

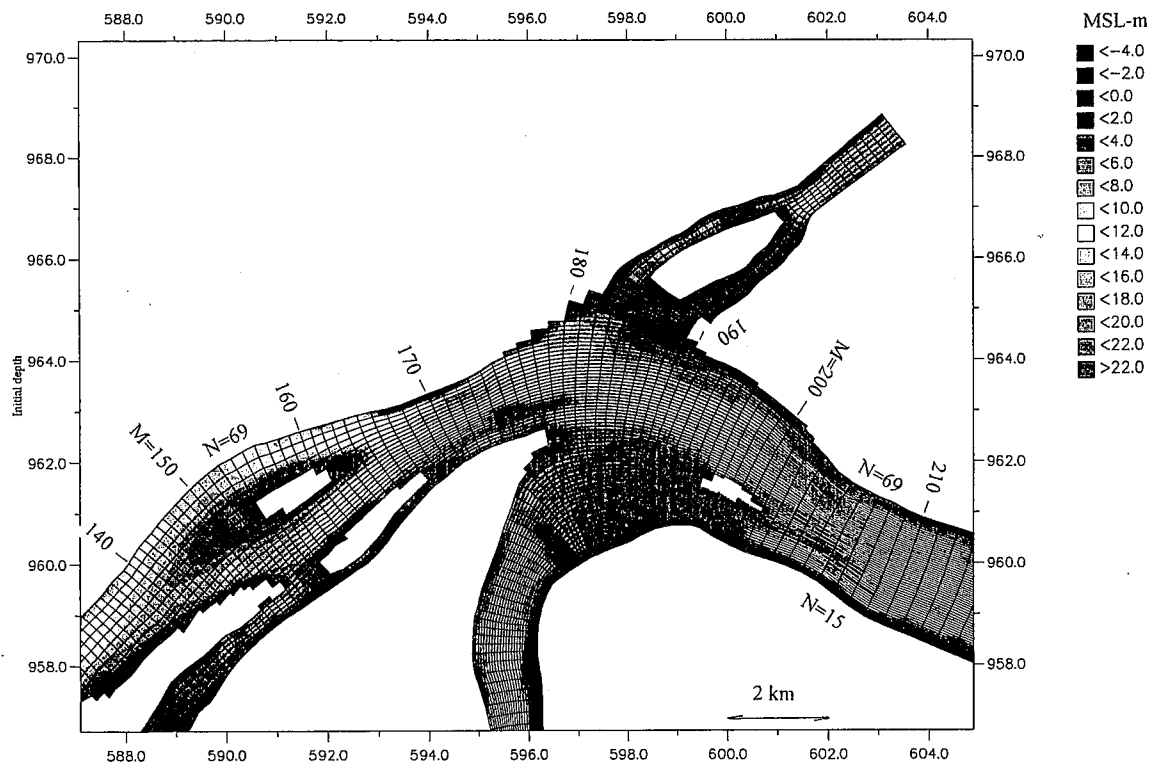
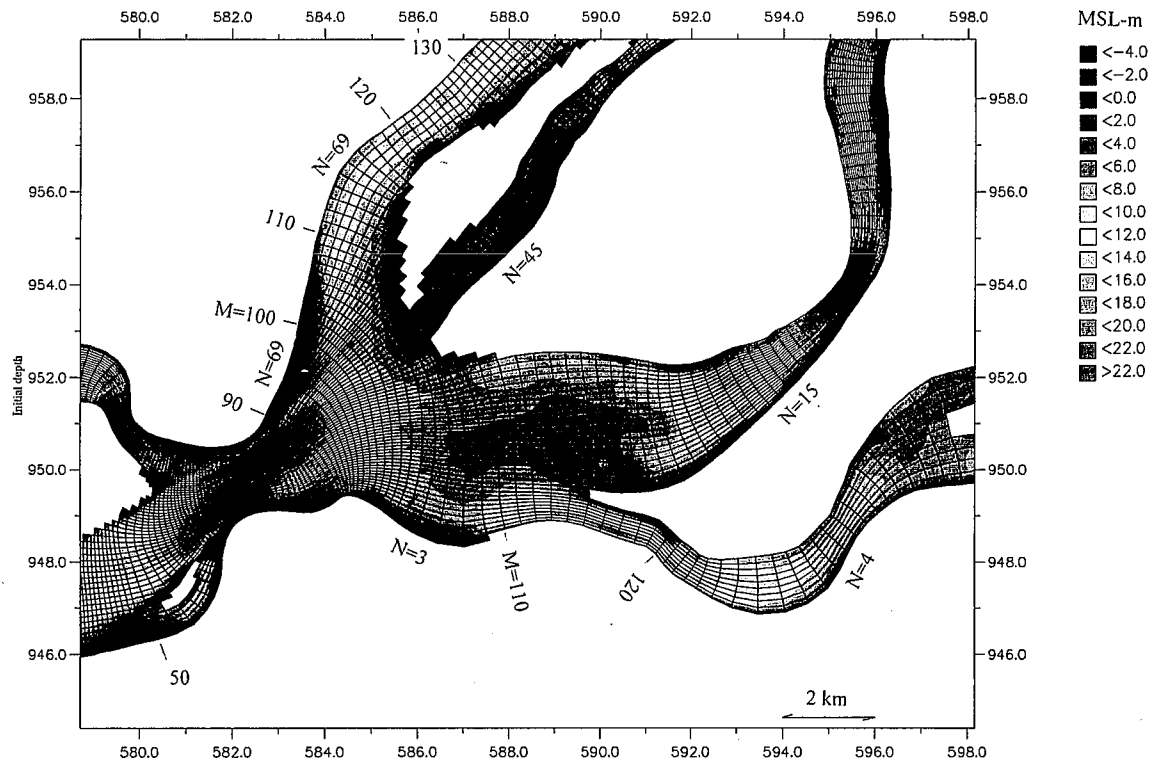


Fig. 7-3-34 Número de Cuadrícula en el Area Modelo

Tabla 7.3.1 Caso de Simulación Bidimensional

Purpose	Bed Condition	Initial Bed Condition	Structure	Structure Location	Alt.	Run-ID	Date	Discharge	Waterlevel (MSL+m)			Sediment Transport	Bed Material	Remarks
									H1	H2	H3			
Calibration of Flow Condition	Fixed Bed	Existing	-	-	-	t13.mdf	1997/4/2	7,000 m3/s	0.66	0.78	0.78	-	-	INC-MARNR Measurement
	Fixed Bed	Existing	-	-	-	t14.mdf	1997/6/3	36,000 m3/s	3.51	2.68	2.68	-	-	INC-MARNR Measurement
	Fixed Bed	Existing	-	-	-	t15.mdf	1997/6/9	42,000 m3/s	4.19	3.28	3.28	-	-	INC-MARNR Measurement
	Fixed Bed	Existing	-	-	-	t16.mdf	1996/9/2	71,650 m3/s	7.99	6.57	6.57	-	-	INC-MARNR Measurement
	Fixed Bed	Existing	-	-	-	.mdf	1999/9/15-20	61,000~63,000 m3/s				-	-	ITCA Discharge Measurement
	Fixed Bed	Existing	-	-	-	t20.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
Simulation of Flow Condition	Fixed Bed	Existing	Non-submerged Dike	Tortola Upstream	B2-1	t21.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
	Fixed Bed	Existing	Groynes	Tortola Entrance	B2-6	t22.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
	Fixed Bed	Existing	Submerged Dike H=MSL+6m	Tortola Upstream	B2-3	t23.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
	Fixed Bed	Existing	Submerged Dike H=MSL+7m	Tortola Upstream	B2-3a	t24.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
	Fixed Bed	Existing	Non-submerged Dike	Tortola Entrance	B2-8	t25.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
	Fixed Bed	Existing	Submerged Dike H=MSL+0m	Tortola Upstream	B2-5	t26.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
	Fixed Bed	Existing	Submerged Dike H=MSL+3m	Tortola Upstream	B2-4	t27.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
	Fixed Bed	Existing	Groynes	Tortola Mid-Upstream	B2-7	t28.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
	Fixed Bed	Existing	Non-submerged Dike	Tortola Downstream	B2-2	t29.mdf	Typical Peak	66,000 m3/s	7.32	5.97	5.97	-	-	
	Movable Bed	Fix Bed (EL=MSL-11m)	-	-	-	morf.ss8	Typical Peak	66,000 m3/s	7.32	5.97	5.97	15,000,000 m3/year	d=0.4 mm	
	Movable Bed	Existing	-	-	-	morf.yy8	5 years	Typical Hydrograph for 6 years				15,000,000 m3/year	d=0.4 mm	
	Movable Bed	Existing	Submerged Dike H=MSL+6m	Tortola Upstream	B2-3	morf.xx6	5 years	Typical Hydrograph for 6 years				15,000,000 m3/year	d=0.4 mm	
	Movable Bed	Existing	Non-submerged Dike	Tortola Upstream	B2-1	morf.xx9	5 years	Typical Hydrograph for 6 years				15,000,000 m3/year	d=0.4 mm	

Tabla 7.3. 2 Tipo y Ubicación del Límite Externo Aplicado

Boundary Type	Boundary Location	Alternative	Remarks
Discharge	M=1, N=3:69	[B2-1],[B2-2],[B2-3],[B2-4],[B2-5],[B2-6],[B2-7],[B2-8]	Upstream Inflow
Waterlevel	M=289, N=15:69		Rio Grande Channel Downstream
	M=220, N=4:13		Piacoa Channel Downstream
	M=182:190, N=118		Macareo Channel Entrance
Bed Elevation Change	M=289, N=15:69	[B2-1] and [B2-3]	Constant
	M=220, N=4:13		Constant
	M=182:190, N=118		Constant
Sediment Transport	M=1, N=3:69	[B2-1] and [B2-3]	Upstream Sediment Inflow

Tabla 7.3. 3 Tipo y Ubicación del Límite Interno Aplicado

Boundary Type	Boundary Location	Alternative	Remarks
Weir	M=119, N=15:39	[B2-1],[B2-3],[B2-4],[B2-5]	Tortola Channel Upstream
	M=170, N=15:39	[B2-2]	Tortola Channel Downstream
	M=109, N=3:41	[B2-8]	Tortola Channel Entrance
Groins	M=100,105,110 N=3:20	[B2-6]	Tortola Channel Entrance
	M=100,105,110 N=3:20	[B2-7]	Tortola Channel Entrance and Mid-stream
	M=120,128 N=15:20		

Tabla 7.3. 4

Alternative	Existing Condition	[B2-1] Complete Closing Dike at Tortola Upstream	[B2-2] Complete Closing Dike at Tortola Downstream
Location of Structures			
Change of Navigation Channel Depth (Compared to Existing Condition)	Same as Existing	-3.9m as an average in the dredging sections	-3.9m as an average in the dredging sections
Water level	MSL+9.0m / -	MSL+9.5m / MSL+8.0 m	MSL+10.0m / MSL+8.0 m
Velocity along the Left Bank of the Rio Grande Channel	0.6~1.4m/s	0.6~2.0m/s	0.6~2.0m/s
Length of Bank Protection	0km	4km	4km
Transportation through Structure	No Effect	Complete Interrupt, but to be allowed by waterway for fish and boat	Complete Interrupt, but to be allowed by waterway for fish and boat
Environmental Impact	Same as Existing	The downstream reach of the Tortola Channel would be closed due to sand bars formation.	The upstream reach of the Tortola Channel would be closed due to sand bars formation.

Tabla 7.3. 4 Alternativas para el Esquema B2 (2/3)

Alternative	[B2-3] Submerged Dike H = MSL+6m	[B2-4] Submerged Dike H = MSL+3m	[B2-5] Submerged Dike H = MSL+0m
Location of Structures			
Change of Navigation Channel Depth (Compared to Existing Condition)	-2.6m as an average in the dredging sections	0m	0m
Water level	MSL+9.5m / MSL+9.0 m	MSL+9.0m / MSL+8.5 m	MSL+9.0m / MSL+8.5 m
Velocity	Guarguapo Section / Structure Downstream Velocity along the Left Bank of the Rio Grande Channel Length of Bank Protection	0.6~1.4m/s	0.6~1.4m/s
Environmental Impact	Transportation through Structure	Interrupted except for flood season, but to be allowed by waterway for fish and boat	No Effect
	Sedimentation in Tortola Channel	The sedimentation is minor because the overflow discharge is secured in flood season.	No Effect

Tabla 7.3. 4 Alternativas para el Esquema B2 (3/3)

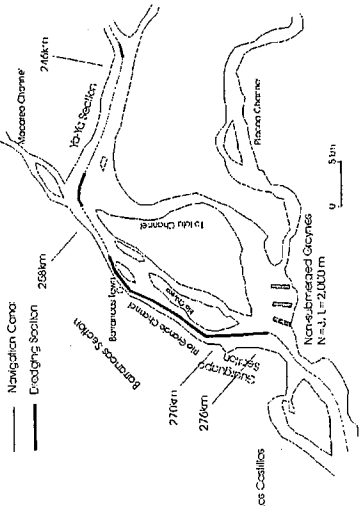
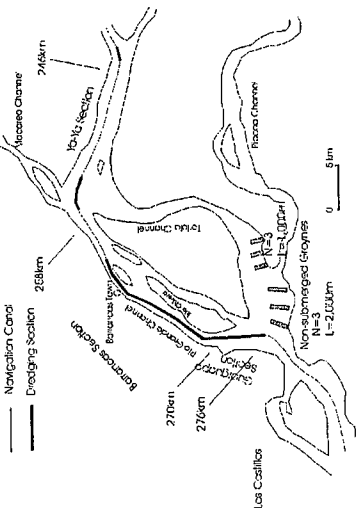
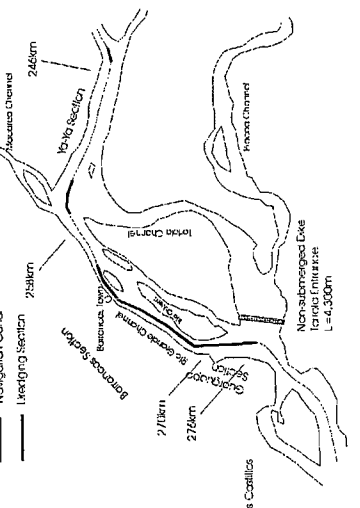
Alternative	[B2-6] Groyne at Tortola Entrance	[B2-7] Groynes at Tortola Entrance and Midstream	[B2-8] Non-submerged Dike at Tortola Entrance
Location of Structures			
Change of Navigation Channel Depth (Compared to Existing Condition)	0m	0m	-5m (estimated from the result of [B2-1])
Water level	MSL+9.0m / MSL+8.5 m	MSL+9.0m / MSL+8.5 m	MSL+11.5m / MSL+8.0 m
Velocity along the Left Bank of the Rio Grande Channel	0.6~1.4m/s	0.6~1.4m/s	0.6~2.4m/s
Length of Bank Protection	0km	0km	13km
Transportation through Structure	No Effect	No Effect	Complete Interrupt, but to be allowed by waterway for fish and boat
Sedimentation in Tortola Channel	No Effect	No Effect	The downstream reach of the Tortola Channel would be closed due to sand bars formation.

Tabla 7.3. 5 Descarga del Corte Transversal para las Alternativas

Unit : m³/s

Alternative Name	Existing Condition	B2-1	B2-2	B2-3	B2-4	B2-5	B2-6	B2-7	B2-8
Run-ID	t20	t21	t29	t23	t27	t26	t22	t28	t25
C-1	65,697	65,804	65,826	66,681	65,727	65,716	65,702	65,695	65,771
C-2	26,440	42,320	42,334	30,187	27,646	26,971	28,228	28,632	64,015
C-3	38,544	23,048	23,033	35,171	37,389	38,035	36,330	35,937	1,235
Piacoa (C-5)	18,496	22,998	23,005	19,295	18,801	18,628	17,925	18,047	13,568
C-4(Tortola Down)	20,688	17	4	16,117	19,188	20,033	19,675	19,176	-13,569
Barrancas(C-6)	21,976	35,340	35,356	25,046	22,986	22,416	23,240	23,562	53,210
C-7	11,337	18,290	18,300	12,946	11,862	11,567	12,000	12,169	27,718
C-8	26,499	42,886	42,906	30,267	27,733	27,043	28,079	28,479	65,766
C-9(Ya-Ya)	37,537	34,930	34,931	37,059	37,369	37,457	37,866	37,800	40,471
C-11	37,544	34,965	34,968	36,997	37,367	37,460	37,860	37,796	40,491
C-12	18,463	22,970	22,965	19,294	18,726	18,578	17,920	18,021	13,574
C-13(Tortola Up)	20,694	12	-11	16,095	19,189	20,032	19,680	19,169	-13,573
Macareo (C-10)	9,641	7,992	7,995	9,344	9,546	9,602	9,878	9,840	11,722

Note: The upstream discharge 66,000 m³/s constant

Tabla 7.3. 6 Volumen del Dragado de Mantenimiento para las Alternativas [B2-1] y

[B2-3]

Item		Guarguapo	Barrancas	Ya-Ya	Total
Actual	Length of Dredging Section(km)	6	7	3	
	Sedimentation Depth above the Design Elevation LWL-10.4m	2.40	0.50	2.00	
	Canal Width(m)	91	91	91	
	Canal Bed Volume above LWL-10.4m (m3/y)	1,310,400	318,500	546,000	2,174,900
	Nominal Dredging Volume(m3/y)	2,480,000	740,000	600,000	3,820,000

Simulation	Sedimentation Depth above the Design Elevation LWL-10.4m	[B2-3]Submerged Dike(H=MSL+6m)	after 1 yr	0.0	3.7	3.1	2.3
			after 3 yr	0.0	1.8	1.5	1.1
			after 5 yr	0.0	1.8	0.0	0.6
		[B2-1]Non-submerged Dike	after 1 yr	0.0	2.4	4.3	2.2
			after 3 yr	0.0	1.0	0.0	0.3
	Remaining Maintenance Dredging Volume(m3/y)	[B2-3]Submerged Dike(H=MSL+6m)	after 5 yr	0.0	0.0	0.0	0.0
			after 1 yr	0	2,110,000	780,000	2,890,000
			after 3 yr	0	360,000	340,000	700,000
		[B2-1]Non-submerged Dike	after 5 yr	0	240,000	0	240,000
			after 1 yr	0	320,000	1,670,000	1,990,000
			after 3 yr	0	130,000	0	130,000
			after 5 yr	0	0	0	0

Note:
"Maximum Depth" is based on Sounding Survey Drawing by INC dated on 1998/10/1 and 1998/11/28 (scale 1:5,000).