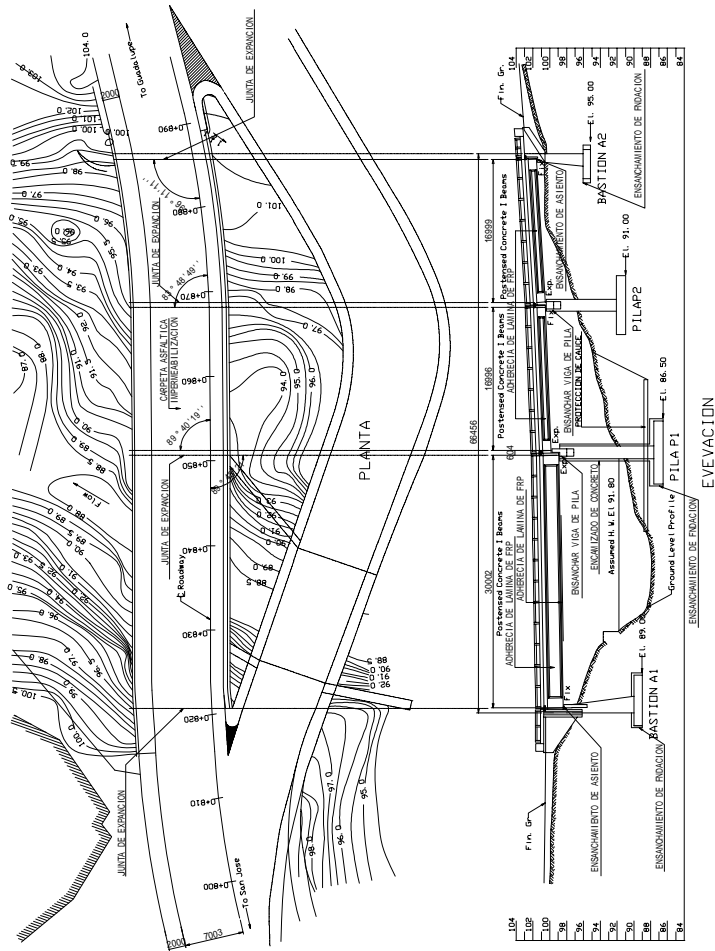


No. 29 Rio Torres Bridge

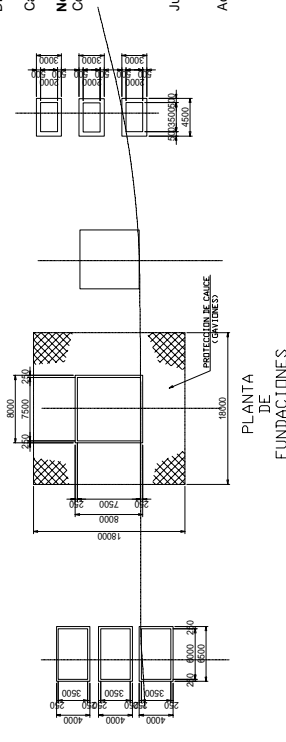
Drawing No.	Sheet No.	Drawing Title	
		Main Title	Sub Title
2901	1	VISTA GENERAL DE PUENTE	
2902	2	REFUERZO DE VIGAS PRINCIPALES	ADHERENCIA DE LAMINAS DE FIBRA DE CARBON
2903	3	REFUERZO DE SUBESTRUCTURA	BASTIONES A1 Y A2
2904	4	REFUERZO DE SUBESTRUCTURA	PILA P1
2905	5	REFUERZO DE SUBESTRUCTURA	PILA P2
2906	6	REFUERZO DE BASTION A1	ASIENTO
2907	7	REFUERZO DE BASTION A1	FUNDACION (1)
2908	8	REFUERZO DE BASTION A1	FUNDACION (2)
2909	9	REFUERZO DE PILA P1	VIGAS CABEZALES (1)
2910	10	REFUERZO DE PILA P1	VIGAS CABEZALES (2)
2911	11	REFUERZO DE PILA P1	FUNDACION
2912	12	REFUERZO DE PILA P1	COLUMN
2913	13	REFUERZO DE PILA P2	VIGAS CABEZALES (1)
2914	14	REFUERZO DE PILA P2	VIGAS CABEZALES (2)
2915	15	REFUERZO DE BASTION A2	ASIENTO
2916	16	REFUERZO DE BASTION A2	FUNDACION (1)
2917	17	REFUERZO DE BASTION A2	FUNDACION (2)

VISTA GENERAL DE PUENTE ESCALA 1:250



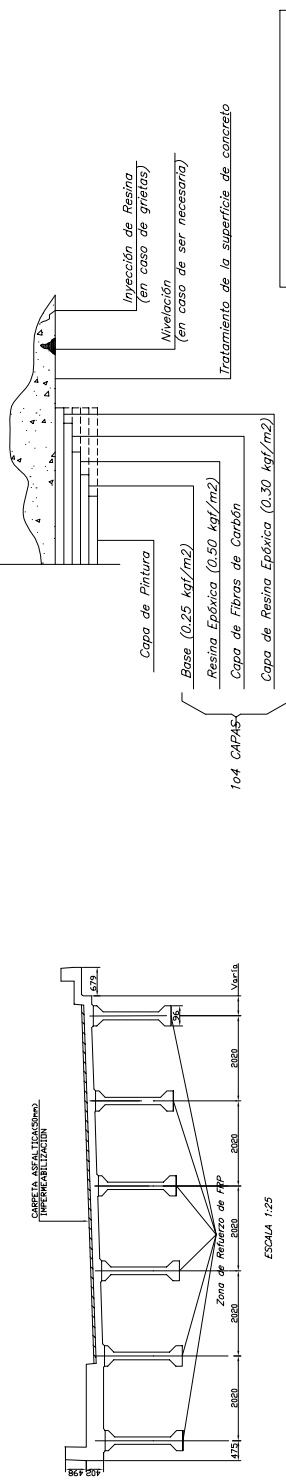
Especificaciones:
 Diseño: AASHTO Standard Specifications for Highway Bridges, 17 Edición -2002, excepto en las notas.
 Carga Viva: HS20 + 25%.

Notas Generales:
 Concreto: Todo el concreto es clase "A", a menos que se indique lo contrario. Todos el concreto debe ser colado en ambiente seco. Se debe hacer un chafán de 2cm en todos los bordes expuestos a menos que se indique lo contrario. Todas las superficies sobre la línea de terreno debe formarse con Madera de formaleta y esas superficies expuestas deben tener un acabado de repello excepto en las superficies de la losa.
 Juntas de Construcción: Las juntas de construcción de la subestructura deben ser horizontales. Las superficies de concreto existente, donde se coloca concreto nuevo, deben ser picadas para lograr una buena conexión con el concreto nuevo.
 Acero de Refuerzo: El acero de refuerzo debe ser de varillas corrugadas Grado 60. Todas las dimensiones relacionadas al refuerzo de acero son de centro a centro de varilla. A menos que se indique lo contrario, las varillas deben colocarse a 1,00mm de la superficie de concreto mas cercana. El acero de refuerzo estara sujeto rigidamente al espaciamiento especificado mientras el concreto es colado. Todas las varillas



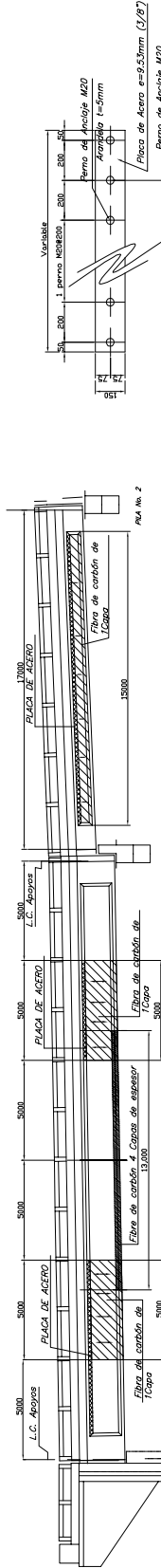
GOBIERNO DE COSTA RICA COOPERACIÓN JICA - MOPT	DIRECCIÓN DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO:	DAVID PARRA ING. CIVIL	REVISÓ:	DAVID PARRA ING. CIVIL	DIBUJÓ:	ANTONIO J. RAMÍREZ CARRO ING. CIVIL	APROBÓ:	DAVID PARRA ING. CIVIL DAVID MAREZ ING. CIVIL	ESCALA:	VARIA	DIBUJO No. 2007	VISTA GENERAL DE PUENTE PUENTE SOBRE RIO TORRES
		PROYECTO:	ENVIÓ 2007	FECHA:	ENVIÓ 2007	FECHA:	ENVIÓ 2007	FECHA:	ENVIÓ 2007	FECHA:	ENVIÓ 2007	FECHA:	HOJA 1 DE 17

REFUERZO DE VIGAS PRINCIPALES
 ADHESION DE LAMINAS DE FIBRA DE CARBON



LAMINAS DE CARBÓN	
ITEM	ESPECIFICACIONES
MODULO ELASTICO	640 N/mm ² (6.8x10 ⁴ kgf/cm ²)
Resistencia última	1.80 N/mm ² (20000 kgf/cm ²)
Peso Unitario	300 g/m ²
Espesor	1 Capa 0.4 Capa

DETALLE DE COLOCACIÓN
 DE FIBRAS DE CARBÓN
 ESCALA 1:25

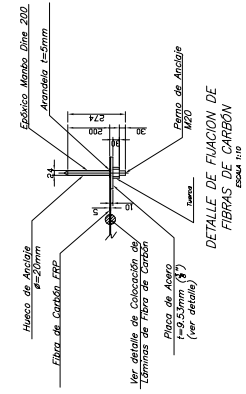


ELEVACION DE VIGA POSTENSADA de 30.00m
 ESCALA 1:50

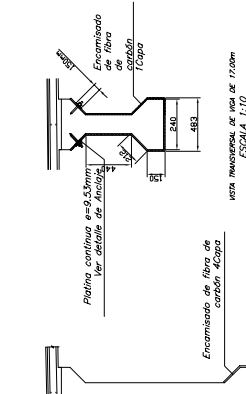
VISTA LONGITUDINAL VIGA
 DE 17.00m
 ESCALA 1:50

DETALLE DE PLACA DE ACERO
 PARA FIBRAS DE CARBÓN
 ESCALA 1:10

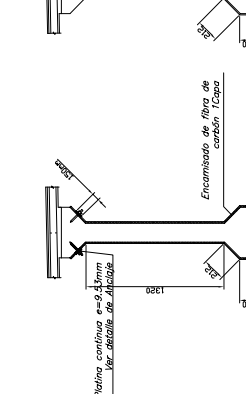
Nota: Adhesión de laminas de fibra de carbono en la viga principal (para el No.2)
 Antes de la adhesión de las laminas de fibra de carbono, las grietas existentes en la viga principal deben ser reparadas con inyección de resina. La lamina de fibra de carbono debe satisfacer las características requeridas como se muestra en la tabla siguiente.
 Se deben adherir 4 capas de laminas de fibra de carbono alrededor del ala inferior de la viga principal para reforzar la capacidad al momento de flexión. La dirección de la fibra de todas las capas debe ser en dirección longitudinal a la direccional puente.
 Se debe adherir 1 capa de laminas de fibra de carbono en ambos lados y en la parte inferior de la viga principal para reforzar la capacidad a la fuerza de cortante. Esta fibra debe ser adherida de espases de adherir la fibra para el momento de flexión. La dirección de la fibra de la capa debe ser transversal a la dirección de la viga. La lamina de fibra de carbono deber ser sujetada con plicatas de acero en ambos lados al final como se muestra en los dibujos.
 Cada capa debe ser adherida con resina adhesiva como se muestra en los detalles.



DETALLE DE FIJACIÓN DE
 FIBRAS DE CARBÓN
 ESCALA 1:10



VISTA TRANSVERSAL de VIGA de 17.00m
 ESCALA 1:10

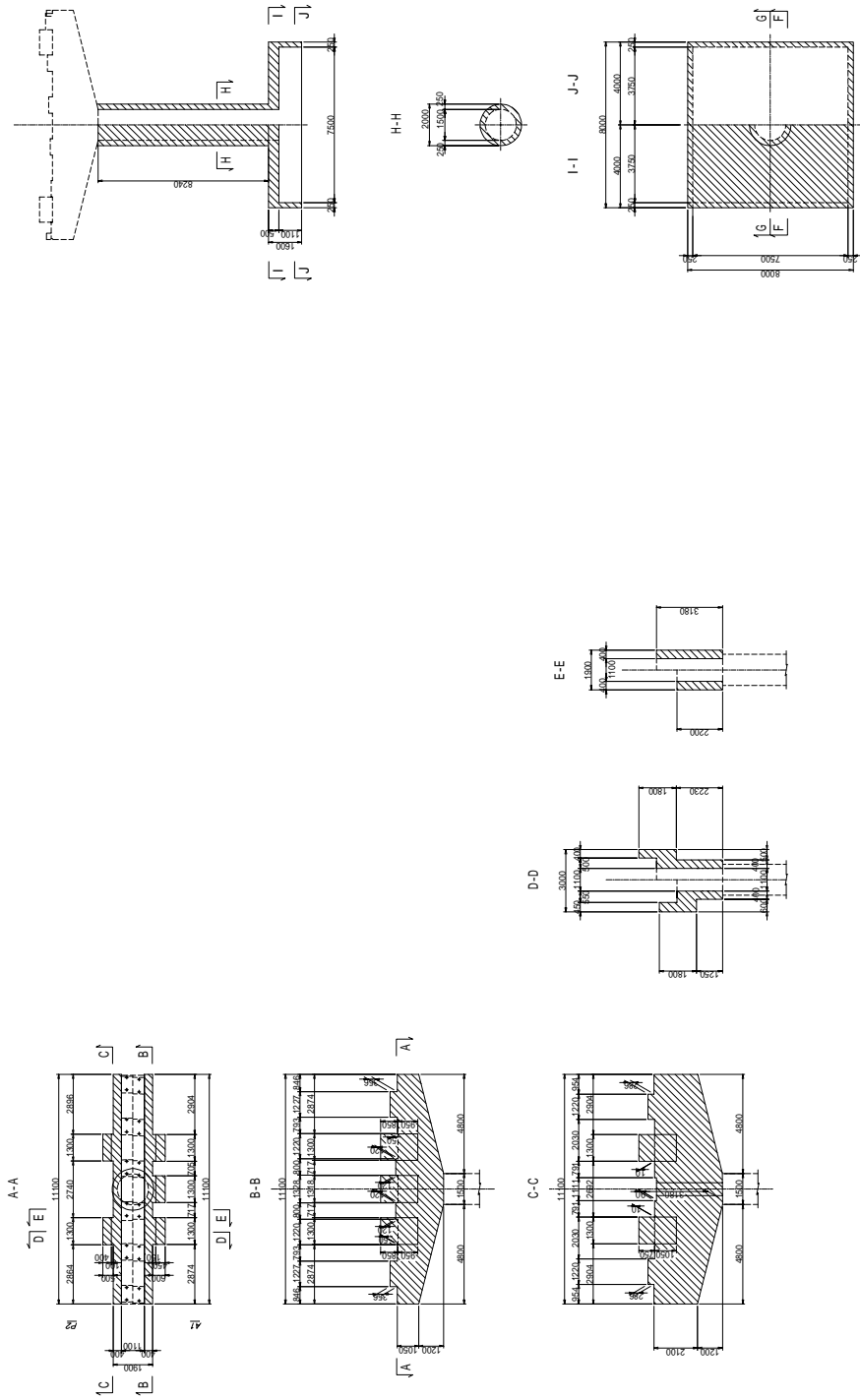


VISTA TRANSVERSAL de VIGA de 30.00m
 ESCALA 1:10

GOBIERNO DE COSTA RICA COOPERACIÓN JICA - MOPT		DIRECCIÓN DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES		REFUERZO DE VIGAS PRINCIPALES PUENTE SOBRE RIO TORRES PROYECTO:	
DISEÑO:	DAIS JIMÉNEZ NIC. CIVIL	REVISÓ:	DAIS JIMÉNEZ NIC. CIVIL	EMPLEO 2007:	HOJA 2 DE 17
APROBÓ:	DAIS JIMÉNEZ NIC. CIVIL	APROBÓ:	DAIS JIMÉNEZ NIC. CIVIL	EMPLEO 2007:	HOJA 2 DE 17
APROBÓ:	DAIS JIMÉNEZ NIC. CIVIL	APROBÓ:	DAIS JIMÉNEZ NIC. CIVIL	EMPLEO 2007:	HOJA 2 DE 17

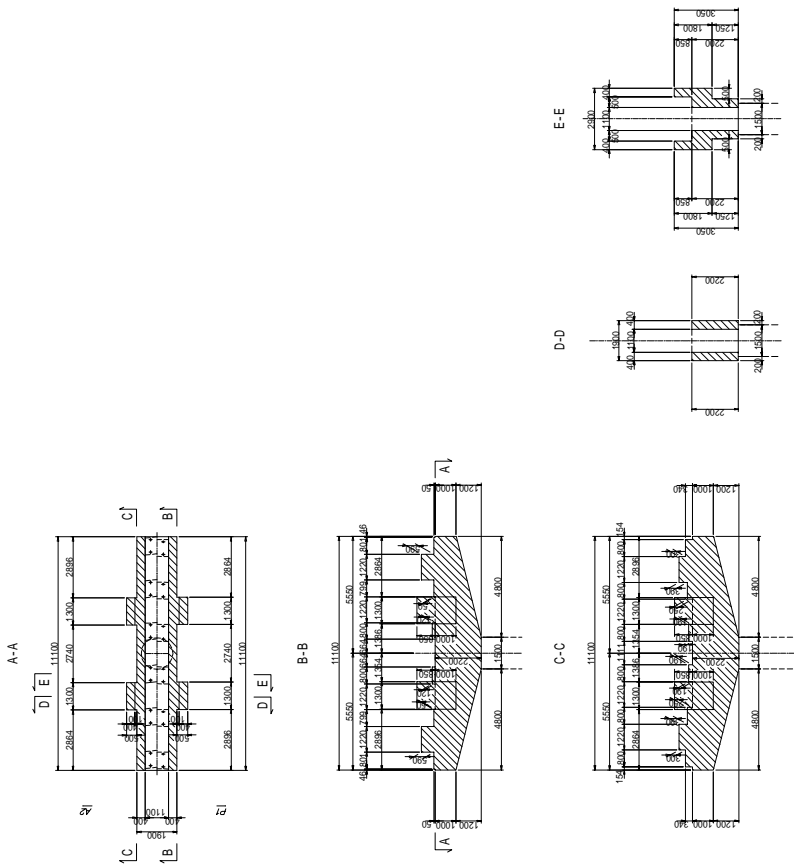
REFUERZO DE SUBESTRUCTURA
 PILA P1

ESCALA 1:100



GOBIERNO DE COSTA RICA COOPERACIÓN JICA - MOPT	DIRECCIÓN DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO:	MARCELO GARCÍA ING. CIVIL	DIBUJOS:	ANTONIO A. RAMÍREZ CASTRO ING. CIVIL SANDY CHAVEZ ING. CIVIL	APROBADO:	ING. JOSÉ ANTONIO SOLÍS RAMÍREZ ING. CIVIL ING. JEFÉ DIRECCIÓN PUENTES	ESCALA:	INDICADA	DIBUJOS No.	2004	REFUERZO DE SUBESTRUCTURA PUENTE SOBRE RÍO TORRES PROYECTO:
		REVISÓ:		REVISÓ:		APROBADO:	ING. JEFÉ DIRECCIÓN PUENTES	FECHA:	ENERO 2007	HUJIA 4 DE 17		

REFUERZO DE SUBESTRUCTURA
 PILA P2
 ESCALA 1:100

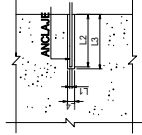


GOBIERNO DE COSTA RICA COOPERACION JICA - MOPT	DIRECCION DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO: MANUEL PEREZ INC. CIVIL		DIBUJO: ANTONIO S. RAMIREZ CORDERO INC. CIVIL		APROBADO: INC. CIVIL	ESCALA: 1:100	REVISADO: INC. CIVIL	DIBUJO No. 2007 MAYA 5 DE 17	REFUERZO DE SUBESTRUCTURA PUENTE SOBRE RIO TORRES PROYECTO:

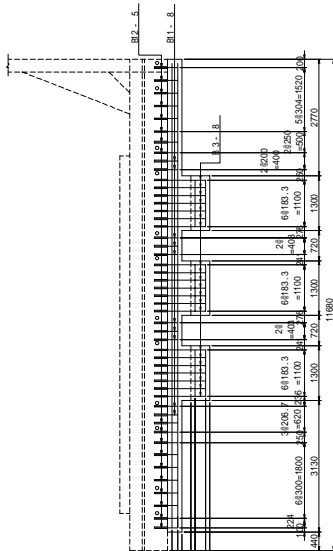
REFUERZO DE BASTION A1
 ASIENTO

ESCALA 1:50

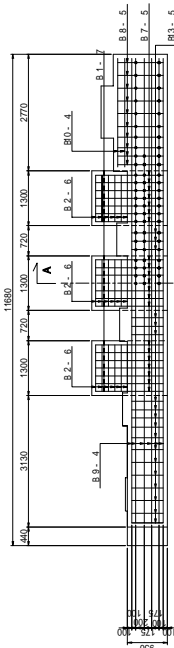
NOTAS:
 Anclajes: Los huecos de anclaje deben ser perforados con la profundidad y diámetro como lo muestra la tabla de acuerdo al diámetro de la barra de anclaje.



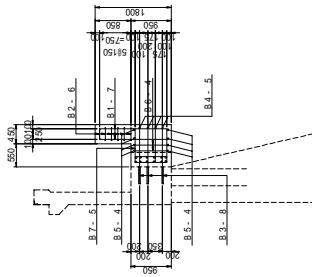
MARCA		TAMANO		LIMITE DE TOLERANCIA		TAMANO DE Hoyo	
#	mm	mm	mm	mm	mm	mm	mm
4	12.7	200	210	20	20	210	220
5	15.9	240	250	28	28	250	260
6	19.1	280	300	32	32	300	320
8	25.4	360	400	40	40	400	440
9	28.7	440	450	48	48	450	460
10	32.3	480	500	50	50	500	520
11	36.8	560	580	58	58	580	600



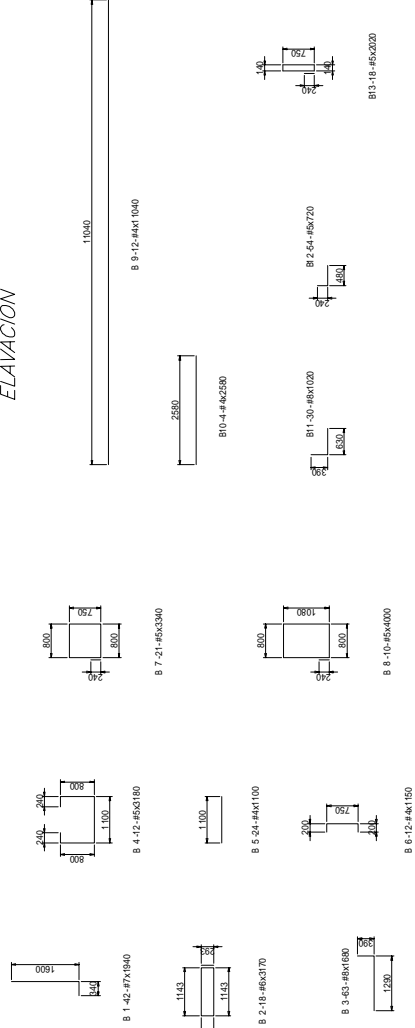
PLANTA



ELEVACION

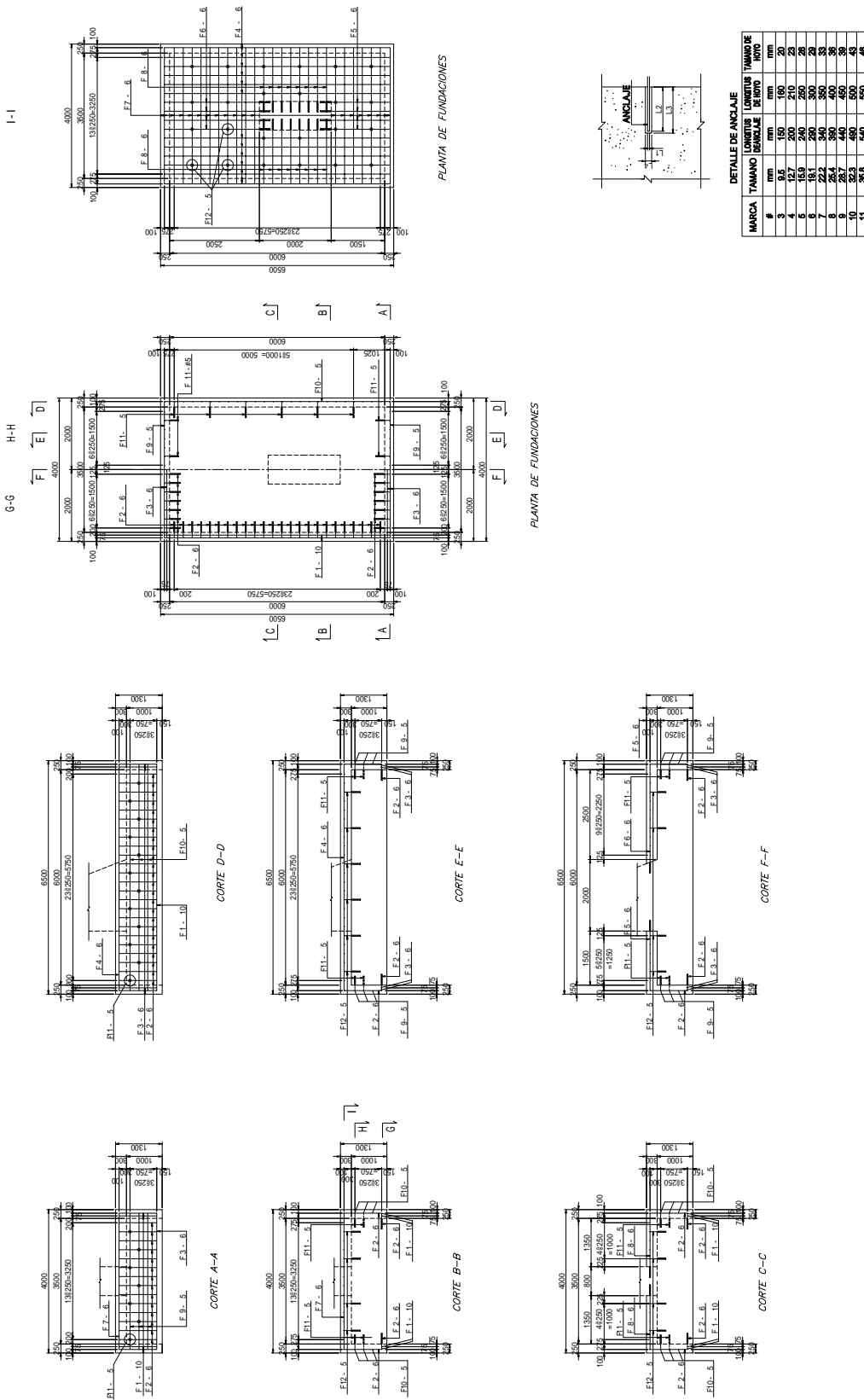


CORTE A



GOBIERNO DE COSTA RICA COOPERACION JICA - MOPT	DIRECCION DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO:	MARCO PEREZ ING. CIVIL	DISEÑO:	MARCO PEREZ ING. CIVIL	DIRECCION:	ANTONIO J. RAMIREZ CAMPO ING. CIVIL	APROBADO:	ING. JESUS COLOTTI ING. CIVIL	ESCALA:	MINIMA	PROYECTO:	REFUERZO DE BASTION A1 PUENTE SOBRE RIO TORRES
		DIBUJO:	ANTONIO J. RAMIREZ CAMPO ING. CIVIL	DIBUJO:	ANTONIO J. RAMIREZ CAMPO ING. CIVIL	APROBADO:	ING. JESUS COLOTTI ING. CIVIL	ESCALA:	MINIMA	DIBUJO No. 2006	PROYECTO:	REFUERZO DE BASTION A1 PUENTE SOBRE RIO TORRES	

REFUERZO DE BASTION A1 ESCALA 1:50
 FUNDACION(1)



REFUERZO DE BASTION A1
 PUENTE SOBRE RIO TORRES
 PROYECTO:

DIBUJO No. 2007

ESCALA: 1/50

FECHA: ENERO 2007

APROBADO: ING. JETE DIRECTIONAL

APROBADO: ING. JETE DIRECTIONAL

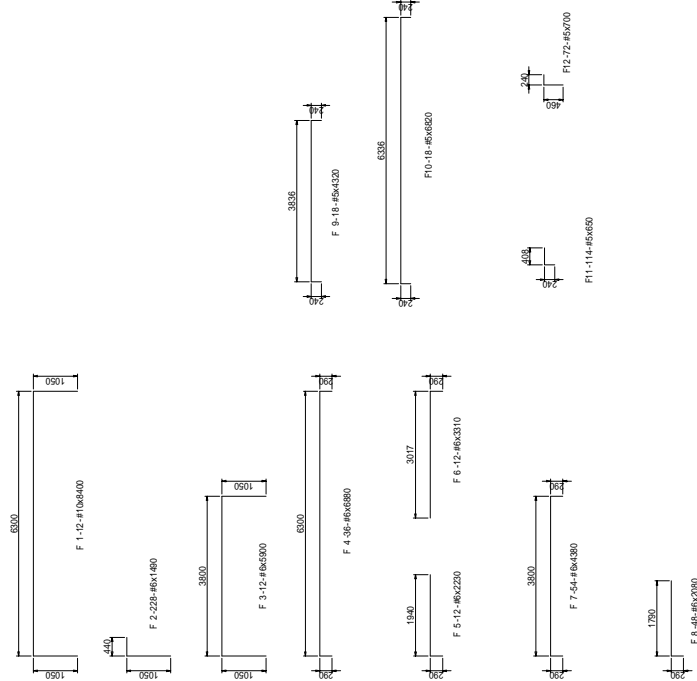
DISEÑADO: MARIO GARCIA INC. CIVIL

REVISADO: MARIO GARCIA INC. CIVIL

DIRECCION DE PUENTES
 DEPARTAMENTO DISEÑO DE PUENTES

Gobierno de Costa Rica
 COOPERACION JICA - MOPT

REFUERZO DE BASTION A1 ESCALA 1:50
 FUNDACION(2)



ACERO DE REFUERZO

MARCA	TAMANO	LONGITUD	CANTIDAD	CANTIDAD POR MARCA	PESO POR MARCA	PESO	COMENTARIOS
				(kg/m)	(kg)	(kg)	
B1	#7	840	42	3.042	5.501	248	J
B2	#6	3170	18	2.235	7.065	128	□
B3	#8	6860	63	3.973	6.675	421	J (E3)
B4	#5	3180	12	1.552	4.585	59	□
B5	#4	1100	24	0.964	1.083	26	—
B6	#4	1160	12	0.964	1.43	14	J
B7	#5	3340	21	1.552	5.164	109	□
B8	#5	4000	10	1.552	6.208	62	□
B9	#4	1040	12	0.964	10.974	132	—
B10	#8	1020	30	3.973	4.062	122	— (30)
B12	#5	720	54	1.552	1.117	60	— (54)
B13	#5	2020	18	1.552	3.135	56	□
F1	#10	8400	12	6.404	53.294	648	—
F2	#6	1480	228	2.235	3.300	759	— (228)
F3	#6	9000	12	2.235	13.87	168	—
F4	#6	6860	36	2.235	15.377	554	—
F5	#6	2230	12	2.235	4.984	60	— (12)
F6	#6	3310	12	2.235	7.388	89	— (12)
F7	#6	4380	54	2.235	9.789	529	— (48)
F8	#6	2080	48	2.235	4.569	223	—
F9	#5	4200	18	1.552	6.705	121	—
F10	#5	6820	18	1.552	10.585	191	—
F11	#5	650	114	1.552	1.009	115	— (114)
F12	#5	700	72	1.552	1.086	78	— (72)
14477 kg							
5029 kg							
#10 648 kg							
#8 543 kg (93)							
#7 248 kg							
#6 2500 kg (240)							
#5 851 kg (300)							
#4 182 kg							
TOTAL 4870 kg (833)							

() ANCLAJE

REFUERZO DE BASTION A1
 PUENTE SOBRE RIO TORRES
 PROYECTO:

BOLETA No. 2008
 HOJA 8 DE 17

ESCALA: 1:50
 FECHA: ENERO 2007

APROBADO: ANTONIO J. RAMIREZ CASO
 INGENIERO CIVIL
 REVISADO: NAIARA GARCIA
 INGENIERA CIVIL

APROBADO: ANTONIO J. RAMIREZ CASO
 INGENIERO CIVIL
 REVISADO: NAIARA GARCIA
 INGENIERA CIVIL

DISEÑO: NAIARA GARCIA
 INGENIERA CIVIL

DIRECCION DE PUENTES
 DEPARTAMENTO DISEÑO DE PUENTES

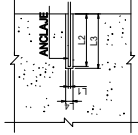
GOBIERNO DE COSTA RICA
 COOPERACION JICA - MOPT

REFUERZO DE PILA P1 ESCALA 1:50

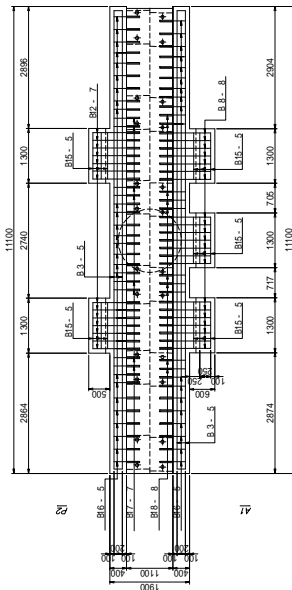
VIGAS CABEZAL(1)

NOTAS:

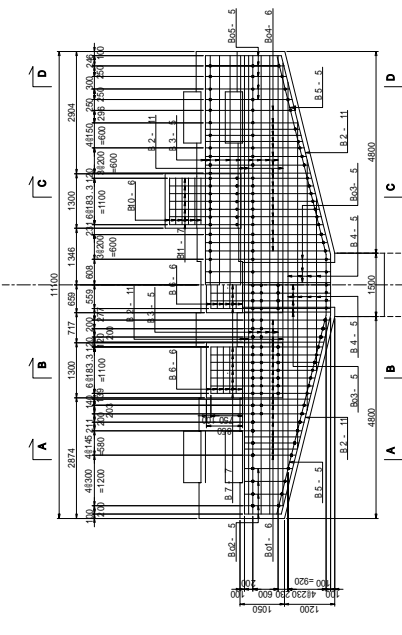
Anciales: Los huecos de anclaje deben ser perforados con la profundidad y diametro como lo muestra la tabla de acuerdo al diametro de la barra de anclaje.



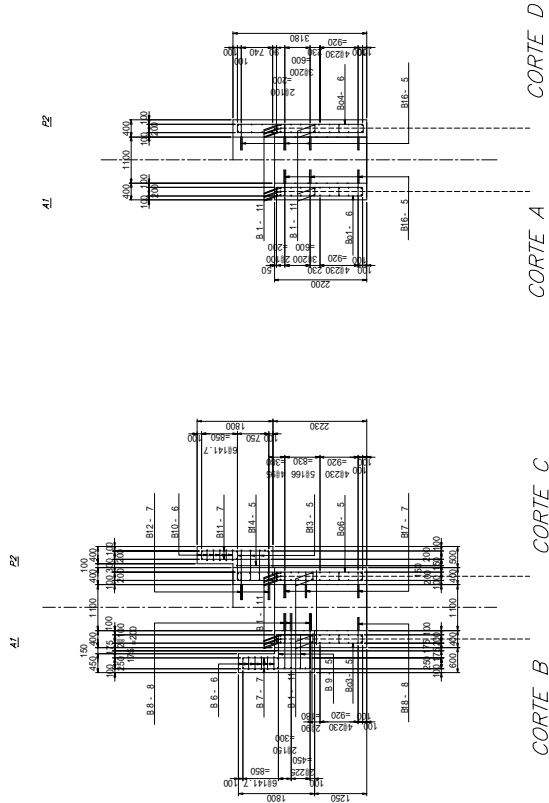
MARCA		TAMANO		LONGITUD DE BARRA		TAMANO DE HUECO	
#	mm	mm	mm	mm	mm	mm	mm
5	51.5	150	150	20			
6	51.5	200	200	20			
7	51.5	250	250	20			
8	51.5	300	300	20			
9	51.5	350	350	20			
10	51.5	400	400	20			
11	51.5	450	450	20			



PLANTA



ELAVACION

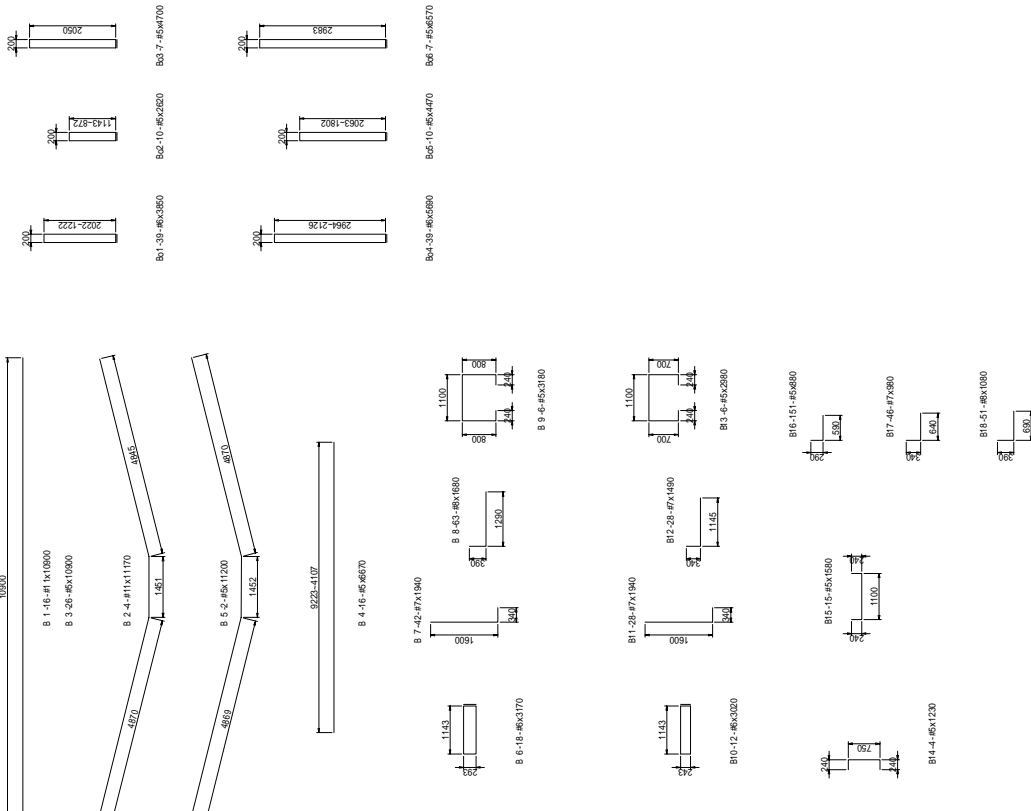


GOBIERNO DE COSTA RICA COOPERACION JICA - MOPT	DIRECCION DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO:	MARCO PEREZ INC. CIVIL
		DIBUJO:	AYRIMO DE ROMERO CAMPO MARCO PEREZ INC. CIVIL
APROBADO:	APROBADO:	APROBADO:	ING. ART. DIRECTIONALISTAS
		APROBADO:	ING. ART. CONSULTOR
DIBUJO No. 2009	PROYECTO:	ESCALA:	VARIA
		FECHA:	ENERO 2007
REFUERZO DE PILA P1 PUENTE SOBRE RIO TORRES		PROYECTO:	

REFUERZO DE PILA P1 ESCALA 1:50
 VIGAS CABEZAL(2)

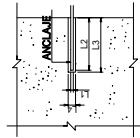
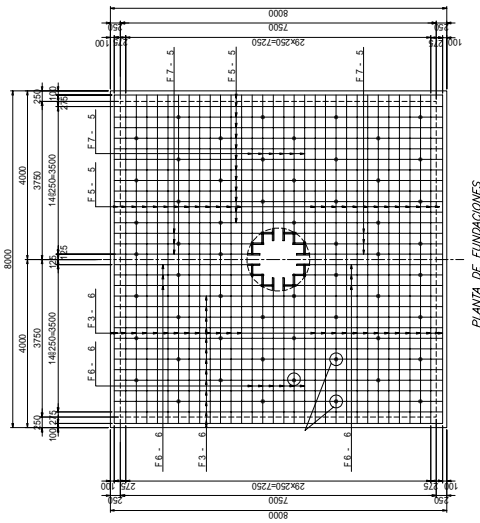
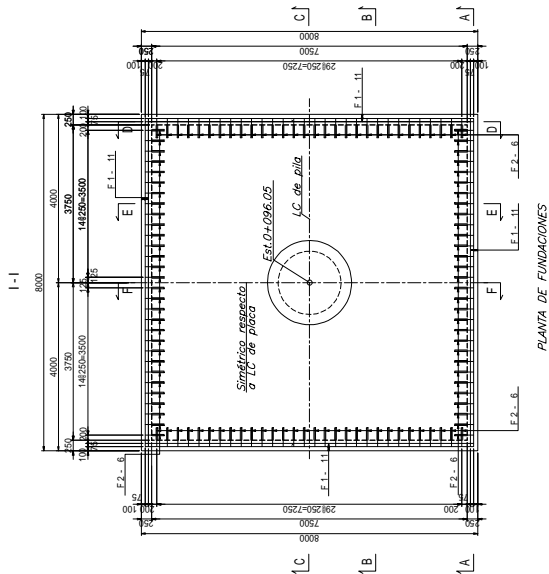
ACERO DE REFUERZO

MARCA	TAMAÑO	LONGITUD (m)	CANTIDAD POR UNIDAD (kg/m)	PESO POR UNIDAD (kg)	PESO TOTAL (kg)	COMENTARIOS
B1	#11	10900	16	7.907	86.106	1039
B2	#11	11170	4	7.907	26.524	535
B3	#5	10900	26	1.552	16.571	449
B4	#5	10900	6	1.552	9.308	198
B5	#5	12000	2	1.552	3.104	83
B6	#5	3170	16	2.235	36.159	928
B7	#5	1940	42	3.045	128.070	294
B8	#5	1980	63	3.045	192.073	486
B9	#5	3100	12	3.045	36.540	94
B10	#5	3100	12	3.045	36.540	94
B11	#7	10400	20	3.045	60.900	156
B12	#7	14000	20	3.045	60.900	156
B13	#5	2000	6	1.552	9.308	24
B14	#5	1200	4	1.552	6.208	16
B15	#5	1500	12	1.552	18.624	48
B16	#5	1800	15	1.552	23.280	59
B17	#7	900	46	3.045	139.170	353
B18	#8	1000	51	3.973	202.623	516
B20	#5	3000	30	2.235	67.050	171
B22	#5	2920	10	1.552	15.520	41
B23	#5	4700	7	1.552	10.864	28
B24	#5	6600	30	2.235	67.050	171
B25	#5	4470	10	1.552	15.520	41
B26	#5	6570	7	1.552	10.864	28
					5772 kg	
P1-1	#8	1300	15	3.973	59.595	151
P1-2	#8	2300	15	3.973	59.595	151
P1-3	#8	8040	15	3.973	31.543	479
P1-4	#8	7040	15	3.973	27.930	400
P2	#5	6100	20	1.552	9.560	277
P3	#5	560	203	1.552	835.456	176
					1576 kg	
F1	#11	10500	8	7.907	83.024	64
F2	#5	1700	120	2.235	4.001	460
F3	#5	8300	52	2.235	116.220	974
F4	#5	8300	64	1.552	99.728	163
F5	#5	8200	52	1.552	80.704	688
F6	#5	3000	24	2.235	53.640	204
F7	#5	3000	24	1.552	37.248	144
F8	#5	8300	16	1.552	24.832	207
F9	#5	880	57	1.552	88.464	67
					3485 kg	
					#11 2006 kg (0)	
					#8 1763 kg (144)	
					#7 677 kg (74)	
					#5 2623 kg (144)	
					#6 2874 kg (401)	
					TOTAL 10333 kg (763)	



GOBIERNO DE COSTA RICA COOPERACIÓN JICA - MOPT	DIRECCIÓN DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO: MANUEL JIMÉNEZ INC. CIVIL	DIBUJOS: ANTONIO J. RAMÍREZ CORDERO NÉSTOR CORDERO INC. CIVIL	APROBADO: INC. JETE DIRECCIÓN PUENTES	ESCALA: 1/40	PROYECTO: REFUERZO DE PILA P1 PUENTE SOBRE RÍO TORRES
		REVISADO: INC. CIVIL	REVISADO: INC. CIVIL	APROBADO: INC. JETE DIRECCIÓN PUENTES	ESCALA: 1/40	PROYECTO: REFUERZO DE PILA P1 PUENTE SOBRE RÍO TORRES

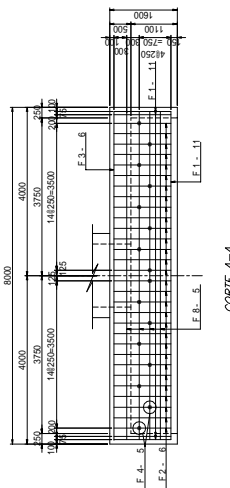
REFUERZO DE PILA P1
 ESCALA 1:50
 G-G



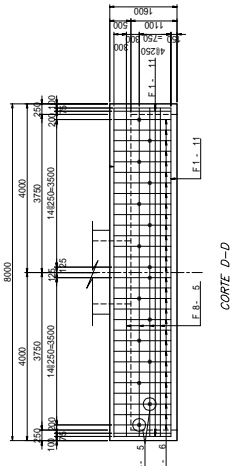
DETALLE DE ANCLAJE		LONGITUD DE BARRA		TAMANO DE HOYO	
MARCA	TAMANO	DE ANCLAJE	DE BARRA	DE HOYO	DE HOYO
Ø	mm	mm	mm	mm	mm
3	32	50	100	50	50
4	32	50	100	50	50
5	32	50	100	50	50
6	19.1	240	250	25	25
6	19.1	250	300	25	25
7	25.2	300	300	30	30
8	25.2	300	300	30	30
9	25.2	400	400	30	30
10	32.3	400	500	40	40
11	32.3	500	500	40	40

PLANTA DE FUNDACIONES

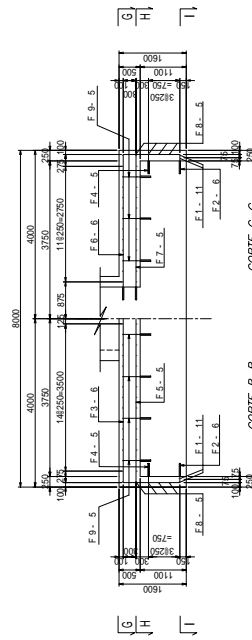
PLANTA DE FUNDACIONES



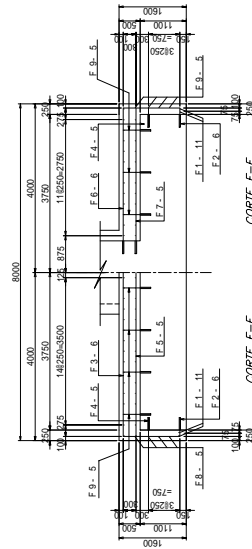
CORTE A-A



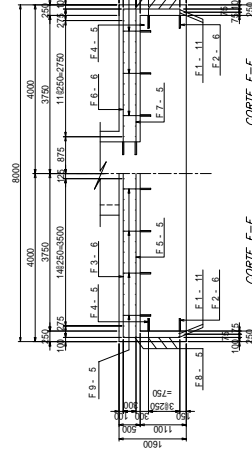
CORTE D-D



CORTE B-B



CORTE E-E



CORTE F-F

GOBIERNO DE COSTA RICA
 COOPERACIÓN JICA - MOPT
 DEPARTAMENTO DISEÑO DE PUENTES

DISEÑO:
 MANUEL GARCIA
 INC. CIVIL

REVISÓ:
 INC. CIVIL

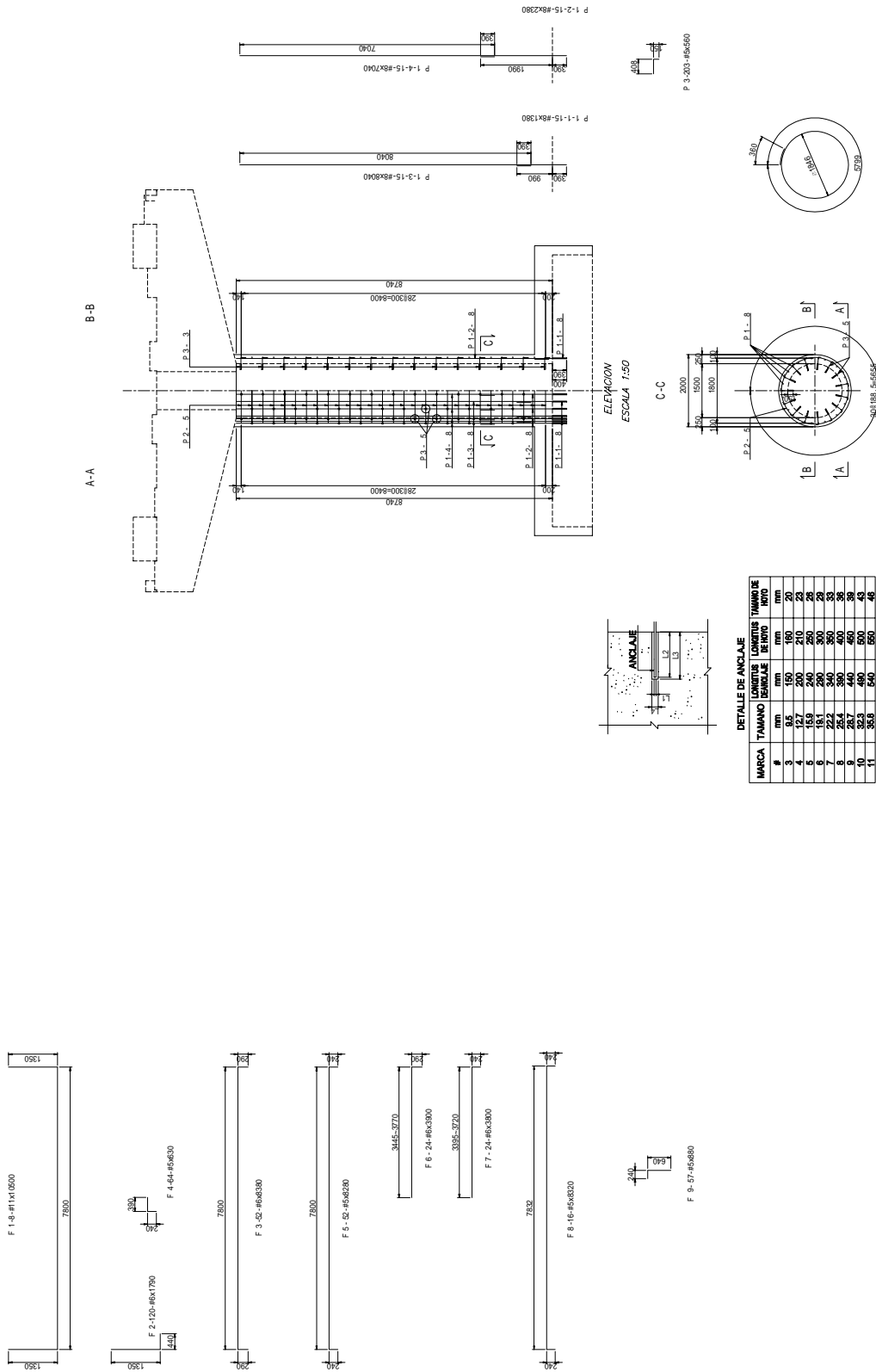
APROBÓ:
 INC. CIVIL

APROBÓ:
 INC. CIVIL

REFUERZO DE PILA P1
 PUENTE SOBRE RIO TORRES
 PROYECTO:

DIBUJO No. 2017
 HOJA 11 DE 17

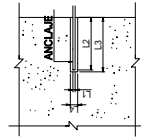
REFUERZO DE PILA P1 ESCALA 1:50
 COLUMN



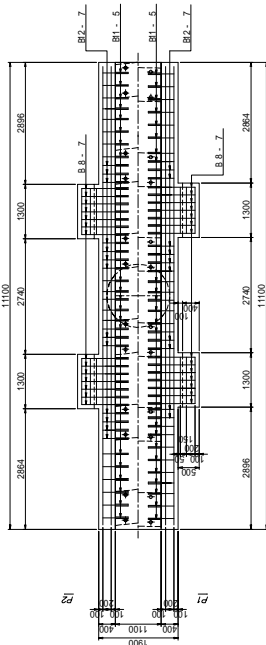
GOBIERNO DE COSTA RICA COOPERACIÓN JICA - MOPT	DIRECCION DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO:	MANUEL PERAZA INC. CIVIL	DIBUJOS:	ANTONIO J. RAMIRO CASTRO NOLDO CHAVEZ INC. CIVIL	APROBADO:	ALDO PERAZA INC. CIVIL CONSEJERO MARIO MAREZ INC. CIVIL DIRECCION PUENTES	ESCALA:	INDICAR	DIBUJOS No.:	2912	REFUERZO DE PILA P1 PUENTE SOBRE RIO TORRES
		PROYECTO:	INDICAR	FECHA:	ENERO 2007	HUJIA 12 DE 17						

REFUERZO DE PILA P2 ESCALA 1:50
 VIGAS CABEZAL(1)

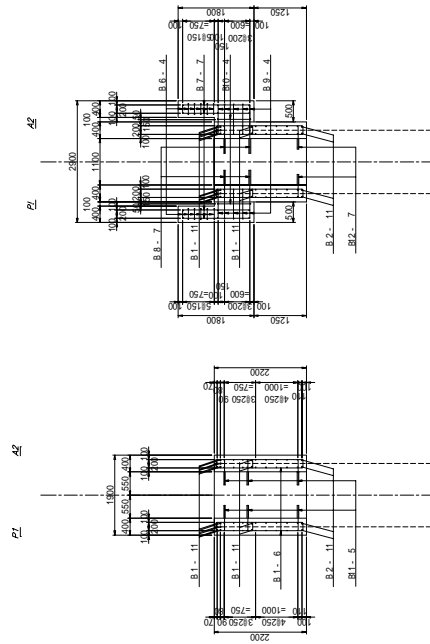
NOTAS:
 Anclajes: Los huecos de anclaje deben ser perforados con la profundidad y diámetro como lo muestra la tabla de acuerdo al diámetro de la barra de anclaje.



DETALLE DE ANCLAJE			
MARKA	TAMANO	LONGITUD DE BARRILE	TAMANO DE MOTO
1	9.5	150	20
2	12.5	200	25
3	15.5	250	30
4	18.5	300	35
5	21.5	350	40
6	24.5	400	45
7	27.5	450	50
8	30.5	500	55
9	33.5	550	60
10	36.5	600	65
11	39.5	650	70

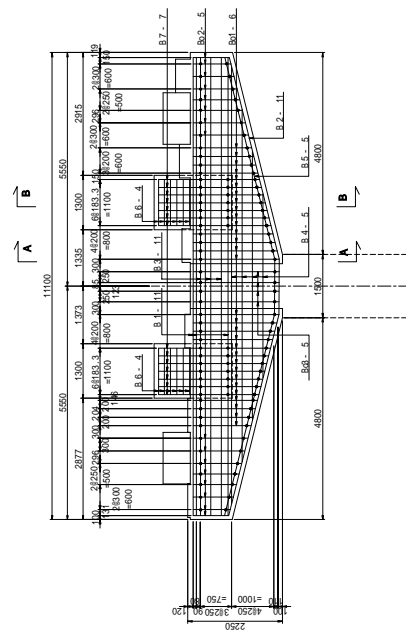


PLANTA



CORTE B

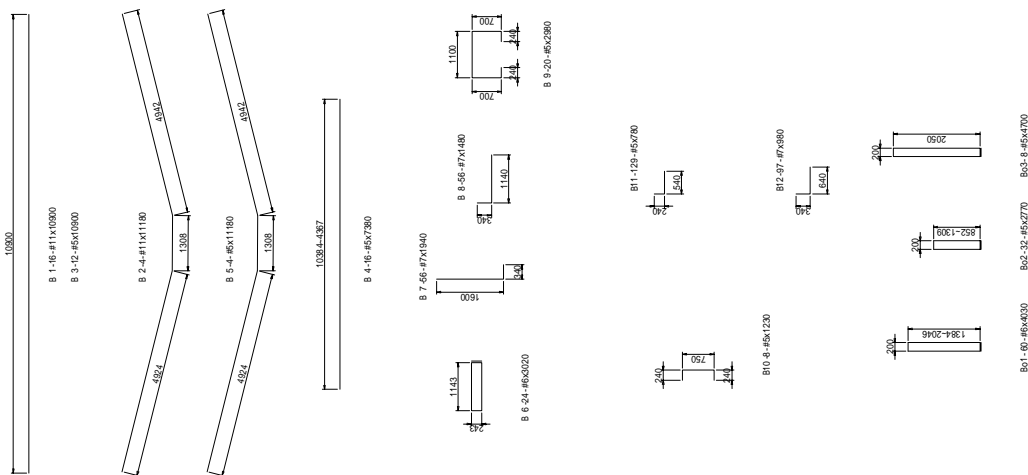
CORTE A



ELEVACION

GOBIERNO DE COSTA RICA COOPERACION JICA - MOPT	DIRECCION DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO:	MARCELO PEREZ ING. CIVIL	DIBUJO:	ANTONIO A. RAMIREZ CAMERO MARIO OJEDA ING. CIVIL	APROBADO:	MARIO OJEDA ING. CIVIL	APROBADO:	ING. JORGE MORALES ING. JORGE MORALES ING. JORGE MORALES	ESCALA:	VARIA	DIBUJO No.:	2913	REFUERZO DE PILA P2 PUENTE SOBRE RIO TORRES
		PROYECTO:	ING. JORGE MORALES	PROYECTO:	ING. JORGE MORALES	PROYECTO:	ING. JORGE MORALES	PROYECTO:	ING. JORGE MORALES	PROYECTO:	ING. JORGE MORALES	PROYECTO:	ING. JORGE MORALES	PROYECTO:

REFUERZO DE PILA P2 ESCALA 1:50
 VIGAS CAABEZALES(2)



ACERO DE REFUERZO

MARCA	TIPO	LONGITUD (CM)	CANTIDAD	PESO UNITARIO (KG/M)	PESO TOTAL (KG)	ESPECIFICACIONES	
B1	#11	10300	16	7.507	86,188	1379	
B2	#11	11180	4	7.507	88,400	354	
B3	#5	10300	12	1.552	18,917	203	
B4	#5	7380	16	1.552	11,454	183	
B5	#5	11180	4	1.552	17,351	69	
B6	#6	3020	24	2.236	6,759	162	
B7	#7	1940	56	3.042	5,901	330	
B8	#7	1480	56	3.042	4,502	252	
B9	#5	2880	20	1.552	4,625	93	
B10	#5	1230	8	1.552	1,909	15	
B11	#5	780	129	1.552	1,211	156	
B12	#7	980	37	3.042	2,881	289	
B13	#6	4030	60	2.236	9,007	540	
B14	#5	2770	32	1.552	4,289	138	
B15	#5	4700	8	1.552	7,294	58	
					4221	KG	
					#11	1733	KG
					#7	871	KG (153)
					#6	702	KG
					#5	915	KG (129)
					TOTAL	4221	KG (282)

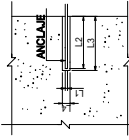
() ANCLAJE

GOBIERNO DE COSTA RICA COOPERACION JICA - MOPT	DIRECCION DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO: _____ MAQUETADO: _____ ANCLAJE: _____	DIBUJOS: _____ AUTORIZADO: _____ INGENIERO: _____	APROBADO: _____ INGENIERO: _____ APROBADO: _____	ESCALA: _____ FECHA: _____ EMPLEADO: _____	DIBUJO No. 2914 PROYECTO:
REFUERZO DE PILA P2 PUENTE SOBRE RIO TORRES						
PAGINA 14 DE 17						

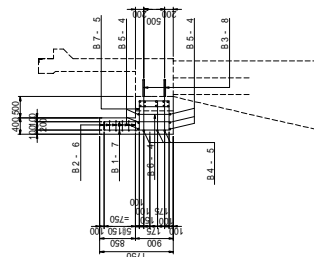
REFUERZO DE BASTION A2

ESCALA 1:50

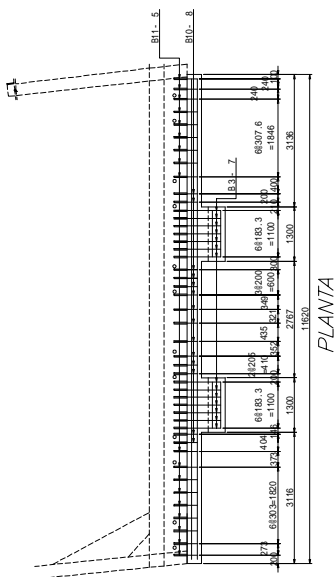
NOTAS:
 Anclajes: Los huecos de anclaje deben ser perforados con la profundidad y diametro como lo muestra la tabla de acuerdo al diametro de la barra de anclaje.



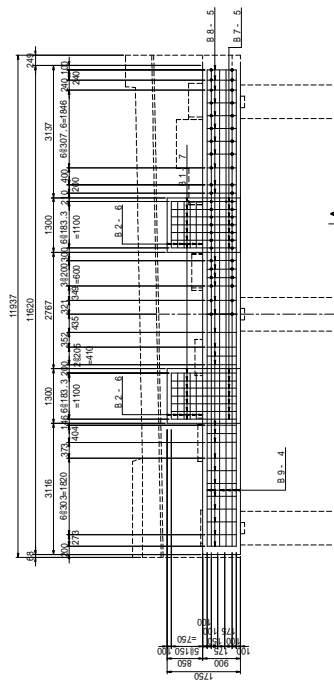
MARCA	TAMANO	LIMITES DE ANCLAJE	LIMITES DE HOTO	TAMANO DE HOTO
8	800	150	100	20
4	127	200	210	23
6	168	240	260	26
7	221	240	300	28
8	264	300	400	36
9	287	440	460	38
11	363	640	660	48



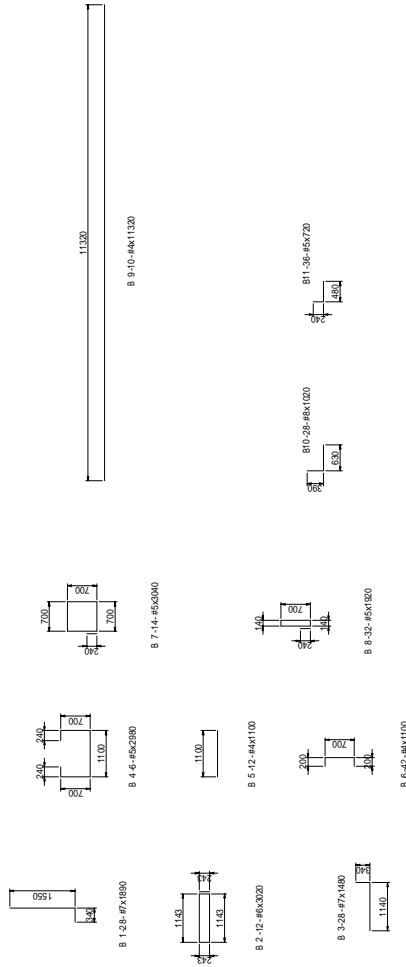
CORTE A-A



PLANTA

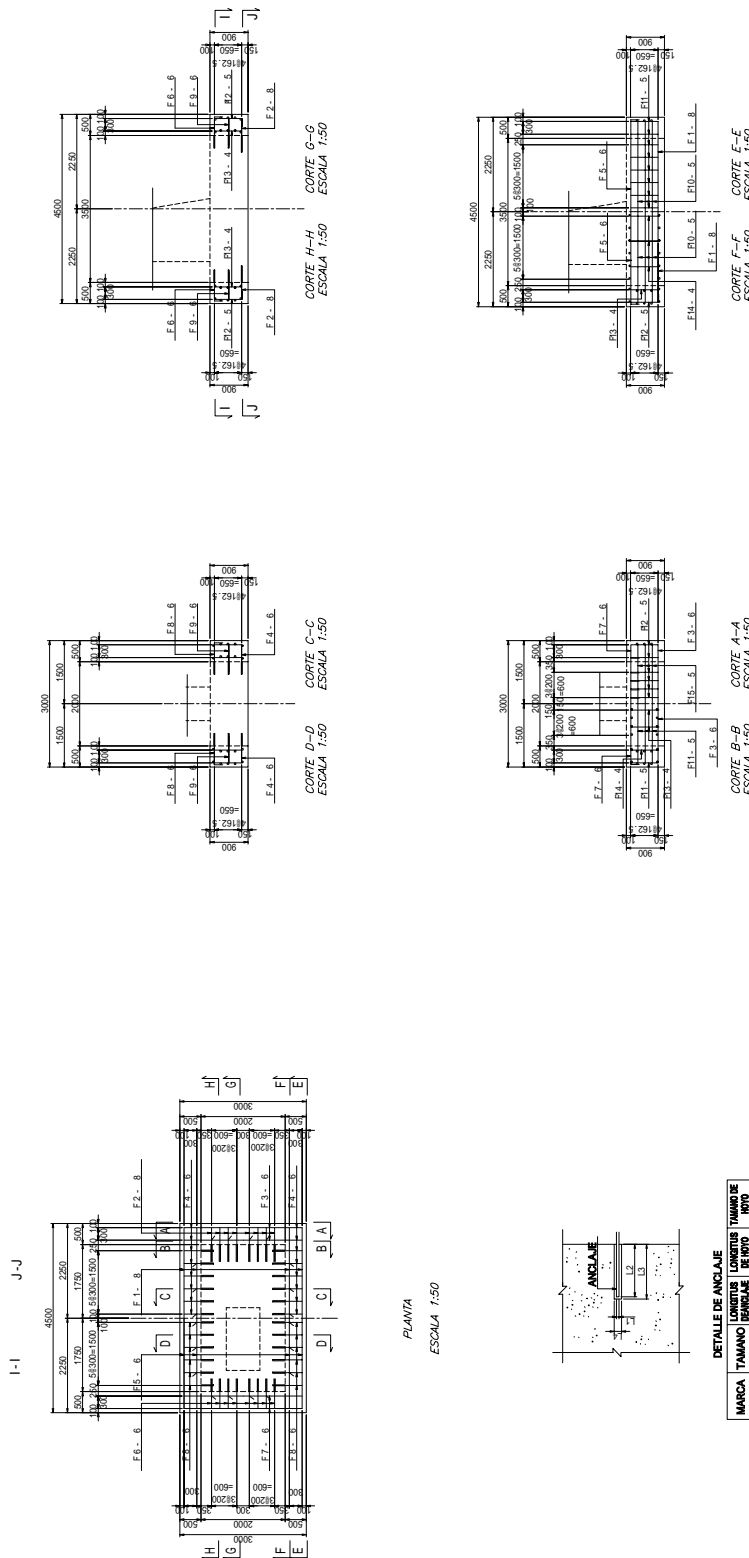


ELEVACION



GOBIERNO DE COSTA RICA COOPERACION JICA - MOPT	DIRECCION DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO:	MARCO PEREZ ING. CIVIL	DISEÑO:	MARCO PEREZ ING. CIVIL	DIRECCION DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	ESCALA:	MINIMA	EMBOLO No. 2915	REFUERZO DE BASTION A2 PUENTE SOBRE RIO TORRES
		APROBADO:	MARCO PEREZ ING. CIVIL	APROBADO:	MARCO PEREZ ING. CIVIL	APROBADO:	ING. ART. DIRECCION PUENTES	FECHA:	15 DE 17	PROYECTO:

REFUERZO DE BASTION A2
 ESCALA 1:50
 FUNDACION(1)



REFUERZO DE BASTION A2
 PUENTE SOBRE RIO TORRES
 PROYECTO:

DIAGRAMA No. 2016
 HAZA 18 DE 17

ESCALA: 1:50

APROBADO: ING. JORGE DIRECTIONAL
 INGENIERO

APROBADO: ING. JORGE DIRECTIONAL
 INGENIERO

APROBADO: ING. JORGE DIRECTIONAL
 INGENIERO

APROBADO: ING. JORGE DIRECTIONAL
 INGENIERO

APROBADO: ING. JORGE DIRECTIONAL
 INGENIERO

APROBADO: ING. JORGE DIRECTIONAL
 INGENIERO

APROBADO: ING. JORGE DIRECTIONAL
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 INGENIERO

REFUERZO DE BASTION A2

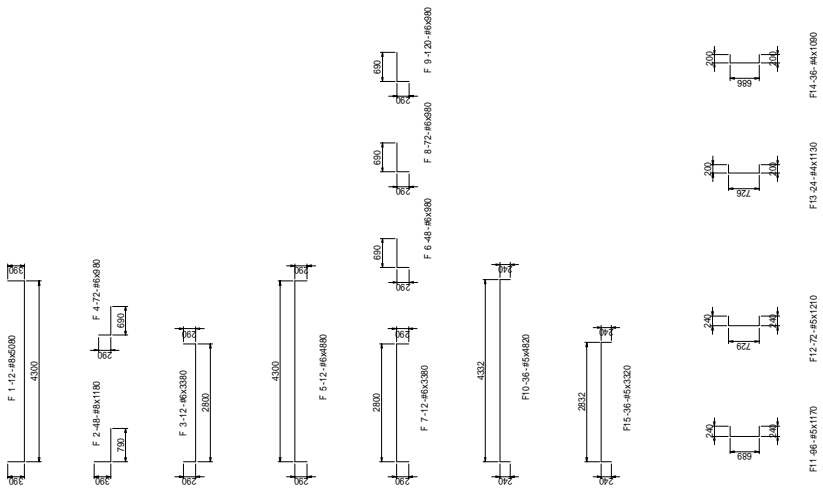
FUNDACION(2)

ESCALA 1:50

ACERO DE REFUERZO

MARCA	TAMAÑO	LONGITUD (Mg/m)	CANTIDAD REQUERIDA POR M.M.	RESQU	COCOSIS		
			kg	kg	kg		
B1	#7	1890	28	3.042	6.7748	181	J
B2	#6	3020	12	2.235	6.750	81	□
B3	#7	1480	28	3.042	4.502	126	J (28)
B4	#5	2980	6	1.552	4.625	28	□
B5	#4	1100	12	0.994	1.093	13	—
B6	#4	1100	42	0.994	1.093	46	J
B7	#5	3940	14	1.552	4.778	66	□
B8	#5	1000	32	1.552	2.980	95	□
B9	#4	11320	10	0.994	11.252	113	—
B10	#6	1000	28	3.973	4.052	113	(28)
B11	#5	720	36	1.552	1.117	40	(36)
						882 kg	
F1	#8	5000	12	3.973	20.183	242	J
F2	#8	1180	48	3.973	4.688	225	J (48)
F3	#6	3300	12	2.235	7.554	91	J
F4	#6	930	72	2.235	2.150	158	J (72)
F5	#6	4800	12	2.235	10.907	131	J
F6	#6	930	48	2.235	2.150	105	J (48)
F7	#6	3300	12	2.235	7.554	91	J
F8	#6	930	72	2.235	2.150	158	J (72)
F9	#6	930	120	2.235	2.150	263	J (120)
F10	#5	4820	36	1.552	7.481	289	J
F11	#5	1170	96	1.552	1.816	174	J
F12	#5	1210	72	1.552	1.878	135	J
F13	#4	1130	24	0.994	1.123	27	J
F14	#4	1090	36	0.994	1.083	39	J
F15	#5	3320	36	1.552	5.183	186	J
						2294 kg	
						#8	500 kg (76)
						#7	237 kg (28)
						#6	1078 kg (312)
						#5	993 kg (96)
						#4	238 kg
						TOTAL	3176 kg (450)

() ANCLAJE



GOBIERNO DE COSTA RICA COOPERACION JICA - MOPT	DIRECCION DE PUENTES DEPARTAMENTO DISEÑO DE PUENTES	DISEÑO: _____ MAESTRO JEFE DE M.O. CIVIL	DIBUJO: _____ AYUDANTE DE M.O. CIVIL	APROBADO: _____ MAESTRO JEFE DE M.O. CIVIL	APROBADO: _____ MAESTRO JEFE DE M.O. CIVIL	APROBADO: _____ MAESTRO JEFE DE M.O. CIVIL	APROBADO: _____ MAESTRO JEFE DE M.O. CIVIL	ESCALA: INGENIERIA	BOFOLIO No. 2917	REFUERZO DE BASTION A2 PUENTE SOBRE RIO TORRES
		FECHA: _____	FECHA: _____	FECHA: _____	FECHA: _____	FECHA: _____	FECHA: _____	FECHA: _____	FECHA: _____	PROYECTO: _____

APPENDIX 2. ENVIRONMENTAL STANDARDS (NOISE/VIBRATION) IMPLEMENTED IN OTHER COUNTRIES.

Table A1 summarizes the noise zone classification currently used in USA.

Table A1 Noise Zone Classification

	Noise Exposure Class	DNL (dBA)	Leq (hour)	HUD Noise Standard
A	Minimal Exposure	< 55	< 55	Acceptable
B	Moderate Exposure	55 – 65	55 - 65	
C-1	Significant Exposure	65 – 70	65- 70	Normally Acceptable
C-2		70 – 75	70 - 75	
D-1	Severe Exposure	75 – 80	40 - 80	Unacceptable
D-2		80 – 85	80 - 85	
D-3		> 85	. 85	

Source: Larry W. Canter, 1996

DNL: Day-Night average sound level, Ldn, defined by following formula;

$$Ldn = 10 \log (0.625 (10^{(Ld/10)}) + 0.375 (10^{(Ln+10)/10})$$

where Ld is the Leq for the daytime (0700 - 2200) and Ln is the Leq for the nighttime (2200 - 0700).

HUD: Department of Housing and Urban Development.

Table A2 summarizes the vibration standards implemented in Japan.

Table A2 Vibration Level L₁₀ (dB)

Zone	Day (6:00 - 20:00)	Night (20:00 - 6:00)
1	65	60
2	70	65

Source: Japan Road Association, 1988

Zone 1: Zone that requires moderate, calm and quiet environment. Basically, this zone 1 values are applied for the evaluation for the residential area.

Zone 2: Zone used for industrial and/or commercial purpose.

APPENDIX 3 CONSTRUCTION PLANNING AND COST ESTIMATE

3.1. CONSTRUCTION SCHEDULE

Rt. 1 Bridge No. 2 Rio Aranjuez

Member	Sub-Member	Work Description	Working period	1			2			3			4			5			6						
				10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30				
Site preparation		Construction & removal of construction yard	15	●●																					
Traffic control		One lane traffic	105	●-----●						●-----●			●-----●												
Superstructure	Slab	Slab replacement (precast slab)	30									●-----●	●-----●												
	Floor system	Stringer addition & re-arrangement	25										●-----●	●-----●											
		Stringer continuation	20										●-----●	●-----●											
	Main girder	Member addition	20												●-----●	●-----●									
	Prevention system for unseating	Bridge seat widening	10						●-----●	●-----●															
		Connection system (chain type)	10							●-----●	●-----●														
	Accessory	New installation of expansion joint	10												●-----●	●-----●									
		Flexible railing installation	10													●-----●	●-----●								
		Asphalt paving & waterproofing	20												●-----●	●-----●									
	Substructure	Pier	Concrete jacketing	15						●-----●	●-----●														
Foundation		Footing widening	20	●-----●		●-----●																			
		Install gabion box	20								●-----●	●-----●													

Rt. 1 Bridge No. 3 Rio Abangares

Member	Sub-Member	Work Description	Working period	1			2			3			4			5			6		
				10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30
Site preparation		Construction & removal of construction yard	15	●	●												●	●			
Traffic control		One lane traffic	55								●	●	●	●	●	●	●	●			
Superstructure	Slab	Slab replacement (precast slab)	35								●	●	●	●	●						
	Floor system	Stringer addition & re-arrangement	25								●	●	●	●	●						
		Stringer continuation	20								●	●	●	●	●						
	Main girder	Diaphragm re-arrangement	10														●	●			
		Cover plate fixing	10								●	●									
	Prevention system for unseating	Bridge seat widening	10								●	●									
		Connection system (chain type)	10														●	●			
	Accessory	New installation of expansion joint	10														●	●			
		Flexible railing installation	10																	●	●
		Asphalt paving & waterproofing	20											●	●						
Substructure	Foundation	Footing widening	30		●	●	●	●													
		Wet masonry work	20														●	●			
		Install gabion box	10														●	●			

Rt. 1 Bridge No. 7 Rio Azufrado

Member	Sub-Member	Work Description	Working period	1			2			3			4			5			6				
				10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30		
Site preparation		Construction & removal of construction yard	15	●	●								●	●									
Traffic control		One lane traffic	45						●	●	●	●	●	●									
Superstructure	Slab	Slab thickness increase	25						●	●	●												
	Main girder	Steel plate bonding	10			●	●																
		Girder height increase	15				●	●															
	Accessory	New installation of expansion joint	10									●	●										
		Flexible railing installation	10										●	●									
		Asphalt paving & waterproofing	10								●	●											
	Substructure	Pier	Concrete jacketing	15	●	●																	

Rt. 2 Bridge No. 16 Rio Nuevo

Member	Sub-Member	Work Description	Working period	1			2			3			4			5			6																					
				10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30																			
Site preparation		Construction & removal of construction yard	15	●	●												●	●																						
Traffic control		One lane traffic	50									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Superstructure	Slab	Slab thickness increase	30									●	●	●	●																									
	Main girder	Steel plate bonding	10									●	●																											
	Prevention system for unseating	Bridge seat widening	20				●	●	●																															
		Concrete block	10										●	●																										
		Accessory	New installation of expansion joint	10																																				
	Accessory	Flexible railing installation	10																																					
		Asphalt paving & waterproofing	20																																					
		Substructure	Pier	Concrete jacketing	20																																			
			Foundation	Footing widening	10				●	●	●																													
Additional pile installation	15					●	●	●																																
Wet masonry work	15																																							
Install gabion box	20																																							

Rt. 4 Bridge No. 17 Rio Chirripo

Member	Sub-Member	Work Description	Working period	1			2			3			4			5			6			
				10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	
Site preparation		Construction & removal of construction yard	15	●	●																	
Traffic control		One lane traffic	25					●	●	●	●											
Superstructure	Accessory	Replacement of expansion joint	10								●	●										
		Asphalt paving & waterproofing	15					●	●	●												
Substructure	Pier	Rolling stone protection	20			●	●	●														
	Foundation	Footing widening	20	●	●																	
		Install gabion box	20					●	●	●												

Rt. 4 Bridge No. 19 Rio Sarapiquí

Member	Sub-Member	Work Description	Working period	1			2			3			4			5			6					
				10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30			
Site preparation		Construction & removal of construction yard	15	●	●																	●	●	
Traffic control		One lane traffic	105	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Superstructure	Slab	FRP bonding (Surface)	25										●	●	●	●	●	●						
		FRP bonding (Bottom)	15							●	●	●	●	●	●									
	Main girder	Prestressing	20							●	●	●	●	●	●									
		Steel plate replacement	15										●	●	●									
		Prevention system for unseating	Bridge seat widening	10							●	●	●	●	●	●								
	Connection system (chain type)		10										●	●	●									
	Accessory	New installation of expansion joint	10																●	●	●	●	●	●
		Asphalt paving & waterproofing	20													●	●	●	●	●	●			
	Substructure	Cofferdam	Install & removal of large sandbag type	15	●	●					●	●	●											
Pier		Height of transversal beam increase	10							●	●	●												
Foundation		Footing widening	15				●	●	●															
		Additional pile installation	20				●	●	●															
		Install gabion box	20							●	●	●												

Rt. 32 Bridge No. 20 Rio Sucio

Member	Sub-Member	Work Description	Working period	1			2			3			4			5			6					
				10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30			
Traffic control		One lane traffic	60	●	●	●	●	●	●	●	●	●												
Superstructure	Accessory	Replacement of expansion joint	15							●	●	●												
		Asphalt paving & waterproofing	25				●	●	●															
Substructure	Pier	Rolling stone protection	20	●	●																			

Rt. 32 Bridge No. 26 Rio Chirripo

Member	Sub-Member	Work Description	Working period	1			2			3			4			5			6					
				10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30			
Site preparation		Construction & removal of construction yard	15	●	●																			
Traffic control		One lane traffic	55										●	●	●	●	●	●						
Superstructure	Slab	FRP bonding (Surface)	40										●	●	●	●	●	●						
		FRP bonding (Bottom)	25																					
	Prevention system for unseating	Bridge seat widening	20																					
		Connection system (chain type)	10																					
	Accessory	New installation of expansion joint	15																					
		Asphalt paving & waterproofing	30																					
Substructure	Foundation	Footing widening	10	●	●																			
		Wet masonry work	10																					

Rt. 218 Bridge No. 29 Rio Torres

Member	Sub-Member	Work Description	Working period	1			2			3			4			5			6					
				10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30			
Traffic control		Detouring to adjoined bridge	140	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●						
Superstructure	Slab	FRP bonding (Surface)	20																					
		FRP bonding (Bottom)	10																					
	Main girder	FRP bonding	10																					
	Prevention system for unseating	Bridge seat widening	10																					
		New installation of expansion joint	15																					
		Asphalt paving & waterproofing	20																					
Substructure	Pier	Height of transversal beam increase	20																					
		Concrete jacketing	10																					
	Foundation	Footing widening	25	●	●																			
		Wet masonry work	15																					
Install gabion box		15																						

3.2. PROJECT COST

Summary		Basic Data: Total project costs of 10 bridges per 1.00 Ls						CODE:			SUM000
Item	Spec.	Unit	Qty	Unit Price			Total Amount			Equivalent (USD)	Remarks
				CRC	USD	JPY	CRC	USD	JPY		
No.2 Rio Aranjuez (1 of 2)	Rt.1, Steel truss, L=87.78m, Completion in 1955	site	1.00	287,241,753		30,285,792	287,241,753		30,285,792	\$815,873.33	RT001.02.1
No.2 Rio Aranjuez (2 of 2)	Rt.1, Steel truss, L=87.78m, Completion in 1955	site	1.00	220,201,030	26,713	2,558,910	220,201,030	26,712.52	2,558,910	\$475,462.37	RT001.02.2
No.2 Rio Aranjuez Total							507,442,784	26,712.52	32,844,701	\$1,291,335.71	
No.3 Rio Abangares (1 of 2)	Rt.1, Steel thru truss, L=101.34m, Completion in 1953	site	1.00	309,068,365		29,292,663	309,068,365		29,292,663	\$849,689.64	RT001.03.1
No.3 Rio Abangares (2 of 2)	Rt.1, Steel thru truss, L=101.34m, Completion in 1953	site	1.00	198,340,941	107,080	3,555,149	198,340,941	107,079.52	3,555,149	\$521,974.79	RT001.03.2
No.3 Rio Abangares Total							507,409,306	107,079.52	32,847,813	\$1,371,664.42	
No.7 Rio Azufrado	Rt.1, Rigid reinforced concrete frame, L=31.39m, Completion in 1955	site	1.00	117,281,252	80,042	14,608,995	117,281,252	80,041.50	14,608,995	\$432,351.76	RT001.07
No.12 Rio Puerto Nuevo (1 of 2)	Rt.2, Steel beam & reinforced concrete girder, L=104.89m, Completion in 1961	site	1.00	78,904,061		72,287,237	78,904,061		72,287,237	\$771,271.60	RT002.12.1
No.12 Rio Puerto Nuevo (2 of 2)	Rt.2, Steel beam & reinforced concrete girder, L=104.89m, Completion in 1961	site	1.00	265,831,855	40,021	5,210,845	265,831,855	40,020.75	5,210,845	\$599,910.01	RT002.12.2
No.12 Rio Puerto Nuevo Total							344,735,916	40,020.75	77,498,082	\$1,371,181.61	
No.16 Rio Nuevo	Rt.2, Continuous reinforced concrete girder, L=55.47m, Completion in 1961	site	1.00	280,730,856		13,694,389	280,730,856		13,694,389	\$661,335.87	RT002.16
No.17 Rio Chirripo	Rt.4, Concrete box girder, L=175.80m, Completion in 1978	site	1.00	226,420,000		5,438,424	226,420,000		5,438,424	\$485,435.57	RT004.17
No.19 Rio Sarapiquí	Rt.4, Steel I-beam, L=100.96m, Completion in 1978	site	1.00	261,206,357		70,312,715	261,206,357		70,312,715	\$1,107,777.26	RT004.19
No.20 Rio Sucio	Rt.32, Concrete box girder, L=187.25m, Completion in N.A.	site	1.00	163,653,216		4,996,830	163,653,216		4,996,830	\$359,984.29	RT032.20
No.26 Rio Chirripo (1 of 2)	Rt.32, Continuous steel I-beam, L=431.90m, Completion in 1974-1978	site	1.00	52,217,159		222,143,100	52,217,159		222,143,100	\$2,001,344.11	RT032.26.1
No.26 Rio Chirripo (2 of 2)	Rt.32, Continuous steel I-beam, L=431.90m, Completion in 1974-1978	site	1.00	610,636,845		9,966,921	610,636,845		9,966,921	\$1,268,978.84	RT032.26.2
No.26 Rio Chirripo Total							682,854,005		232,110,021	\$3,270,322.96	
No.29 Rio Torres (1 of 2)	Rt.218, Concrete post-tensioned I-girder, L=66.46m, Completion in N.A.	site	1.00	34,044,448		24,762,335	34,044,448		24,762,335	\$277,802.34	RT218.29.1
No.29 Rio Torres (2 of 2)	Rt.218, Concrete post-tensioned I-girder, L=66.46m, Completion in N.A.	site	1.00	130,581,768		3,057,081	130,581,768		3,057,081	\$279,283.14	RT218.29.2
No.29 Rio Torres Total							164,626,216		27,819,416	\$557,085.47	
Summary							3,236,359,907	253,854.29	512,171,387	\$10,908,474.93	

No.2 Rio Aranjuez (1 of 2)

Basic Data: Rt.1, Steel truss, L=87.78m, Completion in 1955
per 1.00 site

CODE:

RT001.02.1

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST	(A)									
Site preparation	Construction & removal of site facilities	Ls	1.00	15,299,333		79,444	15,299,333		79,444	DT02.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	7,988,303			7,988,303			DT02.TR01
Superstructure (slab) 1 of 2	Replacement of deck slab (1 of 2)	Ls	1.00	77,810,557		991,427	77,810,557		991,427	DT02.SU01
Superstructure (slab) 2 of 2	Replacement of deck slab (2 of 2)	Ls	1.00	18,367,158		18,719,233	18,367,158		18,719,233	DT02.SU02
Superstructure (Floor) 1 of 2	Replacement of stringers & install cross beams	Ls	1.00	67,016,811		1,952,480	67,016,811		1,952,480	DT02.SU03
Superstructure (Girder)	Reinforced by additional member (brace)	Ls	1.00	21,955,665		870,849	21,955,665		870,849	DT02.SU05
Substructure (Unseat prevention) 1 of 13	Unseating prevention for A1	Ls	1.00	855,240		11,537	855,240		11,537	DT02.SU06
Substructure (Unseat prevention) 2 of 13	Unseating prevention for P1 & P2	Ls	1.00	5,259,715		66,057	5,259,715		66,057	DT02.SU07
Substructure (Unseat prevention) 4 of 13	Unseating prevention for A2	Ls	1.00	766,836		11,539	766,836		11,539	DT02.SU09
TRANSPORTATION COST	(B)	Ls	1.00				10,765,981		1,135,128	5% of (A)
CONTINGENCY COST	(C)	Ls	1.00				11,304,280		1,191,885	5% of ((A)+(B))
ADMINISTRATION COST	(D)	Ls	1.00				23,738,988		2,502,958	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT	(E)	Ls	1.00				26,112,887		2,753,254	10% of ((A) + (B) + (C) + (D))
No.2 Rio Aranjuez (1 of 2)	Rt.1, Steel truss, L=87.78m, Completion in 1955	site					287,241,753		30,285,792	\$815,873.33

No.2 Rio Aranjuez (2 of 2)

Basic Data: Rt.1, Steel truss, L=87.78m, Completion in 1955

CODE:

RT001.02.2

per 1.00 site

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST	(A)									
Accessory work (1 of 3)	Install of expansion joint (steel)	Ls	1.00	4,831,504		701,309	4,831,504		701,309	DT02.AC01
Accessory work (2 of 3)	Waterproofing of deck slab & asphalt pavement	Ls	1.00	33,431,030		940,054	33,431,030		940,054	DT02.AC02
Accessory work (3 of 3)	Install precast handrail at site	Ls	1.00		20,024			20,024		DT02.AC03
Substructure (2 of 2)	Reinforced by concrete jacketing of P2	Ls	1.00	11,705,219		180,532	11,705,219		180,532	DT02.SB02
Foundation (1 of 3)	Expanding dimension of footing & install gabion box on P1	Ls	1.00	29,628,904		37,717	29,628,904		37,717	DT02.FD01
Foundation (2 of 3)	Expanding dimension of footing & install gabion box on P2	Ls	1.00	57,007,594		58,574	57,007,594		58,574	DT02.FD02
Foundation (3 of 3)	Install riprap & gabion box on A1	Ls	1.00	13,420,302			13,420,302			DT02.FD03
Scaffolding	Total cost for scaffolding on No.2	Ls	1.00	15,040,592			15,040,592			DT02.SCF01
TRANSPORTATION COST	(B)	Ls	1.00				8,253,257	1,001	95,909	5% of (A)
CONTINGENCY COST	(C)	Ls	1.00				8,665,920	1,051	100,705	5% of ((A)+(B))
ADMINISTRATION COST	(D)	Ls	1.00				18,198,432	2,208	211,480	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT	(E)	Ls	1.00				20,018,275	2,428	232,628	10% of ((A) + (B) + (C) + (D))
No.2 Rio Aranjuez (2 of 2)	Rt.1, Steel truss, L=87.78m, Completion in 1955	site					220,201,030	26,713	2,558,910	\$475,462.37

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Equivalent (USD)
				CRC	USD	JPY	CRC	USD	JPY	
No.2 Rio Aranjuez Total							507,442,784	26,712.52	32,844,701	\$1,291,335.71

No.3 Rio Abangares (1 of 2)

Basic Data: Rt.1, Steel thru truss, L=101.34m, Completion in 1953

CODE:

RT001.03.1

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST	(A)									
Site preparation	Construction & removal of site facilities	Ls	1.00	17,151,693		79,444	17,151,693		79,444	DT03.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	6,429,609			6,429,609			DT03.TR01
Superstructure (slab) 1 of 2	Replacement of deck slab (1 of 2)	Ls	1.00	72,043,453		793,141	72,043,453		793,141	DT03.SU01
Superstructure (slab) 2 of 2	Replacement of deck slab (2 of 2)	Ls	1.00	20,473,303		18,277,252	20,473,303		18,277,252	DT03.SU02
Superstructure (Floor) 1 of 3 129ft section	Replacement of stringers & install cross beams	Ls	1.00	42,518,913		1,026,447	42,518,913		1,026,447	DT03.SU03
Superstructure (Floor) 2 of 3 200ft section	Replacement of stringers & install cross beams	Ls	1.00	60,174,704		1,448,404	60,174,704		1,448,404	DT03.SU04
Superstructure (Girder) 1 of 2	Re-arrangement of diaphragm to keep clearance	Ls	1.00	5,879,943		187,389	5,879,943		187,389	DT03.SU06
Superstructure (Girder) 2 of 2	Reinforced by additional steel plate	Ls	1.00	3,167,570		85,085	3,167,570		85,085	DT03.SU07
Substructure (Unseat prevention) 1 of 9	Unseating prevention for A1	Ls	1.00	391,499		5,348	391,499		5,348	DT03.SU08
Substructure (Unseat prevention) 2 of 9	Unseating prevention for P1	Ls	1.00	2,882,388		47,958	2,882,388		47,958	DT03.SU09
Substructure (Unseat prevention) 3 of 9	Unseating prevention for A2	Ls	1.00	568,014		7,640	568,014		7,640	DT03.SU10
TRANSPORTATION COST	(B)	Ls	1.00				11,584,054		1,097,905	5% of (A)
CONTINGENCY COST	(C)	Ls	1.00				12,163,257		1,152,801	5% of ((A)+(B))
ADMINISTRATION COST	(D)	Ls	1.00				25,542,840		2,420,881	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT	(E)	Ls	1.00				28,097,124		2,662,969	10% of ((A) + (B) + (C) + (D))
No.3 Rio Abangares (1 of 2)	Rt.1, Steel thru truss, L=101.34m, Completion in 1953	site					309,068,365		29,292,663	\$849,689.64

No.3 Rio Abangares (2 of 2)		Basic Data: Rt.1, Steel thru truss, L=101.34m, Completion in 1953					CODE: RT001.03.2			
Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST										
Substructure (Unseat prevention) 9 of 9	Install unseating prevention system (Chain type; 400kN) on A1, P1 & A2 (24nos)	Ls	1.00	5,306,388		193,350	5,306,388		193,350	DT03.SU16
Accessory work (1 of 3)	Install of expansion joint	Ls	1.00	6,981,919		1,013,449	6,981,919		1,013,449	DT03.AC01
Accessory work (2 of 3)	Waterproofing of deck slab & asphalt pavement	Ls	1.00	38,147,345		1,072,673	38,147,345		1,072,673	DT03.AC02
Accessory work (3 of 3)	Install precast handrail at site	Ls	1.00			20,268		20,268		DT03.AC03
Substructure	Reinforced by concrete jacketing of P1	Ls	1.00	12,281,743		266,694	12,281,743		266,694	DT03.SB01
Foundation (1 of 3)	Expanding dimension of footing on A1	Ls	1.00	13,883,143	30,000	25,317	13,883,143	30,000	25,317	DT03.FD01
Foundation (2 of 3)	Expanding dimension of footing & install gabion box on P1	Ls	1.00	39,620,012		60,848	39,620,012		60,848	DT03.FD02
Foundation (3 of 3)	Expanding dimension of footing on A2	Ls	1.00	16,807,063	30,000	32,647	16,807,063	30,000	32,647	DT03.FD03
Scaffolding	Total cost for scaffolding on No.3	Ls	1.00	15,650,965			15,650,965			DT03.SCF01
TRANSPORTATION COST		Ls	1.00				7,433,929	4,013	133,249	5% of (A)
CONTINGENCY COST		Ls	1.00				7,805,625	4,214	139,911	5% of ((A)+(B))
ADMINISTRATION COST		Ls	1.00				16,391,813	8,850	293,814	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT		Ls	1.00				18,030,995	9,735	323,195	10% of ((A) + (B) + (C) + (D))
No.3 Rio Abangares (2 of 2)	Rt.1, Steel thru truss, L=101.34m, Completion in 1953	site					198,340,941	107,080	3,555,149	\$521,974.79

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Equivalent (USD)
				CRC	USD	JPY	CRC	USD	JPY	
No.3 Rio Abangares Total							507,409,306	107,079.52	32,847,813	\$1,371,664.42

No.7 Rio Azufrado		Basic Data: Rt.1, Rigid reinforced concrete frame, L=31.39m, Completion in 1955						CODE: RT001.07		
Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST		(A)								
Site preparation	Construction & removal of site facilities	Ls	1.00	13,446,972		79,444	13,446,972		79,444	DT07.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	5,260,589			5,260,589			DT07.TR01
Superstructure (slab)	Increase thickness of slab (10cm) on surface side	Ls	1.00	7,479,884			7,479,884			DT07.SU01
Superstructure (Girder) 1 of 2	Reinforced by bonded steel plate	Ls	1.00	3,697,188		9,479,683	3,697,188		9,479,683	DT07.SU02
Superstructure (Girder) 2 of 2	Increase of girder height (approx.30cm)	Ls	1.00	1,027,092		47,348	1,027,092		47,348	DT07.SU03
Accessory work (1 of 3)	Install of expansion joint	Ls	1.00	4,694,215		681,381	4,694,215		681,381	DT07.AC01
Accessory work (2 of 3)	Waterproofing of deck slab & asphalt pavement	Ls	1.00	15,055,670		426,884	15,055,670		426,884	DT07.AC02
Substructure	Reinforced by concrete jacketing on P1 & P2	Ls	1.00	14,004,013		177,788	14,004,013		177,788	DT07.SB01
Foundation	Expanding dimension of footing on P1 & P2	Ls	1.00	17,197,830	60,000	58,536	17,197,830	60,000	58,536	DT07.FD01
Scaffolding	Total cost for scaffolding on No.7	Ls	1.00	6,051,879			6,051,879			DT07.SCF01
TRANSPORTATION COST	(B)	Ls	1.00				4,395,767	3,000	547,553	5% of (A)
CONTINGENCY COST	(C)	Ls	1.00				4,615,555	3,150	574,931	5% of ((A)+(B))
ADMINISTRATION COST	(D)	Ls	1.00				9,692,665	6,615	1,207,355	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT	(E)	Ls	1.00				10,661,932	7,277	1,328,090	10% of ((A) + (B) + (C) + (D))
No.7 Rio Azufrado	Rt.1, Rigid reinforced concrete frame, L=31.39m, Completion in 1955	site					117,281,252	80,042	14,608,995	\$432,351.76

No.12 Rio Puerto Nuevo
(1 of 2)

Basic Data: Rt.2, Steel beam & reinforced concrete girder, L=104.89m, Completion in 1961

CODE:

RT002.12.1

per 1.00 site

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST				(A)						
Site preparation	Construction & removal of site facilities	Ls	1.00	21,782,594		79,444	21,782,594		79,444	DT12.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	10,326,342			10,326,342			DT12.TR01
Superstructure (slab) 1 of 2 Steel bridge section	Reinforced by bonded FRP sheet on top & bottom of slab (2layers/m2)	Ls	1.00	1,128,078		31,209,926	1,128,078		31,209,926	DT12.SU01
Superstructure (slab) 2 of 2 RC bridge section	Reinforced by bonded FRP sheet on top & bottom of slab (2layers/m2)	Ls	1.00	197,630		5,514,185	197,630		5,514,185	DT12.SU02
Superstructure (Girder) 1 of 3 Steel bridge section	Reinforced by PC cable (3@70ft section)	Ls	1.00	12,812,923		6,140,865	12,812,923		6,140,865	DT12.SU03.1
Superstructure (Girder) 2 of 3 Steel bridge section	Reinforced by PC cable (80ft section)	Ls	1.00	3,786,588		2,371,023	3,786,588		2,371,023	DT12.SU03.2
Superstructure (Girder) 3 of 3 RC bridge section	Reinforced by bonded steel plate	Ls	1.00	3,494,763		8,634,674	3,494,763		8,634,674	DT12.SU04
Substructure (Unseat prevention) 1 of 8	Unseating prevention for A1	Ls	1.00	462,526		6,146	462,526		6,146	DT12.SU05
Substructure (Unseat prevention) 2 of 8	Unseating prevention for A2	Ls	1.00	732,561		4,063	732,561		4,063	DT12.SU06
Substructure (Unseat prevention) 6 of 8	Unseating prevention for P1 & P2	Ls	1.00	43,641			43,641			DT12.SU10
Substructure (Unseat prevention) 7 of 8	Unseating prevention for P3 & P4	Ls	1.00	163,126			163,126			DT12.SU11
Substructure (Unseat prevention) 8 of 8	Install unseating prevention system (Chain type; 200kN) on A1, P1-P4 (32nos)	Ls	1.00	4,216,590		226,992	4,216,590		226,992	DT12.SU12
TRANSPORTATION COST				(B)						
CONTINGENCY COST				(C)						
ADMINISTRATION COST				(D)						
CONTRACTOR'S PROFIT				(E)						
No.12 Rio Puerto Nuevo (1 of 2)	Rt.2, Steel beam & reinforced concrete girder, L=104.89m, Completion in 1961	site					78,904,061		72,287,237	\$771,271.60

No.12 Rio Puerto Nuevo
(2 of 2)

Basic Data: Rt.2, Steel beam & reinforced concrete girder, L=104.89m, Completion in 1961

CODE:

RT002.12.2

per 1.00 site

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST (A)										
Accessory work (1 of 2)	Install of expansion joint	Ls	1.00	14,098,486		2,046,443	14,098,486		2,046,443	DT12.AC01
Accessory work (2 of 2)	Waterproofing of deck slab & asphalt pavement	Ls	1.00	50,155,560		1,422,128	50,155,560		1,422,128	DT12.AC02
Substructure	Expanding dimension of transversal beam on P1-P4	Ls	1.00	15,282,017		210,715	15,282,017		210,715	DT12.SB01
Foundation (1 of 6)	Slope protection with wet masonry on A1	Ls	1.00	4,906,048			4,906,048			DT12.FD01
Foundation (2 of 6)	Expanding dimension of footing & install gabion box	Ls	1.00	30,088,530		40,887	30,088,530		40,887	DT12.FD02
Foundation (3 of 6)	Expanding dimension of footing on P2	Ls	1.00	26,991,149		39,889	26,991,149		39,889	DT12.FD03
Foundation (4 of 6)	Expanding dimension of footing on P3	Ls	1.00	20,378,819		90,443	20,378,819		90,443	DT12.FD04
Foundation (5 of 6)	Expanding dimension of footing on P4	Ls	1.00	16,996,724		45,466	16,996,724		45,466	DT12.FD05
Foundation (6 of 6)	Expanding dimension of footing on A2	Ls	1.00	5,279,933	30,000	10,137	5,279,933	30,000	10,137	DT12.FD06
Scaffolding	Total cost for scaffolding on No.12	Ls	1.00	15,093,254			15,093,254			DT12.SCF01
TRANSPORTATION COST (B)										
		Ls	1.00				9,963,526	1,500	195,305	5% of (A)
CONTINGENCY COST (C)										
		Ls	1.00				10,461,702	1,575	205,071	5% of ((A)+(B))
ADMINISTRATION COST (D)										
		Ls	1.00				21,969,575	3,308	430,648	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT (E)										
		Ls	1.00				24,166,532	3,638	473,713	10% of ((A) + (B) + (C) + (D))
No.12 Rio Puerto Nuevo (2 of 2)	Rt.2, Steel beam & reinforced concrete girder, L=104.89m, Completion in 1961	site					265,831,855	40,021	5,210,845	\$599,910.01

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Equivalent (USD)
				CRC	USD	JPY	CRC	USD	JPY	
No.12 Rio Puerto Nuevo Total							344,735,916	40,020.75	77,498,082	\$1,371,181.61

No.16 Rio Nuevo		Basic Data: Rt.2, Continuous reinforced concrete girder, L=55.47m, Completion in 1961						CODE: RT002.16		
Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST										
Site preparation	Construction & removal of site facilities	Ls	1.00	17,151,693		79,444	17,151,693		79,444	DT16.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	5,845,099			5,845,099			DT16.TR01
Superstructure (slab)	Increase thickness of slab (9cm) on surface side	Ls	1.00	13,077,540			13,077,540			DT16.SU01
Superstructure (Girder) 1 of 2	Reinforced by bonded FRP sheet on girder (6layers & 1layer)	Ls	1.00	143,497		6,741,854	143,497		6,741,854	DT16.SU02.1
Superstructure (Girder) 2 of 2	Reconstruction of edge & connection with PC bar on cross beam	Ls	1.00	628,950		1,145	628,950		1,145	DT16.SU02.2
Substructure (Unseat prevention) 1 of 5	Unseating prevention for A1	Ls	1.00	1,850,585		19,369	1,850,585		19,369	DT16.SU03
Substructure (Unseat prevention) 2 of 5	Unseating prevention for A2	Ls	1.00	962,114		9,813	962,114		9,813	DT16.SU04
Accessory work (1 of 3)	Install of expansion joint	Ls	1.00	4,694,215		681,381	4,694,215		681,381	DT16.AC01
Accessory work (2 of 3)	Waterproofing of deck slab & asphalt pavement	Ls	1.00	26,603,094		754,315	26,603,094		754,315	DT16.AC02
Foundation (1 of 4)	Expanding of footing, install riprap & gabion box, & additional pile driving on A1	Ls	1.00	54,457,602		1,881,976	54,457,602		1,881,976	DT16.FD01
Foundation (2 of 4)	Expanding of footing, wall and install riprap & gabion box on P1	Ls	1.00	60,381,796		50,790	60,381,796		50,790	DT16.FD02
Foundation (3 of 4)	Expanding of footing & wall on P2	Ls	1.00	4,379,774		45,381	4,379,774		45,381	DT16.FD03
Foundation (4 of 4)	Slope protection with gabion box & wet masonry on A2	Ls	1.00	10,197,156			10,197,156			DT16.FD04
Scaffolding	Total cost for scaffolding on No.16	Ls	1.00	10,065,861			10,065,861			DT16.SCF01
TRANSPORTATION COST										
CONTINGENCY COST										
ADMINISTRATION COST										
CONTRACTOR'S PROFIT										
No.16 Rio Nuevo		Rt.2, Continuous reinforced concrete girder, L=55.47m, Completion in 1961	site				280,730,856		13,694,389	\$661,335.87

No.17 Rio Chirripo

Basic Data: Rt.4, Concrete box girder, L=175.80m, Completion in 1978

CODE:

RT004.17

per 1.00 site

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST	(A)									
Site preparation	Construction & removal of site facilities	Ls	1.00	11,594,612		79,444	11,594,612		79,444	DT17.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	2,922,550			2,922,550			DT17.TR01
Accessory work (1 of 2)	Replacement of expansion joint	Ls	1.00	7,504,234		1,116,839	7,504,234		1,116,839	DT17.AC01
Accessory work (2 of 2)	Removal & install of pavement, waterproofing of deck slab	Ls	1.00	93,550,386		2,594,732	93,550,386		2,594,732	DT17.AC02
Substructure (1 of 2)	Colum of pier is covered by concrete to protect from rolling stones on P1 & P2	Ls	1.00	7,453,675		46,767	7,453,675		46,767	DT17.SB01
Foundation (2 of 4)	Expanding dimension of footing on P1 & P2	Ls	1.00	44,438,645		238,920	44,438,645		238,920	DT17.FD02
Scaffolding	Total cost for scaffolding on No.17	Ls	1.00	2,262,853			2,262,853			DT17.SCF01
TRANSPORTATION COST	(B)	Ls	1.00				8,486,348		203,835	5% of (A)
CONTINGENCY COST	(C)	Ls	1.00				8,910,665		214,027	5% of ((A)+(B))
ADMINISTRATION COST	(D)	Ls	1.00				18,712,397		449,457	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT	(E)	Ls	1.00				20,583,636		494,402	10% of ((A) + (B) + (C) + (D))
No.17 Rio Chirripo	Rt.4, Concrete box girder, L=175.80m, Completion in 1978	site					226,420,000		5,438,424	\$485,435.57

No.19 Rio Sarapiquí		Basic Data: Rt.4, Steel I-beam, L=100.96m, Completion in 1978						CODE:		RT004.19
Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST (A)										
Site preparation	Construction & removal of site facilities	Ls	1.00	19,004,054		79,444	19,004,054		79,444	DT19.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	6,819,283			6,819,283			DT19.TR01
Superstructure (slab)	Reinforced by bonded FRP sheet on top & bottom of slab (2layers/m2)	Ls	1.00	1,232,678		33,649,100	1,232,678		33,649,100	DT19.SU01
Superstructure (Girder) 1 of 4	Reinforced by PC cable at support	Ls	1.00	9,223,826		6,179,890	9,223,826		6,179,890	DT19.SU02.1
Superstructure (Girder) 2 of 4	Reinforced by PC cable at center span	Ls	1.00	7,204,408		1,822,269	7,204,408		1,822,269	DT19.SU02.2
Superstructure (Girder) 3 of 4	Reinforced by bonded steel plate	Ls	1.00	3,494,763		8,634,674	3,494,763		8,634,674	DT19.SU02.3
Superstructure (Girder) 4 of 4	Partial replacement of main girder	Ls	1.00	6,611,540		233,856	6,611,540		233,856	DT19.SU03
Substructure (Unseat prevention) 1 of 4	Unseating prevention for A1 & A2	Ls	1.00	1,172,686		12,376	1,172,686		12,376	DT19.SU04
Substructure (Unseat prevention) 4 of 4	Install unseating prevention system (Chain type; 200kN) on A1 & A2 (10nos)	Ls	1.00	1,317,879		75,094	1,317,879		75,094	DT19.SU07
Accessory work (1 of 2)	Install of expansion joint	Ls	1.00	3,854,642		559,514	3,854,642		559,514	DT19.AC01
Accessory work (2 of 2)	Waterproofing of deck slab & asphalt pavement	Ls	1.00	37,400,660		1,051,677	37,400,660		1,051,677	DT19.AC02
Substructure (1 of 2)	Expanding dimension of transversal beam on P1 & P2	Ls	1.00	5,682,087		79,991	5,682,087		79,991	DT19.SB01
Foundation (1 of 3)	Expanding of footing & additional pile driving on P1	Ls	1.00	56,384,831		144,163	56,384,831		144,163	DT19.FD01
Foundation (2 of 3)	Expanding of footing on P2	Ls	1.00	24,387,727		185,146	24,387,727		185,146	DT19.FD02
Scaffolding	Total cost for scaffolding on No.19	Ls	1.00	12,012,130			12,012,130			DT19.SCF01
TRANSPORTATION COST (B)										
		Ls	1.00				9,790,160		2,635,360	5% of (A)
CONTINGENCY COST (C)										
		Ls	1.00				10,279,668		2,767,128	5% of ((A)+(B))
ADMINISTRATION COST (D)										
		Ls	1.00				21,587,302		5,810,968	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT (E)										
		Ls	1.00				23,746,032		6,392,065	10% of ((A) + (B) + (C) + (D))
No.19 Rio Sarapiquí	Rt.4, Steel I-beam, L=100.96m, Completion in 1978	site					261,206,357		70,312,715	\$1,107,777.26

No.20 Rio Sucio

Basic Data: Rt.32, Concrete box girder, L=187.25m, Completion in N.A.

CODE:

RT032.20

per 1.00 site

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST	(A)									
Site preparation	Construction & removal of site facilities	Ls	1.00	2,746,656			2,746,656			DT20.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	5,455,426			5,455,426			DT20.TR01
Accessory work (1 of 2)	Replacement of expansion joint	Ls	1.00	7,136,380		1,062,092	7,136,380		1,062,092	DT20.AC01
Accessory work (2 of 2)	Removal & install of pavement, waterproofing of deck slab	Ls	1.00	94,759,181		2,628,260	94,759,181		2,628,260	DT20.AC02
Substructure	Colum of pier is covered by concrete to protect from rolling stones on P1 & P2	Ls	1.00	10,993,278		55,328	10,993,278		55,328	DT20.SB01
Scaffolding	Total cost for scaffolding on No.20	Ls	1.00	1,585,352			1,585,352			DT20.SCF01
TRANSPORTATION COST	(B)	Ls	1.00				6,133,814		187,284	5% of (A)
CONTINGENCY COST	(C)	Ls	1.00				6,440,504		196,648	5% of ((A)+(B))
ADMINISTRATION COST	(D)	Ls	1.00				13,525,059		412,961	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT	(E)	Ls	1.00				14,877,565		454,257	10% of ((A) + (B) + (C) + (D))
No.20 Rio Sucio	Rt.32, Concrete box girder, L=187.25m, Completion in N.A.	site					163,653,216		4,996,830	\$359,984.29

No.26 Rio Chirripo (1 of 2)		Basic Data: Rt.32, Continuous steel I-beam, L=431.90m, Completion in 1974-1978						CODE: RT032.26.1		
Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST		(A)								
Site preparation	Construction & removal of site facilities	Ls	1.00	17,614,783		79,444	17,614,783		79,444	DT26.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	6,429,609			6,429,609			DT26.TR01
Superstructure (slab)	Reinforced by bonded FRP sheet on top & bottom of slab (2layers/m2)	Ls	1.00	6,045,941		166,269,733	6,045,941		166,269,733	DT26.SU01
Substructure (Unseat prevention) 1 of 8	Unseating prevention for P1	Ls	1.00	1,630,144		6,451	1,630,144		6,451	DT26.SU02
Substructure (Unseat prevention) 2 of 8	Unseating prevention for P7	Ls	1.00	3,237,963		23,090	3,237,963		23,090	DT26.SU03
Substructure (Unseat prevention) 3 of 8	Unseating prevention for A2	Ls	1.00	545,123		5,019	545,123		5,019	DT26.SU04
Substructure (Unseat prevention) 8 of 8	Install unseating prevention system (Chain type) on P1, P7 & A2 (16nos)	Ls	1.00	3,639,000		137,205	3,639,000		137,205	DT26.SU09
TRANSPORTATION COST	(B)	Ls	1.00				1,957,128		8,326,047	5% of (A)
CONTINGENCY COST	(C)	Ls	1.00				2,054,985		8,742,349	5% of ((A)+(B))
ADMINISTRATION COST	(D)	Ls	1.00				4,315,468		18,358,934	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT	(E)	Ls	1.00				4,747,014		20,194,827	10% of ((A) + (B) + (C) + (D))
No.26 Rio Chirripo (1 of 2)	Rt.32, Continuous steel I-beam, L=431.90m, Completion in 1974-1978	site					52,217,159		222,143,100	\$2,001,344.11

No.26 Rio Chirripo (2 of 2)

Basic Data: Rt.32, Continuous steel I-beam, L=431.90m, Completion in 1974-1978

CODE:

RT032.26.2

per 1.00 site

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST	(A)									
Accessory work (1 of 2)	Install of expansion joint	Ls	1.00	8,173,954		1,186,477	8,173,954		1,186,477	DT26.AC01
Accessory work (2 of 2)	Waterproofing of deck slab & asphalt pavement	Ls	1.00	181,542,870		5,104,843	181,542,870		5,104,843	DT26.AC02
Substructure	Expanding dimension of transversal beam on P4	Ls	1.00	3,077,347		59,607	3,077,347		59,607	DT26.SB01
Foundation (1 of 4)	Expanding dimension of footing on P1 & P7	Ls	1.00	31,051,721		118,440	31,051,721		118,440	DT26.FD01
Foundation (2 of 4)	Expanding dimension of footing on P2 & P6	Ls	1.00	61,790,909		330,281	61,790,909		330,281	DT26.FD02
Foundation (3 of 4)	Expanding dimension of footing on P3, P4 & P5	Ls	1.00	123,183,849		671,668	123,183,849		671,668	DT26.FD03
Scaffolding	Total cost for scaffolding on No.26	Ls	1.00	48,919,531			48,919,531			DT26.SCF01
TRANSPORTATION COST	(B)	Ls	1.00				22,887,009		373,566	5% of (A)
CONTINGENCY COST	(C)	Ls	1.00				24,031,360		392,244	5% of ((A)+(B))
ADMINISTRATION COST	(D)	Ls	1.00				50,465,855		823,712	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT	(E)	Ls	1.00				55,512,440		906,084	10% of ((A) + (B) + (C) + (D))
No.26 Rio Chirripo (2 of 2)	Rt.32, Continuous steel I-beam, L=431.90m, Completion in 1974-1978	site					610,636,845		9,966,921	\$1,268,978.84

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Equivalent (USD)
				CRC	USD	JPY	CRC	USD	JPY	
No.26 Rio Chirripo Total							662,854,005		232,110,021	\$3,270,322.96

No.29 Rio Torres (1 of 2)

Basic Data: Rt.218, Concrete pos-tensioned I-girder, L=66.46m, Completion in N.A.
 per 1.00 site

CODE:

RT218.29.1

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST	(A)									
Site preparation	Construction & removal of site facilities	Ls	1.00	6,408,864			6,408,864			DT29.SP01
Traffic control	One-way traffic in construction period	Ls	1.00	8,572,812			8,572,812			DT29.TR01
Superstructure (slab) 1 of 2 L=30m section	Increase thickness of slab (5cm) on surface side	Ls	1.00	3,254,112			3,254,112			DT29.SU01
Superstructure (slab) 2 of 2 L=17m*2 section	Increase thickness of slab (5cm) on surface side	Ls	1.00	2,557,431			2,557,431			DT29.SU02
Superstructure (Girder)	Reinforced by bonded FRP sheet on bottom of girder (4layers/m2 & 1layer/m2)	Ls	1.00	394,116		18,516,525	394,116		18,516,525	DT29.SU03
Substructure (Unseat prevention) 1 of 7	Unseating prevention for A1	Ls	1.00	1,777,505		28,045	1,777,505		28,045	DT29.SU04
Substructure (Unseat prevention) 2 of 7	Unseating prevention for P1	Ls	1.00	844,852			844,852			DT29.SU05
Substructure (Unseat prevention) 3 of 7	Unseating prevention for A2	Ls	1.00	1,312,572		17,552	1,312,572		17,552	DT29.SU06
Substructure (Unseat prevention) 6 of 7	Unseating prevention for P2	Ls	1.00	397,834			397,834			DT29.SU09
TRANSPORTATION COST	(B)	Ls	1.00				1,276,005		928,106	5% of (A)
CONTINGENCY COST	(C)	Ls	1.00				1,339,805		974,511	5% of ((A)+(B))
ADMINISTRATION COST	(D)	Ls	1.00				2,813,591		2,046,474	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT	(E)	Ls	1.00				3,094,950		2,251,121	10% of ((A) + (B) + (C) + (D))
No.29 Rio Torres (1 of 2)	Rt.218, Concrete pos-tensioned I-girder, L=66.46m, Completion in N.A.	site					34,044,448		24,762,335	\$277,802.34

No.29 Rio Torres (2 of 2)		Basic Data: Rt.218, Concrete pos-tensioned I-girder, L=66.46m, Completion in N.A.					CODE:		RT218.29.2	
Item	Spec.	Unit	Qty	Unit Price			Total Amount			Remarks
				CRC	USD	JPY	CRC	USD	JPY	
CONSTRUCTION COST (A)										
Accessory work (1 of 2)	Install of expansion joint (steel)	Ls	1.00	11,701,216		1,698,471	11,701,216		1,698,471	DT29.AC01
Accessory work (2 of 2)	Waterproofing of deck slab & asphalt pavement	Ls	1.00	8,263,195		238,902	8,263,195		238,902	DT29.AC02
Substructure (1 of 4)	Reinforced by concrete jacketing of P1	Ls	1.00	2,245,922		25,756	2,245,922		25,756	DT29.SB01
Substructure (3 of 4)	Expanding dimension of transversal beam on P1	Ls	1.00	6,380,226		91,660	6,380,226		91,660	DT29.SB03
Substructure (4 of 4)	Expanding dimension of transversal beam on P2	Ls	1.00	5,192,740		70,738	5,192,740		70,738	DT29.SB04
Foundation (1 of 4)	Expanding dimension of footing on A1	Ls	1.00	15,795,213		76,750	15,795,213		76,750	DT29.FD01
Foundation (2 of 4)	Expanding dimension of footing & install gabion box on P1	Ls	1.00	27,802,872		20,358	27,802,872		20,358	DT29.FD02
Foundation (4 of 4)	Expanding dimension of footing on A2	Ls	1.00	11,012,247		68,987	11,012,247		68,987	DT29.FD04
Scaffolding	Total cost for scaffolding on No.29	Ls	1.00	9,491,917			9,491,917			DT29.SCF01
TRANSPORTATION COST (B)										
							4,894,277		114,581	5% of (A)
CONTINGENCY COST (C)										
							5,138,991		120,310	5% of ((A)+(B))
ADMINISTRATION COST (D)										
							10,791,882		252,651	10% of ((A) + (B) + (C))
CONTRACTOR'S PROFIT (E)										
							11,871,070		277,916	10% of ((A) + (B) + (C) + (D))
No.29 Rio Torres (2 of 2)	Rt.218, Concrete pos-tensioned I-girder, L=66.46m, Completion in N.A.	site					130,581,768		3,057,081	\$279,283.14

Item	Spec.	Unit	Qty	Unit Price			Total Amount			Equivalent (USD)
				CRC	USD	JPY	CRC	USD	JPY	
No.29 Rio TorresTotal							164,626,216		27,819,416	\$557,085.47

