DEL AYUNTAMIENTO

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-70.069	14.601	-63.148	13.396	-62.826	13.357	-61.565	13.284	-55.583	13.049
-49.707	12.851	-48.341	12.82	-46.197	12.777	-41.098	12.729	-37.849	12.619
-33.856	12.496	-30	12.308	-27.589	12.191	-25.991	12.091	-23.184	12.016
-14.133	11.578	-12.128	11.618	-2.265	11.109	0	11.066	4.102	10.946
4.155	11.041	5.264	11.1	6.296	11.177	9.44	11.795	11.732	12.117
16.526	12.062	19.812	12.003	32.926	11.762	38.436	11.763	49.992	11.745
55.195	11.876	75.268	11.998	83.023	11.937	98.822	11.295	98.728	10.967
103.362	11.195	114.1	12.083	117.75	12.121	120	12.067		

Manning's n Values

num=

3

Sta	n val	Sta	n val	Sta	n val
-70.069	.045	-30	.045	117.75	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-30	117.75	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 11.71	* Element	* Left OB	* Channel
* Right OB				
* Vel Head (m)	* 0.05	* Wt. n-val.	* 0.045	*
* W.S. Elev (m)	* 11.66	* Reach Len. (m)	* 20.00	* 20.00
* Crit W.S. (m)	* 11.49	* Flow Area (m2)	* 16.75	*
* E.G. Slope (m/m)	* 0.007945	* Area (m2)	* 16.75	*
* Q Total (m3/s)	* 16.86	* Flow (m3/s)	* 16.86	*
* Top width (m)	* 46.03	* Top width (m)	* 46.03	*
* Vel Total (m/s)	* 1.01	* Avg. Vel. (m/s)	* 1.01	*
* Max Chl Dpth (m)	* 0.72	* Hydr. Depth (m)	* 0.36	*
* Conv. Total (m3/s)	* 189.2	* Conv. (m3/s)	* 189.2	*
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 46.20	*
* Min Ch El (m)	* 10.95	* Shear (N/m2)	* 28.24	*
* Alpha	* 1.00	* Stream Power (N/m s)	* 28.44	*
* Frctn Loss (m)	* 0.17	* Cum Volume (1000 m3)	* 0.14	* 2.25
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.83	* 7.79

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 12.06	* Element	* Left OB	* Channel
* Right OB				
* Vel Head (m)	* 0.08	* Wt. n-val.	* 0.045	*
* W.S. Elev (m)	* 11.98	* Reach Len. (m)	* 20.00	* 20.00

DILIGENCIA.- El presente Plan.....ha sido aprobado
definitivamente por el.....en sesión
celebrada el día.....29 MAYO 2012

EL SECRETARIO DEL AYUNTAMIENTO Def.rep

20.00 *									
* Crit W.S. (m)	*	11.85	*	Flow Area (m2)	*		*	41.22	*
* E.G. Slope (m/m)	*	0.013839	*	Area (m2)	*		*	41.22	*
* Q Total (m3/s)	*	52.77	*	Flow (m3/s)	*		*	52.77	*
* Top width (m)	*	120.03	*	Top Width (m)	*		*	120.03	*
* Vel Total (m/s)	*	1.28	*	Avg. Vel. (m/s)	*		*	1.28	*
* Max chl Dpth (m)	*	1.03	*	Hydr. Depth (m)	*		*	0.34	*
* Conv. Total (m3/s)	*	448.6	*	Conv. (m3/s)	*		*	448.6	*
* Length wtd. (m)	*	20.00	*	Wetted Per. (m)	*		*	120.26	*
* Min ch El (m)	*	10.95	*	Shear (N/m2)	*		*	46.51	*
* Alpha	*	1.00	*	Stream Power (N/m s)	*		*	59.55	*
* Frctn Loss (m)	*	0.23	*	Cum Volume (1000 m3)	*	0.76	*	8.63	*
0.39 *									
* C & E Loss (m)	*	0.01	*	Cum SA (1000 m2)	*	1.99	*	14.88	*
1.16 *									

Warning: Divided flow computed for this cross-section.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 150

INPUT

Description: 0+150

Station Elevation Data		num= 38		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-64.017	13.965	-62.761	13.746	-61.938	13.643	-57.983	13.431	-56.936	13.365		
-55.777	13.321	-44.511	12.954	-40.853	12.859	-31.039	12.474	-30	12.406		
-25.93	12.14	-21.535	11.827	-17.568	11.639	-14.455	11.492	-11.006	11.397		
-7.374	11.339	0	11.125	4.372	10.943	5.362	10.803	7.872	10.523		
9.105	11.135	9.747	11.579	10.052	11.589	10.275	11.586	18.316	11.535		
22.181	11.47	35.618	11.291	47.884	11.358	53.088	11.377	62.668	11.672		
73.487	11.779	85.089	11.744	98.568	11.002	101.187	10.836	104.091	11		
116.101	12.059	119.234	12.102	120	12.087						

Manning's n Values

num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-64.017	.045	-30	.045	116.101	.045

Bank Sta:	Left	Right	Lengths:	Left channel	Right	Coeff Contr.
Expan.	-30	116.101	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	*	11.54	* Element	*	Left OB	* Channel *
Right OB *						
* Vel Head (m)	*	0.04	* Wt. n-Val.	*		* 0.045 *

PRUDENCIA, El presente Plan..... ha sido aprobado
 definitivamente por el..... en sesión
 celebrada el día..... 29 MAYO 2012

EL SECRETARIO DEL AYUNTAMIENTO Def.rep

* W.S. Elev (m)	* 11.50	* Reach Len. (m)	* 20.00	* 20.00
* 20.00				
* Crit W.S. (m)		* Flow Area (m2)		* 19.83
* E.G. Slope (m/m)	* 0.009612	* Area (m2)		* 19.83
* Q Total (m3/s)	* 16.86	* Flow (m3/s)		* 16.86
* Top width (m)	* 81.01	* Top width (m)		* 81.01
* Vel Total (m/s)	* 0.85	* Avg. Vel. (m/s)		* 0.85
* Max chl Dpth (m)	* 0.98	* Hydr. Depth (m)		* 0.24
* Conv. Total (m3/s)	* 172.0	* Conv. (m3/s)		* 172.0
* Length wtd. (m)	* 20.00	* Wetted Per. (m)		* 81.35
* Min ch El (m)	* 10.52	* Shear (N/m2)		* 22.98
* Alpha	* 1.00	* Stream Power (N/m s)		* 19.54
* Frctn Loss (m)	* 0.27	* Cum Volume (1000 m3)	* 0.14	* 1.88
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.83	* 6.52

Warning: Divided flow computed for this cross-section.
 Warning: The conveyance ratio (upstream conveyance divided by downstream
 conveyance) is less than
 0.7 or greater than 1.4. This may indicate the need for additional
 cross sections.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 11.83	* Element	* Left OB	* Channel
Right OB				
* Vel Head (m)	* 0.06	* Wt. n-Val.		* 0.045
* W.S. Elev (m)	* 11.77	* Reach Len. (m)	* 20.00	* 20.00
* 20.00				
* Crit W.S. (m)		* Flow Area (m2)		* 47.33
* E.G. Slope (m/m)	* 0.009531	* Area (m2)		* 47.33
* Q Total (m3/s)	* 52.77	* Flow (m3/s)		* 52.77
* Top width (m)	* 128.11	* Top width (m)		* 128.11
* Vel Total (m/s)	* 1.11	* Avg. Vel. (m/s)		* 1.11
* Max chl Dpth (m)	* 1.24	* Hydr. Depth (m)		* 0.37
* Conv. Total (m3/s)	* 540.5	* Conv. (m3/s)		* 540.5
* Length wtd. (m)	* 20.00	* Wetted Per. (m)		* 128.50
* Min ch El (m)	* 10.52	* Shear (N/m2)		* 34.43
* Alpha	* 1.00	* Stream Power (N/m s)		* 38.38
* Frctn Loss (m)	* 0.26	* Cum Volume (1000 m3)	* 0.76	* 7.75
* 0.39				
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 1.99	* 12.39
* 1.16				

Def.rep

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

DILIGENCIA: El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Turis en sesión celebrada el día 2-9-MAYO-2012.....

RIVER: FATES
REACH: ARROYO

RS: 130

EL SECRETARIO DEL AYUNTAMIENTO

INPUT

Description: 0+130

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-63.728	13.083	-61.408	12.97	-59.939	13.015	-56.567	12.947	-53.407	12.843
-43.875	12.576	-41.064	12.488	-35.083	12.251	-30	12.142	-28.72	12.115
-26.817	12.021	-16.377	11.412	-13.599	11.237	-7.883	11.5	-.926	11.164
0	11.074	5.283	10.506	6.171	10.385	6.35	10.355	6.507	10.362
6.577	10.358	7.32	10.439	12.32	10.428	12.537	10.96	14.24	11.189
14.511	11.212	17.9	11.13	29.677	10.959	31.794	10.963	32.638	10.955
36.234	10.932	52.801	11.128	54.548	11.146	66.36	11.578	73.174	11.676
87.015	11.72	99.803	11.114	103.245	10.92	107.894	11.213	118.156	12.153
120	12.185								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-63.728	.045	-30	.045	118.156	.045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.
Expan. -30 118.156 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	* 11.27	* Element	* Left OB	* Channel
Right OB				
* Vel Head (m)	* 0.07	* wt. n-val.	* 0.045	
* W.S. Elev (m)	* 11.20	* Reach Len. (m)	* 20.00	* 20.00
20.00		* Flow Area (m2)	* 14.89	
* Crit W.S. (m)	* 0.019478	* Area (m2)	* 14.89	
* E.G. slope (m/m)	* 16.86	* Flow (m3/s)	* 16.86	
* Q Total (m3/s)	* 67.43	* Top width (m)	* 67.43	
* Top width (m)	* 1.13	* Avg. vel. (m/s)	* 1.13	
* Vel Total (m/s)	* 0.85	* Hydr. Depth (m)	* 0.22	
* Max chl Dpth (m)	* 120.8	* Conv. (m3/s)	* 120.8	
* Conv. Total (m3/s)	* 20.00	* wetted Per. (m)	* 67.54	
* Length wtd. (m)	* 10.35	* Shear (N/m2)	* 42.12	
* Min Ch El (m)	* 1.00	* Stream Power (N/m s)	* 47.69	
* Alpha				

DILIGENCIA. El presente Plan..... ha sido aprobado definitivamente por la Junta de Arriba en sesión celebrada el día... 29 MAYO 2012

Def.rep
* Frctn Loss (m) * 0.45 * Cum Volume (1000 m3) * 0.14 * 1.53 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.83 * 5.04 *

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m) * 11.57 * Element * Left OB * Channel *
Right OB *
* Vel Head (m) * 0.12 * wt. n-Val. * 0.045 *
* W.S. Elev (m) * 11.44 * Reach Len. (m) * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m) * 11.39 * Flow Area (m2) * 34.23 *
* E.G. Slope (m/m) * 0.018759 * Area (m2) * 34.23 *
* Q Total (m3/s) * 52.77 * Flow (m3/s) * 52.77 *
* Top Width (m) * 94.84 * Top Width (m) * 94.84 *
* Vel Total (m/s) * 1.54 * Avg. Vel. (m/s) * 1.54 *
* Max Chl Dpth (m) * 1.09 * Hydr. Depth (m) * 0.36 *
* Conv. Total (m3/s) * 385.3 * Conv. (m3/s) * 385.3 *
* Length Wtd. (m) * 20.00 * Wetted Per. (m) * 94.99 *
* Min Ch El (m) * 10.35 * Shear (N/m2) * 66.30 *
* Alpha * 1.00 * Stream Power (N/m s) * 102.19 *
* Frctn Loss (m) * 0.46 * Cum Volume (1000 m3) * 0.76 * 6.93 *
0.39 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 1.99 * 10.17 *
1.16 *

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FATES
REACH: ARROYO RS: 110

INPUT

Description: 0+110

Station	Elevation	Data	num=	70	Sta	Elev	Sta	Elev	Sta	Elev
-65.492	12.537	-60.468	12.269	-58.409	12.321	-54.864	12.175	-47.351	11.848	
-41.478	11.636	-32.308	11.393	-30	11.312	-28.092	11.245	-22.994	10.987	
-15	11.377	-14.135	11.419	-12.848	11.449	-12.694	11.43	-12.388	11.395	
-11.344	11.329	-11.315	11.327	-11.235	11.322	-11.073	11.307	-10.872	11.288	

DILIGENCIA.- El presente Plan.....ha sido aprobado
definitivamente por la.....a en sesión
celebrada el día.....29 MAYO 2012

Def. rep									
-10.508	11.258	-10.251	11.242	-10.179	11.242	-9.933	11.229	-9.763	11.232
-9.386	11.214	-6.031	11.055	-5.798	11.033	-5.743	11.03	-5.44	11
-5.08	10.964	-4.232	10.883	-1.184	10.5	-1.174	10.5	-1.115	10.5
-.391	10.5	-1.06	10.5	0	10.5	1.286	10.47	1.541	10.466
3.368	10.471	6.719	10.517	7.318	10.505	8.193	10.504	9.905	10.504
9.969	10.531	11.043	10.651	12.468	10.902	13.446	10.992	15	11.088
15.443	11.115	16.554	11.201	17.97	11.15	18.875	11.016	21.691	10.893
24.519	10.797	30	10.668	39.517	10.443	46.131	10.511	50	10.6
58.673	10.798	60	10.842	63.943	10.974	70.468	10.976	81.217	10.818
92.113	10.445	98.56	10.116	103.887	10.622	109.682	11.142	120	11.291

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

-65.492 .045 60 .045 109.682 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.
Expan. 60 109.682 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

```
*****
* E.G. Elev (m)      * 10.81 * Element      * Left OB * Channel *
Right OB *
* Vel Head (m)      * 0.10 * Wt. n-val.      * 0.045 * 0.045 *
*
* W.S. Elev (m)      * 10.72 * Reach Len. (m)  * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m)      * 10.72 * Flow Area (m2)   * 6.98 * 5.82 *
*
* E.G. Slope (m/m)   * 0.026894 * Area (m2)        * 6.98 * 5.82 *
*
* Q Total (m3/s)      * 16.86 * Flow (m3/s)       * 7.81 * 9.06 *
*
* Top width (m)       * 62.45 * Top width (m)     * 41.63 * 20.82 *
*
* Vel Total (m/s)     * 1.32 * Avg. Vel. (m/s)   * 1.12 * 1.56 *
*
* Max chl Dpth (m)    * 0.60 * Hydr. Depth (m)   * 0.17 * 0.28 *
*
* Conv. Total (m3/s)  * 102.8 * Conv. (m3/s)      * 47.6 * 55.2 *
*
* Length wtd. (m)     * 20.00 * Wetted Per. (m)   * 41.67 * 20.86 *
*
* Min Ch El (m)       * 10.12 * Shear (N/m2)      * 44.18 * 73.58 *
*
* Alpha              * 1.08 * Stream Power (N/m s) * 49.42 * 114.49 *
*
* Frctn Loss (m)      * 0.46 * Cum Volume (1000 m3) * 0.07 * 1.33 *
*
* C & E Loss (m)      * 0.01 * Cum SA (1000 m2)  * 0.42 * 4.15 *
*****
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there

PRUDENCIA.- El presente Plan.....ha sido aprobado
 definitivamente por el C.A.V.....
 celebrado el día 29 MAYO 2012

Def.rep
 is not a valid subcritical answer. The program defaulted to critical
 depth.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 11.10	* Element	* Left OB	* Channel *
Right OB *				
* Vel Head (m)	* 0.16	* Wt. n-Val.	* 0.045	* 0.045 *
* W.S. Elev (m)	* 10.94	* Reach Len. (m)	* 20.00	* 20.00 *
20.00 *				
* Crit W.S. (m)	* 10.94	* Flow Area (m2)	* 18.00	* 11.69 *
*				
* E.G. Slope (m/m)	* 0.029564	* Area (m2)	* 18.00	* 11.69 *
*				
* Q Total (m3/s)	* 52.77	* Flow (m3/s)	* 32.04	* 20.73 *
*				
* Top Width (m)	* 93.81	* Top width (m)	* 56.88	* 36.93 *
*				
* Vel Total (m/s)	* 1.78	* Avg. Vel. (m/s)	* 1.78	* 1.77 *
*				
* Max Chl Dpth (m)	* 0.82	* Hydr. Depth (m)	* 0.32	* 0.32 *
*				
* Conv. Total (m3/s)	* 306.9	* Conv. (m3/s)	* 186.3	* 120.6 *
*				
* Length wtd. (m)	* 20.00	* Wetted Per. (m)	* 56.96	* 36.98 *
*				
* Min Ch El (m)	* 10.12	* Shear (N/m2)	* 91.62	* 91.66 *
*				
* Alpha	* 1.00	* Stream Power (N/m s)	* 163.07	* 162.53 *
*				
* Frctn Loss (m)	* 0.45	* Cum Volume (1000 m3)	* 0.58	* 6.47 *
0.39 *				
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 1.42	* 8.85 *
1.16 *				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FATES
 REACH: ARROYO RS: 90

INPUT

Description: 0+090

Station	Elevation	Data	num=	47	Sta	Elev	Sta	Elev	Sta	Elev
-65.683	12.164	-58.578	11.739	-58.573	11.739	-58.54	11.738	-51.463	11.504	
-45.73	11.258	-44.353	11.234	-42.653	11.174	-32.861	10.869	-30	10.709	
-26.766	10.528	-19.992	10.068	-15.913	9.794	-9.816	10.329	-7.451	10.38	

Def. rep									
-6.668	10.317	-5.313	10.213	-2.464	10	0	9.812	2.111	9.626
4.857	9.439	5.876	9.209	7.527	8.883	8.195	8.694	8.224	8.701
8.9	8.782	10.897	9.185	11.959	9.272	13.412	9.697	16.718	10.749
17.553	10.784	19.709	10.771	20.204	10.616	21.332	10.305	22.434	10.252
25.264	10.199	40.681	9.87	54.43	9.681	59.367	9.766	73.759	9.578
75.268	9.553	76.277	9.499	97.007	10.139	97.651	10.201	113.439	10.73
114.902	10.747	120	10.917						

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-65.683	.045	-30	.045	97.007	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	-30	97.007	20	20	20	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

	*	9.95	*	Element	*	Left OB	*	Channel	*
* E.G. Elev (m)	*	9.95	*	Element	*	Left OB	*	Channel	*
* Right OB	*	0.23	*	Wt. n-Val	*		*	0.045	*
* Vel Head (m)	*	0.23	*	Wt. n-Val	*		*	0.045	*
* W.S. Elev (m)	*	9.72	*	Reach Len. (m)	*	20.00	*	20.00	*
* 20.00	*	9.72	*	Reach Len. (m)	*	20.00	*	20.00	*
* Crit W.S. (m)	*	9.79	*	Flow Area (m2)	*		*	7.94	*
* E.G. Slope (m/m)	*	0.076413	*	Area (m2)	*		*	7.94	*
* Q Total (m3/s)	*	16.86	*	Flow (m3/s)	*		*	16.86	*
* Top width (m)	*	38.89	*	Top Width (m)	*		*	38.89	*
* Vel Total (m/s)	*	2.12	*	Avg. Vel. (m/s)	*		*	2.12	*
* Max chl Dpth (m)	*	1.03	*	Hydr. Depth (m)	*		*	0.20	*
* Conv. Total (m3/s)	*	61.0	*	Conv. (m3/s)	*		*	61.0	*
* Length Wtd. (m)	*	20.00	*	Wetted Per. (m)	*		*	39.10	*
* Min Ch El (m)	*	8.69	*	Shear (N/m2)	*		*	152.22	*
* Alpha	*	1.00	*	Stream Power (N/m s)	*		*	323.12	*
* Frctn Loss (m)	*	0.85	*	Cum Volume (1000 m3)	*		*	1.19	*
* C & E Loss (m)	*	0.01	*	Cum SA (1000 m2)	*		*	3.56	*

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #PF 7

	*	10.26	*	Element	*	Left OB	*	Channel	*
* E.G. Elev (m)	*	10.26	*	Element	*	Left OB	*	Channel	*
* Right OB	*		*		*		*		*

DILIGENCIA: El presente Plan..... ha sido aprobado
definitivamente por el..... en sesión
celebrada el día 29 MAYO 2012

Def.rep
* Vel Head (m) * 0.30 * Wt. n-Val. * * 0.045 *

EL SECRETARIO DEL AYUNTAMIENTO
* W.S. Elev (m) * 9.96 * Reach Len. (m) * 20.00 * 20.00 *

20.00 *
* Crit W.S. (m) * 10.04 * Flow Area (m2) * * 21.75 *

* E.G. slope (m/m) * 0.062251 * Area (m2) * * 21.75 *

* Q Total (m3/s) * 52.77 * Flow (m3/s) * * 52.77 *

* Top Width (m) * 74.84 * Top width (m) * * 74.84 *

* Vel Total (m/s) * 2.43 * Avg. Vel. (m/s) * * 2.43 *

* Max Chl Dpth (m) * 1.26 * Hydr. Depth (m) * * 0.29 *

* Conv. Total (m3/s) * 211.5 * Conv. (m3/s) * * 211.5 *

* Length wtd. (m) * 20.00 * Wetted Per. (m) * * 75.12 *

* Min Ch El (m) * 8.69 * Shear (N/m2) * * 176.74 *

* Alpha * 1.00 * Stream Power (N/m s) * * 428.84 *

* Frctn Loss (m) * 0.83 * Cum Volume (1000 m3) * 0.40 * 6.14 *

0.39 *
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.85 * 7.73 *

1.16 *

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: FATES
REACH: ARROYO RS: 70

INPUT

Description: 0+070

Station Elevation Data		num= 109		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-63.584	11.353	-60.44	11.165	-58.416	11.044	-56.474	10.979	-49.737	10.886
-49.061	10.876	-46.179	10.852	-36.192	10.778	-33.85	10.703	-28.034	10.402
-23.323	10.098	-20.924	9.904	-17.963	9.673	-13.814	9.301	-10.509	9.472
-3.046	9.574	-3.021	9.573	-2.766	9.565	-2.424	9.556	-1.167	9.509
-1.013	9.5	0	9.416	.719	9.356	5.095	9	6.903	8.804
7.016	8.787	7.14	8.769	7.383	8.729	7.96	8.631	8.783	8.5
8.807	8.5	8.844	8.5	9.087	8.5	9.445	8.5	10.782	8.5
12.382	8.5	14.715	8.995	14.735	9	14.767	9.008	14.786	9.014
16.42	9.5	17.34	9.75	18.424	10	20.956	10	22.992	10
24.543	9.881	25.955	9.836	27.866	9.73	29.698	9.679	31.864	9.592
33.887	9.544	34.072	9.538	35.484	9.5	35.512	9.5	35.537	9.5
35.916	9.475	36.333	9.447	37.045	9.405	37.582	9.373	38.302	9.357
39.385	9.296	40.151	9.253	41.609	9.234	41.813	9.225	42.119	9.212
42.474	9.196	42.863	9.177	45.331	9.152	45.939	9.134	46.799	9.117
50.676	9.035	50.851	9.029	51.087	9.023	51.307	9.02	51.973	9.005
52.276	9	53.043	9	54.77	9	54.855	9	57.354	9.123

				Def. rep					
58.554	9.181	59.155	9.211	64.708	9.477	64.79	9.481	64.87	9.485
65.189	9.5	67.333	9.5	67.367	9.5	67.708	9.5	69.94	9.5
70.702	9.5	70.962	9.5	71.585	9.5	72.382	9.5	73.107	9.5
73.919	9.5	74.635	9.5	75.032	9.5	75.6	9.5	75.753	9.5
76.308	9.5	76.677	9.5	77.018	9.5	85.31	9.5	85.674	9.5
86.567	9.5	102.526	9.769	105.575	10.223	115.603	10.514		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 -63.584 .045 -17.963 .045 86.567 .045 7-9 MAYO 2012

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr
 Expan. -17.963 86.567 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (m)	*	9.43	* Element	*	Left OB	*	Channel	*	
Right OB *									
* Vel Head (m)	*	0.14	* Wt. n-Val.	*		*	0.045	*	
*									
* W.S. Elev (m)	*	9.29	* Reach Len. (m)	*	20.00	*	20.00	*	
20.00 *									
* Crit W.S. (m)	*	9.28	* Flow Area (m2)	*		*	10.20	*	
*									
* E.G. slope (m/m)	*	0.029258	* Area (m2)	*		*	10.20	*	
*									
* Q Total (m3/s)	*	16.86	* Flow (m3/s)	*		*	16.86	*	
*									
* Top Width (m)	*	35.37	* Top Width (m)	*		*	35.37	*	
*									
* Vel Total (m/s)	*	1.65	* Avg. Vel. (m/s)	*		*	1.65	*	
*									
* Max Chl Dpth (m)	*	0.79	* Hydr. Depth (m)	*		*	0.29	*	
*									
* Conv. Total (m3/s)	*	98.6	* Conv. (m3/s)	*		*	98.6	*	
*									
* Length Wtd. (m)	*	20.00	* Wetted Per. (m)	*		*	35.52	*	
*									
* Min Ch El (m)	*	8.50	* Shear (N/m2)	*		*	82.35	*	
*									
* Alpha	*	1.00	* Stream Power (N/m s)	*		*	136.20	*	
*									
* Frctn Loss (m)	*	0.59	* Cum Volume (1000 m3)	*		*	1.01	*	
*									
* C & E Loss (m)	*	0.00	* Cum SA (1000 m2)	*		*	2.81	*	
*									

Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	*	9.78	* Element	*	Left OB	*	Channel	*	
Right OB *									
* Vel Head (m)	*	0.16	* Wt. n-Val.	*		*	0.045	*	
0.045 *									
* W.S. Elev (m)	*	9.62	* Reach Len. (m)	*	20.00	*	20.00	*	
20.00 *									

* Crit W.S. (m)	* 9.62	* Def.rep			
0.40		* Flow Area (m2)	*	* 29.39	*
* E.G. Slope (m/m)	* 0.028658	* Area (m2)	*	* 29.39	*
0.40					
* Q Total (m3/s)	* 52.77	* Flow (m3/s)	*	* 52.54	*
0.23					
* Top Width (m)	* 96.39	* Top Width (m)	*	* 89.49	*
6.90					
* Vel Total (m/s)	* 1.77	* Avg. vel. (m/s)	*	* 1.79	*
0.56					
* Max Chl Dpth (m)	* 1.12	* Hydr. Depth (m)	*	* 0.33	*
0.06					
* Conv. Total (m3/s)	* 311.7	* Conv. (m3/s)	*	* 310.4	*
1.3					
* Length Wtd. (m)	* 20.00	* Wetted Per. (m)	*	* 89.73	*
6.90					
* Min Ch El (m)	* 8.50	* Shear (N/m2)	*	* 92.06	*
16.35					
* Alpha	* 1.01	* Stream Power (N/m s)	*	* 164.56	*
9.23					
* Frctn Loss (m)	* 0.35	* Cum Volume (1000 m3)	*	0.40	* 5.63 *
0.39					
* C & E Loss (m)	* 0.02	* Cum SA (1000 m2)	*	0.85	* 6.09 *
1.09					

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth.

This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 50

INPUT

Description: 0+050
0+050

Station Elevation Data				num=	105				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-61.242	10.824	-60.685	10.789	-60.34	10.767	-58.861	10.713	-54.001	10.556
-46.996	10.417	-46.76	10.411	-46.39	10.406	-35.131	10.231	-27.811	9.864
-23.265	9.583	-15.231	8.882	-11.4	8.574	-9.902	8.62	-5.111	9
-4.941	8.942	-3.399	8.5	-1.848	8.297	-.555	8.233	0	8.191
.227	8.174	.496	8.16	2.118	8.087	2.279	8.079	2.543	8.068
3.899	8	4.205	8	4.938	8	5.591	8	6.044	8
8.774	8	10.641	8.37	10.865	8.395	11.111	8.41	11.473	8.435
13.173	8.473	13.36	8.479	14.996	8.5	15.837	8.513	15.929	8.515
17.275	8.54	18.529	8.573	18.911	8.586	19.869	8.6	22.859	8.697

DILIGENCIA: El presente Plan..... ha sido aprobado
definitivamente por..... en sesión
celebrada el día..... 29 MAYO 2012

				Def. rep					
23.993	8.714	26.003	8.773	27.629	8.805	28.294	8.821	29.123	8.845
29.998	8.872	30.858	8.896	32.783	9	32.828	9	32.939	9
33.884	9	34.132	9	37.179	9	37.578	9	37.827	9
38.214	9	40.366	9	41.811	9	44.286	9	44.468	9
46.71	9	46.805	9	46.916	9	47.216	9	50.538	9
50.8	9	51.54	9	51.601	9	51.625	9	51.748	9
51.872	9	51.887	9	51.993	9	56.047	9	59.477	9
62.101	9	62.882	9	62.903	9	72.045	9.304	75.554	9.428
77.678	9.5	77.691	9.5	77.694	9.5	77.71	9.5	77.72	9.5
77.725	9.5	77.814	9.5	77.852	9.5	80.709	9.5	81.058	9.5
82.859	9.5	84.751	9.5	84.788	9.5	86.69	9.5	90.486	9.5
92.252	9.5	107.468	9.5	107.59	9.5	110.499	9.5	115.666	9.58

Manning's n values num= 3
Sta n Val Sta n Val Sta n Val

-61.242 .045 -15.231 .045 62.101 .045

Bank Sta: Left Right Lengths: Left channel Right Coeff Contr.
Expan. -15.231 62.101 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

```
*****
* E.G. Elev (m) * 8.83 * Element * Left OB * Channel *
Right OB *
* Vel Head (m) * 0.17 * Wt. n-Val. * * 0.045 *
*
* W.S. Elev (m) * 8.67 * Reach Len. (m) * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m) * 8.67 * Flow Area (m2) * * 9.35 *
*
* E.G. Slope (m/m) *0.030153 * Area (m2) * * 9.35 *
*
* Q Total (m3/s) * 16.86 * Flow (m3/s) * * 16.86 *
*
* Top width (m) * 29.16 * Top width (m) * * 29.16 *
*
* Vel Total (m/s) * 1.80 * Avg. Vel. (m/s) * * 1.80 *
*
* Max chl Dpth (m) * 0.67 * Hydr. Depth (m) * * 0.32 *
*
* Conv. Total (m3/s) * 97.1 * Conv. (m3/s) * * 97.1 *
*
* Length Wtd. (m) * 20.00 * Wetted Per. (m) * * 29.26 *
*
* Min Ch El (m) * 8.00 * Shear (N/m2) * * 94.49 *
*
* Alpha * 1.00 * Stream Power (N/m s) * * 170.43 *
*
* Frctn Loss (m) * 0.35 * Cum Volume (1000 m3) * * 0.81 *
*
* C & E Loss (m) * 0.03 * Cum SA (1000 m2) * * 2.17 *
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 7

```

*****
* E.G. Elev (m)      * 9.28 * Element * Left OB * Channel *
Right OB *
* Vel Head (m)      * 0.11 * wt. n-val. * 0.045 * 0.045 *
0.045 *
* W.S. Elev (m)      * 9.17 * Reach Len. (m) * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m)      * 9.07 * Flow Area (m2) * 0.48 * 35.78 *
0.57 *
* E.G. slope (m/m)   * 0.012061 * Area (m2) * 0.48 * 35.78 *
0.57 *
* Q Total (m3/s)      * 52.77 * Flow (m3/s) * 0.32 * 52.16 *
0.29 *
* Top width (m)      * 86.55 * Top width (m) * 3.30 * 77.33 *
5.91 *
* Vel Total (m/s)     * 1.43 * Avg. Vel. (m/s) * 0.67 * 1.46 *
0.51 *
* Max Chl Dpth (m)    * 1.17 * Hydr. Depth (m) * 0.14 * 0.46 *
0.10 *
* Conv. Total (m3/s)  * 480.5 * Conv. (m3/s) * 2.9 * 474.9 *
2.7 *
* Length wtd. (m)     * 20.00 * Wetted Per. (m) * 3.32 * 77.50 *
5.92 *
* Min Ch El (m)       * 8.00 * Shear (N/m2) * 16.98 * 54.60 *
11.41 *
* Alpha              * 1.02 * Stream Power (N/m s) * 11.36 * 79.60 *
5.86 *
* Frctn Loss (m)      * 0.04 * Cum Volume (1000 m3) * 0.39 * 4.97 *
0.38 *
* C & E Loss (m)      * 0.03 * Cum SA (1000 m2) * 0.82 * 4.42 *
0.96 *
*****
  
```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: FATES
 REACH: ARROYO RS: 30

INPUT

Description: 0+030

Station Elevation Data		num= 110		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-56.831	9.824	-53.448	9.771	-49.59	9.754	-47.904	9.728	-40.255	9.492		
-36.038	9.352	-33.653	9.273	-27.868	9.028	-24.173	8.775	-19.853	8.51		
-19.005	8.491	-18.524	8.478	-16.744	8.424	-8.13	8.507	-7.862	8.503		
-7.69	8.5	-7.619	8.5	-7.408	8.5	-7.216	8.5	-6.866	8.5		

DILIGENCIA. El presente Plan..... ha sido aprobado definitivamente por el..... de fecha en sesión celebrada el día 29 MAYO 2012

				Def.rep					
-6.725	8.5	-5.87	8.5	-5.751	8.5	-5.739	8.5	-5.669	8.493
-5.594	8.489	0	8.154	2.965	8	2.717	8	2.799	8
2.863	8	2.865	8	2.876	8	2.894	8	2.927	8
2.962	8	3.011	8	3.05	8	3.072	8	3.804	7.946
3.911	7.939	12.379	7.668	15.117	7.699	25.194	8	26.409	8
26.528	8	26.698	8	26.811	8	26.905	8	27.585	8
27.658	8	27.68	8	27.689	8	28.338	8	28.388	8
28.987	8	29.334	8	29.766	8	31.254	8.021	31.729	8
46.902	8.393	50.892	8.5	51.198	8.5	51.355	8.5	52.272	8.5
52.677	8.5	52.758	8.5	52.876	8.5	53.02	8.5	53.55	8.5
53.851	8.5	54.128	8.5	54.325	8.5	59.988	8.947	60.151	8.956
60.329	8.966	60.964	9	61.064	9	61.092	9	61.101	9
61.114	9	61.131	9	61.369	9	61.426	9	62.233	9
64.387	9.121	64.792	9.131	66.995	9.213	74.237	9.43	74.279	9.431
76.634	9.5	79.271	9.5	79.832	9.5	83.734	9.5	85.036	9.5
86.795	9.5	87.397	9.5	89.103	9.5	90.287	9.5	91.551	9.478
91.932	9.472	92.133	9.469	101.626	9.4	102.532	9.4	103.457	9.399
112.204	9.383	114.558	9.378	118.418	9.374	118.516	9.374	121.376	9.375

Manning's n Values num= 3
 Sta n Val Sta n Val

 -56.831 .045 -19.853 .045 52.272 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.
 Expan. -19.853 52.272 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

```

*****
* E.G. Elev (m) * 8.36 * Element * Left OB * Channel *
Right OB *
* Vel Head (m) * 0.07 * Wt. n-Val. * 0.045 *
*
* W.S. Elev (m) * 8.29 * Reach Len. (m) * 20.00 * 20.00 *
20.00 *
* Crit W.S. (m) * 8.18 * Flow Area (m2) * 14.83 *
*
* E.G. Slope (m/m) *0.011571 * Area (m2) * 14.83 *
*
* Q Total (m3/s) * 16.86 * Flow (m3/s) * 16.86 *
*
* Top width (m) * 45.19 * Top width (m) * 45.19 *
*
* Vel Total (m/s) * 1.14 * Avg. Vel. (m/s) * 1.14 *
*
* Max Chl Dpth (m) * 0.62 * Hydr. Depth (m) * 0.33 *
*
* Conv. Total (m3/s) * 156.8 * Conv. (m3/s) * 156.8 *
*
* Length wtd. (m) * 20.00 * Wetted Per. (m) * 45.22 *
*
* Min Ch El (m) * 7.67 * Shear (N/m2) * 37.22 *
*
* Alpha * 1.00 * Stream Power (N/m s) * 42.31 *
*
* Frctn Loss (m) * 0.35 * Cum Volume (1000 m3) * 0.57 *
*
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 1.42 *

```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

DILIGENCIA. El presente Plan... ha sido aprobado
definitivamente por... en sesión
celebrada el día 9 MAYO 2012

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 9.21	* Element	* Left OB	* channel
* Right OB	* 0.02	* wt. n-Val.	* 0.045	* 0.045
* Vel Head (m)	* 0.045	* Reach Len. (m)	* 20.00	* 20.00
* W.S. Elev (m)	* 9.19	* Flow Area (m2)	* 3.71	* 75.52
* Crit W.S. (m)	* 4.83	* Area (m2)	* 3.71	* 75.52
* E.G. Slope (m/m)	* 0.000840	* Flow (m3/s)	* 1.11	* 50.14
* Q Total (m3/s)	* 52.77	* Top Width (m)	* 11.78	* 72.13
* Top width (m)	* 97.95	* Avg. Vel. (m/s)	* 0.30	* 0.66
* Vel Total (m/s)	* 0.63	* Hydr. Depth (m)	* 0.32	* 1.05
* Max Chl Dpth (m)	* 1.52	* Conv. (m3/s)	* 38.2	* 1729.8
* Conv. Total (m3/s)	* 1820.5	* Wetted Per. (m)	* 11.80	* 72.16
* Length wtd. (m)	* 20.00	* Shear (N/m2)	* 2.59	* 8.62
* Min Ch El (m)	* 7.67	* Stream Power (N/m s)	* 0.77	* 5.72
* Alpha	* 1.07	* Cum Volume (1000 m3)	* 0.35	* 3.86
* Frctn Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.67	* 2.92
* C & E Loss (m)	* 0.00			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FATES
REACH: ARROYO RS: 20

INPUT

Description: 0+020

Station	Elevation	Data	num=	112	Sta	Elev	Sta	Elev	Sta	Elev
-54.626	9.31	-54.499	9.308	-54.29	9.307	-47.385	9.037	-42.425	8.891	
-40.144	8.867	-36.574	8.714	-30.559	8.513	-26.218	8.125	-23.932	8.025	
-18.736	8	-18.636	7.99	-15.328	7.564	-14.939	7.509	-14.903	7.507	
-14.892	7.506	-14.834	7.5	-11.589	7.061	-11.562	7.066	-11.527	7.071	
-11.486	7.077	-10.827	7.116	-10.382	7.184	-10.305	7.194	-10.282	7.197	
-7.905	7.5	-5.747	7.73	-3.149	7.988	-3.067	7.996	-2.808	7.996	
-2.757	7.996	-2.713	7.994	0	7.851	1.466	7.774	1.901	7.752	
2.832	7.704	5.27	7.567	5.863	7.535	6.469	7.5	8.375	7.5	
10.304	7.5	12.246	7.5	12.251	7.5	12.377	7.5	12.43	7.5	
12.653	7.5	12.708	7.5	12.821	7.5	12.85	7.5	13.227	7.5	
13.271	7.5	13.307	7.5	13.654	7.5	13.755	7.5	15.808	7.575	
22.188	8	25.252	8.07	25.54	8.07	33.869	8.185	38.156	8	

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				Def.rep							
50.328	8.316	51.281	8.33	53.436	8.372	55.962	8.442	57.846	8.5		
61.477	8.711	63.011	8.796	63.26	8.807	65.345	8.926	65.638	8.931		
65.939	8.937	67.344	9	67.467	9	67.544	9	68.1	9		
69.157	9	69.228	9	70.453	9	71.684	9.439	71.805	9.47		
71.862	9.491	71.913	9.492	72.047	9.49	72.266	9.482	72.421	9.479		
72.552	9.479	72.886	9.48	73.613	9.488	73.692	9.496	74.04	9.5		
74.465	9.5	74.491	9.5	75.594	9.5	75.641	9.5	76.599	9.5		
77.572	9.5	78.417	9.477	79.903	9.437	80.718	9.41	81.566	9.414		
82.088	9.397	84.838	9.292	86.49	9.3	88.655	9.24	88.986	9.246		
89.638	9.226	93.23	9.277	94.392	9.278	95.828	9.253	96.029	9.25		
96.136	9.248	100	9.22								

Manning's n Values num= 3
Sta n Val sta n Val Sta n Val

-54.626 .045 -23.932 .045 50.328 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.
Expan. -23.932 50.328 10 10 10 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

```
*****
* E.G. Elev (m) * 8.00 * Element * Left OB * Channel *
Right OB *
* Vel Head (m) * 0.15 * wt. n-Val. * 0.045 *
*
* W.S. Elev (m) * 7.85 * Reach Len. (m) * 10.00 * 10.00 *
10.00 *
* Crit W.S. (m) * 7.85 * Flow Area (m2) * 9.79 *
*
* E.G. Slope (m/m) * 0.030144 * Area (m2) * 9.79 *
*
* Q Total (m3/s) * 16.86 * Flow (m3/s) * 16.86 *
*
* Top width (m) * 32.73 * Top width (m) * 32.73 *
*
* Vel Total (m/s) * 1.72 * Avg. Vel. (m/s) * 1.72 *
*
* Max chl Dpth (m) * 0.79 * Hydr. Depth (m) * 0.30 *
*
* Conv. Total (m3/s) * 97.1 * Conv. (m3/s) * 97.1 *
*
* Length wtd. (m) * 10.00 * Wetted Per. (m) * 32.84 *
*
* Min ch El (m) * 7.06 * Shear (N/m2) * 88.13 *
*
* Alpha * 1.00 * Stream Power (N/m s) * 151.76 *
*
* Frctn Loss (m) * 0.05 * Cum Volume (1000 m3) * 0.32 *
*
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * 0.65 *
*****
```

warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
warning: Divided flow computed for this cross-section.
warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

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Def.rep

Warning: This may indicate the need for additional cross sections.
During the standard step iterations, when the assumed water surface was
set equal to critical
depth, the calculated water surface came back below critical depth.
This indicates that there
is not a valid subcritical answer. The program defaulted to critical
depth.

CROSS SECTION OUTPUT Profile #PF 7

```
*****
* E.G. Elev (m) * 9.20 * Element * Left OB * Channel *
Right OB * 0.01 * Wt. n-Val. * 0.045 * 0.045 *
* Vel Head (m) * 0.01 * Reach Len. (m) * 10.00 * 10.00 *
0.045 * * Flow Area (m2) * 13.24 * 99.93 *
* W.S. Elev (m) * 9.19 * Area (m2) * 13.24 * 99.93 *
10.00 * * Flow (m3/s) * 3.16 * 47.01 *
* Crit W.S. (m) * * Top width (m) * 27.26 * 74.26 *
10.55 * * Avg. vel. (m/s) * 0.24 * 0.47 *
* E.G. slope (m/m) *0.000302 * Hydr. Depth (m) * 0.49 * 1.35 *
10.55 * * Conv. (m3/s) * 181.7 * 2703.2 *
* Q Total (m3/s) * 52.77 * wetted Per. (m) * 27.29 * 74.41 *
2.60 * * Shear (N/m2) * 1.44 * 3.98 *
* Top width (m) * 122.17 * Stream Power (N/m s) * 0.34 * 1.87 *
20.65 * * Cum volume (1000 m3) * 0.18 * 2.11 *
* Vel Total (m/s) * 0.43 * Cum SA (1000 m2) * 0.28 * 1.46 *
0.25 * *
* Max Chl Dpth (m) * 2.12 *
0.51 *
* Conv. Total (m3/s) * 3034.6 *
149.7 *
* Length Wtd. (m) * 10.00 *
20.69 *
* Min Ch El (m) * 7.06 *
1.51 *
* Alpha * 1.12 *
0.37 *
* Frctn Loss (m) * 0.00 *
0.17 *
* C & E Loss (m) * 0.00 *
0.42 *
*****
*****
```

Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional
cross sections.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 10

INPUT

Description: 0+010

Station	Elev	Data	num=	126	Elev	Sta	Elev	Sta	Elev
-50.899	8.754	-46.031	8.45	-45.652	8.308	-45.201	8.14	-39.494	8.268
-37.939	8.251	-36.946	8.209	-33.764	7.427	-28.977	7	-26.581	7
-20.771	7	-19.754	7	-19.224	7	-17.321	6.776	-14.755	6.796
-12.834	6.857	-12.686	6.856	-12.559	6.856	-12.392	6.855	-8.647	6.965
-8.625	6.965	-8.234	7	-7.861	7	-0.899	7.345	-0.764	7.343
-0.572	7.343	-0.441	7.342	-0.119	7.333	0	7.329	0.057	7.327
0.241	7.317	0.611	7.293	0.714	7.292	1.187	7.261	1.44	7.242
1.836	7.209	4.066	7.012	4.124	7.006	4.197	7	6.105	7

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6.311	7	7.395	7	7.734	7.064	9.974	7.5	10.802	7.67
10.873	7.68	10.936	7.683	11.9	7.868	12.62	7.851	13.217	7.895
13.235	7.898	14.127	7.877	16.491	8	17.383	8	18.294	8
20.789	8.106	21.587	8.109	22.326	8.112	26.582	8.237	27.414	8.237
28.129	8.237	28.938	8.239	31.304	8.293	32.508	8.295	36.483	8.35
44.582	8	49.399	8.125	49.776	8.131	50.628	8.147	51.628	8.175
51.631	8.175	53.296	8.226	57.656	8.362	57.697	8.362	57.812	8.364
57.825	8.365	59.817	8.5	60.072	8.5	62.343	8.5	65.136	8.643
65.219	8.647	66.817	8.703	67.178	8.712	67.459	8.721	68.792	8.747
68.827	8.747	69.106	8.751	70.972	8.706	71.039	8.707	71.09	8.704
71.534	8.703	72.825	8.691	73.475	8.685	73.775	8.682	75.144	8.671
75.454	8.67	75.574	8.67	75.928	8.669	76.958	8.672	78.67	8.68
79.995	8.686	81.27	8.692	83.193	8.701	84.264	8.711	84.453	8.718
86.453	8.737	86.586	8.743	87.854	8.798	89.239	8.846	89.933	8.894
90.363	8.887	91.022	8.954	91.118	8.953	91.509	9	91.535	9
92.212	9	92.723	9	92.932	9	93.965	9	94.11	9
94.171	9	95.395	9	95.53	9	97.497	9.028	99.95	9.03
100	9.029								

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

-50.899 .045 -36.946 .045 68.792 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.
Expan. -36.946 68.792 10 10 10 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

```
*****
* E.G. Elev (m) * 7.64 * Element * Left OB * Channel *
Right OB *
* Vel Head (m) * 0.02 * Wt. n-Val. * 0.045 *
*
* W.S. Elev (m) * 7.62 * Reach Len. (m) * 10.00 * 10.00 *
10.00 *
* Crit W.S. (m) * 7.28 * Flow Area (m2) * 24.59 *
*
* E.G. Slope (m/m) * 0.002146 * Area (m2) * 24.59 *
*
* Q Total (m3/s) * 16.86 * Flow (m3/s) * 16.86 *
*
* Top width (m) * 45.06 * Top Width (m) * 45.06 *
*
* Vel Total (m/s) * 0.69 * Avg. Vel. (m/s) * 0.69 *
*
* Max chl Dpth (m) * 0.84 * Hydr. Depth (m) * 0.55 *
*
* Conv. Total (m3/s) * 364.0 * Conv. (m3/s) * 364.0 *
*
* Length wtd. (m) * 10.00 * wetted Per. (m) * 45.20 *
*
* Min ch El (m) * 6.78 * Shear (N/m2) * 11.44 *
*
* Alpha * 1.00 * Stream Power (N/m s) * 7.85 *
*
* Frctn Loss (m) * 0.06 * Cum Volume (1000 m3) * 0.15 *
*
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * 0.26 *
*****
*****
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream

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Def.rep

conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 7

* E.G. Elev (m)	* 9.19	* Element	* Left OB	* Channel *
Right OB				
* Vel Head (m)	* 0.00	* Wt. n-Val.	* 0.045	* 0.045 *
* 0.045 *				
* W.S. Elev (m)	* 9.19	* Reach Len. (m)	* 10.00	* 10.00 *
* 10.00 *				
* Crit W.S. (m)	*	* Flow Area (m2)	* 11.61	* 154.66 *
* 11.89 *				
* E.G. Slope (m/m)	* 0.000122	* Area (m2)	* 11.61	* 154.66 *
* 11.89 *				
* Q Total (m3/s)	* 52.77	* Flow (m3/s)	* 2.46	* 48.78 *
* 1.53 *				
* Top Width (m)	* 150.90	* Top Width (m)	* 13.95	* 105.74 *
* 31.21 *				
* Vel Total (m/s)	* 0.30	* Avg. Vel. (m/s)	* 0.21	* 0.32 *
* 0.13 *				
* Max Chl Dpth (m)	* 2.41	* Hydr. Depth (m)	* 0.83	* 1.46 *
* 0.38 *				
* Conv. Total (m3/s)	* 4782.4	* Conv. (m3/s)	* 222.8	* 4421.2 *
* 138.4 *				
* Length wtd. (m)	* 10.00	* Wetted Per. (m)	* 14.45	* 106.01 *
* 31.38 *				
* Min Ch El (m)	* 6.78	* Shear (N/m2)	* 0.96	* 1.74 *
* 0.45 *				
* Alpha	* 1.08	* Stream Power (N/m s)	* 0.20	* 0.55 *
* 0.06 *				
* Frctn Loss (m)	* 0.00	* Cum Volume (1000 m3)	* 0.06	* 0.83 *
* 0.06 *				
* C & E Loss (m)	* 0.10	* Cum SA (1000 m2)	* 0.07	* 0.56 *
* 0.16 *				

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FATES
REACH: ARROYO

RS: 0

INPUT

Description: 0+000
0+000

Station	Elevation	Data	num=	10	Sta	Elev	Sta	Elev	Sta	Elev
-13.8	12.47	-13.75	6.17	-10.5	6.17	-10.45	12.47	-1.5	9.17	
-1.45	6.17	0	6.171	1.45	6.17	1.5	9.17	20	9.17	

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.
Expan. -13.8 0.45 -13.8 0.45 1.5 0.045
-13.8 1.5 10 10 10 .1 .3

CROSS SECTION OUTPUT Profile #PF 2

```
*****
*****
* E.G. Elev (m) * 7.54 * Element * Left OB * Channel *
* Right OB * 0.46 * wt. n-Val. * * 0.045 *
* Vel Head (m) *
* W.S. Elev (m) * 7.08 * Reach Len. (m) * * *
* Crit W.S. (m) * 7.08 * Flow Area (m2) * * 5.62 *
* E.G. Slope (m/m) * 0.038198 * Area (m2) * * 5.62 *
* Q Total (m3/s) * 16.86 * Flow (m3/s) * * 16.86 *
* Top Width (m) * 6.19 * Top Width (m) * * 6.19 *
* Vel Total (m/s) * 3.00 * Avg. Vel. (m/s) * * 3.00 *
* Max Chl Dpth (m) * 0.91 * Hydr. Depth (m) * * 0.91 *
* Conv. Total (m3/s) * 86.3 * Conv. (m3/s) * * 86.3 *
* Length Wtd. (m) * * Wetted Per. (m) * * 9.79 *
* Min Ch El (m) * 6.17 * Shear (N/m2) * * 215.00 *
* Alpha * 1.00 * Stream Power (N/m s) * * 644.90 *
* Frctn Loss (m) * * Cum Volume (1000 m3) * * *
* C & E Loss (m) * * Cum SA (1000 m2) * * *
*****
*****
```

Warning: Divided flow computed for this cross-section.
Warning: Slope too steep for slope area to converge during supercritical flow
calculations (normal depth
is below critical depth). Water surface set to critical depth.

CROSS SECTION OUTPUT Profile #PF 7

```
*****
*****
* E.G. Elev (m) * 9.09 * Element * Left OB * Channel *
* Right OB * 0.97 * wt. n-Val. * * 0.045 *
* Vel Head (m) *
* W.S. Elev (m) * 8.12 * Reach Len. (m) * * *
* Crit W.S. (m) * 8.12 * Flow Area (m2) * * 12.07 *
* E.G. Slope (m/m) * 0.046948 * Area (m2) * * 12.07 *
* Q Total (m3/s) * 52.77 * Flow (m3/s) * * 52.77 *
* Top Width (m) * 6.25 * Top Width (m) * * 6.25 *
* Vel Total (m/s) * 4.37 * Avg. Vel. (m/s) * * 4.37 *
* Max Chl Dpth (m) * 1.95 * Hydr. Depth (m) * * 1.93 *
```


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* Conv. Total (m3/s)	* 243.5	* Def.rep	* 243.5
* Length wtd. (m)	*	* Conv. (m3/s)	*
* Min Ch El (m)	* 6.17	* Wetted Per. (m)	* 13.94
* Alpha	* 1.00	* Shear (N/m2)	* 398.53
* Frctn Loss (m)	*	* Stream Power (N/m s)	* 1742.95
* C & E Loss (m)	*	* Cum Volume (1000 m3)	*
		* Cum SA (1000 m2)	*

Warning: Divided flow computed for this cross-section.
Warning: Slope too steep for slope area to converge during supercritical flow
calculations (normal depth
is below critical depth). water surface set to critical depth.

SUMMARY OF MANNING'S N VALUES

River: FATES

* Reach	* River Sta.	* n1	* n2	* n3
*ARROYO	* 528	* .045*	* .045*	* .045*
*ARROYO	* 510	* .045*	* .045*	* .045*
*ARROYO	* 490	* .045*	* .045*	* .045*
*ARROYO	* 470	* .045*	* .045*	* .045*
*ARROYO	* 450	* .045*	* .045*	* .045*
*ARROYO	* 430	* .045*	* .045*	* .045*
*ARROYO	* 410	* .045*	* .045*	* .045*
*ARROYO	* 390	* .045*	* .045*	* .045*
*ARROYO	* 370	* .045*	* .045*	* .045*
*ARROYO	* 350	* .045*	* .045*	* .045*
*ARROYO	* 330	* .045*	* .045*	* .045*
*ARROYO	* 310	* .045*	* .045*	* .045*
*ARROYO	* 290	* .045*	* .045*	* .045*
*ARROYO	* 270	* .045*	* .045*	* .045*
*ARROYO	* 250	* .045*	* .045*	* .045*
*ARROYO	* 230	* .045*	* .045*	* .045*
*ARROYO	* 210	* .045*	* .045*	* .045*
*ARROYO	* 190	* .045*	* .045*	* .045*
*ARROYO	* 170	* .045*	* .045*	* .045*
*ARROYO	* 150	* .045*	* .045*	* .045*
*ARROYO	* 130	* .045*	* .045*	* .045*
*ARROYO	* 110	* .045*	* .045*	* .045*
*ARROYO	* 90	* .045*	* .045*	* .045*
*ARROYO	* 70	* .045*	* .045*	* .045*
*ARROYO	* 50	* .045*	* .045*	* .045*
*ARROYO	* 30	* .045*	* .045*	* .045*
*ARROYO	* 20	* .045*	* .045*	* .045*
*ARROYO	* 10	* .045*	* .045*	* .045*
*ARROYO	* 0	* .045*	* .045*	* .045*

SUMMARY OF REACH LENGTHS

River: FATES

* Reach	* River Sta.	* Left	* channel	* Right
*ARROYO	* 528	* 18.77*	* 18.77*	* 18.77*

			Def. rep		
*ARROYO	*	510	*	20*	20*
*ARROYO	*	490	*	20*	20*
*ARROYO	*	470	*	20*	20*
*ARROYO	*	450	*	20*	20*
*ARROYO	*	430	*	20*	20*
*ARROYO	*	410	*	20*	20*
*ARROYO	*	390	*	20*	20*
*ARROYO	*	370	*	20*	20*
*ARROYO	*	350	*	20*	20*
*ARROYO	*	330	*	20*	20*
*ARROYO	*	310	*	20*	20*
*ARROYO	*	290	*	20*	20*
*ARROYO	*	270	*	20*	20*
*ARROYO	*	250	*	20*	20*
*ARROYO	*	230	*	20*	20*
*ARROYO	*	210	*	20*	20*
*ARROYO	*	190	*	20*	20*
*ARROYO	*	170	*	20*	20*
*ARROYO	*	150	*	20*	20*
*ARROYO	*	130	*	20*	20*
*ARROYO	*	110	*	20*	20*
*ARROYO	*	90	*	20*	20*
*ARROYO	*	70	*	20*	20*
*ARROYO	*	50	*	20*	20*
*ARROYO	*	30	*	20*	20*
*ARROYO	*	20	*	10*	10*
*ARROYO	*	10	*	10*	10*
*ARROYO	*	0	*	10*	10*

 DILIGENCIA.- El presente Plan..... ha sido aprobado
 SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS por el Excmo. Ayuntamiento de Tarifa en sesión
 River: FATES celebrada el día..... 2-9 MAYO 2012

* Reach	* River Sta.	* Contr.	* Expan.
*ARROYO	* 528	* .1*	
*ARROYO	* 510	* .1*	
*ARROYO	* 490	* .1*	
*ARROYO	* 470	* .1*	
*ARROYO	* 450	* .1*	
*ARROYO	* 430	* .1*	
*ARROYO	* 410	* .1*	
*ARROYO	* 390	* .1*	
*ARROYO	* 370	* .1*	
*ARROYO	* 350	* .1*	
*ARROYO	* 330	* .1*	
*ARROYO	* 310	* .1*	
*ARROYO	* 290	* .1*	
*ARROYO	* 270	* .1*	
*ARROYO	* 250	* .1*	
*ARROYO	* 230	* .1*	
*ARROYO	* 210	* .1*	
*ARROYO	* 190	* .1*	
*ARROYO	* 170	* .1*	
*ARROYO	* 150	* .1*	
*ARROYO	* 130	* .1*	
*ARROYO	* 110	* .1*	
*ARROYO	* 90	* .1*	
*ARROYO	* 70	* .1*	
*ARROYO	* 50	* .1*	
*ARROYO	* 30	* .1*	
*ARROYO	* 20	* .1*	
*ARROYO	* 10	* .1*	
*ARROYO	* 0	* .1*	

ESTUDIO DE ESTABLECIMIENTO

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Plan 02

River: FATES Reach: ARROYO RS: 528 Profile: PF 2
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: FATES Reach: ARROYO RS: 528 Profile: PF 7
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
River: FATES Reach: ARROYO RS: 510 Profile: PF 2
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: FATES Reach: ARROYO RS: 510 Profile: PF 7
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: FATES Reach: ARROYO RS: 490 Profile: PF 2
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: FATES Reach: ARROYO RS: 490 Profile: PF 7
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

EL SECRETARIO DEL AYUNTAMIENTO Def rep

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 470 Profile: PF 2

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

River: FATES Reach: ARROYO RS: 470 Profile: PF 7

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

River: FATES Reach: ARROYO RS: 450 Profile: PF 2

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 450 Profile: PF 7

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 430 Profile: PF 2

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.

River: FATES Reach: ARROYO RS: 430 Profile: PF 7

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.

River: FATES Reach: ARROYO RS: 410 Profile: PF 2

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

Def.rep

conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

River: FATES Reach: ARROYO RS: 410 Profile: PF 7

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

River: FATES Reach: ARROYO RS: 390 Profile: PF 2

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: FATES Reach: ARROYO RS: 390 Profile: PF 7

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 370 Profile: PF 2

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 370 Profile: PF 7

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.

River: FATES Reach: ARROYO RS: 350 Profile: PF 2

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.

River: FATES Reach: ARROYO RS: 350 Profile: PF 7

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: FATES Reach: ARROYO RS: 330 Profile: PF 2
Warning: The energy equation could not be balanced within the specified
number of iterations. The program selected the water
surface that had the least amount of error between computed and
assumed values.

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface
was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that
there is not a valid subcritical answer. The
program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 330 Profile: PF 7

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the
computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.

River: FATES Reach: ARROYO RS: 310 Profile: PF 2

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the
previous upstream section.

River: FATES Reach: ARROYO RS: 310 Profile: PF 7

Warning: The energy equation could not be balanced within the specified
number of iterations. The program selected the water
surface that had the least amount of error between computed and
assumed values.

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.

River: FATES Reach: ARROYO RS: 290 Profile: PF 2

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.

River: FATES Reach: ARROYO RS: 290 Profile: PF 7

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the
previous upstream section.

River: FATES Reach: ARROYO RS: 270 Profile: PF 2

Warning: The energy equation could not be balanced within the specified
number of iterations. The program selected the water
surface that had the least amount of error between computed and
assumed values.

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface
was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that
there is not a valid subcritical answer. The
program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 270 Profile: PF 7

Warning: The energy equation could not be balanced within the specified
number of iterations. The program selected the water
surface that had the least amount of error between computed and
assumed values.

SECRETARIO DEL AYUNTAMIENTO Def. rep

Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 250 Profile: PF 2

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.

River: FATES Reach: ARROYO RS: 250 Profile: PF 7

Warning: Divided flow computed for this cross-section.

River: FATES Reach: ARROYO RS: 230 Profile: PF 2

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
 Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

River: FATES Reach: ARROYO RS: 230 Profile: PF 7

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: FATES Reach: ARROYO RS: 210 Profile: PF 2

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: FATES Reach: ARROYO RS: 210 Profile: PF 7

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 190 Profile: PF 2

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 190 Profile: PF 7

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.

River: FATES Reach: ARROYO RS: 170 Profile: PF 2

Warning: Divided flow computed for this cross-section.

River: FATES Reach: ARROYO RS: 170 Profile: PF 7

Def.rep

warning:Divided flow computed for this cross-section.
Note: Hydraulic jump has occurred between this cross section and the
previous upstream section.
River: FATES Reach: ARROYO RS: 150 Profile: PF 2
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: FATES Reach: ARROYO RS: 150 Profile: PF 7
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: FATES Reach: ARROYO RS: 130 Profile: PF 2
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
River: FATES Reach: ARROYO RS: 130 Profile: PF 7
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
River: FATES Reach: ARROYO RS: 110 Profile: PF 2
Warning:The energy equation could not be balanced within the specified
number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface
was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that
there is not a valid subcritical answer. The
program defaulted to critical depth.
River: FATES Reach: ARROYO RS: 110 Profile: PF 7
Warning:The energy equation could not be balanced within the specified
number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface
was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that
there is not a valid subcritical answer. The
program defaulted to critical depth.
River: FATES Reach: ARROYO RS: 90 Profile: PF 2
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
River: FATES Reach: ARROYO RS: 90 Profile: PF 7
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
River: FATES Reach: ARROYO RS: 70 Profile: PF 2

Def.rep

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the
previous upstream section.
River: FATES Reach: ARROYO RS: 70 Profile: PF 7
Warning: The energy equation could not be balanced within the specified
number of iterations. The program selected the water
surface that had the least amount of error between computed and
assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface
was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that
there is not a valid subcritical answer. The
program defaulted to critical depth.
River: FATES Reach: ARROYO RS: 50 Profile: PF 2
Warning: The energy equation could not be balanced within the specified
number of iterations. The program selected the water
surface that had the least amount of error between computed and
assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface
was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that
there is not a valid subcritical answer. The
program defaulted to critical depth.
River: FATES Reach: ARROYO RS: 50 Profile: PF 7
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the
previous upstream section.
River: FATES Reach: ARROYO RS: 30 Profile: PF 2
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.
River: FATES Reach: ARROYO RS: 30 Profile: PF 7
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: FATES Reach: ARROYO RS: 20 Profile: PF 2
Warning: The energy equation could not be balanced within the specified
number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the
current and previous cross section. This may indicate
the need for additional cross sections.

Def.rep

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: FATES Reach: ARROYO RS: 20 Profile: PF 7

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: FATES Reach: ARROYO RS: 10 Profile: PF 2

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: FATES Reach: ARROYO RS: 10 Profile: PF 7

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: FATES Reach: ARROYO RS: 0 Profile: PF 2

Warning: Divided flow computed for this cross-section.

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

River: FATES Reach: ARROYO RS: 0 Profile: PF 7

Warning: Divided flow computed for this cross-section.

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día... **29 MAYO 2012**.....

EL SECRETARIO DEL AYUNTAMIENTO



*Proyecto de Urbanización del sector S.L.-1 en Valdevaqueros, Tarifa
(Cádiz)*

Al final del cauce existen dos obras de paso transversal, una circular y otra embovedada,
cuyas fotografías se adjuntan a continuación:

DILIGENCIA.- El presente Plan... ha sido aprobado
definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión
celebrada el día...

29 MAYO 2012

EL SECRETARIO DE...





DILIGENCIA.- El presente Plan..... ha sido aprobada definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día..... **29 MAYO 2012**....

EL SECRETARIO DEL AYUNTAMIENTO



Proyecto de Urbanización del sector S.L.-1 en Valdevaqueros, Tarifa
(Cádiz)

DILIGENCIA.- El presente Plan..... ha sido aprobado
definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión
celebrada el día 29 MAYO 2012.....

EL SECRETARIO DEL AYUNTAMIENTO



Tras los resultados arrojados por el HEC-RAS, se comprueba a continuación que ambas obras de paso no afectan a la lámina de agua, ya que son capaces de asumir el caudal de la avenida de 500 años.

O.D.T	Sección Máxima	I (m/m)	Pm (m)	Rh (m ² /m)	v (m/s)	Qmáx (m ³ /s)
CIRCULAR	7.06	0.0231	9.42	0.749	5.016	35.414
EMBOVEDADO	10.91	0.0231	12.82	0.851	10.499	114.546

Por tanto, ambas obras de paso son capaces de evacuar 149.96 m³/s, mientras que nuestro caudal de avenida para un periodo de retorno de 500 años es de 52,768 m³/s.

De todas formas, aunque estas obras de paso cumplen para evacuar la avenida de un periodo de retorno de 500 años, se han modelizado también en el HEC-RAS, para tener en cuenta

el efecto que produce en la lámina de agua. El coeficiente de rugosidad de Manning empleado para los cálculos ha sido de 0,045, correspondiente a cauces normales sin vegetación.

Por otro lado, puede observarse en los perfiles transversales correspondientes a la avenida de 500 años, que existen dos puntos en los que la lámina de agua llega al límite de la parcela, uno de ellos en el P.K. 0+130 y otro en el P.K. 0+150. Al existir únicamente estos dos puntos, se contempla como solución la ejecución de un murete de hormigón de 1 metro de altura, para evitar que el nivel del agua alcance dicho límite.

Se presentan seguidamente la documentación gráfica y planos descriptivos del Estudio así como plano final de la lámina de inundación y límites del Dominio Público Hidráulico (para T=10 años) con línea de servidumbre a 5 metros, y lámina de inundación para un periodo de retorno de 500 años.

DILIGENCIA.- El presente Plan.....ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día...2-9 MAYO 2012.....

En Cádiz a 8 de marzo de 2010

EL SECRETARIO DEL AYUNTAMIENTO



El Ingeniero Redactor del Estudio

Miguel Ángel Fernández Vélchez
Ingeniero de Caminos, Canales y Puertos
Colegiado nº 25.651



DILIGENCIA.- El presente Plan..... ha sido aprobado definitivamente por el Excmo. Ayuntamiento de Tarifa en sesión celebrada el día..... **29 MAYO 2012**.....

EL SECRETARIO DEL AYUNTAMIENTO



3.- PLANOS