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1. Miembros del Equipo de Estudio (nombre/organización pertinente)

(1) Primer estudio en Bolivia (del 5 de agosto al 3 de septiembre de 2014)

- Gerente General Sr. Nobuyuki TSUNEOKA (Departamento de Infraestructura y Consolidación de la Paz, JICA)
- Cooperación / Planificación Sr. Shinichi SAITO (Departamento de Infraestructura y Consolidación de la Paz, JICA)
- Ingeniero Jefe/ Planificador de Carretera Sr. Tomohiko NAKAMURA (KEI)
(Planificador de Drenaje)
- Diseñador de Carretera /Diseñador de Puente Sr. Tsuyoshi YAMAJUKU (KEI)
- Investigador de Condiciones Naturales Sr. Shunsaku YOSHIOKA (KEI)
(Topografía, Geología y Base)
- Investigador de Condiciones Naturales Sr. Masateru TOCHINAKA (KEI)
(Hidrología / Meteorología)
- Socio-medioambientalista Sr. Takayasu MAEHATA (KEI)
- Planificacador de Construcción / Estimador de Sr. Kiyoshi MUKAI (KEI)
Costo
- Intérprete (Español) Sr. Kiyokazu YAMAKAWA (KEI:refuerzo)

(2) Segundo estudio en Bolivia (del 1 al 18 de diciembre de 2014)

- Ingeniero Jefe/ Planificador de Carretera Sr. Tomohiko NAKAMURA (KEI)
(Planificador de Drenaje)
- Investigador de Condiciones Naturales Sr. Masateru TOCHINAKA (KEI)
(Hidrología / Meteorología)

(3) Tercer estudio en Bolivia (del 9 al 23 de mayo de 2016)

- Gerente General Sr. Yoshio FUKUDA (Departamento de Infraestructura y Consolidación de la Paz, JICA)
- Ingeniero Jefe/ Planificador de Carretera Sr. Tomohiko NAKAMURA (KEI)
(Planificador de Drenaje)
- Diseñador de Carretera /Diseñador de Puente Sr. Tsuyoshi YAMAJUKU (KEI)
- Intérprete (Español) Sr. Kiyokazu YAMAKAWA (KEI:refuerzo)

(4) Cuarto estudio en Bolivia (del 30 de enero al 13 de febrero de 2017)

- Gerente General Sr. Yoshio FUKUDA (Departamento de Infraestructura y Consolidación de la Paz, JICA)

- Cooperación / Planificación Sr. Yoshihiro KAWASAKI (Departamento de Infraestructura y Consolidación de la Paz, JICA)
- Ingeniero Jefe/ Planificador de Carretera Sr. Tomohiko NAKAMURA (KEI)
(Planificador de Drenaje)
- Socio-medioambientalista Sr. Takayasu MAEHATA (KEI)
- Intérprete (Español) Sr. Kiyokazu YAMAKAWA (KEI:refuerzo)

(5) Quinto estudio en Bolivia (del 17 al 31 de julio de 2017)

- Gerente General Sr. Yoshio FUKUDA (Departamento de Infraestructura y Consolidación de la Paz, JICA)
- Ingeniero Jefe/ Planificador de Carretera Sr. Tomohiko NAKAMURA (KEI)
(Planificador de Drenaje)
- Intérprete (Español) Sr. Kiyokazu YAMAKAWA (KEI:refuerzo)

(6) Sexto estudio en Bolivia (del 31 de julio al 14 de agosto de 2017)

- Planificador de Construcción / Estimador de Costo Sr. Kiyoshi MUKAI (KEI)
- Intérprete (Español) Sr. Kiyokazu YAMAKAWA (KEI:refuerzo)

(7) Séptimo estudio en Bolivia (del 28 de agosto al 11 de septiembre de 2017)

- Socio-medioambientalista Sr. Takayasu MAEHATA (KEI)
- Intérprete (Español) Sr. Kiyokazu YAMAKAWA (KEI:refuerzo)

(8) Octavo estudio en Bolivia (del 4 al 18 de diciembre de 2017)

- Socio-medioambientalista Sr. Takayasu MAEHATA (KEI)
- Intérprete (Español) Sr. Kiyokazu YAMAKAWA (KEI:refuerzo)

(9) Explicación de diseño preliminar (del 25 de febrero al 11 de marzo de 2018)

- Gerente General Sr. Yoshio FUKUDA (Departamento de Infraestructura y Consolidación de la Paz, JICA)
- Ingeniero Jefe/ Planificador de Carretera Sr. Tomohiko NAKAMURA (KEI)
(Planificador de Drenaje)
- Intérprete (Español) Sr. Kiyokazu YAMAKAWA (KEI:refuerzo)

2. Itinerarios

(1) Primer estudio en Bolivia

Itinerario para el Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa

Organización		JICA		JICA		KEI		KEI		KEI		KEI		KEI		
Nombre		Sr. Nobuyuki TSUNEOKA		Sr. Shinichi SATO		Sr. Tomohiko NAKAMURA		Sr. Tetsuyoshi YAMAJUKU		Sr. Kiyoshi MUKAI		Sr. Shunsaku YOSHIOKA		Sr. Masateru TOCHINAKA		
Mes	Asignación	#	Gerente General	#	Cooperación / Planificación	#	Ingeniero Jefe/ Planificador de Carretera (Planificador de Drenaje)	#	Disñador de Carretera / Diseñador de Puente	#	Planificador de Construcción/ Estimador de Costo	#	Investigador de Condiciones Naturales (Topografía, Geología y Base)	#	Investigador de Condiciones Naturales (Hidrología / Meteorología)	
	Fecha															Día
Agosto	5	Martes				1	Narita - Nueva York	1	Narita - Nueva York	1	Narita - Nueva York	1	Narita - Nueva York	1	Narita - Nueva York	
	6	Miércoles				2	Nueva York - La Paz	2	Nueva York - La Paz	2	Nueva York - La Paz	2	Nueva York - La Paz	2	Nueva York - La Paz	
	7	Jueves				3	Visita a EOJ, JICA	3	Visita a EOJ, JICA	3	Visita a EOJ, JICA	3	Visita a EOJ, JICA	3	Visita a EOJ, JICA	
	8	Viernes				4	Reunión en SEDCAM	4	Reunión en SEDCAM	4	Reunión en SEDCAM	4	Reunión en SEDCAM	4	Reunión en SEDCAM	
	9	Sábado				5	Estudio en Sitio	5	Estudio en Sitio	5	Estudio en Sitio	5	Estudio en Sitio	5	Estudio en Sitio	
	10	Domingo				6	Estudio en Sitio	6	Estudio en Sitio	6	Estudio en Sitio	6	Estudio en Sitio	6	Estudio en Sitio	
	11	Lunes				7	Reunión en SEDCAM, ABC	7	Reunión en SEDCAM, ABC	7	Reunión en SEDCAM, ABC	7	Estudio en Sitio	7	Reunión en SEDCAM, ABC	
	12	Martes				8	Reunión en SEDCAM, ABC	8	Reunión en SEDCAM, ABC	8	Reunión en SEDCAM, ABC	8	Estudio en Sitio	8	Reunión en SEDCAM, ABC	
	13	Miércoles				9	Estudio en Sitio	9	Estudio en Sitio	9	Estudio en Sitio	9	Estudio en Sitio	9	Estudio en Sitio	
	14	Jueves				10	Reunión en SEDCAM, ABC	10	Estudio en Sitio	10	Estudio en Sitio	10	Estudio en Sitio	10	Reunión en SEDCAM, ABC	
	15	Viernes				11	Firma de MD	11	Estudio en Sitio	11	Estudio en Sitio	11	Estudio en Sitio	11	Firma de MD	
	16	Sábado				12	Estudio en Sitio	12	Estudio en Sitio	12	Estudio en Sitio	12	Estudio en Sitio	12	Estudio en Sitio	
	17	Domingo				13	Estudio en Sitio	13	Estudio en Sitio	13	Estudio en Sitio	13	Estudio en Sitio	13	Estudio en Sitio	
	18	Lunes				14	Estudio en Sitio	14	Estudio en Sitio	14	Estudio en Sitio	14	Estudio en Sitio	14	Estudio en Sitio	
	19	Martes				15	Estudio en Sitio	15	Estudio en Sitio	15	Estudio en Sitio	15	Estudio en Sitio	15	Estudio en Sitio	
	20	Miércoles				16	Estudio en Sitio	16	Estudio en Sitio	16	Estudio en Sitio	16	Estudio en Sitio	16	Estudio en Sitio	
	21	Jueves				17	Estudio en Sitio	17	Estudio en Sitio	17	Estudio en Sitio	17	Estudio en Sitio	17	Estudio en Sitio	
	22	Viernes				18	Reunión en SEDCAM	18	Reunión en SEDCAM	18	Estudio en Sitio	18	Estudio en Sitio	18	Estudio en Sitio	
	23	Sábado				19	Estudio en Sitio	19	Estudio en Sitio	19	Estudio en Sitio	19	Estudio en Sitio	19	Estudio en Sitio	
	24	Domingo				20	Estudio en Sitio	20	Estudio en Sitio	20	Estudio en Sitio	20	Estudio en Sitio	20	Estudio en Sitio	
	25	Lunes				21	Presentación de Informe	21	Presentación de Informe	21	Presentación de Informe	21	Estudio en Sitio	21	Presentación de Informe	
	26	Martes				22	Presentación de Informe	22	Presentación de Informe	22	Presentación de Informe	22	Estudio en Sitio	22	Presentación de Informe	
	27	Miércoles				23	Reunión en SEDCAM, ABC	23	Reunión en SEDCAM, ABC	23	Reunión en SEDCAM, ABC	23	Estudio en Sitio	23	Reunión en SEDCAM, ABC	
	28	Jueves				24	Reunión en SEDCAM, ABC	24	Reunión en SEDCAM, ABC	24	Reunión en SEDCAM, ABC	24	Estudio en Sitio	24	Reunión en SEDCAM, ABC	
	29	Viernes				25	Firma de Nota Técnica	25	Firma de Nota Técnica	25	Firma de Nota Técnica	25	Presentación de Informe	25	Firma de Nota Técnica	
	30	Sábado				26	Presentación de Informe	26	Presentación de Informe	26	Presentación de Informe	26	Presentación de Informe	26	Presentación de Informe	
	31	Domingo				27	Santa Cruz - La Paz	27	Santa Cruz - La Paz	27	Santa Cruz - La Paz	27	Santa Cruz - La Paz	27	Santa Cruz - La Paz	
	Septiembre	1	Lunes				28	Visita a EOJ, JICA	28	Visita a EOJ, JICA	28	Visita a EOJ, JICA	28	Visita a EOJ, JICA	28	Visita a EOJ, JICA
		2	Martes				29	Miami - Nueva York	29	Miami - Nueva York	29	Miami - Nueva York	29	Miami - Nueva York	29	Miami - Nueva York
		3	Miércoles				30	Nueva York - Narita	30	Nueva York - Narita	30	Nueva York - Narita	30	Nueva York - Narita	30	Nueva York - Narita

Note) EOJ: Embassy of Japan, JICA: Japan International Cooperation Agency, KEI: Kaitoh & Engineers International

(2) Segundo estudio en Bolivia

Itinerario para el Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa

Organización			KEI		KEI	
Nombre			Sr. Tomohiko NAKAMURA		Sr. Masateru TOCHINAKA	
Asignación			Ingeniero Jefe/ # Planificador de Carretera (Planificador de Drenaje)		Investigador de # Condiciones Naturales (Hidrología / Meteorología)	
Mes	Fecha	Día	#		#	
Diciembre	1	Lunes	1	Narita - Nueva York	1	Narita - Nueva York
	2	Martes	2	Nueva York-Lima-Santa Cruz	2	Nueva York-Lima-Santa Cruz
	3	Miércoles	3	Reunión con SEDCAM Recoger Datos	3	Reunión con SEDCAM Recoger Datos
	4	Jueves	4	Estudio en Sitio	4	Estudio en Sitio
	5	Viernes	5	Encuesta	5	Encuesta
	6	Sábado	6	Estudio en Sitio	6	Estudio en Sitio
	7	Domingo	7	Estudio en Sitio	7	Estudio en Sitio
	8	Lunes	8	Estudio en Sitio	8	Estudio en Sitio
	9	Martes	9	Estudio en Sitio	9	Estudio en Sitio
	10	Miércoles	10	Encuesta	10	Encuesta
	11	Jueves	11	Estudio en Sitio	11	Estudio en Sitio
	12	Viernes	12	Estudio en Sitio	12	Estudio en Sitio
	13	Sábado	13	Estudio en Sitio	13	Estudio en Sitio
	14	Domingo	14	Estudio en Sitio	14	Estudio en Sitio
	15	Lunes	15	Santa Cruz - La Paz	15	Santa Cruz - La Paz
	16	Martes	16	Visita a JICA y EOJ, La Paz - Lima	16	Visita a JICA y EOJ, La Paz - Lima
	17	Miércoles	17	Lima - Nueva York	17	Lima - Nueva York
	18	Jueves	18	Nueva York - Narita	18	Nueva York - Narita

Note) EOJ: Embassy of Japan, JICA: Japan International Cooperation Agency
KEI: Katahira & Engineers International

(3) Tercer estudio en Bolivia

Itinerario para el Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa

Organización				KEI	KEI	KEI
Nombre				Sr. Tomohiko NAKAMURA	Sr. Tsuyoshi YAMAJUKU	Sr. Kiyokazu YAMAKAWA
Asignación				Ingeniero Jefe/ Planificador de Carretera (Planificador de Drenaje)	Diseñador de Carretera /Diseñador de Puente	Intérprete (Español)
mes	Fecha	Día	#			
Mayo de 2016	9	Lunes	1	Narita - Nueva York -Miami		
	10	Martes	2	→ Santa Cruz Reunión con SOPOT		
	11	Miércoles	3	Reunión con SEDCAM,ABC,etc. Investigación sobre adquisición local		
	12	Jueves	4	Reunión con SEDCAM,ABC,etc. Investigación sobre adquisición local		
	13	Viernes	5	Estudio en Sitio, Investigación sobre adquisición local		
	14	Sábado	6	Estudio en Sitio, Investigación sobre adquisición local		
	15	Domingo	7	Documentación de los ítems estudiados		
	16	Lunes	8	Estudio en Sitio, investigación sobre adquisición local		
	17	Martes	9	Discusión sobre M/D, Estudio en Sitio, Investigación de adquisición		
	18	Miércoles	10	Discusión sobre M/D y Memorando Técnico		
	19	Jueves	11	Firma de M/D y de Memorando Técnico Santa Cruz - La Paz		
	20	Viernes	12	Visita a JICA y EOJ		
	21	Sábado	13	La Paz - Miami		
	22	Domingo	14	Miami - Narita		
	23	Lunes	15	Llegada a Narita		

Note) EOJ: Embassy of Japan, JICA: Japan International Cooperation Agency
KEI: Katahira & Engineers International

(4) Cuarto studio en Bolivia

Itinerario para el Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa

Organización			JICA	KEI	KEI	KEI
Nombre			Yoshio Fukuda	Sr. Tomohiko NAKAMURA	Sr. Takayasu MAEHATA	Sr. Kiyokazu YAMAKAWA
Asignación			# Gerente General	# Ingeniero Jefe/ Planificador de Carretera (Planificador de Drenaje)	# Socio-medioambientalista	# Intérprete (Español)
Mes	Fecha	Día				
Enero 2017	30	Lunes		1 Narita - Nueva York Nueva York - Miami -	1 Narita - Nueva York Nueva York - Miami -	1 Narita - Nueva York Nueva York - Miami -
	31	Martes		2 -Santa Cruz Reunión con SOPOT	2 -Santa Cruz Reunión con SOPOT	2 -Santa Cruz Reunión con SOPOT
	1	Miércoles		3 Estudio en Sitio Reunión con SOPOT	3 Estudio en Sitio Reunión con SOPOT	3 Estudio en Sitio Reunión con SOPOT
	2	Jueves		4 Estudio en Sitio Reunión con el municipio de Okinawa	4 Estudio en Sitio Reunión con el municipio de Okinawa	4 Estudio en Sitio Reunión con el municipio de Okinawa
	3	Viernes		5 Reunión con SOPOT	5 Reunión con SOPOT	5 Reunión con SOPOT
	4	Sábado	1 Narita - Nueva York Nueva York - Miami -	6 Documentación de resultados obtenidos	6 Documentación de resultados obtenidos	6 Documentación de resultados obtenidos
Febrero	5	Domingo	2 - Santa Cruz	7 Documentación de resultados obtenidos	7 Documentación de resultados obtenidos	7 Documentación de resultados obtenidos
	6	Lunes	3 Reunión sobre MD con SOPOT	8 Reunión sobre MD con SOPOT	8 Reunión sobre MD con SOPOT	8 Reunión sobre MD con SOPOT
	7	Martes	4 Reunión sobre MD con SOPOT Estudio en Sitio	9 Reunión sobre MD con SOPOT Estudio en Sitio	9 Reunión sobre MD con SOPOT Estudio en Sitio	9 Reunión sobre MD con SOPOT Estudio en Sitio
	8	Miércoles	5 Firma de MD Santa Cruz - La Paz	10 Firma de MD Santa Cruz - La Paz	10 Firma de MD Santa Cruz - La Paz	10 Firma de MD Santa Cruz - La Paz
	9	Jueves	6 Reunión con MPD	11 Reunión con MPD	11 Reunión con MPD	11 Reunión con MPD
	10	Viernes	7 Visita a JICA y EOJ	12 Visita a JICA y EOJ	12 Visita a JICA y EOJ	12 Visita a JICA y EOJ
	11	Sábado	8 La Paz - Miami	13 La Paz - Miami	13 La Paz - Miami	13 La Paz - Miami
	12	Domingo	9 Miami - Nueva York Nueva York -	14 Miami - Nueva York Nueva York -	14 Miami - Nueva York Nueva York -	14 Miami - Nueva York Nueva York -
	13	Lunes	10 - Narita	15 - Narita	15 - Narita	15 - Narita

Note) EOJ: Embassy of Japan, JICA: Japan International Cooperation Agency, KEI: Katahira & Engineers International

(5) Quinto y Sexto estudios en Bolivia

Itinerario para el Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa

Organización			JICA	KEI	KEI	KEI
Nombre			Sr. Yoshio Fukuda	Sr. Tomohiko NAKAMURA	Sr. Kiyoshi MUKAI	Sr. Kiyokazu YAMAKAWA
Asignación			# Gerente General	# Ingeniero Jefe/ Planificador de Carretera (Planificador de Drenaje)	# Planificador de Construcción / Estimador de Costo	# Intérprete (Español)
Mes	Fecha	Día				
Julio de 2017	16	Domingo	1 Narita -			
	17	Lunes	2 - Miami Miami -	1 Narita - Dallas Dallas - Miami Miami -		1 Narita - Dallas Dallas - Miami Miami -
	18	Martes	3 - Santa Cruz Reunión con SOPOT	2 - Santa Cruz Reunión con SOPOT		2 Estudio en Sitio Reunión con SOPOT
	19	Miércoles	4 Reunión con SOPOT	3 Reunión con SOPOT		3 Estudio en Sitio Reunión con municipio de Okinawa
	20	Jueves	5 Santa Cruz - La Paz Visita a EOJ y JICA	4 Reunión con SOPOT		4 Reunión con SOPOT
	21	Viernes	6 La Paz - Miami	5 Estudio en Sitio		5 Estudio en Sitio
	22	Sábado	7 Miami - Nueva York Nueva York -	6 Estudio en Sitio		6 Estudio en Sitio
	23	Domingo	8 - Narita	7 Documentación de resultados obtenidos		7 Estudio en Sitio
	24	Lunes		8 Reunión con subcontratista		8 Reunión con subcontratista
	25	Martes		9 Reunión con subcontratista		9 Reunión con subcontratista
	26	Miércoles		10 Reunión con subcontratista Reunión con SOPOT		10 Reunión con subcontratista Reunión con SOPOT
	27	Jueves		11 Reunión con subcontratista		11 Reunión con subcontratista
	28	Viernes		12 Santa Cruz - La Paz Visita a EOJ y JICA		12 Santa Cruz - La Paz Visita a EOJ y JICA
	29	Sábado		13 La Paz - Miami		13 La Paz - Santa Cruz
	30	Domingo		14 Miami - Dallas Dallas -		14 Estudio en Sitio
	31	Lunes		15 -Narita	1 Haneda - Nueva York Nueva York - Miami Miami -	15 Estudio en Sitio
	1	Martes			2 - Santa Cruz Reunión con SOPOT	16 Reunión con SOPOT
	2	Miércoles			3 Entrevista a contratista	17 Entrevista a contratista
	3	Jueves			4 Entrevista a contratista	18 Entrevista a contratista
	4	Viernes			5 Entrevista a contratista	19 Entrevista a contratista
	5	Sábado			6 Entrevista a contratista	20 Entrevista a contratista
	6	Domingo			7 Documentación de resultados obtenidos	21 Estudio en Sitio
	7	Lunes			8 Entrevista a proveedor	22 Entrevista a proveedor
	8	Martes			9 Entrevista a proveedor	23 Entrevista a proveedor
	9	Miércoles			10 Entrevista a empresa de extracción de piedras	24 Entrevista a empresa de extracción de piedras
	10	Jueves			11 Entrevista a empresa de extracción de piedras	25 Entrevista a empresa de extracción de piedras
	11	Viernes			12 Reunión con SOPOT y SEDCAM	26 Reunión con SOPOT y SEDCAM
	12	Sábado			13 Santa Cruz - Miami	27 Santa Cruz - Miami
	13	Domingo			14 Miami - Nueva York Nueva York -	28 Miami - Nueva York Nueva York -
	14	Lunes			15 - Haneda	29 - Haneda
Agosto						

Note) EOJ: Embassy of Japan, JICA: Japan International Cooperation Agency, KEI: Katahira & Engineers International

(6) Séptimo estudio en Bolivia

Itinerario para el Estudio Preparatorio para el Proyecto de
Pavimentación de la Carretera Okinawa

Organización			KEI	KEI
Nombre			Sr. Takayasu MAEHATA	Sr. Kiyokazu YAMAKAWA
Asignación			# Socio-medioambientalista	# Intérprete (Español)
Mes	Fecha	Día		
Agosto de 2017	27	Domingo		
	28	Lunes	1 Narita - Dallas Dallas - Miami Miami -	1 Narita - Dallas Dallas - Miami Miami -
	29	Martes	2 - Santa Cruz Reunión con SOPOT	2 - Santa Cruz Reunión con SOPOT
	30	Miércoles	3 Estudio en Sitio Reunión con subcontratista	3 Estudio en Sitio Reunión con el municipio de Okinawa
	31	Jueves	4 Reunión con SOPOT	4 Reunión con SOPOT
	1	Viernes	5 Estudio en Sitio	5 Estudio en Sitio
	2	Sábado	6 Ordenación de materiales Preparación de informe	6 Ordenación de materiales Preparación de informe
	3	Domingo	7 Ordenación de materiales Preparación de informe	7 Ordenación de materiales
	4	Lunes	8 Reunión con subcontratista	8 Reunión con subcontratista
	5	Martes	9 Ordenación de materiales Preparación de informe	9 Ordenación de materiales
Septiembre	6	Miércoles	10 Reunión con subcontratista Reunión con SOPOT	10 Reunión con subcontratista Reunión con SOPOT
	7	Jueves	11 Estudio en Sitio	11 Estudio en Sitio
	8	Viernes	12 Reunión con subcontratista Reunión con SOPOT	12 Reunión con subcontratista Reunión con SOPOT
	9	Sábado	13 Santa Cruz - Miami	13 Santa Cruz - Miami
	10	Domingo	14 Miami - Dallas Dallas -	14 Miami - Dallas Dallas -
	11	Lunes	15 - Narita	15 - Narita

Note) EOJ: Embassy of Japan, JICA: Japan International Cooperation Agency,
KEI: Katahira & Engineers International

(7) Octavo estudio en Bolivia

Itinerario para el Estudio Preparatorio para el Proyecto de
Pavimentación de la Carretera Okinawa

Organización			KEI	KEI
Nombre			Sr. Takayasu MAEHATA	Sr. Kiyokazu YAMAKAWA
Asignación			# Socio-medioambientalista	# Intérprete (Español)
Mes	Fecha	Día		
Diciembre de 2017	3	Domingo		
	4	Lunes	1 Haneda - Nueva York Nueva York - Miami Miami -	1 Haneda - Nueva York Nueva York - Miami Miami -
	5	Martes	2 - Santa Cruz Reunión con SOPOT	2 - Santa Cruz Reunión con SOPOT
	6	Miércoles	3 Estudio en Sitio Reunión con subcontratista	3 Estudio en Sitio Reunión con subcontratista
	7	Jueves	4 Reunión con SOPOT	4 Reunión con SOPOT
	8	Viernes	5 Reunión con subcontratista	5 Reunión con subcontratista
	9	Sábado	6 Ordenación de materiales Preparación de informe	6 Ordenación de materiales
	10	Domingo	7 Ordenación de materiales Preparación de informe	7 Ordenación de materiales
	11	Lunes	8 Estudio en Sitio Reunión con subcontratista	8 Estudio en Sitio Reunión con subcontratista
	12	Martes	9 Estudio en Sitio Reunión con Asociación Boliviana Japonesa	9 Estudio en Sitio Reunión con Asociación Boliviana Japonesa
	13	Miércoles	10 Reunión con subcontratista Reunión con SOPOT	10 Reunión con subcontratista Reunión con SOPOT
	14	Jueves	11 Reunión con SOPOT	11 Reunión con SOPOT
	15	Viernes	12 Reunión con subcontratista Reunión con SOPOT	12 Reunión con subcontratista Reunión con SOPOT
	16	Sábado	13 Santa Cruz - Miami Miami - Nueva York	13 Santa Cruz - Miami Miami - Nueva York
	17	Domingo	14 Nueva York -	14 Nueva York -
	18	Lunes	15 - Narita	15 - Narita

Note) EOJ: Embassy of Japan, JICA: Japan International Cooperation Agency,
KEI: Katahira & Engineers International

(8) Explicación de diseño preliminar

Itinerario para el Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa

Organización			JICA	KEI	KEI
Nombre			Sr. Yoshio Fukuda	Sr. Tomohiko NAKAMURA	Sr. Kiyokazu YAMAKAWA
Asignación			# Gerente General	# Ingeniero Jefe/ Planificador de Carretera (Planificador de Drenaje)	# Intérprete (Español)
Mes	Fecha	Día			
Febrero de 2018	25	Domingo		1 Haneda - Nueva York Nueva York - Miami Miami -	1 Narita - Nueva York Nueva York - Miami Miami -
	26	Lunes		2 - Santa Cruz Explicación del informe a SOPOT	2 - Santa Cruz Explicación del informe a SOPOT
	27	Martes	1 Narita - Chicago Chicago - Miami Miami -	3 Explicación del informe a SOPOT	3 Explicación del informe a SOPOT
	28	Miércoles	2 - Santa Cruz	4 Reunión con SOPOT sobre MD	4 Reunión con SOPOT sobre MD
	1	Jueves	3 Reunión con SOPOT sobre MD	5 Reunión con SOPOT sobre MD	5 Reunión con SOPOT sobre MD
	2	Viernes	4 Explicación a la Asociación Boliviana Japonesa	6 Explicación a la Asociación Boliviana Japonesa	6 Explicación a la Asociación Boliviana Japonesa
	3	Sábado	5 Visita al Sitio	7 Visita al Sitio	7 Visita al Sitio
	4	Domingo	2 Santa Cruz - La Paz	8 Santa Cruz - La Paz	8 Santa Cruz - La Paz
Marzo	5	Lunes	3 Reunión con JICA Reunión con MPD sobre MD	9 Reunión con JICA Reunión con MPD sobre MD	9 Reunión con JICA Reunión con MPD sobre MD
	6	Martes	4 Coordinación de MD	10 Coordinación de MD	10 Coordinación de MD
	7	Miércoles	5 Reunión con MPD sobre MD	11 Reunión con MPD sobre MD	11 Reunión con MPD sobre MD
	8	Jueves	7 Firma de MD con MPD Visita a EOJ y JICA	12 Firma de MD con MPD Visita a EOJ y JICA	12 Firma de MD con MPD Visita a EOJ y JICA
	9	Viernes	8 La Paz - Miami Miami -	13 La Paz - Miami	13 La Paz - Miami
	10	Sábado	9 - Nueva York Nueva York -	14 Miami - Los Ángeles Los Ángeles -	14 Miami - Los Ángeles Los Ángeles -
	11	Domingo	10 - Narita	15 - Narita	15 - Narita

Note) EOJ: Embassy of Japan, JICA: Japan International Cooperation Agency,
KEI: Katahira & Engineers International

3. Listado de personas involucradas (visitadas)

Nombre de institución/cargo	Nombre
<u>Embajada del Japón en Bolivia</u>	
• Embajadora Extraordinaria y Plenipotenciaria :	Sra. Kyoko Koga
• Embajador Extraordinario y Plenipotenciario (Predecesor) :	Sr. Hidehiro Tsubaki
• Consejero (Predecesor) :	Sr. Hiroshi Ezaki
• Consejero Jefe de la cancillería :	Sr. Tatsushi Ryosenan
• Primer Secretario (cooperación para de Desarrollo) :	Sr. Masahiro Oshima
• Primer Secretario (Predecesor) (cooperación económica) :	Sr. Naoki Nagasawa
• Segundo Secretario (cooperación económica) :	Sr. Hiroki Ishibashi
• Segundo Secretario (cooperación para de Desarrollo) :	Sr. Kunihiro Otsuka
<u>Asociación Boliviana Japonesa de Okinawa</u>	
• Presidente de la Asociación Boliviano Japonesa - :	Sr. Yuji Nakamura
• Vicepresidente de la Asociación Boliviano Japonesa - :	Sr. Hiroaki Sakurai
• Secretario General :	Sr. Satoshi Higa Taira
<u>JICA Bolivia</u>	
• Director Representante Residente :	Sr. Yoshikazu Tatehara
• Directora Representante Residente (Predecesor) :	Sra. Mika Yamamoto
• Sub-Director Representante Residente (Predecesor) :	Sr. Shintaro Akiyama
• Sub-Director Representante Residente (Predecesor) :	Sr. Hajime Tsuboi
• Representante (Predecesor) :	Sr. Takuma Itoh
• Representante (Predecesor) :	Sr. Shinji Maruyama
• Representante (Predecesor) :	Sr. Shohei Kashiwagi
• Oficial de programas :	Sr. Romiro Flores
• Jefe de Programa :	Sr. Carlos Omoya
<u>Gobierno Autónomo Departamental de Santa Cruz</u>	

• Gobernador	:	Sr. Rubén Costas Aguilera
<u>Secretaría de Obras Públicas y Ordenamiento Territorial de la Gobernación de Santa Cruz (SOPOT)</u>		
• Secretario de Obras Públicas y Ordenamiento Territorial	:	Ing. Carlos Hugo Sosa Arreaza
• Director de Infraestructuras	:	Ing. Ricardo Fries
• Director de Proyectos	:	Ing. Kathia Consuelo Lara Melgar
• Director de Ordenamiento Territorial	:	Lic. Ignacio Martínez
• GIS	:	Lic. Patricia Méndez
• Ingeniera Ambientalista	:	Ing. Silvana Ines Salazar Gomez
• Directora de Áreas Protegidas	:	Lic. Pamela Justiniano
• Asesor General	:	Lic. Jose Luis Parada Rivero
• Profesional I	:	Lic. María Marleny Velasco Vargas
• Profesional I	:	Lic. Mirtna MELGAR
<u>Viceministerio de Inversión Pública y Financiamiento Externo - Ministerio de Planificación del Desarrollo</u>		
• Viceministro	:	Ing. Antonio Mullisaca
• Jefe de Unidad	:	Ing. Luis Ochoa
• Analista de Financiación Externo	:	Ing. Adriana Daza
• Abogada	:	Ing. María José Velarde
• Abogada	:	Ing. Carola Tellez
• Especialista en Infraestructura	:	Ing. Victor Vaca Aguilar
<u>Secretaría de Desarrollo Sostenible y Medio Ambiente</u>		
• Secretario de Desarrollo Sostenible y Medio Ambiente	:	Ing. Manlio Alberto Roca Zamora
• Directora de Calidad Ambiental	:	Ing. Yanderí Kent
<u>Museo de la Historia Natural</u>		
• Directora	:	Lic. Patricia HERERA
• Encargada de Geografía	:	Lic. Liriana SORIA
• Encargado de Hacienda	:	Lic. Carlos Schlink
<u>ABC Gerencia Regional</u>		
• Gerente Regional Centro Este	:	Ing. Ademar Rocabado C.
• Encargado de las Rutas 4 y 10	:	Ing. Boris Vargas
• Encargado de las Rutas 4 y 10	:	Ing. José Suárez
<u>Gobierno Autónomo Municipal de Okinawa</u>		
• Alcalde Municipal	:	Raúl Condori

• Alcalde Municipal	:	Sr. Dionicio Condori Mamani (Predecesor)
• Fiscal de Obras	:	Ing. Douglas Parada Urgel
• Responsable de Unidad de Manejo de Recursos y Medio Ambiente	:	Medardo Moran Hurtado
• Concejal Okinawa	:	Filomena Perez Paco
• Concejal Okinawa	:	Rube D. Mercado
• Concejal Okinawa	:	Giovanna Pittary
• Control Social	:	Rolando Lanzarte
• Director de Planificación	:	Roberto Camacho
<u>SEDCAM Santa Cruz</u>		
• Director Departamental	:	Ing. Jhony SORIA
• Director de Estimación Vial	:	Juan Carlos VILLAGÓMEZ F.
• Diseño Vial	:	Ing. Arturo SILES
• Proyecto Costo y Presupuesto	:	F. Libert GARCIA
• Costo y Presupuesto	:	Jesús SUAREZ R.
• Director de Proyectos Viales	:	Ing. Juan Felix Pacheco
• Asesor Técnico	:	José Ernesto del Rio
• Coordinador	:	Javier QUIÑONES
• Técnico de suelo	:	Dionicio DÍAS Ch.
• Diseño Obras Menores	:	Raúl VÁSQUEZ LUCANA
• Ambientalista	:	Lic. Carlos CÁCERES R.
• Profesional Experto Asesoría Legal	:	Lic.Karen SUÁREZ
• Director Asesoría Legal	:	Lic. Luis Orlando PARADA BECERRA
• Profesional experto	:	José Antonio JUSTINIANO
<u>Alcaldía de Santa Cruz de la Sierra</u>		
• Oficialía de Obras Públicas	:	Ing. Freddy ARAUCO
<u>VIAS BOLIVIA</u>		
• Jefe regional Santa Cruz	:	Sr. Julio Fernández Vásquez
<u>Autoridad de Fiscalización y Control Social de Bosques y Tierra</u>		
• Jefe Nacional de Conservación de Bosques y Tierras	:	Sr. José Luis Osinaga Egüez

4.	Minuta de Discusiones (M/D)	A-14
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4-2	Minuta de Discusiones (agosto de 2014)	A-61

4-1 Minuta de Discusiones (marzo de 2018)

Minuta de discusiones
Sobre el Estudio Preparatorio
Para el Proyecto de Pavimentación de
la Carretera Okinawa en el Estado Plurinacional de Bolivia
(Explicación sobre el Borrador del Informe Final)

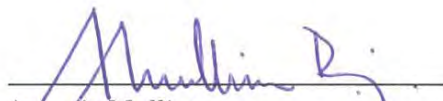
En respuesta a la solicitud presentada por el Gobierno del Estado Plurinacional de Bolivia(en adelante se denomina “Bolivia”), JICA (en adelante se denomina como “JICA”) envió una Misión con el fin de explicar y conversar sobre el Borrador del Informe Final del Estudio Preparatorio realizado por JICA para el Proyecto de Pavimentación de la Carretera Okinawa (en adelante se denomina como “el Proyecto”), liderada por el Ing. Yoshio Fukuda, Director Asistente Senior, Equipo 1, Grupo de Transporte e ICT, Departamento de Infraestructura y Construcción de la Paz, Agencia de Cooperación Internacional de Japón, desde el 26 de febrero de 2018 hasta el día 9 de marzo del mismo año.

Como resultado de la explicación y conversaciones, JICA, el Ministerio de Planificación del Desarrollo y el Gobierno Autónomo Departamental de Santa Cruz acordaron los ítems principales descritos en los anexos.

La Paz, 8 de marzo de 2018



Ing. Yoshio Fukuda
Jefe de la Misión del
Estudio Preparatorio
JICA



Antonio Mullisaca
Viceministro de Inversión Pública y
Financiamiento Externo
Ministerio de Planificación del Desarrollo



Sr. Rubén Costas Aguilera
Gobernador
Gobierno Autónomo Departamental de
Santa Cruz



Abg. Betty Carolina Ortuste Telleria
DIRECTORA DEL SERVICIO JURIDICO OPTAL.
SECRETARIA DE GOBIERNO
GOBIERNO AUTONOMO DEPARTAMENTAL DE SANTA CRUZ

Documento Adjunto

1. Objetivo del Proyecto

Al presente, el Proyecto se encuentra en la etapa de formulación y preparación, la parte boliviana y la parte japonesa (en adelante se denomina “ambas partes”) confirmaron el objetivo del Proyecto como sigue:

El Proyecto tiene por objeto mejorar la carretera entre Okinawa I y Okinawa II en el municipio de Okinawa del Departamento de Santa Cruz en el Estado Plurinacional de Bolivia, complementar a través de dicho Proyecto, el tránsito de la carretera troncal que conecta las principales áreas de producción agrícola, tales como el área norte del Departamentos de Santa Cruz y el de Beni, con la Ciudad de Santa Cruz de la Sierra, centro de las actividades económicas del país, contribuirse a formar una parte de la red vial internacional que conecta Bolivia con Brasil, Perú, Chile y Argentina, y al desarrollo económico del país a través del mejoramiento de la logística.

2. Nombre del Proyecto

Ambas partes confirmaron que el nombre del Proyecto es “Proyecto de Pavimentación de la Carretera Okinawa”.

3. Sitio del Proyecto

El Sitio objeto del Proyecto es el tramo de aproximadamente 19.1 km entre Okinawa I y Okinawa II que se menciona en el Anexo 1.

4. Entidades relacionadas con el Proyecto

La ejecución del Proyecto será realizada por el Estado Plurinacional de Bolivia a través del Gobierno Autónomo Departamental de Santa Cruz (en adelante se denomina “la parte boliviana”)

Ambas partes confirmaron que las siguientes entidades están relacionadas con el Proyecto.

- 4-1 El Ministerio de Planificación del Desarrollo realizará las coordinaciones necesarias para que el Gobierno Autónomo Departamental de Santa Cruz realice la buena ejecución del Proyecto.



4-2 El Gobierno Autónomo Departamental de Santa Cruz es la entidad ejecutora (en adelante se denomina como “la entidad ejecutora”). La entidad ejecutora, con iniciativa de la Secretaría de Obras Públicas y Ordenamiento Territorial, organización subordinada de la misma, ejecutará el Proyecto de manera adecuada en coordinación con otras entidades relacionadas y cumplirá adecuadamente con obligaciones del Proyecto en determinados momentos junto con otras entidades pertinentes. El organigrama de dicha entidad ejecutora se menciona en el Anexo 2.

5. Contenido del Borrador del Informe Final

La Misión explicó sobre el contenido de dicho Borrador y la parte boliviana acordó el contenido de dicho Borrador.

6. Costo del Proyecto

Ambas partes confirmaron que el costo del Proyecto, incluyendo el monto de contingencia, mencionados en el Anexo 3, no es definitivo y se estudiará detalladamente durante el proceso de aprobación por parte del Gobierno del Japón. El presupuesto de contingencia se destinará a los gastos adicionales a ser causados por desastres naturales y fenómenos naturales extraordinarios.

7. Confidencialidad del costo del Proyecto y de especificaciones técnicas

Ambas partes confirmaron que el costo del Proyecto y especificaciones técnicas no se revelarán a terceros hasta que se firmen todos los contratos del Proyecto.

8. Procedimientos y principios básicos de la Cooperación Financiera No Reembolsable de Japón

La parte boliviana acordó que los procedimientos y principios básicos de la Cooperación Financiera No Reembolsable de Japón, descritos en el Anexo 4, se aplican al Proyecto. Y, la parte boliviana reconoció que va a tomar procedimientos debidamente necesarios.

9. Cronograma de ejecución del Proyecto

La Misión explicó a la parte boliviana sobre el cronograma de ejecución del Proyecto, mencionado en el Anexo 5.

10. Efectos e Índices a ser esperados

Ambas partes acordaron el borrador de índices de logros del Proyecto, abajo mencionados. La parte boliviana tiene la responsabilidad de lograr estos índices en 2024 y hacer



monitoreo de avance de acuerdo con estos índices. Y, la parte boliviana comprendió que los índices de logros se finalizarán durante el proceso de elaboración del Informe Final.

[Efectos cuantitativos]

Nombre de índice	Valor de referencia (Valor real de 2016)	Valor meta(2024) [3 años después de la finalización del Proyecto]
Reducción de días de tránsito difícil (días/año)	14	0
Reducción de tiempo de traslado entre Okinawa I y Santa Cruz (minutos)	80	65
Aumento del tráfico de la Carretera Okinawa (unidad/día)	553	4.230
Volumen de transporte: número de viajeros (personas/año)	310.000	2.100.000
Volumen de transporte: volumen de cargas (t/año)	340.000	2.290.000

[Efectos cualitativos]

- ① Se resolverán problemas de visibilidad y transitabilidad causados por polvos y se asegurará la misma.
- ② Se mejorará la logística entre las colonias Okinawa y sus contornos y contribuirá al desarrollo económico del Departamento, incluyendo dichas colonias.

11. Obligaciones relacionadas con la ejecución del Proyecto

Ambas partes confirmaron las obligaciones de la parte boliviana a través del Gobierno Autónomo Departamental de Santa Cruz mencionadas en el Anexo 6. La parte boliviana se comprometió a tomar procedimientos y coordinación necesarios como presupuestación, como condiciones previas para la ejecución del Proyecto. Y comprendió que los montos de gastos mencionados esta vez son del nivel del diseño preliminar. Los montos de gastos correctos se calcularán a la hora del diseño detallado. Ambas partes confirmaron que el Anexo 6 se adjuntará en el Acuerdo de Donación.




12. Monitoreo durante la ejecución del Proyecto

El Proyecto será monitoreado por la entidad ejecutora. El Informe de Monitoreo del Proyecto, de acuerdo con el formulario descrito en el Anexo 7, se presentará a JICA. Las fechas para presentarlo se mencionan en el Anexo 6.

13. Terminación del Proyecto

Ambas partes confirman que se terminará el Proyecto cuando se operen instalaciones construidas. La entidad ejecutora informará a JICA dentro de seis meses después de la terminación del Proyecto.

14. Evaluación después de la terminación del Proyecto

JICA hará post-evaluación de 5 ítems (pertinencia, efectividad, impacto, eficiencia, sostenibilidad), en principio 3 años después de la terminación del Proyecto. Se publicará el resultado de dicha evaluación. Se requiere a la parte boliviana brindar apoyos para conseguir datos proporcionados por la entidad ejecutora para dicha evaluación.

15. Ítems y apoyos necesarios para la buena ejecución del Proyecto

Ambas partes confirmaron los ítems y apoyos abajo mencionados para la buena ejecución del Proyecto:

- Apoyar los procedimientos de exoneración (reembolso incluido) relacionados con la ejecución del Proyecto.
- Apoyar distintos procedimientos necesarios relacionados con la ejecución del Proyecto.

16. Cronograma del Estudio

JICA elaborará el Informe Final del Estudio Preparatorio de acuerdo con los ítems confirmados y se lo enviará a la parte boliviana alrededor de junio de 2018.

17. Consideraciones socio-ambientales

17-1 Ítems generales

17-1-1 Pautas y categorías ambientales

La Misión explicó que la pauta ambiental de JICA para consideraciones socio-ambientales (en adelante se denomina como "la pauta") se aplicará al Proyecto. El Proyecto se categoriza B (de acuerdo con la pauta de JICA) porque no es carretera ni puente de gran magnitud y el área objeto no requerirá consideraciones especiales por tanto es un proyecto que no causa problemas grandes ni impactos ambientales



graves, de acuerdo con la pauta.

17-1-2 Lista de chequeo ambiental

Los impactos y consideraciones como medidas de mitigación se mencionan en la Lista de chequeo ambiental descritos en el Anexo 8. Ambas partes confirmaron que en caso de haber algún cambio grande en el contenido de dicha lista, la parte boliviana presentará a JICA la versión enmendada.

17-2 Ítems ambientales

17-2-1 Evaluación de Impacto Ambiental

Ambas partes confirmaron que el Informe de EIA se ha aprobado por el Ministerio de Medio Ambiente y Agua.

17-2-2 Plan de Manejo Ambiental y Plan de Monitoreo Ambiental

Ambas partes confirmaron el Plan de Manejo Ambiental y Plan de Monitoreo Ambiental descritos en el Anexo 9. Ambas partes confirmaron que las medidas de mitigación y monitoreo se realizarán de acuerdo con el Plan de Manejo Ambiental y Plan de Monitoreo Ambiental a ser renovados a la hora del diseño detallado.

17-3 Ítems sociales: Reasentamiento de habitantes y logro de terreno (liberación del Derecho de Via)

Ambas partes confirmaron que no hay reasentamiento de habitantes en este Proyecto y los procedimientos del logro de terreno objeto del Proyecto (liberación del Derecho de Via) se está llevando a cabo debidamente.

17-4 Monitoreo Socio-ambiental

17-4-1 Monitoreo Ambiental

Ambas partes acordaron que la parte boliviana a través del Gobierno Autónomo Departamental de Santa Cruz presentará Informes de Monitoreo Ambiental a JICA incluyendo los resultados de monitoreo ambiental, de acuerdo con el formulario de monitoreo mencionado en el Anexo 10.

17-4-2 Publicación de informaciones sobre el resultado de monitoreo

Ambas partes acordaron que se dará a conocer el resultado de monitoreo a través de la página web del Gobierno Autónomo Departamental de Santa Cruz o en la oficina de las obras in situ para los interesados locales. El Gobierno Autónomo Departamental de



Santa Cruz acordó publicar el resultado de monitoreo socio-ambiental en su página web, de acuerdo con el formulario de monitoreo mencionado en el Anexo 10.

18. Otros ítems

18-1 Asignación de presupuestos necesarios para las obras del tramo que ejecuta la parte boliviana:

18-1-1 El tramo desde el punto final que ejecuta la parte japonesa (el límite de la Colonia Okinawa II) hasta la Colonia Okinawa III (15.6km):

El Gobierno Autónomo Departamental de Santa Cruz se comprometió a tomar medidas presupuestarias sin falta para la ejecución de las obras del tramo.

18-1-2 El tramo desde la Colonia Okinawa III hasta la ciudad de Santa Cruz de la Sierra (Parque Industrial) (28.14km aprox.):

El Gobierno Autónomo Departamental de Santa Cruz realizará las gestiones necesarias ante el Gobierno Central para el posible financiamiento del tramo mencionado. Sin embargo, en el caso de que no se concrete el financiamiento de organizaciones internacionales, el Gobierno Autónomo Departamental de Santa Cruz se comprometió a tomar todas las medidas presupuestarias del tramo utilizando sus propios fondos o fuentes de financiamiento apropiadas.

18-2 Aseguramiento de la seguridad durante las obras

La parte boliviana a través del Gobierno Autónomo Departamental de Santa Cruz comprendió la importancia de medidas de seguridad durante las obras y comprometió asumir las medidas de seguridad de las obras junto con el Contratista y el Consultor, de acuerdo con "Guía de Gestión de seguridad de las Obras de Construcción en los Proyectos de AOD del Japón" que se menciona abajo en la página web.

https://www.jica.go.jp/activities/schemes/oda_safety/ku57pq00001nz4eu-att/guidance_spa.pdf

18-3 Mantenimiento después de la terminación de las obras

La parte boliviana a través del Gobierno Autónomo Departamental de Santa Cruz se comprometió a conseguir presupuesto para hacer mantenimiento después de la terminación de las obras y tomar medidas debidas para que los vehículos pesados (que excedan las cargas de diseño) no dañen la Carretera.



18-4 Publicación de información

Ambas partes confirmaron que el Informe sobre el Estudio Preparatorio, que no menciona el costo del Proyecto se publicará después de la terminación del Estudio Preparatorio. El Informe Final que incluya el costo del Proyecto se publicará después de firmar el contrato del Proyecto.

Anexo 1 Sitio del Proyecto

Anexo 2 Organigrama

Anexo 3 Costo del Proyecto

Anexo 4 Cooperación Financiera No Reembolsable de Japón

Anexo 5 Cronograma de implementación del Proyecto

Anexo 6 Obligaciones a ser asumidas por el Gobierno de Bolivia

Anexo 7 Informe de Monitoreo del Proyecto (formulario)

Anexo 8 Lista de chequeo ambiental

Anexo 9 Plan de Manejo Ambiental/Plan de Monitoreo Ambiental

Anexo10 Formulario de Monitoreo Socio-Ambiental



Anexo.1 Sitio del Proyecto

MAPA PROYECTO DE PAVIMENTACION DE LA CARRETERA OKINAWA I,II Y III

Mapa de ubicación del Proyecto

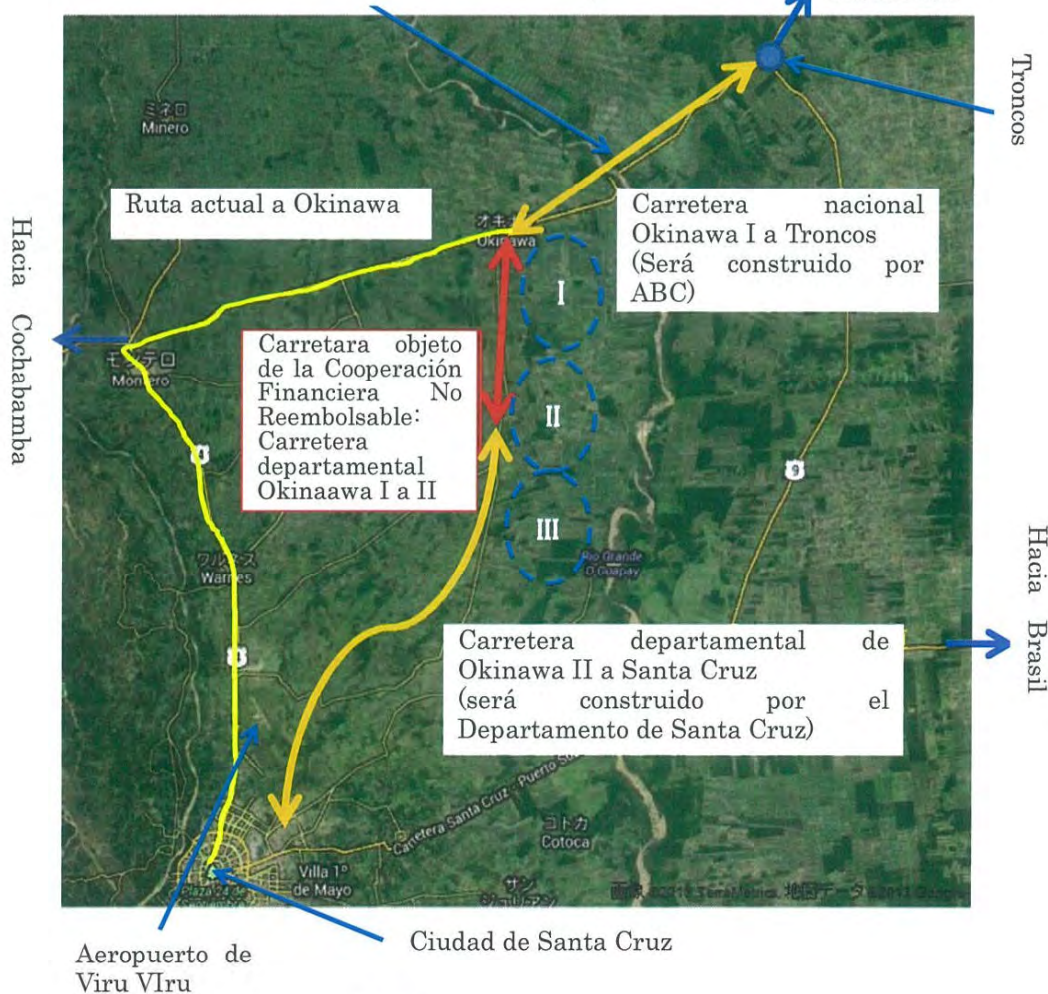


Departamento de Santa Cruz



Puente ha construido por Corea del Sur

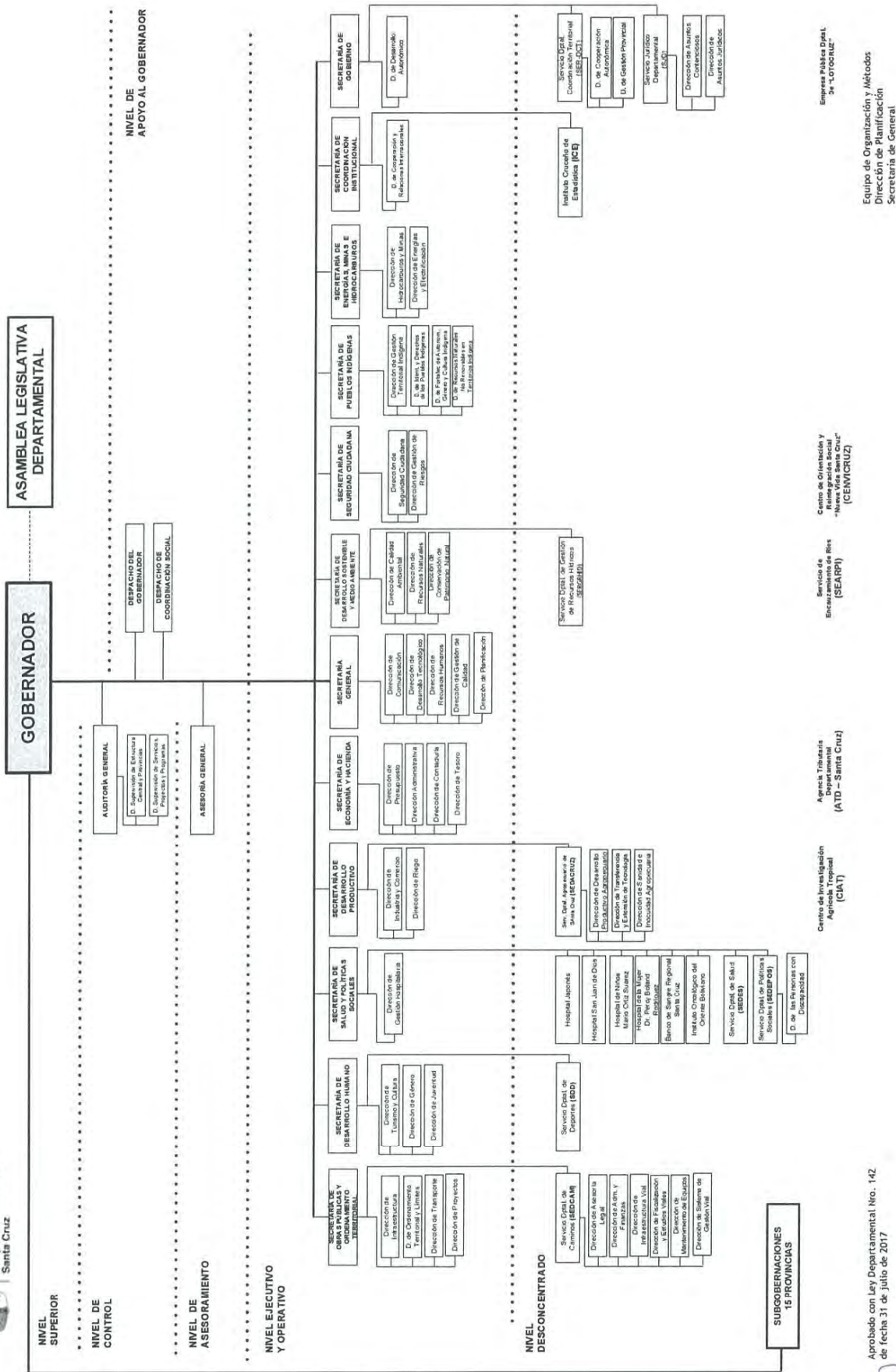
Hacia Beni



7C

Gobierno
Autónomo
Departamental
Santa Cruz

ESTRUCTURA ORGÁNICA 2017
GOBIERNO AUTÓNOMO DEPARTAMENTAL DE SANTA CRUZ



Aprobado con Ley Departamental Nro. 142
de fecha 31 de julio de 2017

Annex.3 Project Cost

CONFIDENTIAL

This Page is closed due to the confidentiality.

Anexo.4 Cooperación Financiera No Reembolsable de Japón

Esquema de la Cooperación Financiera No Reembolsable del Japón

El Gobierno del Japón (en adelante se denominará “GdJ”) realiza la reforma organizacional para mejorar la calidad de operaciones de la Asistencia Oficial para el Desarrollo (AOD). Como una parte de este reajuste una nueva ley de JICA entró en vigencia el 1 de octubre de 2008. Sobre la base de la ley y la decisión de GdJ, JICA llegó a ser la agencia ejecutora de los proyectos de la Cooperación Financiera No Reembolsable.

La Cooperación Financiera No Reembolsable es el fondo no reembolsable a un país receptor para adquirir instalaciones, equipos y servicios (servicios de ingeniería, transporte de los productos y etc.) con el fin de contribuir al desarrollo económico y social del país bajo los principios de las leyes y reglamentos relacionados del Japón. La Cooperación Financiera No Reembolsable no se realiza a través de la donación de materiales y etc.

1. Procedimientos de la Cooperación Financiera No Reembolsable

Se realiza la Cooperación Financiera No Reembolsable del Japón de la siguiente manera:

- Estudio (Estudio Preparativo (en adelante se denominará “el Estudio”)
JICA ejecuta el Estudio.
- Evaluación y a probación
Evaluación por el GdJ y aprobación por su Gabinete del Japón
- Decisión de ejecución
Notas canjeadas entre el GdJ y un país receptor
- Acuerdo de Donación (en adelante se denominará “el A/D”)
Acuerdo establecido entre JICA y el país receptor
- Ejecución
Realización del Proyecto en la base del A/D

2. Significación del Estudio

(1) Contenido del Estudio

El propósito del Estudio es proveer de un documento básico necesario para la aprobación del Proyecto por JICA y por el GdJ. Los contenidos del Estudio son como sigue:

- Confirmación de los antecedentes, objetivos, beneficios del Proyecto y capacidad institucional de las agencias concernientes del país receptor necesarias para la implementación del Proyecto.
- Evaluación de la factibilidad del Proyecto que se implementa bajo el Esquema de la Cooperación Financiera No Reembolsable desde los puntos de vista técnicos, financieros, sociales y medio-ambientales.
- Confirmación de los ítems acordados por ambas partes acerca del concepto básico del Proyecto.
- Preparación de un diseño básico del Proyecto.
- Estimación de los costos del Proyecto.

Por consiguiente, la totalidad de la solicitud no será automáticamente objeto de la cooperación, sino se confirmará el concepto básico del Proyecto conforme a la Directivas de la Cooperación Financiera

No Reembolsable de Japón.

JICA exigirá al Gobierno del país receptor tomar todas las medidas necesarias para promover su autonomía en la implementación del Proyecto. Estas deberán ser garantizadas aunque estén fuera de la jurisdicción de la entidad ejecutora del Proyecto en el país receptor. Por lo tanto, la ejecución del Proyecto será confirmada por todas las organizaciones relevantes en el país receptor mediante las Minutas de Reuniones.

(2) Selección de la compañía consultora

Al realizar el Estudio, JICA selecciona una de las compañías consultoras - entre aquellas registradas en JICA - mediante una licitación en la que presentan sus propuestas.

(3) Los resultados del Estudio

JICA revisa el informe del Estudio. JICA recomienda al GdJ que apruebe la implementación del Proyecto.

3. Esquema de la Cooperación Financiera No Reembolsable

(1) El N/R y el A/D

Después de que el Gabinete del Japón aprueba el Proyecto el N/R será firmado entre el GdJ y el Gobierno del País Receptor, con el fin de asegurar la asistencia, a la cual sigue la suscripción del A/D entre JICA y el Gobierno del país receptor para definir artículos necesarios para la implementación del Proyecto, tales como condiciones de pago, responsabilidades del Gobierno del país receptor, y condiciones de adquisición.

(2) Selección de Consultores

JICA recomendará al país receptor que la compañía consultora que realizó el Estudio continúe el trabajo de implementación del Proyecto después de las firmas del N/R y A/D con el fin de mantener la consistencia tecnológica.

(3) País de procedencia elegible

La Cooperación Financiera No Reembolsable será utilizada apropiadamente por el Gobierno del país receptor para la adquisición de los productos japoneses o del país receptor y los servicios de nacionales japoneses y nacionales del país receptor para la ejecución del Proyecto: No obstante lo arriba mencionado, la Cooperación Financiera No Reembolsable podrá ser utilizada, cuando los dos Gobiernos lo estimen necesario, para la adquisición de productos de terceros países (países que no sean ni Japón ni el país receptor) y los servicios como los de transporte ofrecidos por éstos. Sin embargo, considerando el esquema de la donación del Japón, los contratistas principales para la ejecución del Proyecto como consultores, constructores y proveedores deberán ser nacionales japoneses. (Los nacionales japoneses significan personas naturales o jurídicas dominadas por las personas naturales japonesas)

(4) Necesidad de Verificación

El Gobierno del país receptor o su autoridad designada, concertará contratos, en yenes japoneses, nacionales japoneses. A fin de ser aceptable, tales contratos deberán ser verificados por JICA. Esta verificación se debe a que el fondo de donación proviene de los impuestos generales de los nacionales japoneses.

(5) Responsabilidad del Gobierno del país receptor

El Gobierno del país receptor tomará las medidas necesarias como se explica en el Anexo 6.

(6) Uso Adecuado

El país receptor deberá asegurar que las instalaciones construidas y los productos adquiridos bajo la Cooperación Financiera No Reembolsable sean debida y efectivamente mantenidos y utilizados para la ejecución del Proyecto, y asignar el personal necesario a tal fin. Deberá también sufragar todos otros gastos necesarios para la ejecución del Proyecto que no cubra la Donación.

(7) Exportación y Reexportación

Los productos adquiridos bajo la Donación no deberán ser exportados ni reexportados del país receptor.

(8) Arreglo Bancario

- a) El gobierno de país receptor (o su autoridad designada) deberá abrir una cuenta bancaria a nombre del Gobierno del país receptor en un banco de cambio exterior en el Japón. JICA efectuará la Donación efectuando pagos, en yenes japoneses, para cubrir las obligaciones contraídas por el Gobierno del país receptor o la autoridad designada por él, bajo los Contratos Verificados.
- b) Los pagos por parte del Japón se efectuarán, cuando el Banco presente las solicitudes de pago a JICA, en virtud de la autorización de pago (A/P) expedida por el Gobierno del país receptor o su autoridad designada.

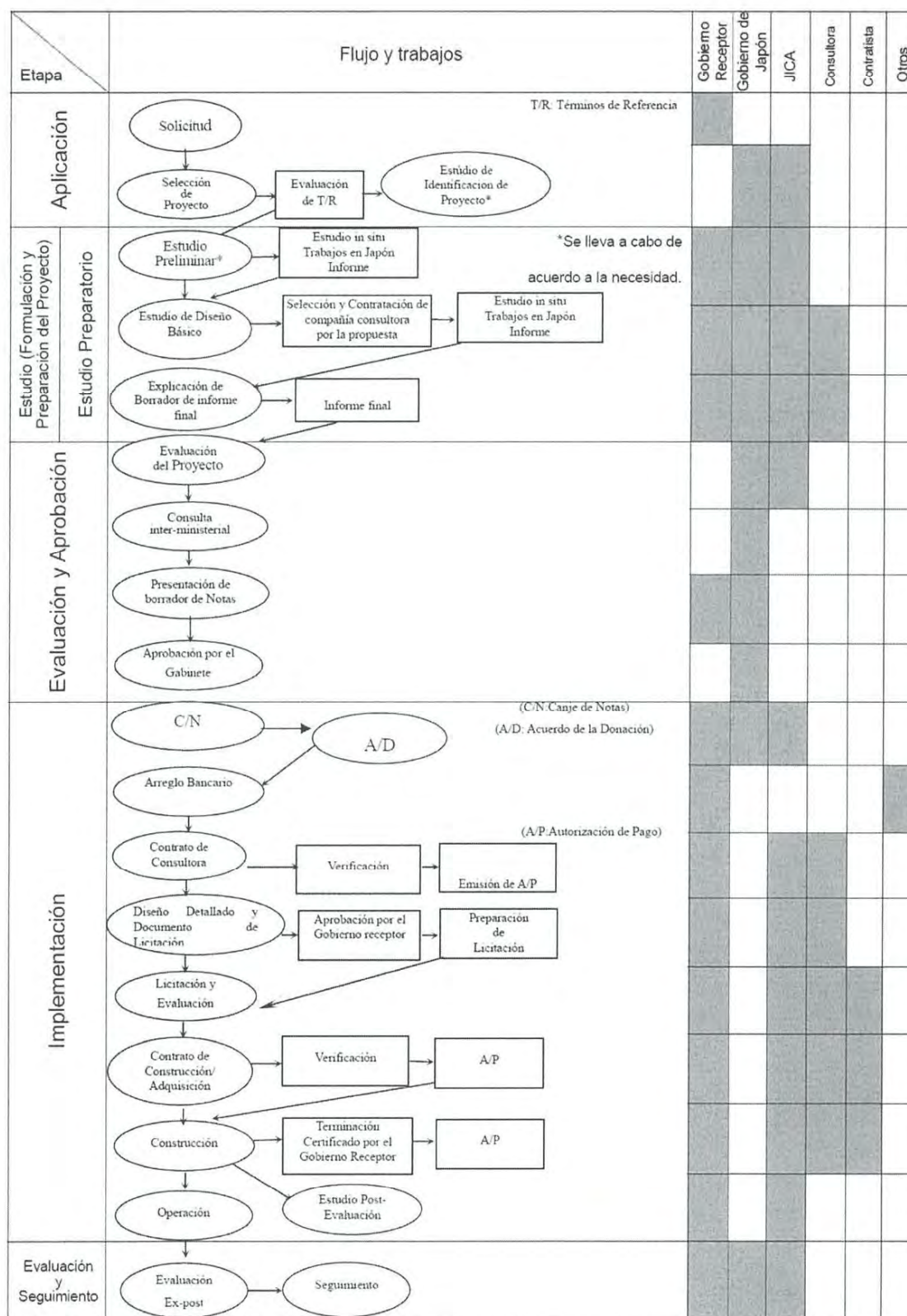
(9) Autorización de Pago (A/P)

El Gobierno del país receptor deberá cubrir la comisión de aviso de la autorización de pago y comisiones de pago al Banco.

(10) Consideraciones medioambientales y sociales

El país receptor deberá asegurar las consideraciones medioambientales y sociales para el proyecto y respetar regulaciones medioambientales del país receptor y las directrices socio-ambiental de JICA.

Adjunto: Flujograma de los procedimientos de la Cooperación Financiera No Reembolsable del
Japón



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Anexo.6 Obligaciones a ser asumidas por el Gobierno de Bolivia

1. Obligaciones Específicas del Gobierno de Bolivia que no serán financiadas por la Donación.

(1) Antes de la licitación

NO	Items	Fecha tope	A cargo de	Costo Estimado	ref
1	Abrir una cuenta bancaria(Convenio Bancario(C/B)	Dentro de un mes después de firmar el A/D	GADSC		
2	Concluir el convenio subsidiario(C/S) entre el Ministerio de Planificación del Desarrollo y GADSC	Dentro de un mes después de firmar el A/D	Ministerio de Planificación del Desarrollo y GADSC		
3	Emitir la A/P a un banco en Japón(Banco Agente) para el pago al consultor	Dentro de un mes después de firmar el contrato	GADSC		
4	Cubrir las siguientes comisiones a un banco en Japón por los servicios bancarios basados en el arreglo bancario		GADSC		
	1) Comisión de asesoría de A/P	Dentro de un mes después de firmar el contrato	GADSC		
	2) Pago de comisión para A/P	Cada pago	GADSC	JPY 1,42millón	
5	Obtener Licencia de EIA (Condiciones de la aprobación deberán ser satisfechas, si hay) y asegurar el presupuesto necesario para la implementación.	Para mayo de 2018	GADSC		
6	Asegurar y limpiar las siguientes tierras: 1) Patio temporal de construcción y depósito de materiales cerca del área del Proyecto	Antes de la notificación de la licitación	GADSC		Adjunto 1

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	2) Banco de materiales y el vertedero cerca del área del Proyecto				
7	Limpiar, nivelar y recuperar los siguientes sitios 1) Trasladar instalaciones (cañería de agua que cruza caminos, postes de energía) 2) Trasladar instalaciones (casita de vigilancia)	Antes de la notificación de la licitación	GADSC	JPY 9,09millones	Adjunto2
8	Presentar el Informe de Monitoreo del Proyecto (con el resultado del Diseño Detallado)	Antes de preparar los documentos de licitación	GADSC		

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(2) Durante la Implementación del Proyecto

NO	Items	Fecha tope	A cargo de	Costo estimado	Ref
1	Emitir A/P a un banco en Japón (el Banco Agente) para el pago al contratista	Dentro de un mes después de la firma del contrato	GADSC		
2	Hacerse cargo de las siguientes comisiones a un banco en Japón por los servicios bancarios basados en el arreglo bancario		GADSC		
	1) Comisión de asesoría de A/P	Dentro de un mes después de la firma del contrato	GADSC		
	2) Pago de comisión para A/P	Cada pago	GADSC	JPY 19,57 millones	
3	Asegurar el pronto despacho aduanero y asistir transporte interno de productos en el país receptor.	Durante el Proyecto	GADSC		
4	Otorgar a las personas físicas japonesas y/o personas físicas de terceros países, cuyos servicios sean requeridos en relación con el suministro de los productos y/o los servicios, tantas facilidades como sean necesarias para su ingreso y estadía en el país receptor para el desempeño de su trabajo.	Durante el Proyecto	GADSC		
5	1) Asegurar que los pagos de derechos aduaneros, impuestos internos y otras cargas fiscales que se imponga en el país receptor con respecto a la adquisición de los productos y/o los servicios sean eximidos o cubiertos. - Derechos aduaneros - IVA sobre Bienes	Durante el Proyecto	El Estado Plurinacional de Bolivia a través del Gobierno Autónomo Departamental de Santa Cruz		

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	importados - Impuesto a las utilidades de las empresas(IUE) - Tasa de IT(impuesto a las transacciones) - Impuestos sobre renta				
	2)El siguiente impuesto será devuelto por la autoridad designada sin usar la Donación. IVA sobre Bienes domésticamente adquiridos	Durante el Proyecto	GADSC	JPY 190 millones para IVA sobre Bienes domésticamente adquiridos	
6	Hacerse cargo de todos los gastos necesarios, excepto aquellos cubiertos por la Donación, para la implementación.	Durante el Proyecto	GADSC		
7	1) Presentar Informe de Monitoreo del Proyecto	Cada mes	GADSC		
	2) Presentar Informe de Monitoreo del Proyecto(final)	Dentro de un mes después de firmar el certificado de finalización por obras bajos el contrato	GADSC		
8	Presentar un informe concerniente a la terminación del Proyecto	Dentro de seis meses después de la finalización del Proyecto	GADSC		
9	Implementar Plan de Manejo Ambiental y Plan de Monitoreo Ambiental	Durante la construcción	GADSC	JPY 2,61millón	
10	Presentar resultados de monitoreo ambiental trimestralmente a JICA, usando formulario de monitoreo, como una parte del Informe de Monitoreo del Proyecto	Durante la construcción	GADSC		

(3) Después del Proyecto

NO	Items	Fecha tope	A cargo de	Costo Estimado	Ref
1	Implementar el Monitoreo Ambiental del Proyecto(PMA)	Por un período basado en el PMA	GADSC	JPY 1,49millones	
2	Presentar semestralmente resultados de monitoreo ambiental a JICA, utilizando formulario de monitoreo - El período de monitoreo ambiental podría ser prolongado si algunos significantes impactos negativos sobre el ambiente se descubren. La extensión de monitoreo ambiental será decidida basado en el acuerdo entre Depto. De Santa Cruz y JICA.	Por tres años después del Proyecto	GADSC		
3	Mantener y utilizar debida y efectivamente las instalaciones construidas y los equipos suministrados bajo la Donación. 1) Asignación del coste de mantenimiento 2) Estructura de operación y mantenimiento 3) revisión rutinaria/inspección periódica	Después de la finalización de la construcción	GADSC-SEDCAM	JPY 8,26 millones por año	

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2. Otras obligaciones del Estado Plurinacional de Bolivia a través del Gobierno Autónomo Departamental de Santa Cruz financiadas por la Donación

NO	Items	Fecha tope	Monto (Millones de yenes japoneses)*
1	Construir caminos y un puente - Mejoramiento de caminos - Reconstrucción de un puente - Mejoramiento de drenaje de aguas pluviales a) Transporte Marítimo(Aéreo) de los productos desde Japón hasta el país receptor b) Transporte interno desde el puerto de desembarque hasta el sitio del proyecto.		
2	Implementar diseño detallado, asistencia a licitación y supervision de construcción (Servicio de consultoría)		
	Total		4.408

*El monto es provisional, el cual está sujeto a la aprobación del Gobierno de Japón

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Adjunto1: Ubicación de bancos de materiales candidatos



Prog.16+850 (Izquierda)

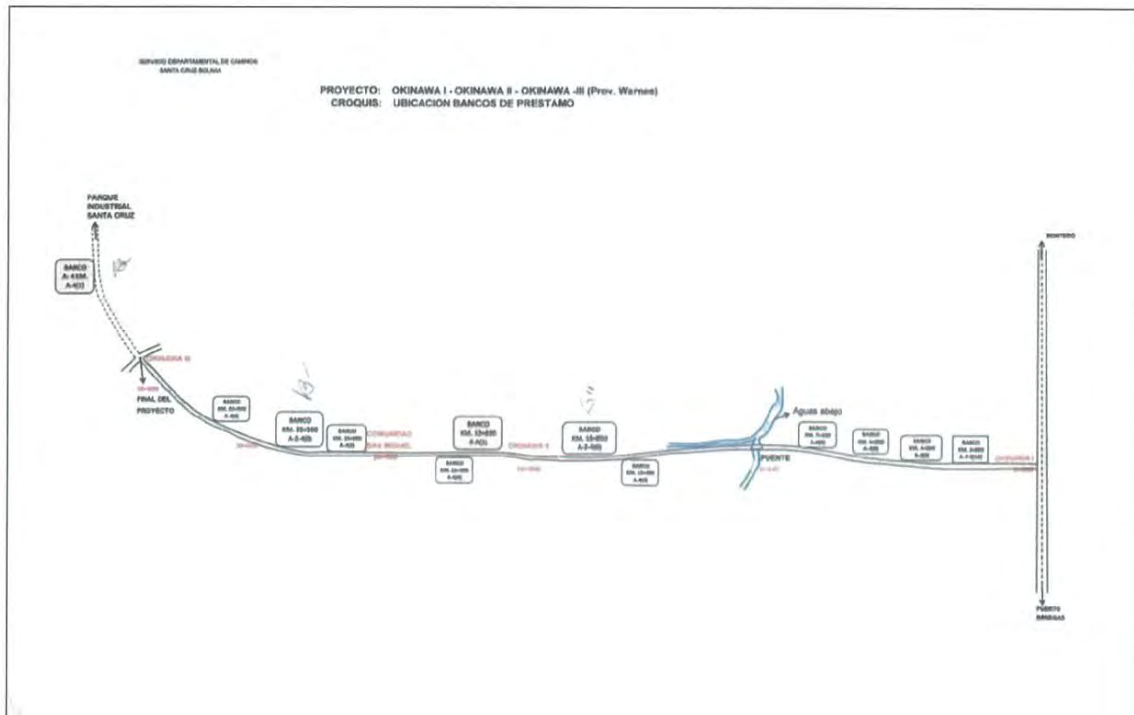


Prog.23+600 (Derecha)



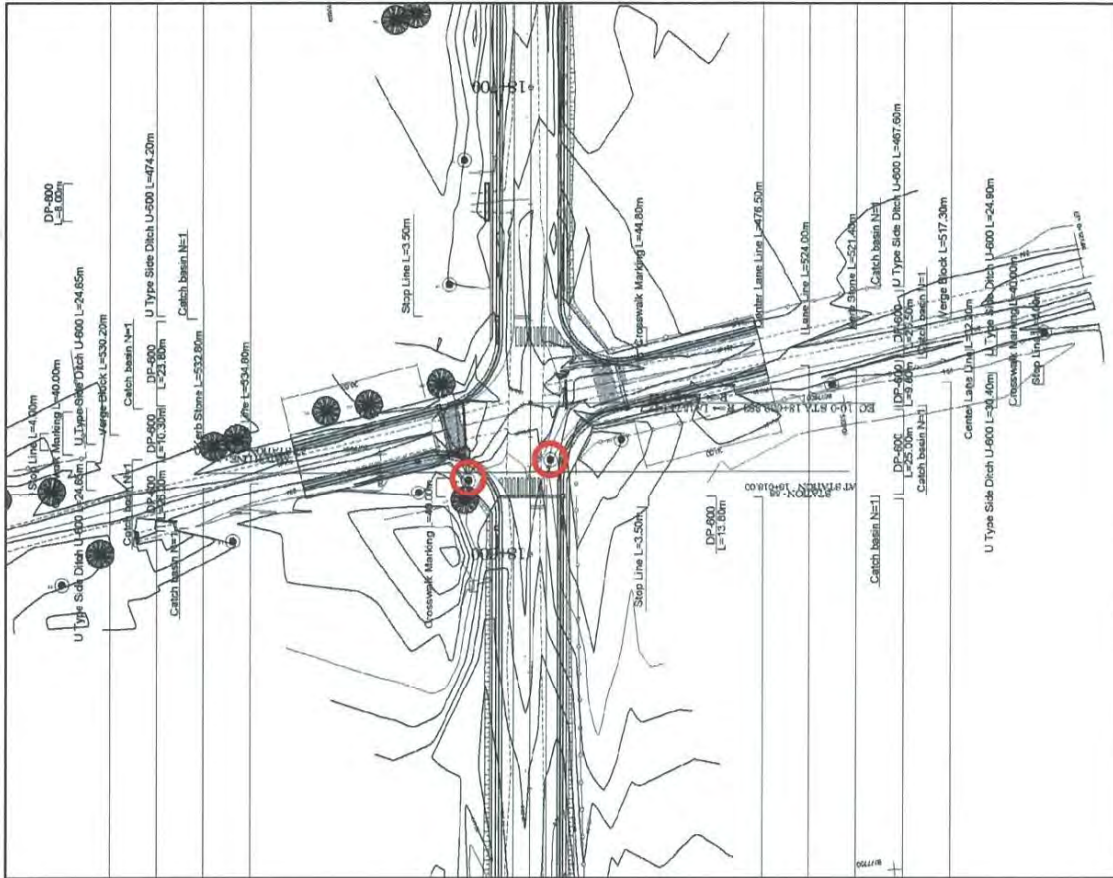
Prog.39+000 (Derecha)

Tres (3) sitios alrededor de Carretera de OKINAWA para extracción de tierra para la construcción

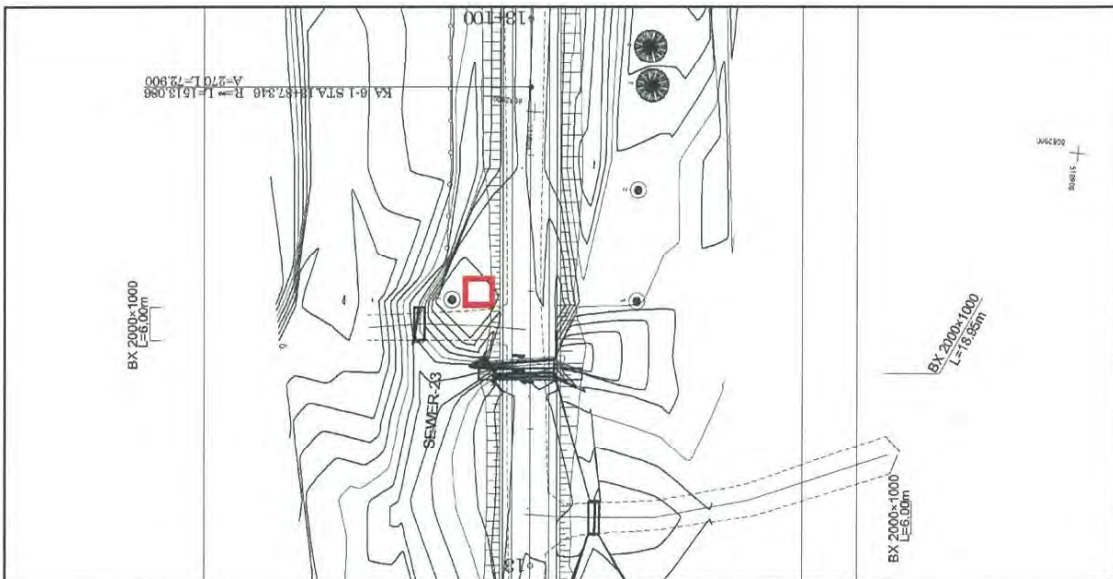


Ubicación de bancos de materiales (Las marcas indican bancos de materiales candidatos)

Adjunto2: Traslado de instalaciones y construcciones



Traslado de dos postes de energía eléctrica y una cañería de agua que cruza el camino en Okinawa II cuya ubicación no está confirmada.



Traslado de una casita de vigilancia en Sta. 13+000

<u>Informe de Monitoreo del Proyecto</u> sobre <u>Nombre del Proyecto</u> <u>Acuerdo de Donación No. XXXXXXXX</u> Mes de 20XX
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Información de la Organización

Firmante A/D (Receptor)	del <u>Persona encargada(Designación)</u> Contactos <u>Domicilio:</u> <u>TEL/FAX:</u> <u>Correo:</u>
Executing Agency	<u>Person in Charge (Designation)</u> Contactos <u>Domicilio:</u> <u>TEL/FAX:</u> <u>Correo:</u>
Ministerio competente	<u>Persona encargada (Designación)</u> Contactos <u>Domicilio:</u> <u>TEL/FAX:</u> <u>Correo:</u>

Información General:

Título del Proyecto	
C/N	Fecha de firma: Duración:
A/D	Fecha de firma: Duración:
Fuente de Financiación	Gobierno del Japón: No exceder a JPY _____ mil. Gobierno de (_____): _____

1: Descripción del Proyecto

1-1 Objetivo del Proyecto

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1-2 Razones del Proyecto

- Objetivos del nivel superior a los cuales el Proyecto contribuye (políticas y estrategias nacionales/regionales/sectoriales)
- Situación de grupos objeto a la cual el Proyecto se enfoca

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1-3 Indicadores para medición de "Eficacia"

Indicadores cuantitativos para medir el logro de objetivos del Proyecto		
Indicadores	Original (Año)	Meta (Año)
Indicadores cualitativos para medir el logro de objetivos del Proyecto		

2: Detalles del Proyecto

2-1 Ubicación

Componentes	Original (propuesto en el diseño preliminar)	Actual
1.		

2-2 Alcance del trabajo

Componentes	Original* (propuesto en el diseño preliminar)	Actual*
1.		

Razones para modificación de alcance(si hay).

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(IMP))

2-3 Cronograma de ejecución

Items	Original		Actual
	<i>(propuesto en el diseño preliminar)</i>	<i>(a la hora de firmar el Acuerdo de Donación)</i>	

Razones para algunos cambios del cronograma, y sus efectos sobre el Proyecto (si hay)

2-4 Obligaciones por el Receptor

2-4-1 Progreso de Obligaciones Específicas
Ver Adjunto 2.

2-4-2 Actividades
Ver Adjunto 3.

2-4-3 Informe sobre Acta de Discusiones
Ver Adjunto 11.

2-5 Costo del Proyecto

2-5-1 Costo cubierto por la Donación(Confidencial hasta la licitación)

Components			Costo (Millón de Yen)	
	Original <i>(propuesto en el diseño preliminar)</i>	Actual <i>(en caso de alguna modificación)</i>	Original ^(1),2) <i>((propuesto en el diseño preliminar)</i>	Actual
	1.			
Total				

Note: 1) Fecha estimada:
2) Tipo de cambio: 1 US Dólar = Yen

2-5-2 Costo cubierto por el Receptor

Componentes			Costo (1,000 bol)	
	Original <i>(propuesto en el diseño preliminar)</i>	Actual <i>(en caso de alguna modificación)</i>	Original ^(1),2) <i>(propuesto en el diseño preliminar)</i>	Actual
	1.			

Nota: 1) Fecha estimada:
2) Tipo de cambio:1 US Dólar =

Razones para las brechas notables entre el costo original y el actual, y las contramedidas (si hay)
(IMP)

2-6 Entidad Ejecutora

- Rol de Organización, situación financiera, capacidad, recuperación del costo etc,
- Organigrama incluyendo la unidad a cargo de la implementación y número de empleados.

Original (a la hora del diseño preliminar)

nombre:

rol:

situación financiera:

arreglo institucional y organizacional (organigrama):

recursos humanos (número y habilidad de personal):

Actual (PMR)

2-7 Impactos Ambiental y Social

- Los resultados de monitoreo ambiental basados en Adjunto 5 (de acuerdo con el Cronograma 4 del Acuerdo de Donación).
- Los resultados de monitoreo social basados en Adjunto 5 (de acuerdo con el Cronograma 4 del Acuerdo de Donación).
- Información revelada concerniente a los resultados de monitoreo ambiental y social a los interesados locales (siempre que sea aplicable).

3: Operación y Mantenimiento (O&M)

3-1 Arreglo Físico

- Plan para O&M (número y habilidad del personal en la division o sección responsable, disponibilidad de manuales y guías, disponibilidad de repuestos, etc.)

Original (a la hora del diseño preliminar)

Actual (IMP)

3-2 Arreglo Presupuestario

- Costo de O&M requerido y actual asignación del presupuesto para O&M

Original (a la hora del diseño preliminar)
Actual (IMP)

4: Riesgos Potenciales y Medidas de Mitigación

- Riesgos Potenciales que podrían afectar a la implementación del proyecto, logro de objetivos, sostenibilidad
- Medidas de mitigación correspondiendo a los riesgos potenciales

Evaluación de Riesgos Potenciales (a la hora del diseño preliminar)

Riestos Potenciales	Evaluación
1. (Descripción de riesgo)	Probabilidad: Alto/Moderado/Bajo
	Impacto: Alto/Moderado/Bajo
	Análisis de Probabilidad e Impacto:
	Medidas de mitigación:
	Acción requerida durante la etapa de implementación :
2. (Descripción de Riesgo)	Probabilidad: Alto/Moderado/Bajo
	Impacto: Alto/Moderado/Bajo
	Análisis de Probabilidad e Impacto:
	Medidas de Mitigación:
	Acción requerida durante la etapa de implementación:
3. (Descripción de Riesgos)	Probabilidad: Alto/Moderado/Bajo
	Impacto: Alto/Moderado/Bajo
	Análisis de Probabilidad e Impacto:
	: Medidas de Mitigación
	: Acción requerida durante la etapa de implementación

	Plan de Contingencia (si es aplicable):
Actual Situación y Contramedidas (IMP)	

5: Plan de Evaluación y Monitoreo(después de la finalización del trabajo)

5-1 Evaluación general

Favor de describir su evaluación general sobre el Proyecto.

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5-2 Lecciones aprendidas y Recomendaciones

Favor de mencionar algunas lecciones aprendidas desde la experiencia del proyecto, que serían valiosos para la futura asistencia o proyectos de tipo similar, tanto como algunas recomendaciones, que serían beneficiosos para mejor efecto de los proyectos, impacto y garantía de sostenibilidad.

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5-3 Plan de Monitoreo de los Indicadores para Evaluación Posterior

Favor de describir métodos de monitoreo, sección(es)/departamento(s) a cargo de monitoreo, frecuencia, los términos para monitorear los indicadores estipulado en 1-3.

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Adjuntos del Anexo 7 como ejemplo

1. Mapa de Ubicación del Proyecto
2. Obligaciones específicas del Receptor que no serán financiado con la Donación
3. Informe mensual presentado por el Consultor
 - Apéndice - Fotocopia del Informe de Progreso del Contratista (si hay)
 - Lista de Miembros Consultores
 - Lista del Personal Principal del Contratista
4. Lista de chequeo para el Contrato (incluyendo Notas de Enmienda del Contrato/Acuerdo y Cronograma de Pago)
5. Formulario de Monitoreo Ambiental/ Formulario de Monitoreo Social
6. Hoja de Monitoreo sobre precio de materiales especificados(Trimestral)
7. Informe sobre Proportion of Procurement (País Receptor, Japón y Terceros Países) (IMP (final) solamente)
8. Pinturas (por estilo de JPEG por CD-R) (IMP (final) solamente)
9. Lista de equipamiento (IMP (final) solamente)
10. Diseño (IMP (final) solamente)
11. Informe sobre Acta de Discusiones (Después del proyecto)



Hoja de Monitoreo sobre precios de materiales especificados

1. Condiciones Iniciales(Confirmado)

Items de materiales especificados		Volumen Inicial A	Unidad Inicial Precio (¥) B	Total inicial Precio C=A×B	1% de Contrato Precio D	Condición de pago	
						Precio (Reducido) E=C-D	Precio (Aumentado) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoreo del Precio Unitario de Materiales especificados

(1) Método de Monitoreo : ●●

(2) Resultado del Estudio de Monitoreo sobre el Precio Unitario para cada material especificado

Items de Materiales Especificados		1ra mes, 2015	2da mes, 2015	3ra mes, 2015	4ta	5ta	6ta
1	Item 1	●	●	●			
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Resumen de Discusiones con el Contratista (si es necesario)

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Informe sobre la Proporción de Adquisición (País receptor, Japón y Países Terceros)
(Egreso Actual por Construcción y cada Equipamiento)

	Adquisición Doméstica Adquisición (País Receptor) A	Adquisición Externa (Japón) B	Adquisición Externa Adquisición (Países Terceros) C	Total D
Costo de Construcción	(A/D%)	(B/D%)	(C/D%)	
Costo de Construcción Directo	(A/D%)	(B/D%)	(C/D%)	
Costo de Equipamiento otros	(A/D%)	(B/D%)	(C/D%)	
Costo de Equipamiento	(A/D%)	(B/D%)	(C/D%)	
Costo de Diseño y Supervisión	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

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Anexo.8 Lista de chequeo ambiental

Lista de comprobación ambiental: 7 Camino (1)

Variables ambientales	Principales aspectos de comprobación	Si: S No: N	Consideraciones sociales y ambientales concretas (Razones de Si/No, justificación, medidas de mitigación, etc.)
Clasificación			
(1) EIA, permisos y autorizaciones	(a) ¿El informe de la Evaluación del Impacto Ambiental (EIA) ha sido elaborado? (b) ¿El informe de la EIA y otros documentos han sido aprobados por el gobierno receptor de asistencia? (c) ¿La aprobación del informe de la EIA es condicionada? ¿El Proyecto satisface el permiso condicionado? (d) ¿Se obtuvieron otras autorizaciones y permisos ambientales de los organismos e instituciones relevantes locales?	(a) N (b) N (c) - (d) -	(a) Actualmente el informe de la EIA está en revisión. (b) Se contempla obtener la licencia de EIA a más tardar en mayo de 2018. (c) Se desconoce a la fecha. (d) Se requiere obtener el permiso de para el destronque y corta de árboles, además de la licencia de EIA. Actualmente se está tramitando la obtención de este permiso por ser necesario para la EIA.
(2) Información a los interesados locales	(a) ¿Se ha hecho pública la información sobre el contenido y los impactos del Proyecto, explicando correctamente a los interesados locales obteniendo su consentimiento? (b) ¿Se reflejaron debidamente las opiniones y observaciones recogidas de la población local?	(a) S (b) S	(a) Se organizaron las reuniones informativas con los actores locales a la elaboración del informe de EIA, logrando su consentimiento. (b) Las opiniones recogidas en las reuniones con los actores locales han sido en lo posible incorporadas en el Proyecto.
(3) Análisis de las alternativas	(a) ¿Se analizaron y se compararon varias opciones del Proyecto (incluyendo las variables ambientales y sociales)?	(a) S	(a) Se analizaron y se compararon cinco opciones, incluyendo la Opción Cero, y se seleccionó la mejor propuesta.
(1) Calidad de aire	(a) ¿Los contaminantes de aire emitidos de los vehículos circulantes, etc. pueden impactar el entorno ambiental? ¿El Proyecto satisface las normas ambientales del país receptor? (b) En el caso de que la contaminación de aire de la zona donde atraviesa el camino exceda las normas ambientales, ¿es posible que el Proyecto agrave más la situación? ¿Se está tomando alguna medida para conservación de la calidad de aire?	(a) S (b) N	(a) El Proyecto consiste en la pavimentación de la carretera, por lo que el volumen de tráfico aumentará. Sin embargo, dado que aumentará la velocidad de los vehículos, a la larga las emisiones se reducirán ligeramente o se mantendrán igual en comparación con la Opción Cero. (b) No se contempla que la contaminación de aire exceda las normas ambientales. En todo caso se contempla tomar las siguientes medidas de mitigación para controlar la contaminación de aire después de terminadas las obras: i) Ejecución del monitoreo periódico de la calidad de aire en el área de influencia; ii) recomendar a las autoridades relevantes intensificar el control del uso de la gasolina con plomo; iii) recomendar a las autoridades relevantes intensificar el control de circulación de vehículos mal mantenidos.

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Lista de comprobación ambiental: 7 Camino (2)

Variables ambientales	Principales aspectos de comprobación	Si: S No: N	Consideraciones sociales y ambientales concretas (Razones de Si/No, justificación, medidas de mitigación, etc.)
Clasificación			
(2) Calidad de agua	(a) ¿Hay alguna posibilidad de que la escorrentía de las tierras desnudas resultantes de las actividades de movimiento de tierras, tales como corte y relleno provoque la degradación de la calidad de agua en la cuenca más baja? (b) ¿Hay alguna posibilidad de que la escorrentía superficial de las carreteras contamine las fuentes de agua, como el agua subterránea? (c) ¿Los efluentes de diversas instalaciones, como los estacionamientos y áreas de servicio cumplen con las normas de efluentes del país receptor? ¿Existe la posibilidad de que los efluentes formen cuerpos de agua que no cumplan con las normas ambientales de calidad del agua en el país receptor?	(a) S (b) S (c) -	(a) Si es posible. Sin embargo, dado que las obras no incluyen el relleno o corte de gran cantidad de tierra, y que se contempla tomar las medidas apropiadas, es poco probable que se produzca el arrastre del suelo, y por lo tanto la degradación de la calidad de agua en la cuenca baja es limitada. (b) Es posible que el aceite y otros materiales acumulados sobre la calzada sean arrastrados por lluvias y se infiltren en la capa freática. Sin embargo, la influencia negativa es muy reducida ya que la cantidad de estos materiales es insignificante, además que la policía habrá fortalecido el control de circulación de los vehículos mal mantenidos. (c) No se proyecta construir estacionamientos ni áreas de servicio.
(3) Residuos sólidos	(a) ¿Los residuos generados como los estacionamientos y áreas de servicio son tratados y manejados adecuadamente de acuerdo con los reglamentos del país receptor?	(a) -	(a) No se proyecta construir estacionamientos ni áreas de servicio.
(4) Ruidos y vibración	(a) ¿Los ruidos y las vibraciones de los vehículos cumplen con las normas del país receptor?	(a) S/N	(a) Bolivia establece las normas (tentativas) de control de ruidos, no así de las vibraciones. Se contempla ejecutar el monitoreo periódico después de concluido el Proyecto y tomar las siguientes medidas de mitigación: i) recomendar a las autoridades relevantes intensificar el control de circulación de vehículos mal mantenidos; ii) recomendar a las autoridades relevantes controlar la carga excesiva de los vehículos.

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Lista de comprobación ambiental: 7 Camino (3)

Clasificación	Variables ambientales	Principales aspectos de comprobación	Si: S No: N	Consideraciones sociales y ambientales concretas (Razones de Si/No, justificación, medidas de mitigación, etc.)
3. Entorno natural	(1) Áreas protegidas	(a) ¿El sitio del Proyecto se encuentra en las áreas protegidas designadas por las leyes del país receptor o por los tratados y convenios internacionales? ¿Existe la posibilidad de que el Proyecto afecte a las áreas protegidas?	(a) N	(a) No existen áreas protegidas en la cercanía de la carretera a ser rehabilitada por el Proyecto.
	(2) Biosfera y ecosistema	(a) ¿El sitio del Proyecto incluye los bosques primitivos, selvas tropicales, los hábitats de gran valor ecológico (por ejemplo, arrecifes de coral, los manglares, o planicies de marea)? (b) ¿El sitio del Proyecto incluye los hábitats de especies en peligro de extinción protegidas que han sido designadas por las leyes del país receptor o por los tratados y convenios internacionales? (c) ¿En el caso de que se anticipen los impactos ecológicos significativos, se tomarán las medidas de protección adecuadas para reducir los impactos en el ecosistema? (d) ¿Existen medidas adecuadas de protección adoptadas para prevenir los impactos, tales como la interrupción de las rutas migratorias, la fragmentación del hábitat, o el accidente de tráfico de la fauna silvestre y el ganado? (e) ¿Existe la posibilidad de que la construcción del puente y caminos de acceso provoque impactos, como la destrucción de los bosques, la caza furtiva, la desertificación, reducción de las zonas de humedales? ¿Existe la posibilidad de perturbar el ecosistema debido a la introducción de especies exóticas (especies que no existían anteriormente), enfermedades y plagas? ¿Se consideran medidas adecuadas para prevenir tales impactos? (f) En el caso de que el sitio del Proyecto se encuentra en áreas no desarrolladas, ¿existe la posibilidad de que el nuevo desarrollo produzca grandes pérdidas en el ambiente natural?	(a) N (b) N (c) - (d) N (e) N (f) N	(a) A través del estudio en campo y discusiones con las autoridades de Santa Cruz, se ha verificado que no existen bosques primitivos, selvas tropicales ni los hábitats de gran valor ecológico a lo largo de la carretera a ser rehabilitada por el presente Proyecto. (b) A través de las discusiones con las autoridades de Santa Cruz, se ha verificado que no existen los hábitats de especies en peligro de extinción protegidas que han sido designadas por las leyes de Bolivia o por los tratados y convenios internacionales a lo largo de la carretera a ser rehabilitada por el presente Proyecto. (c) El presente Proyecto no producirá impactos ecológicos significativos. En todo caso se tomará la siguiente medida de mitigación: i) No cortar los árboles que no afecten directamente a la carretera o a sus obras de arte dentro de ROW. (d) Las obras no interrumpirán las rutas migratorias de la vida silvestre ni del ganado, ni fragmentará sus hábitats, dado que la carretera a ser rehabilitada por el Proyecto se ubica sobre el camino existente, tierras agrícolas y residenciales. (e) Se contempla cortar algunos árboles para la ejecución de obras del presente Proyecto, pero a fin de mitigar los impactos, se procurará no cortar los árboles que no afecten directamente a la carretera o a sus obras de arte dentro de ROW. (f) Las tierras contiguas a la carretera a ser rehabilitada son utilizadas para la producción agrícola o para fines residenciales, por lo que no producirá la destrucción del ambiente natural por del desarrollo de nuevas áreas.
	(3) Hidrología	(a) ¿Existe la posibilidad de que los cambios hidrológicos debido a la instalación de estructuras afecte negativamente al flujo del agua superficial y subterránea?	(a) N	(a) Se propone construir los pilares que no afecten el régimen ni la corriente del río.

Lista de comprobación ambiental: 7 Camino (4)

Clasificación	Variables ambientales	Principales aspectos de comprobación	Si: S No: N	Consideraciones sociales y ambientales concretas (Razones de Si/No, justificación, medidas de mitigación, etc.)
	(4) Topografía y geología	(a) ¿Existe algún suelo blando en la ruta que pueda causar colapso de laderas o deslizamientos de tierra? Si existe, ¿se están tomando las medidas adecuadas, cuando sea necesario? (b) ¿Existe la posibilidad de que las obras civiles, tales como el corte y el relleno provoque colapso de pendientes o deslizamientos de tierra? ¿Se están tomando las medidas adecuadas para evitar tal colapso o deslizamiento, cuando sea necesario? (c) ¿Existe la posibilidad de que el arrastre del suelo se produzca en los tramos de corte o relleno, bote de residuos del suelo, y banco de préstamo? ¿Se están tomando las medidas adecuadas para evitar el arrastre de sedimentos?	(a) N (b) N (c) Y	(a) La topografía de la ruta de la carretera a ser rehabilitada es relativamente plana en su totalidad, por lo que no existe el riesgo del deslizamiento. Asimismo, los resultados del estudio geológico ha puesto de manifiesto que no existen áreas con suelo frágil. (b) No se contempla ejecutar las obras de ingeniería que implique el terraplenado, corte, etc. de gran cantidad de tierra. (c) Es posible. Sin embargo, se contempla tomar las medidas apropiadas en el terraplén y corte de talud, como por ejemplo, la adopción de una pendiente apropiada o pulverización de semillas. Adicionalmente, se ha visto que el sitio de bote y el banco de préstamo están siendo debidamente manejados.





Lista de comprobación ambiental: 7 Camino (5)

Clasificación	Variables ambientales	Principales aspectos de comprobación	Si: S No: N	Consideraciones sociales y ambientales concretas (Razones de Si/No, justificación, medidas de mitigación, etc.)
	(1) Desplazamiento involuntario de la población	(a) ¿Existe la posibilidad de realizar el desplazamiento involuntario de la población por la ejecución del Proyecto? Si existe, ¿se hicieron los esfuerzos para reducir al mínimo los impactos causados por el desplazamiento? (b) ¿Se le dio explicación adecuada sobre la indemnización o compensación y la asistencia a la población afectada antes del desplazamiento? (c) ¿Se ejecutaron los estudios socioeconómicos sobre el desplazamiento y se elaboró el plan de desplazamiento, incluyendo la indemnización o compensación con el costo total de sustitución, la restauración de los medios de vida y los niveles de vida? (d) ¿La indemnización o compensación será pagada antes del desplazamiento? (e) ¿La política de indemnización o compensación ha sido elaborada y documentada? (f) El plan incluye las consideraciones apropiadas para la población vulnerable incluyendo los hogares pobres, mujeres, niños, ancianos, grupos minoritarios y étnicos, etc.? (g) ¿Se lograron concertar acuerdos con las personas afectadas antes del desplazamiento? (h) ¿Ha sido construido el marco organizativo para ejecutar correctamente el desplazamiento? ¿Se tiene suficiente capacidad y presupuesto para poner en práctica el plan? (i) ¿Se ha elaborado el plan para monitorear los impactos de desplazamiento? (j) ¿Se ha establecido el mecanismo de resolución de quejas?	(a) N (b) - (c) - (d) - (e) - (f) - (g) - (h) - (i) - (j) -	(a) El Proyecto no contempla realizar el desplazamiento involuntario de la población. Por lo tanto, no es necesario prestar consideraciones especiales al respecto. Sin embargo, se necesita la adquisición del terreno. (b) No hay desplazamiento de la población. Además, dado que el terreno se ofrece voluntariamente de forma gratuita, no se realiza ninguna indemnización o compensación. (c) Idem. Debido a que no hay producción de cultivos agrícolas, etc. en el terreno que se ofrece, no se produce pérdidas económicas. (d) Idem (e) Idem (f) Idem (g) Se acuerda proporcionar voluntariamente de forma gratuita entre el propietario y el Gobierno Autónomo Departamental de Santa Cruz. (h) Debido a que se proporciona de forma gratuita, no se toman medidas presupuestarias. Además, no hay problema para el terreno porque no se usa actualmente. (i) Idem (j) En CAP se hizo una propuesta al Gobierno Autónomo Departamental de Santa Cruz, y éste la aceptó.

Lista de comprobación ambiental: 7 Camino (6)

Clasificación	Variables ambientales	Principales aspectos de comprobación	Si: S No: N	Consideraciones sociales y ambientales concretas (Razones de Si/No, justificación, medidas de mitigación, etc.)
4. Entorno social		(a) En el caso de que la carretera haya sido rehabilitada, ¿existe la posibilidad de que el Proyecto afecte a los medios de transporte y los trabajadores asociados? ¿Es posible que el Proyecto produzca grandes cambios en el uso de las tierras o medios de subsistencia de la población, desempleo, etc.? ¿El plan incluye las medidas de mitigación de estos impactos? (b) ¿Existe la posibilidad de que el Proyecto provoque impactos negativos a otra población? ¿Se tomarán las medidas adecuadas para mitigar estos impactos? (c) ¿Existe la posibilidad de que las enfermedades, incluidas las enfermedades infecciosas, como el VIH sean traídos por la inmigración de los trabajadores relacionados con el Proyecto? ¿Se tomarán las medidas adecuadas de salud pública que sean necesarias? (d) ¿Existe la posibilidad de que el Proyecto afecte negativamente el tráfico local (por ejemplo, agravamiento de la congestión y accidentes de tráfico)? (e) ¿Existe la posibilidad de que el camino estorbe el desplazamiento de los habitantes? (f) ¿Existe la posibilidad de que las estructuras viales (puentes, etc.) produzcan interferencias de la radiación solar y de las ondas eléctricas?	(a) N (b) N (c) S (d) S (e) N (f) N	(a) El presente Proyecto consiste en la pavimentación del camino existente, por lo que no provocará impactos negativos a los medios de transporte existentes. (b) El presente Proyecto no provocará impactos negativos a la vida comunitaria y a la economía familiar de la población. (c) Existe la posibilidad de que las enfermedades (VIH/SIDA, etc.) sean transmitidas por la inmigración de la población al avanzar el desarrollo de la zona mediante la ejecución del presente Proyecto. (d) La congestión del tráfico se reducirá mediante la ejecución del presente Proyecto, pero es posible que aumente el número de accidentes de tráfico al aumentar la velocidad de los vehículos. (e) El presente Proyecto consiste en la pavimentación del camino existente, por lo que no estorbará el desplazamiento de los habitantes. (f) Las viviendas están construidas casi a la misma altura del suelo actual, y el terraplén tendrá una altura no más de un metro, por lo que no producirán interferencias de la radiación solar o de las ondas eléctricas.
	(2) Vida y sustento			
	(3) Patrimonio cultural	(a) ¿Existe la posibilidad de que el Proyecto produzca daños al patrimonio arqueológico, histórico, cultural y religiosa local? ¿Se tomarán las medidas adecuadas para proteger estos sitios conforme con las leyes del país receptor?	(a) N	(a) No existe dentro del Área del Proyecto patrimonio arqueológico, históricos, culturales ni religiosos.
	(4) Paisaje	(a) ¿Existe la posibilidad de que el Proyecto afecte negativamente el paisaje local? ¿Se tomarán las medidas necesarias?	(a) N	(a) No se contemplan impactos negativos graves del Proyecto.
	(5) Grupos minoritarios y étnicos	(a) ¿Se toman las consideraciones necesarias para reducir los impactos sobre la cultura y el estilo de vida de las minorías étnicas y los pueblos indígenas? (b) ¿Se respetan todos los derechos de las minorías étnicas y de los pueblos indígenas en relación con la tierra y los recursos?	(a) - (b) -	(a) No habitan grupos minoritarios o étnicos alrededor del camino a ser rehabilitado por el Proyecto. Por lo tanto, no es necesario prestar consideraciones especiales al respecto. (b) Ídem

Lista de comprobación ambiental: 7 Camino (7)

Clasificación	Variables ambientales	Principales aspectos de comprobación	Si: S No: N	Consideraciones sociales y ambientales concretas (Razones de Si/No, justificación, medidas de mitigación, etc.)
4. Entorno social	(6) Entorno laboral	(a) ¿El Proyecto obedece las leyes y ordenanzas relacionadas con las condiciones laborales del país receptor? (b) ¿Serán tomadas las medidas estructurales de seguridad de las personas involucradas en el Proyecto, tales como la instalación de equipos de seguridad para prevenir los accidentes de trabajo, el manejo de materiales peligrosos, etc.? (c) ¿Serán tomadas las medidas no estructurales de seguridad de las personas involucradas en el Proyecto, tales como la planificación y ejecución de un programa de seguridad y salud, capacitación en el tema de la seguridad (incluyendo la seguridad del tráfico y la salud pública) para los trabajadores, etc.? (d) ¿Serán tomadas las medidas adecuadas para garantizar que los guardias de seguridad del Proyecto no violan la seguridad de otros individuos involucrados, o los residentes locales?	(a) S (b) S (c) S (d) S	Las obras han sido diseñadas cumpliendo las leyes y ordenanzas relacionadas con las condiciones laborales de Bolivia. Se tomarán las medidas estructurales de seguridad para prevenir la ocurrencia de accidentes conforme el plan de seguridad de las obras. Asimismo, se tomarán las medidas no estructurales elaborando adecuadamente el plan de ejecución de obras y reglamentando capacitar y educar adecuadamente a los trabajadores y otro personal relevante para mantener la seguridad conforme el plan de seguridad de obras. El Proyecto contempla realizar la supervisión y dirección en este tema. Se propone instalar los equipos de seguridad para evitar accidentes y capacitar debidamente en materia de seguridad a los operadores, personal de obras, vigilantes y bandereros. Asimismo, se contempla elaborar los planes de sanidad laboral y de ejecución de obras para mantener la seguridad y sanidad laboral.

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Lista de comprobación ambiental: 7 Camino (8)

Clasificación	Variables ambientales	Principales aspectos de comprobación	Si: S No: N	Consideraciones sociales y ambientales concretas (Razones de Si/No, justificación, medidas de mitigación, etc.)
		(a) ¿Se tomarán las medidas adecuadas para reducir el impacto durante la construcción (por ejemplo, ruidos, vibraciones, agua turbia, polvo, gases de escape, y desechos)? (b) ¿Existe la posibilidad de que las obras de construcción afecten negativamente el medio ambiente natural (ecosistemas)? ¿Se tomarán las medidas adecuadas para reducir tales impactos? (c) ¿Existe la posibilidad de que las obras de construcción afecten negativamente el medio ambiente social? ¿Se tomarán las medidas adecuadas para reducir tales impactos?	(a) S (b) S (c) S	(a) Se contempla tomar las siguientes medidas para mitigar los impactos durante la ejecución de obras. Para los ruidos y vibraciones: i) ejecutar la pavimentación de hormigón al camino de tierra actual con el fin de mitigar la congestión; ii) reducir al mínimo las juntas de construcción de la capa superficial del camino; iii) utilizar las maquinarias pesadas de bajo nivel de emisión de ruidos; iv) utilizar las maquinarias pesadas y vehículos pesados apropiados y realizar periódicamente su mantenimiento preventivo; v) ejecutar las obras solo de día en la cercanía de los hospitales, escuelas, etc.; vi) ejecutar periódicamente el monitoreo de ruidos y vibraciones en la zona de la carretera; vii) obtener el permiso necesario de la policía y comunicar a la población local en el caso de ejecutar las obras en las horas nocturnas; viii) recomendar a las autoridades relevantes intensificar el control de circulación de los vehículos mal mantenidos. En cuanto a la turbiedad de agua se tomarán las siguientes medidas: i) utilizar las maquinarias pesadas y vehículos pesados apropiados y realizar periódicamente su mantenimiento preventivo; ii) no descargar el agua residual de las obras directamente al río; iii) utilizar las cercas de aceite, red de prevención de contaminación, etc. durante la construcción del puente; iv) no lavar las maquinarias de construcción, etc. en el río. Para el control de emisión de polvos y gases, se tomarán las siguientes medidas: i) utilizar las maquinarias pesadas y vehículos pesados apropiados y realizar periódicamente su mantenimiento preventivo, y no dejar prendido el motor cuando no sea necesario; ii) prevenir la dispersión de polvos regando periódicamente durante la época seca; iii) en el caso de depositar periódicamente el material de relleno o excavado, cubrirlo con funda, etc. para prevenir su dispersión; v) ejecutar periódicamente el monitoreo de calidad de aire en la zona de la carretera; y v) utilizar la gasolina sin plomo. Para los residuos sólidos se tomarán las siguientes medidas: i) procurar reciclar los residuos de construcción; ii) disponer adecuadamente los residuos no reciclables en los sitios registrados.
5 Otros	(1) Impacto durante la ejecución de obras			

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Lista de comprobación ambiental: 7 Camino (9)

Variables ambientales	Principales aspectos de comprobación	Si: S No: N	Consideraciones sociales y ambientales concretas (Razones de Si/No, justificación, medidas de mitigación, etc.)
			(b) Se tomarán las siguientes medidas de mitigación del impacto al medio ambiente: i) No cortar los árboles que no afecten directamente a la carretera o a sus obras de arte dentro de ROW; ii) ejecutar el monitoreo de los ecosistemas del Río Pailón. (c) Se tomarán las siguientes medidas de mitigación del impacto negativo: i) proporcionar oportunidades de trabajo en las obras del Proyecto prioritariamente a la población menos favorecida; ii) permitir a los vendedores ambulantes circular dentro de ROW, si no afecta a la ejecución de obras; iii) procurar mantener la fluidez del tráfico y evitar accidentes contratando los bandereros; iv) instalar el paradero temporal de autobuses; y v) asegurar los medios de desplazamiento de la población local.
(2) Monitoreo	(a) ¿El Proyecto elaborará e implementará el programa de monitoreo ambiental para los elementos con potencial impacto? (b) ¿Cuáles son las variables, métodos y frecuencias del programa de monitoreo? (c) ¿El Proyecto tiene establecido un adecuado marco de monitoreo (organización, personal, equipo y presupuesto suficiente para mantener el marco de monitoreo)? (d) ¿Existen requisitos regulatorios relativos al sistema de informe de monitoreo, tales como el formato y la frecuencia de presentación de los informes por las autoridades reguladoras?	(a) S (b) S (c) S (d) S	(a) Se ha elaborado el plan de monitoreo dentro del informe de EIA. (b) Se indican los métodos y la frecuencia del monitoreo para cada variable de los posibles impactos ambientales. (c) El Gobierno Departamental de Santa Cruz cuenta con la dirección encargada de la gestión ambiental, debidamente organizada con el personal y equipos necesarios. Asimismo, se contempla tramitar el financiamiento necesario en el plan presupuestario del próximo año fiscal. (d) Se contempla incluir en el informe de EIA.
Referencia de otras listas de comprobación ambiental	(a) En caso necesario y pertinente se debe revisar también los elementos incluidos en lista de revisión de los proyectos forestales (por ejemplo, proyectos que incluyen grandes áreas de deforestación). (b) En caso de ser necesario y pertinente se debe revisar también los elementos incluidos en la lista de revisión de los proyectos de las instalaciones de transmisión, transformación y de distribución eléctrica (por ejemplo, proyectos que incluyen la instalación de las líneas de transmisión eléctrica y/o distribución eléctrica).	(a) N (b) N	(a) No se contempla cortar gran cantidad de árboles para la ejecución del presente Proyecto. (b) El Proyecto no incluye la construcción del sistema de transmisión, transformación y distribución eléctrica.
Notas sobre el uso de la lista de comprobación ambiental	(a) En caso de ser necesario, deberán analizar los impactos transfronterizos o problemas globales. (Por ejemplo, los proyectos que incluyen los factores que puedan causar problemas, como tratamiento de residuos transfronterizos, lluvia ácida, destrucción de la capa de ozono o el calentamiento global).	(a) S	(a) Entre los posibles impactos transfronterizos se mencionan el impacto al calentamiento global (debido al aumento de las emisiones de CO2). Si bien es cierto que mediante la implementación del presente Proyecto, aumentarán las emisiones de CO2, su nivel se reducirá ligeramente o se mantendrá igual en comparación con la Opción Cero.

Nota 1) En cuanto a las "normas del país receptor" que aparecen en la Tabla, si éstas son muy diferentes a las normas internacionalmente reconocidas, se tomarán las medidas que se consideren necesarias. Para las variables no reguladas actualmente en el país receptor, se buscarán las normas aplicables de otros países (incluyendo las experiencias japonesas) mediante el análisis comparativo.

Nota 2) Esta lista de comprobación solo incluyen las variables más representativas, y algunas de las variables serán eliminadas o agregadas de acuerdo con las características del Proyecto y de la zona.

Anexo.9 Plan de Manejo Ambiental/Plan de Monitoreo Ambiental

Elementos ambientales	Dato	Lugar	Frecuencia Arriba: Antes de la construcción Centro: Durante la construcción Abajo: Etapa de servicio	Entidad ejecutora Arriba: Antes de la construcción Centro: Durante la construcción Abajo: Etapa de servicio
(Antes de la construcción) (Durante la construcción) (Etapa de servicio)				
Calidad de aire (incluyendo mal olor)	PM 2.5, PM10, CO2, NOx, Sox2, polvo, malos olores, dirección de viento, velocidad de viento	Punto de partida (Okinawa 1), punto intermedio (entre Okinawa 1 y 2), punto final (Okinawa 2)	Una vez (antes de la EIA), una vez/ 1.5 a 2 meses una vez/6 meses	SOPOT SOPOT SOPOT
Ruidos	Nivel de ruido	Zona residencial (Okinawa 1 y 2), zonas agrarias (entre Okinawa 1 y 2)	Una vez (antes de la EIA) una vez/ 1.5 a 2 meses una vez/6 meses	SOPOT SOPOT SOPOT
Vibraciones	Aceleración	Zona residencial (Okinawa 1 y 2), zonas agrarias (entre Okinawa 1 y 2)	Una vez (antes de la EIA) una vez/ 1.5 a 2 meses una vez/6 meses	SOPOT SOPOT SOPOT
Calidad de agua,	pH, SS, DQO, OD, aceites, conductividad, turbidez, olores, color	Pozos de agua y Rio Pailón (2 lugares, alrededores de la carretera)	Una vez (antes de la EIA), una vez/6 meses una vez/6 meses	SOPOT SOPOT SOPOT
Residuos sólidos	Inspección visual (se tomarán y se archivarán las fotografías tomadas)	Sitio de disposición de residuos designado	Una vez (antes de la EIA), una vez/6 meses una vez/6 meses	SOPOT SOPOT SOPOT
Accidentes	Accidentes de la Policía	A lo largo de la carretera	Una vez (antes de la EIA), una vez/6 meses una vez/6 meses	SOPOT/Municipio de Okinawa SOPOT/Municipio de Okinawa SOPOT/Municipio de Okinawa

Anexo10 Formulario de Monitoreo Socio-Ambiental
Formulario de monitoreo ambiental para Construcción/Etapa de Operación

		Presentación del Informe de Monitoreo
1	2021(Segunda Mitad)	YYYY/MM/DD
2	2022(Primera Mitad)	YYYY/MM/DD
3	2022(Segunda Mitad)	YYYY/MM/DD
4	2023(Primera Mitad)	YYYY/MM/DD

Queja

	Quejas recibidas	Quejas resueltas	Tipo de quejas
1	YYYY/MM/DD	YYYY/MM/DD	
2	YYYY/MM/DD	YYYY/MM/DD	
3	YYYY/MM/DD	YYYY/MM/DD	
	YYYY/MM/DD	YYYY/MM/DD	
	YYYY/MM/DD	YYYY/MM/DD	
	YYYY/MM/DD	YYYY/MM/DD	
	YYYY/MM/DD	YYYY/MM/DD	
	YYYY/MM/DD	YYYY/MM/DD	
	YYYY/MM/DD	YYYY/MM/DD	

Sida y otras enfermedades de transmisión sexual <Campana>

	Fecha	Lugar	Número de medidas distribuidas Measures Distributed		Número de Participantes		
			Anticonceptivos	Condón	Masculino	Femenino	Total
1	YYYY/MM/DD						
2	YYYY/MM/DD						
3	YYYY/MM/DD						
	YYYY/MM/DD						
	YYYY/MM/DD						
	YYYY/MM/DD						
	YYYY/MM/DD						
	YYYY/MM/DD						

Situación sanitaria(basura a lo largo del camino>

<Monitoring Frequency>Monthly

	Fecha	Situación Observada	Medidas tomadas
1	YYYY/MM/DD		
2	YYYY/MM/DD		
3	YYYY/MM/DD		
	YYYY/MM/DD		
	YYYY/MM/DD		
	YYYY/MM/DD		
	YYYY/MM/DD		
	YYYY/MM/DD		

Situación de drenaje

<Frecuencia de monitoreo>Cada dos (2) semanas

	Fecha	Situación Observada	Medidas tomadas
1	YYYY/MM/DD		
2	YYYY/MM/DD		
3	YYYY/MM/DD		
	YYYY/MM/DD		
	YYYY/MM/DD		
	YYYY/MM/DD		
	YYYY/MM/DD		
	YYYY/MM/DD		

environmental monitoring form for Construction/Operation Stage

Calidad de, Calidad de agua, Ruidos y Vibración

Item	Parámetro	Ubicación	Resultado	Estándar	Notas
Calidad de aire	PM10 (promedio 24h)	[A]		150µg/m3(Ley 1333) 50µg/m3(OMS)	
		[B]			
		[C]			
	TSP (promedio 24h)	[A]		260µg/m3(Ley 1333) (promedio 24h)	
		[B]			
		[C]			
	NO2 (promedio 24h)	[A]		400µg/m3(Ley 1333) (promedio 8h) 40µg/m3(OMS) (promedio 24h)	
		[B]			
		[C]			
	SO2 (promedio 24h)	[A]		400µg/m3(Ley 1333) (promedio 24h) 20µg/m3(OMS) (promedio 24h)	
		[B]			
		[C]			
	CO (promedio 8h)	[A]		1,000mg/m3(OMS)	
		[B]			
		[C]			
Ruidos	Nivel de ruidos (De día: 06:01-22:00)	[A]		65dB	
		[B]		65dB	
		[C]		65dB	
Vibración	Nivel de vibración (De día: 06:01-22:00)	[A]		4.0m/s ²	
		[B]		4.0m/s ²	
		[C]		4.0m/s ²	
Calidad de agua	pH	[A]		6.5-9.0(Nacional)	
		[B]		6.5-8.5(OMS)	
	Temperatura	[A]		-	
		[B]		-	
	SS	[A]		30mg/L(OMS)	
		[B]		30mg/L(OMS)	
	COD	[A]		30-50mg/L(OMS)	
		[B]		30-50mg/L(OMS)	
	DO	[A]		<5.0mg/L(OMS)	
		[B]		<5.0mg/L(OMS)	
	Conductividad eléctrica	[A]		-	
		[B]		-	
	Lubricante&Grasa	[A]		0.1mg/L(OMS)	
		[B]		0.1mg/L(OMS)	

OMS:Organización Mundial de Salud

**Notas:Tendencia pasada y estatus actual incluyendo medidas remediales si es necesario

<Frecuencia de monitoreo>Cada seis(6)months

Formulario de monitoreo ambiental para Construcción/Etapa de Operación

Coordenadas de cada punto de estudio

punto de estudio	Norte:N	Coordenadas		
	Oeste:O	Calidad de aire	Calidad de agua	Ruidos& Vibración
[A]	N			
	Oeste:O			
[B]	N			
	O			
[C]	N			
	O			
[D]	N			
	O			

Ecosistema< Observación Visual de animales>

		Ubicación Fecha de estudio	Criaturas encontrada	Amenaza a Ecosistema(si hay)	Causa Fundamental	Medida tomada
1	2021 (Segunda Mitad)	YYYY/MM/DD				
		YYYY/MM/DD				
2	2022 (Primera Mitad)	YYYY/MM/DD				
		YYYY/MM/DD				
3	2022 (Segunda Mitad)	YYYY/MM/DD				
		YYYY/MM/DD				
4	2023 (Primera Mitad)	YYYY/MM/DD				
		YYYY/MM/DD				



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**Minuta de Discusiones
sobre el Estudio Preparatorio para
El Proyecto de Pavimentación de la Carretera Okinawa I,II,III
en el Estado Plurinacional de Bolivia**

En respuesta a la solicitud presentada por el Gobierno del Estado Plurinacional de Bolivia (en adelante se denominará "Bolivia"), la Agencia de Cooperación Internacional del Japón (en adelante se denominará "JICA"), envió a Bolivia una Misión de Estudio Preparatorio (en adelante se denominará "la Misión"), encabezada por el Jefe Adjunto del Departamento de Infraestructuras Económicas, Dr. Nobuyuki Tsuneoka, desde el 6 de agosto hasta el 1 de septiembre de 2014, para discutir sobre el Proyecto de Pavimentación de la Carretera Okinawa I,II,III (en adelante se denominará "el Proyecto").

JICA y La Secretaría de Obras Públicas y Ordenamiento Territorial del Gobierno Autónomo del Departamento de Santa Cruz (en adelante se denominará "SOPOT"), primeramente, acordaron la ejecución de un estudio preparatorio (en adelante se denominará "el Estudio") del Proyecto.

La Misión mantuvo conversaciones con distintas autoridades del Gobierno de Bolivia (la Gobernación de Santa Cruz) y ejecutó un estudio de campo en el área objeto. Como consecuencias de dichas conversaciones y estudio de campo, JICA y SOPOT confirmaron los principales ítems descritos en el Documento Adjunto. La Misión continuará su estudio y preparará un Informe de Estudio Preparatorio.

Santa Cruz, 15 de agosto de 2014



Lic. Mika YAMAMOTO
Directora Representante Residente
Oficina de JICA en Bolivia



Ing. Rubén Costas Aguilera
Gobernador
Departamento de Santa Cruz



Dr. Nobuyuki Tsuneoka
Jefe de la Misión de Estudio Preparatorio
JICA

DOCUMENTO ADJUNTO

1. Título del Proyecto

Ambas partes confirmaron que el título del Proyecto será "El Proyecto de Pavimentación de la Carretera Okinawa I, II, III".

2. Objetivo del Proyecto

Ambas partes confirmaron que el Proyecto tiene por objeto pavimentar y mejorar "la Carretera Okinawa I, II, III" para asegurar el transporte, bueno y seguro a lo largo del año en el área de Okinawa.

3. Sitio del Proyecto

El sitio del Proyecto se demuestra en el Anexo-1.

4. Objetivo del Estudio

Ambas partes confirmaron que los objetivos del Estudio son los siguientes :

- 4-1. para entender los antecedentes y objetivos del Proyecto, examinar sus impactos y lo apropiado.
- 4-2. para identificar los componentes del proyecto y elaborar el diseño preliminar y la estimación del costo del Proyecto, con base a datos e informaciones recopilados y resultados de conversaciones con la parte boliviana.
- 4-3. para estudiar asuntos de consideraciones socio-ambientales a través del Estudio.

5. Entidad responsable y ejecutora.

Ambas partes confirmaron lo siguiente.

- 5-1. La entidad responsable y ejecutora es la Secretaría de Obras Públicas y Ordenamiento Territorial, del Gobierno Autónomo Departamental de Santa Cruz.
- 5-2. El organigrama de la Secretaría arriba mencionada se demuestra en el Anexo-2.

6. Contenido del Proyecto solicitado por la parte boliviana.

Ambas partes confirmaron que el contenido del Proyecto incluirá lo siguiente :

- Pavimentación de la Carretera existente de dos carriles
- Reconstrucción de un puente que tenga dos carriles
- Sistema de drenaje.

7. Esquema de la Cooperación Financiera No Reembolsable del Japón

- 7-1. La parte boliviana comprendió el Esquema de la Cooperación Financiera No Reembolsable del Japón explicado por la Misión, como se describe en los Anexos 3 y 4.
- 7-2. Bolivia tomará medidas necesarias descritas en el Anexo-5, con el fin de facilitar la

buena ejecución del Proyecto, como una condición para la Cooperación Financiera No Reembolsable del Japón a ser ejecutada, de acuerdo con el Acuerdo existente entre el Gobierno del Japón y el Gobierno de Bolivia.

8. Consideraciones socio-ambientales

- 8-1. La Misión explicó que el Proyecto está categorizado como "Categoría B" de acuerdo con la Directriz de JICA porque el Proyecto contiene la pavimentación y mejoramiento de la carretera existente y un probable impacto sobre el medio ambiente.
- 8-2. La parte boliviana comprendió que el Proyecto necesita seguir los "Lineamientos para las consideraciones Ambientales y Sociales de la JICA" (abril 2010). Por lo tanto, la licencia ambiental efectiva para el proyecto de acuerdo a la Ley 1333, será obtenida por la parte Boliviana hasta el último día de marzo de 2015.
- 8-3. En caso de haber Personas Afectadas por el Proyecto (PsAP) dentro del área del Proyecto, la parte boliviana acordó de asegurar el presupuesto apropiado a ser asignado para el traslado o reubicación y/o compensación, y asegurar el terreno antes de la ejecución del Proyecto. Con respecto a esto, previamente un Plan de Acción de Reubicación (PAR) se preparará y será aprobado por las autoridades responsables, y la parte boliviana tomará medidas necesarias para PsAP de acuerdo el PAR en estrecha comunicación con JICA.

9. Cronograma del Estudio

Ambas partes confirmaron el cronograma del Estudio como se menciona abajo. El cronograma estará sujeto a cambio durante la preparación y el curso del Estudio.

- 9-1. La Misión continuará su estudio en Bolivia hasta el 1 de septiembre de 2014.
- 9-2. JICA enviará la Misión a Bolivia como un Segundo Estudio en la época de lluvias alrededor del próximo diciembre del presente año.
- 9-3. JICA preparará el Borrador del Informe Final y enviará una Misión a Bolivia para explicar los detalles del Proyecto incluyendo los componentes finales y costo estimado alrededor del próximo marzo de 2015.
- 9-4. JICA terminará el Informe Final y lo enviará a la parte boliviana alrededor del abril de 2015.

10. Otros ítems relevantes

- 10-1. La parte boliviana comprendió el principio de la Carta de la Asistencia Oficial del Japón para el Desarrollo (AOD), el cual enfatiza que la AOD no debe ser utilizada para propósitos militares o promover conflictos internacionales, y acordó asegurar que el equipo a ser provisto a través del Proyecto jamás será usado para propósitos militares.
- 10-2. La parte Boliviana confirmó asumir los ítems abajo mencionados a su propio costo si se acepta la ejecución del Proyecto por parte del Gobierno del Japón.

(1) Asegurar sitios para patio de almacenaje de materiales, patio de construcción

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temporal y de residuos para el Proyecto.

- (2) Traslado de instalaciones existentes dentro del sitio del Proyecto al área designada.
- (3) Gestionar la emisión de licencias, permisos y otros procedimientos necesarios
- 10-3. La parte boliviana asegurará un presupuesto y personal suficientes para la operación y mantenimiento de las instalaciones instaladas por el Proyecto, incluyendo obras de mantenimiento periódico después del término del Proyecto.
- 10-4. La parte boliviana, a su propia costo, proveerá a la Misión los siguientes ítems en cooperación con otras organizaciones concernientes:
 - (1) información relacionada con la seguridad como medidas para asegurar la seguridad de la Misión del estudio preparatorio;
 - (2) información además de ayudas para obtener servicio médico ;
 - (3) datos e información relacionados con el Estudio Preparatorio;
 - (4) personal de contraparte;
 - (5) espacio como oficina adecuada con equipos necesarios y servicios;
 - (6) tarjetas de identidad o credencial;
 - (7) permiso de entrada necesario para los miembros de la Misión de estudio para realizar estudio de campo; y
 - (8) ayuda para obtener otros privilegios y beneficios si son necesarios.
- 10-5. La parte boliviana acordó gestionar la exención de tasas para el equipamiento y materiales del Proyecto si la ejecución del Proyecto se aprueba por el Gobierno del Japón.
 - (1) La parte boliviana acordó que derechos de aduana, tasas internas y otros cargos fiscales, que se impongan en el Estado Plurinacional de Bolivia, serán eximidos bajo el acuerdo mutuo establecidos en las Notas Revérsales (N/R).
 - (2) Si cualquier gasto arriba mencionado es causado por alguna razón tal como la demora de ejecución de exención de tasa, la parte boliviana lo cubrirá.

11. Mala conducta

Si JICA recibe alguna información concerniente a corrupción o fraude sospechoso, el Gobierno del Estado Plurinacional de Bolivia tomará medidas necesarias de acuerdo con la Directriz de Adquisición en la competencia para, o en ejecución de, el contrato elaborado para la Cooperación Financiera No Reembolsable:

- 11-1. Proveer a JICA la información que JICA podría solicitar, incluyendo la concernientes a cualquier oficial del gobierno y/o de organizaciones públicas del Estado Plurinacional de Bolivia;
- 11-2. No tratar injustamente o desfavorablemente a las personas que provean dicha Información.

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Anexo-1. Sitio del Proyecto

Anexo-2 Organigrama de la Secretaría de Obras Públicas y Ordenamiento territorial del Gobierno
Autónomo Departamental de Santa Cruz

Anexo-3 Esquema de la Cooperación Financiera No Reembolsable del Japón

Anexo-4 Flujograma de los procedimientos de la Cooperación Financiera No Reembolsable del
Japón

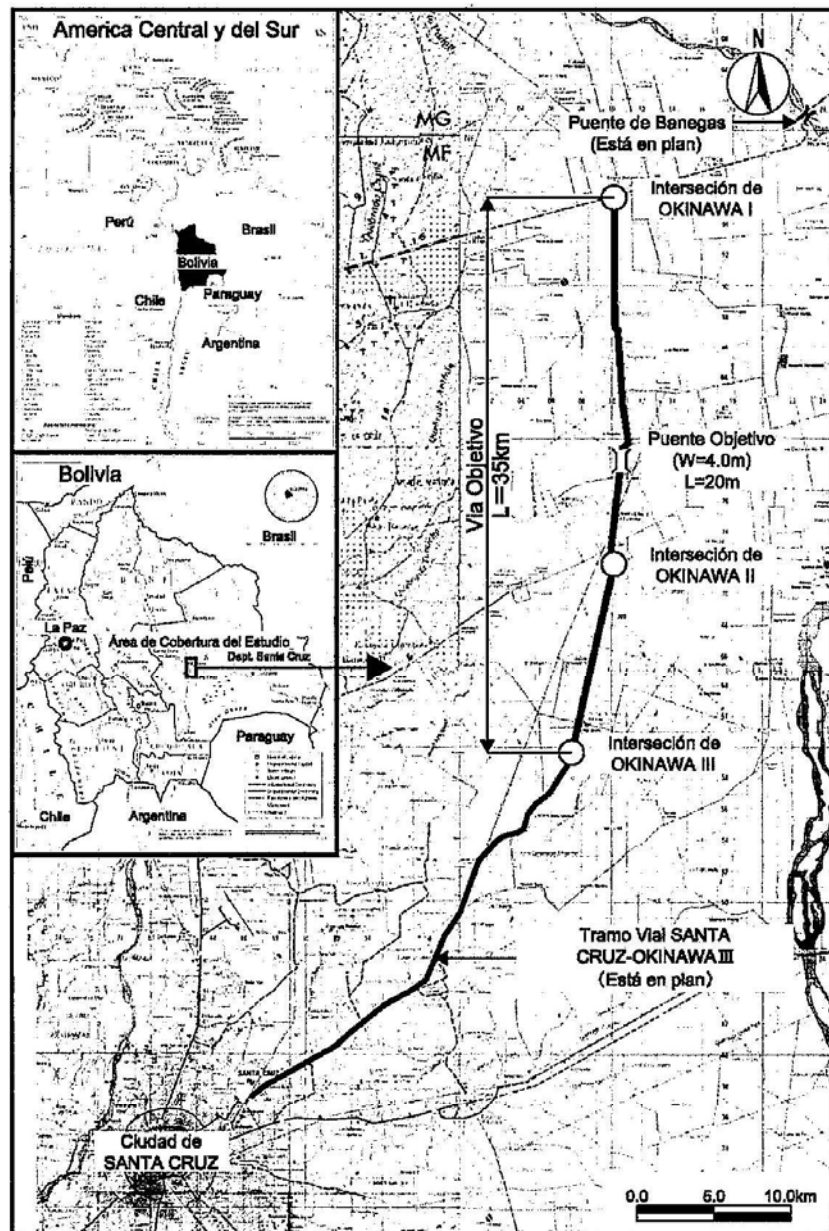
Anexo-5 Responsabilidades a ser asumidas por cada Gobierno

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Anexo-1. Sitio del Proyecto



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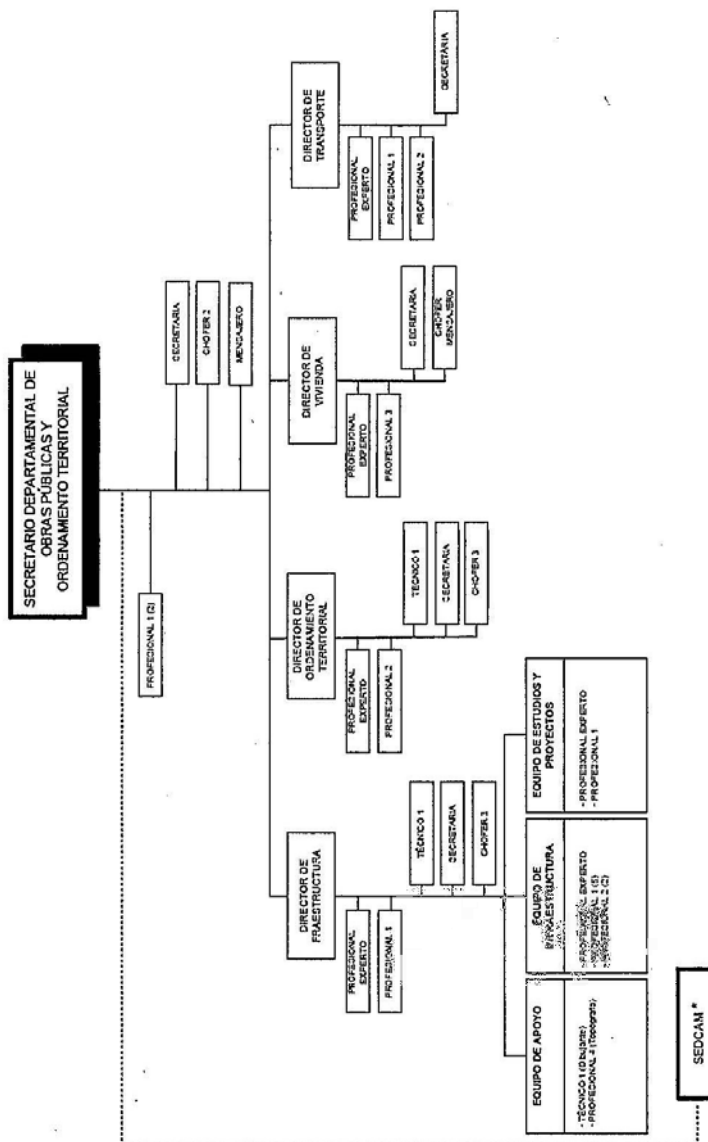
Anexo-2 Organigrama de la Secretaría de Obras Publicas y Ordenamiento Territorial del Gobierno Autónomo Departamental de Santa Cruz



**Gobierno
Autónomo
Departamental
Santa Cruz**

ORGANIGRAMA GENERAL

SECRETARÍA DEPARTAMENTAL DE OBRAS PÚBLICAS Y ORDENAMIENTO TERRITORIAL



* DELAGREGADO EN LA HOYA 22

Escuela de Organización y Métodos
Oficina de Planificación y Políticas
Secretaría de Coordinación Institucional

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Anexo 3: Esquema de la Cooperación Financiera no Reembolsable del Japón

Esquema de la Cooperación Financiera No Reembolsable del Japón

El Gobierno del Japón (en adelante se denominará "GdJ") realiza la reforma organizacional para mejorar la calidad de operaciones de la Asistencia Oficial para el Desarrollo (AOD). Como una parte de este reajuste una nueva ley de JICA entró en vigencia el 1 de octubre de 2008. Sobre la base de la ley y la decisión de GdJ, JICA llegó a ser la agencia ejecutora de los proyectos de la Cooperación Financiera No Reembolsable.

La Cooperación Financiera No Reembolsable es el fondo no reembolsable a un país receptor para adquirir instalaciones, equipos y servicios (servicios de ingeniería, transporte de los productos y etc.) con el fin de contribuir al desarrollo económico y social del país bajo los principios de las leyes y reglamentos relacionados del Japón. La Cooperación Financiera No Reembolsable no se realiza a través de la donación de materiales y etc.

1. Procedimientos de la Cooperación Financiera No Reembolsable

Se realiza la Cooperación Financiera No Reembolsable del Japón como siguiente:

- Estudio (Estudio Preparativo (en adelante se denominará "el Estudio")
JICA ejecuta el Estudio.
- Evaluación ya probación
Evaluación por el GdJ y aprobación por su Gabinete del Japón
- Decisión de ejecución
Notas canjeadas entre el GdJ y un país receptor
- Acuerdo de Donación (en adelante se denominará "el A/D")
Acuerdo establecido entre JICA y el país receptor
- Ejecución
Realización del Proyecto en la base del A/D

2. Significación del Estudio

(1) Contenido del Estudio

El propósito del Estudio es proveer de un documento básico necesario para la aprobación del Proyecto por JICA y por el GdJ. Los contenidos del Estudio son como siguientes:

- Confirmación de los antecedentes, objetivos, y beneficios del Proyecto y capacidad institucional de las agencias concernientes del país receptor necesarias para la implementación del Proyecto.
- Evaluación de la factibilidad del Proyecto que se implementa bajo el Esquema de la Cooperación Financiera No Reembolsable desde los puntos de vista técnicos, financieros, sociales y medio-ambientales.
- Confirmación de los ítems acordados por ambas partes acerca del concepto básico del Proyecto.
- Preparación de un diseño básico del Proyecto.
- Estimación de los costos del Proyecto.

Por consiguiente, la totalidad de la solicitud no será automáticamente objeto de la cooperación, sino se confirmará el concepto básico del Proyecto conforme a la Directivas de la Cooperación Financiera

No Reembolsable de Japón.

JICA exigirá al Gobierno del país receptor tomar todas las medidas necesarias para promover su autonomía en la implementación del Proyecto. Estas deberán ser garantizadas aunque estén fuera de la jurisdicción de la entidad ejecutora del Proyecto en el país receptor. Por lo tanto, la ejecución del Proyecto será confirmada por todas las organizaciones relevantes en el país receptor mediante las Minutas de Reuniones.

(2) Selección de la compañía consultora

Al realizar el Estudio, JICA selecciona una de las compañías consultoras - entre aquellas registradas en JICA - mediante una licitación en la que presentan sus propuestas.

(3) Los resultados del Estudio

JICA revisa el informe del Estudio. JICA recomienda al GdJ que apruebe la implementación del Proyecto.

3. Esquema de la Cooperación Financiera No Reembolsable

(1) El N/R y el A/D

Después de que el Gabinete del Japón aprueba el Proyecto el N/R será firmado entre el GdJ y el Gobierno Receptor, con el fin de asegurar la asistencia, la cual que sigue la suscripción del A/D entre JICA y el Gobierno del país receptor para definir artículos necesarios para la implementación del Proyecto, tales como condiciones de pago, responsabilidades del Gobierno del país receptor, y condiciones de adquisición.

(2) Selección de Consultores

JICA selecciona compañía(s) consultora(s) registradas para la implementación adecuada del Estudio. que se encargó el Estudio al país receptor para trabajar en la implementación del Proyecto después de las firmas del N/R y A/D con el fin de mantener la consistencia tecnológica.

(3) País de procedencia elegible

La Cooperación Financiera No Reembolsable será utilizada apropiadamente por el Gobierno del país receptor para la adquisición de los productos japoneses o del país receptor y los servicios de nacionales japoneses y nacionales del país receptor para la ejecución del Proyecto: No obstante lo arriba mencionado, la Cooperación Financiera No Reembolsable podrá ser utilizada, cuando los dos Gobiernos lo estimen necesario, para la adquisición de productos de terceros países (países que no sean ni Japón ni el país receptor) y los servicios como los de transporte ofrecidos por éstos. Sin embargo, considerando el esquema de la donación del Japón, los contratistas principales para la ejecución del Proyecto como consultores, constructores y proveedores deberán ser nacionales japoneses. (Los nacionales japoneses significan personas naturales o jurídicas dominadas por las personas naturales japonesas)

(4) Necesidad de Verificación

El Gobierno del país receptor o su autoridad designada, concertará contratos, en yenes japoneses, nacionales japoneses. A fin de ser aceptable, tales contratos deberán ser verificados por JICA. Esta verificación se debe a que el fondo de donación proviene de los impuestos generales de los nacionales japoneses.

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(5) Responsabilidad del Gobierno del país receptor

El Gobierno del país receptor tomará las medidas necesarias como se explica en el Anexo.

(6) Uso Adecuado

El país receptor deberá asegurar que las instalaciones construidas y los productos adquiridos bajo la Cooperación Financiera No Reembolsable sean debida y efectivamente mantenidos y utilizados para la ejecución del Proyecto, y asignar el personal necesario a tal fin. Deberá también sufragar todos otros gastos necesarios para la ejecución del Proyecto que no cubra la Donación.

(7) Exportación y Reexportación

Los productos adquiridos bajo la Donación no deberán ser exportados ni reexportados del país receptor.

(8) Arreglo Bancario

a) El gobierno de país receptor (o su autoridad designada) deberá abrir una cuenta bancaria a nombre del Gobierno del país receptor en un banco de cambio exterior en el Japón. JICA efectuará la Donación efectuando pagos, en yenes japoneses, para cubrir las obligaciones contraídas por el Gobierno del país receptor o la autoridad designada por él, bajo los Contratos Verificados.

b) Los pagos por parte del Japón se efectuarán, cuando el Banco presente las solicitudes de pago a JICA, en virtud de la autorización de pago (A/P) expedida por el Gobierno del país receptor o su autoridad designada.

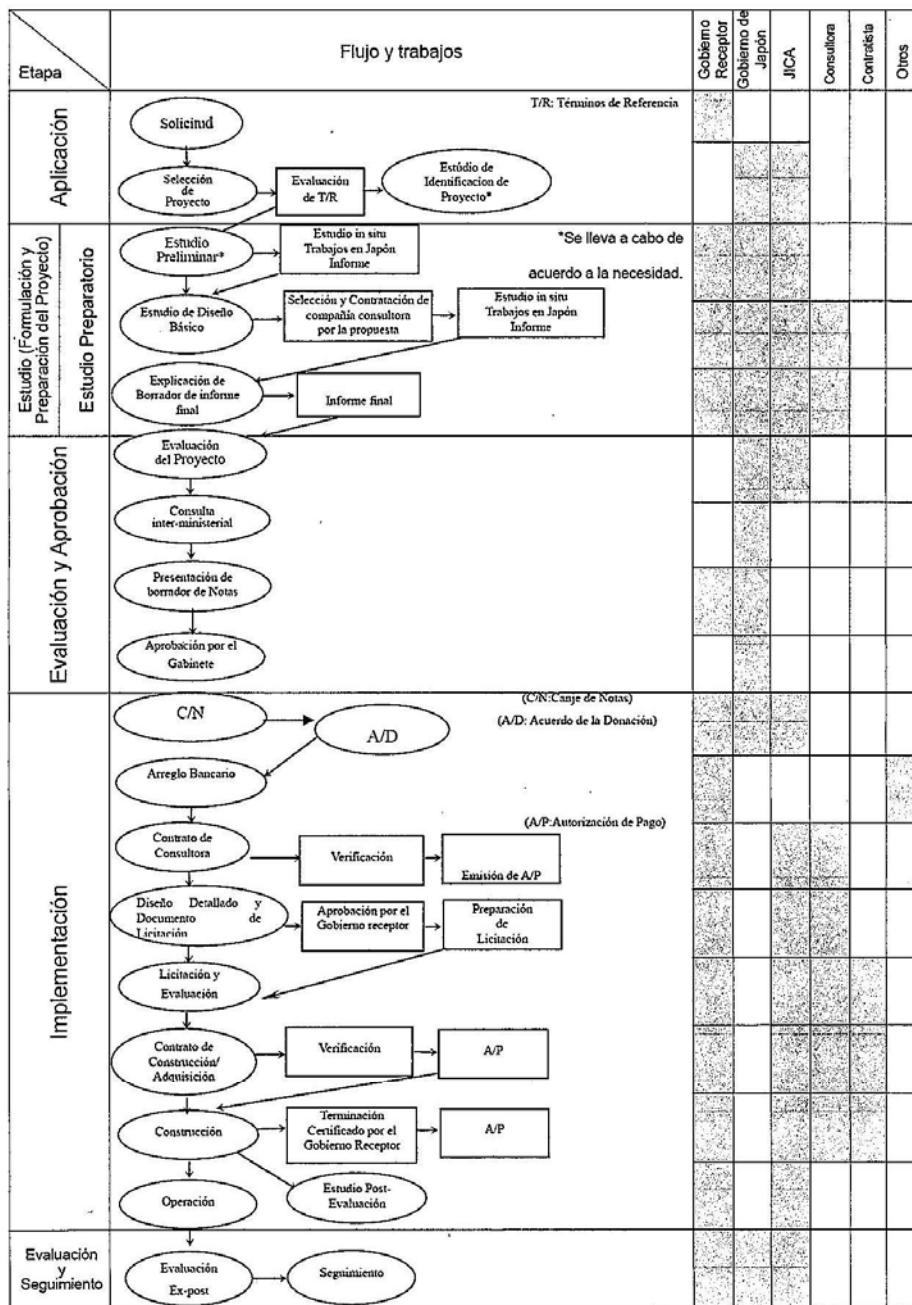
(9) Autorización de Pago (A/P)

El Gobierno del país receptor deberá cubrir la comisión de aviso de la autorización de pago y comisiones de pago al Banco.

(10) Consideraciones medioambientales y sociales

El país receptor deberá asegurar las consideraciones medioambientales y sociales para el proyecto y respetar regulaciones medioambientales del país receptor y las directrices socio-ambiental de JICA.

Anexo 4: Flujograma de los procedimientos de la Cooperación Financiera No Reembolsable del Japón



De

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Anexo 5: Principales acciones a ser tomadas por cada Gobierno

No.	Ítems	Cubierto por el Japón	Cubierto por el País Receptor
1	Asegurar los lotes de terreno necesarios para la implementación del Proyecto y la limpieza del sitio.		●
2	Asegurar la pronta descarga y despacho de aduanas de los productos en los puertos de desembarque del país receptor y ayudar en el transporte de los productos.		
	1) Transporte marítimo(aéreo) de los equipos y materiales del Proyecto del Japón al país receptor	●	
	2) Gestiones sobre el transporte interno rápido desde el punto de desembarque hasta el sitio del Proyecto	(●)	(●)
3	Garantizar que los derechos aduaneros, los impuestos internos y otros impuestos fiscales que pudieran ser gravados en el país receptor con respecto a la compra de productos y servicios serán exonerados.		●
4	Otorgar el permiso de entrada y permanencia en el país receptor a las personas naturales japonesas y/o a las personas naturales de terceros países cuyos servicios pudieran ser requeridos con relación al abastecimiento de productos y servicios tales como facilidades que pudieran ser necesarias para la ejecución del Proyecto.		●
5	Asegurar que las Facilidades del Proyecto sean mantenidas y utilizadas adecuada y efectivamente.		●
6	Sufragar todos los gastos necesarios para la ejecución del Proyecto excepto aquellos cubiertos por la Cooperación Financiera No Reembolsable del Japón		●
7	Con respecto al Proyecto, pagar las siguientes comisiones al banco del Japón por los servicios bancarios basados en el A/B.		
	1) Comisión por notificación de la A/P		●
	2) Comisión de Pago		●
8	Al ejecutar el Proyecto, realizar las adecuadas consideraciones al medio ambiente y la sociedad		●

(A/B : Arreglo Bancario, A/P : Autorización de Pago)

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5. Memorando Técnico

Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa I,II,III

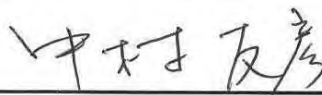
Memorando Técnico

La Misión de JICA mantuvo conversaciones técnicas con la Secretaría de Obras Públicas y Ordenamiento Territorial del Gobierno Autónomo Departamental de Santa Cruz (SOPOT) y confirmó los ítems descritos en el Documento Adjunto. Con respecto a cada uno de dichos ítems, se definirá después de hacer análisis y mantener conversaciones con la Cancillería del Japón y JICA.

Santa Cruz, 18 de mayo de 2016



Ing. Carlos Hugo SOSA A.
Secretario de Obras Públicas y
Ordenamiento Territorial del
Gobierno Autónomo Departamental
de Santa Cruz



Ing. Tomohiko NAKAMURA
Jefe de los consultores
Misión del Estudio Preparatorio de
JICA

Documento Adjunto

1. Ítems acordados en el presente Memorando Técnico

Los ítems acordados en el presente Memorando Técnico, dentro de los lineamientos del análisis de la estructura de pavimentación de las carreteras y las responsabilidades a asumirse por la parte boliviana: los trámites para conseguir Licencia Ambiental y el permiso de ABT para corte y desmonte de árboles.

Dentro del contenido del Memorando Técnico, firmado el día 29 de agosto de 2014, los ítems son vigentes salvo el contenido renovado en el presente Memorando Técnico.

2. Líneamientos para el análisis de la estructura de pavimentación de carretera

La estructura de carretera se compondrá de capa de hormigón que pueda resistir a la carga de tráfico diseñada, subbase y plataforma (o subrasante) a construirse. Sin embargo, se analizarán distintas opciones del espesor y se propondrá una opción económica. También, se analizará la pavimentación asfáltica y se propondrá una opción económica en comparación con la pavimentación de hormigón.

3. Responsabilidades a asumirse por la parte boliviana

- Obtención de la Licencia Ambiental y el permiso de tala y desmonte

Debido a que se ha definido la categoría "2" para la Carretera Okinawa1~Okinawa3, la parte boliviana elaborará un informe del EEIA y plan de tala y desmonte de árboles, y obtendrá la Licencia Ambiental antes del día 31 de mayo de 2017.

Documento Anexo : Memorando Técnico firmado el día 29 de agosto de 2014



**Estudio Preparatorio para el Proyecto de Pavimentación de
la Carretera Okinawa I,II,III**

Memorando Técnico

La Misión de JICA mantuvo conversaciones técnicas con distintas autoridades de Bolivia tales como la Secretaría de Obras Públicas y Ordenamiento Territorial del Gobierno Autónomo Departamental de Santa Cruz (SOPOT), Servicio De Caminos (SEDCAM), Administradora Boliviana de Caminos (ABC), la Alcaldía de Santa Cruz de la Sierra y la Alcaldía de Okinawa, y confirmó los ítems descritos en el Documento Adjunto. Con respecto a cada uno de dichos ítems, se definirá después de hacer análisis de los resultados del Estudio Preparatorio y mantener conversaciones con la Cancillería del Japón y JICA.

Santa Cruz, 29 de agosto de 2014



Ing. Carlos Hugo SOSA ARREAZA
Secretario de Obras Públicas y
Ordenamiento Territorial del
Gobierno Autónomo Departamental
de Santa Cruz



Ing. Tomohiko NAKAMURA
Jefe de los consultores
Misión del Estudio Preparatorio de
JICA

Documento Adjunto

1. Contenido del Proyecto

- Pavimentación de la Carretera Okinawa (Tramo de unos 35 km de distancia desde la Intersección de Okinawa 1 hasta la de Okinawa 3) .
- Mejoramiento de Cunetas, Alcantarillas transversales y alcantarillas a las cuales fluye finalmente el agua de dichas cunetas de la mencionada Carretera
- Mejoramiento de las aceras de las comunidades habitadas, ubicadas sobre dicha Carretera (Okinawa2, San Miguel, alrededores de la Intersección de Okinawa 3)
- Señalizaciones horizontales y verticales de todo el trayecto de dicha Carretera (línea eje, etc.)
- Mejoramiento de 5 intersecciones sobre dicha Carretera (Okinawa1, Okinawa2, San Miguel, Zona Franca~Okinawa2,3, Okinawa3)
- Mejoramiento de otras intersecciones y de rampa de acceso desde la entrada de construcciones hasta dicha Carretera
- Reconstrucción del Puente

2. Normativa de estructura geométrica de camino

- Normativa de AASHTO
- Velocidad de diseño : 80km/hora
- Pendiente(bombeo) transversal vial estándar : 2 %

3. Normativa de diseño estructural para pavimentación de camino

- tipo de pavimentación : pavimentación de concreto asfáltico o de hormigón
- vida útil diseñada : 10 años en caso de la pavimentación de concreto asfáltico, 20 años en caso de la pavimentación de hormigón
- método de diseño (Normativa aplicable) : AASHTO GUIDE FOR Design of Pavement Structures (AASHTO 1993) , "Análisis de teoría elástica de multi-estrato" (Japan Road Association)

4. Perfil normal vial

- En la mayor parte del trayecto de la Carretera

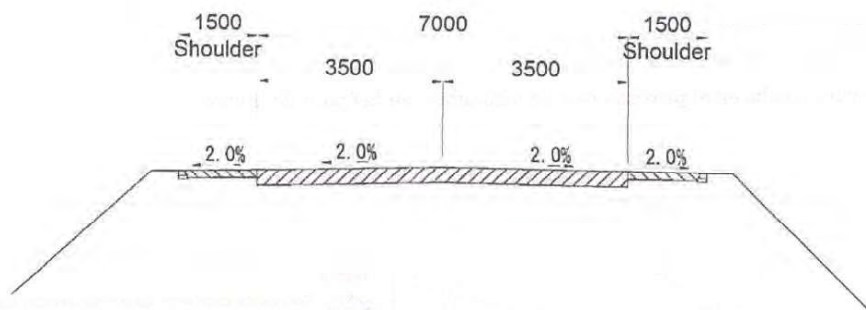


Figura 4-1 Perfil transversal normal vial en la mayor parte del trayecto de la Carretera

- Áreas habitadas

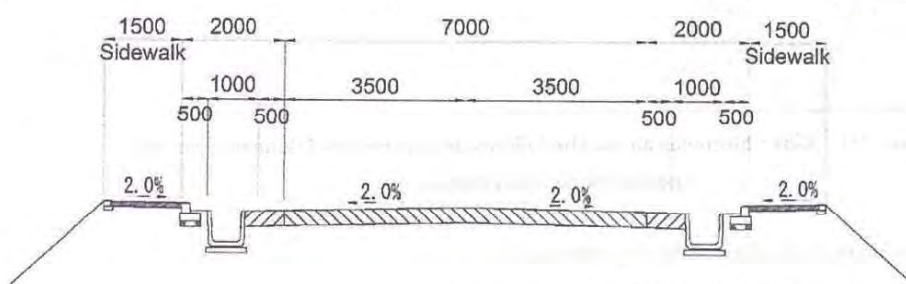


Figura 4-2 Perfil transversal normal vial en las áreas habitadas

5. Mejoramiento de canal de drenaje

Como se menciona en la Figura 5-1, las instalaciones de drenaje existentes ubicadas desde Okinawa 1 hasta el Puente, en un tramo de unos 9.7 km de distancia, están conectadas con la hidrovía existente, pasando por las alcantarillas ubicadas a lo largo de la Ruta 10.

Las instalaciones de drenaje desde dicho puente hasta Okinawa 3, en un tramo de unos 25.4 km de distancia, están conectadas con el río Pailón sobre el cual está construido dicho puente.

Para mantener la estructura vial en buen estado, se necesitará elevar la cota de la rasante del camino en tramos donde se inunda la carretera. Por lo tanto, se

instalarán alcantarillas transversales para no cambiar el drenaje de agua en momento de inundaciones.

El plan definitivo se definirá en consideración al resultado del estudio de campo que se llevará a cabo en el próximo mes de diciembre, en la época de lluvias.



Figura 5-1 Ríos • hidroviás en los alrededores de la carretera Okinawa y tramos inundados de dicha carretera

6. Mejoramiento de intersecciones y caminos de acceso

Abajo se mencionan propuestas para mejorar cada intersección.

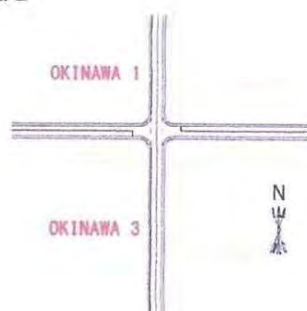
• Intersección de Okinawa 1

La Misión mantuvo conversaciones con ABC sobre el alcance de obras (Ver el Anexo-1)



Figura 6-1 Propuesta para el mejoramiento de la Intersección de Okinawa 1

- Intersección de Okinawa 2



Figur6-2 Propuesta para el mejoramiento de la Intersección Okinawa2

- Intersección de Okinawa2 y 3~Zona Franca

Con respecto al alcance de obras, la Misión mantuvo conversaciones con ingenieros encargados de diseño de SEDCAM. (Ver el Anexo-2)



Figura 6-3 Propuesta para el mejoramiento de la Intersección de Okinawa2,3~Zona Franca

• Intersección de San Miguel

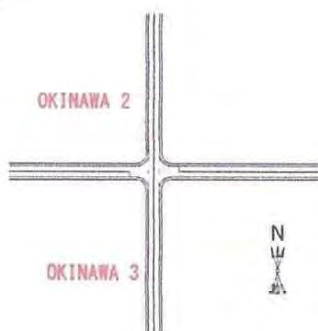


Figura 6-4 Propuesta para el mejoramiento de la Intersección de San Miguel

• Intersección de Okinawa 3

Con respecto al alcance de obras, la Misión mantuvo conversaciones con ingenieros encargados de diseño de SEDCAM. (Ver el Anexo-3)



Figura 6-5 Propuesta para el mejoramiento de la Intersección de Okinawa 3

7. Reconstrucción del puente

7-1 Plano de ubicación del puente a ser reconstruido

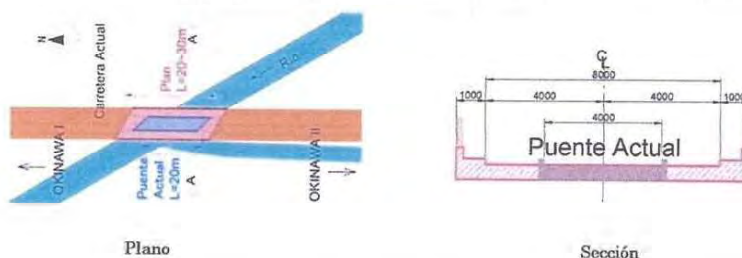


Figura 7-1 Plano de ubicación del puente a ser reconstruido

7-2 Tipo de puente y longitud de luz

Tabla 7-1 Examen comparativo de tipo de puente

Número de luces	2 luces	1 luz	
Tipo de puente	Puente de viga I Hormigón Armado	Puente de viga I Pretensado	Puente mixto
Sección			
Longitud de puente 30m	2@15=30 m	1@30=30 m	1@30=30 m
Facilidad de ejecución	Las obras serán complicadas debido a que se necesitará estancar el río para la construcción de pilas.	Será fácil hacer obras por no tener necesidad de estancar el río.	Será fácil hacer obras por no tener necesidad de estancar el río.
Mantenimiento	Se necesitará poco mantenimiento por ser de hormigón.	Se necesitará poco mantenimiento por ser pretensado.	Se requiere con frecuencia el mantenimiento por ser de acero.
Plazo de obras	Se necesitará bastante tiempo para construir pilas.	No se necesitan pilas. Es posible ejecutar obras en corto tiempo.	No se necesitan pilas. Es posible ejecutar obras en corto tiempo. Sin embargo, se necesita tiempo de transporte debido a ser fabricadas en algún tercer país.
Proporción de costo de construcción	1.0	1.0	1.4
prioridad	2	1(recomendable)	3

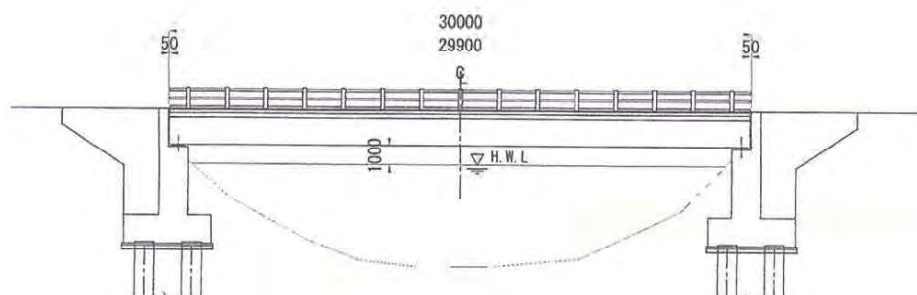


Figura 7-2 Elevación lateral y transversal del puente

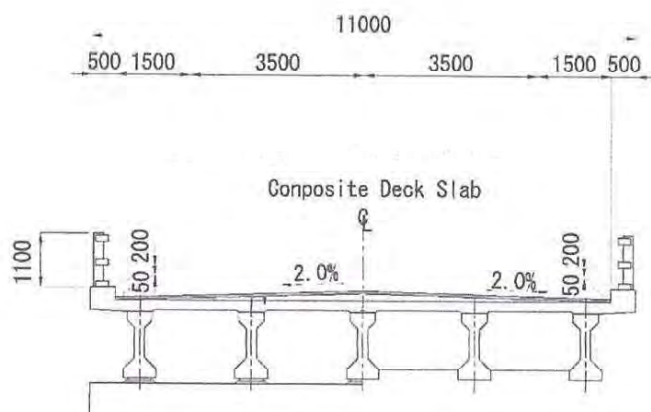


Figura 7-3 Sección transversal del puente

7-3 Normativa de diseño de puente

Método de diseño(base aplicable): Se aplicará la normativa del Japón.

Carga viva: carga viva B (equivalente a 125% de HS20-44)

Carga en momento de sismo:

Carga viva en momento de sismo : Se utilizará el coeficiente sísmico diseñada $K_h=0.1$.

8. Medidas de seguridad

Se asegurará la seguridad de peatones en las áreas habitadas debido a que se mejore la carretera y eleve la velocidad de vehículos. Como se menciona en la Figura. 4-2, se asegurará la seguridad de peatones a través de elevarse el nivel de superficie de

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carretera e instalarse cunetas a ambos lados de la carretera. Además, en las intersecciones se examinará a instalar pasos peatonales e instalarán marcas viales como "paso peatonal", "máxima velocidad 20km/h" y "sonorizadores".

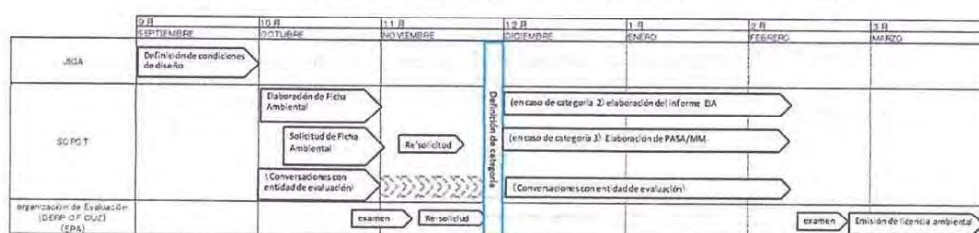
9. Responsabilidades a ser asumidas por la parte boliviana

9-1 Consideraciones socio-ambientales

- Obtención de licencia ambiental de EIA

La parte boliviana quedó acordado con el siguiente cronograma de obtención de licencia ambiental de EIA para la Carretera Okinawa I~III.

Tabla 9-1 Cronograma de obtención de la licencia ambiental de EIA



※1: Está previsto presentar la ficha ambiental antes finales de octubre y primeros de noviembre.
 ※2: En caso de no haber re-solicitud, se adelantará la fecha de elaboración del informe EIA.
 ※3: PASA= plan de seguimiento ambiental.
 ※MM(PMA)= Plan de mitigación ambiental.

- Plan de monitoreo ambiental

La parte boliviana quedó acordado con el siguiente plan de monitoreo ambiental.

Tabla 9-2 Propuesta del plan de monitoreo ambiental

Ítem ambiental	Ítem	Lugar	Frecuencia arriba : antes de obras medio : durante obras abajo : después de obras	Entidad responsable
[antes] [durante] [después]				
aire	PM ₁₀ , PM _{2.5} , CO, O ₂ , NOx, SOx, polvo, olor Dirección de viento, velocidad de viento	Punto inicial (área urbana) , punto intermedio (entre Okinawa1 y 2) , punto intermedio (Okinawa2) - punto intermedio (Okinawa2~3 [M]) - punto final (área urbana)	1 vez (antes de EIA) 1 vez / cada 3 meses 1 vez / cada 6 meses	Constructora o SOPOT
ruidos + vibraciones	Nivel de ruidos + vibraciones	Zona habitada (Okinawa1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000		
Calidad de agua	pH, SS, COD, DO, aceites, conductividad, turbiedad, olor, ecolor	pozo(uno o dos - cerca de la carretera)	1 vez (antes de EIA) 1 vez / cada 3 meses 1 vez / cada 6 meses	Constructora o SOPOT
biosfera	Fauna y flora	Okinawa1-3 (dentro del Derecho de vía)	1 vez (antes de EIA) 1 vez / cada 3 meses 1 vez / cada 6 meses	Constructora o SOPOT

- Con respecto al monitoreo ambiental previo

La parte boliviana, de acuerdo con el plan de monitoreo ambiental previo arriba descrito, acordó con la ejecución de monitoreo ambiental previo como parte de responsabilidades a ser asumidas por el país receptor del Proyecto. La parte boliviana informará a la parte japonesa el resultado de dicho monitoreo.

- Obtención de permiso de desmonte y poda de árboles

La parte boliviana acordó con la obtención de permiso de desmonte y corte de árboles que hay entre Okinawa 1 ~ Okinawa 3, de acuerdo con el cronograma de desmonte y corte de árboles.

Tabla 9-3 Cronograma de obtención de permiso de desmonte y corte de árboles.



※ 1 PASA=plan de seguimiento ambiental
MM (PMM)=plan de mitigación ambiental

9-2 Traslado de instalaciones (tuberías de agua, postes de energía eléctrica, etc.) y de casetas de vigilancia

La parte boliviana, con base al plano esquemático de mejoramiento de dicha Carretera y plano de ubicación de instalaciones como tuberías de agua, postes de energía eléctrica y casetas de vigilancia que se adjuntarán al Borrador del Informe Final, que se presentará en marzo de 2015, terminará de desplazar las instalaciones necesarias antes de la convocatoria de precalificación de constructoras (posiblemente en octubre de 2015).

9-3 Disposición del campamento provisional para obras y de botadero de residuos

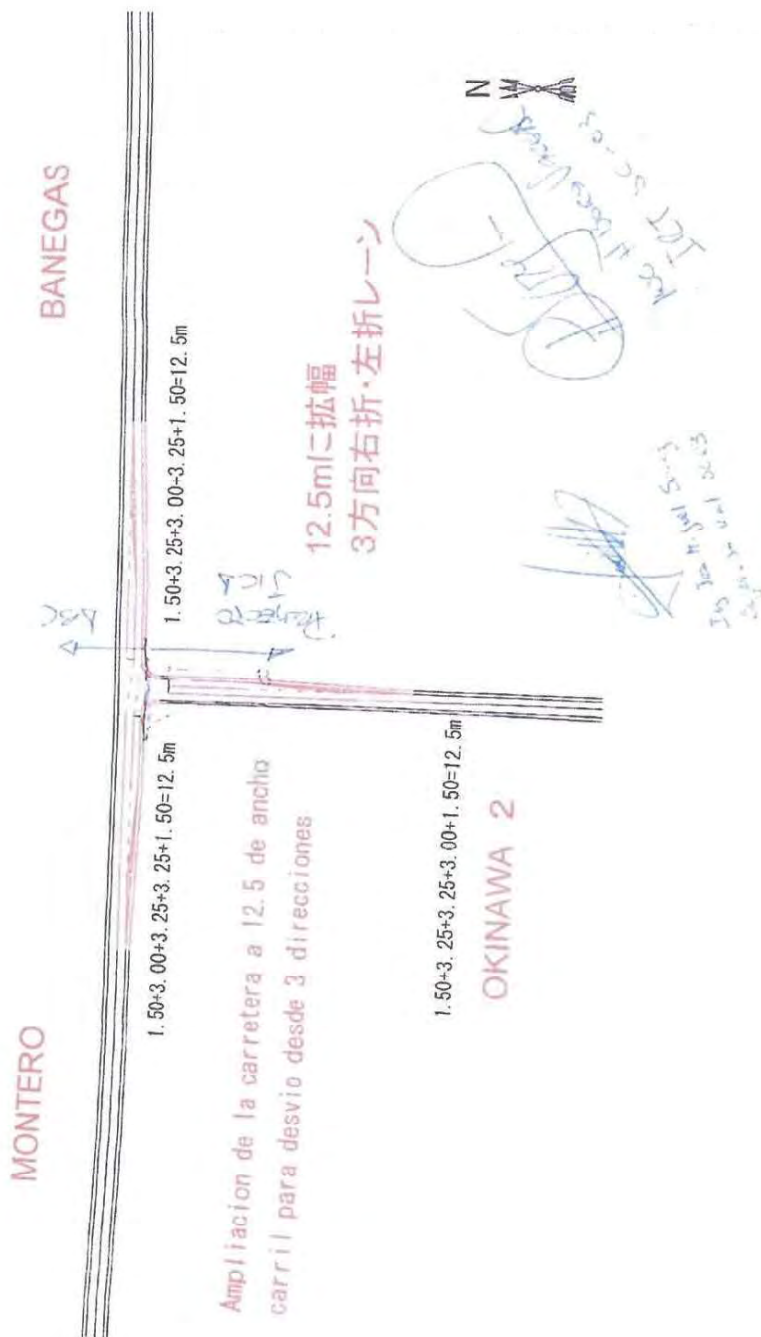
La parte boliviana, consultando con los consultores y constructoras a la hora del inicio de obras, dispondrá de un patio o área provisional para colocar materiales y equipos, construir plantas y campamento. La extensión de dicho patio será de varias hectáreas a definirse. Además, asegurará un botadero de residuos sólidos cerca del sitio de obras. La Alcaldía de Okinawa asegurará un

patio provisional (1 hectárea) para obras cerca de Okinawa 2. Y, está de acuerdo con el uso de botadero ubicado a unos 14 km al norte de Okinawa 1.

9-4 Impulso de mejoramiento de los caminos en sus contornos

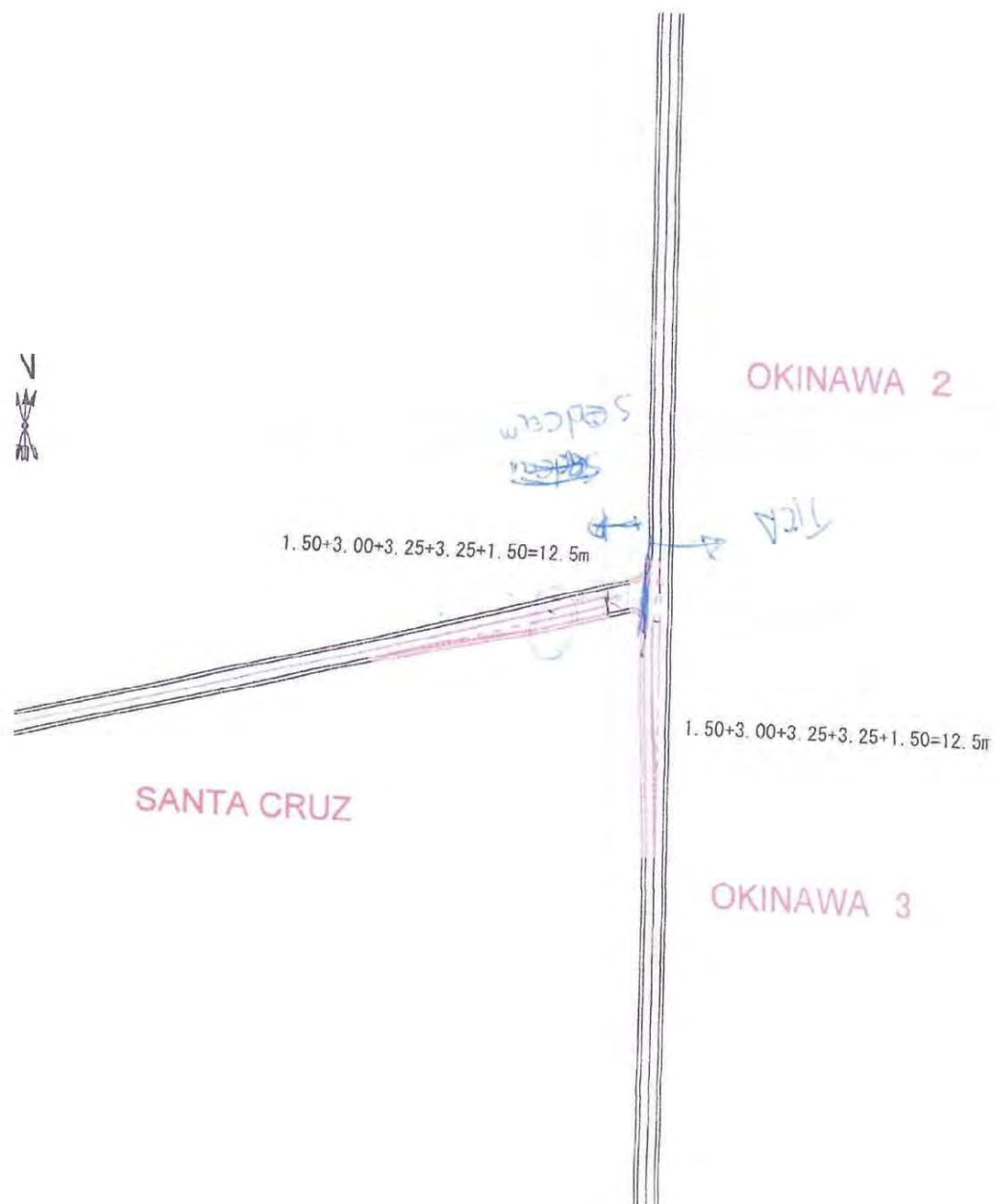
La parte boliviana, con el fin de lograr más eficacia del mejoramiento de la Carretera Okinawa, impulsará a distintas ejecutoras, del Proyecto de pavimentación de la carretera entre Santa Cruz y Okinawa3 (Proyecto de la Gobernación de Santa Cruz y de la Alcaldía de Santa Cruz de la Sierra), Mejoramiento de la Ruta 10 entre Okinawa1~Los Troncos (Proyecto de ABC), y Construcción del Puente Banegas (Proyecto de ABC), para que terminen dichos Proyectos antes de finales del año 2017.

Anexo-1 Conversaciones sobre la interseccion Okinawa1



Handwritten signature/initials in blue ink.

Anexo-2 Conversacion sobre la interseccion Zona Franca~Okinawa2,3



6. Declaratoria de Impacto Ambiental (DIA)



Estado Plurinacional de Bolivia

Viceministerio de Medio Ambiente, Biodiversidad,
Cambios Climáticos y de Gestión y Desarrollo Forestal



MMAY A
Ministerio de Medio Ambiente y Agua



DECLARATORIA DE IMPACTO AMBIENTAL (DIA)

070202/06/DIA/Nº 7059/18.

LA AUTORIDAD AMBIENTAL COMPETENTE NACIONAL

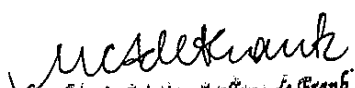
CERTIFICA:

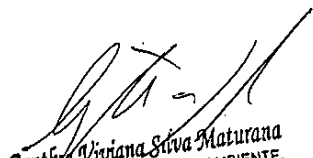
Que, dando cumplimiento al artículo 25º de la Ley Nº 1333 del Medio Ambiente, y con ajustes al Procedimiento de Evaluación de Impacto Ambiental del Reglamento de Prevención y Control Ambiental (RPCA), el **Gobierno Autónomo Departamental de Santa Cruz**, legalmente representado por el Ing. **Carlos Hugo Sosa Arreaza**, ha presentado la Ficha Ambiental Nº 7059/15 y el correspondiente Estudio de Evaluación de Impacto Ambiental – Análisis Específico del proyecto **“CONSTRUCCIÓN CARRETERA OKINAWA I - II - III”**, el mismo se encuentra ubicado en el municipio de Okinawa I, provincia Warnes del departamento de Santa Cruz, habiéndose cumplido con los requisitos mínimos desde el punto de vista ambiental, por lo cual queda autorizada la implementación del proyecto.

La presente Declaratoria de Impacto Ambiental (DIA) se constituye conjuntamente el Estudio de Evaluación de Impacto Ambiental aprobado, en particular con el Programa de Prevención y Mitigación (PPM) y el Plan de Aplicación y Seguimiento Ambiental (PASA), en referencia para la realización de los Procedimientos de inspección, vigilancia y control, establecidos en el Reglamento de Prevención y Control Ambiental.

En caso de no darse estricto cumplimiento a lo previsto en los planes anteriormente mencionados y el Estudio de Evaluación de Impacto Ambiental, se aplicarán las sanciones previstas en la Ley Nº 1333 sus Reglamentos (Decreto Supremo 24176) y demás disposiciones conexas.

Es cuanto certifico para los fines consiguientes.


Lic. María Cristina Arellano de Frank
DIRECTORA GENERAL DE MEDIO
AMBIENTE Y CAMBIOS CLIMÁTICOS
VMABCCGDF - MMAY A


Cynthia Viviana Silva Maturana
VICE-MINISTRA DE MEDIO AMBIENTE,
BIODIVERSIDAD, CAMBIOS CLIMÁTICOS Y
DE GESTIÓN Y DESARROLLO FORESTAL
MMAY A

La Paz, 29 de enero de 2018.

VICEMINISTERIO DE MEDIO AMBIENTE, BIODIVERSIDAD CAMBIOS CLIMÁTICOS Y DE GESTIÓN Y DESARROLLO FORESTAL
CALLE CAÑADA STRONGEST Nº 1878 (frente a la Biblioteca Municipal) - Telf.: 2146382 - 2146385 y 2141929

7. Listado de Materiales Recopilados

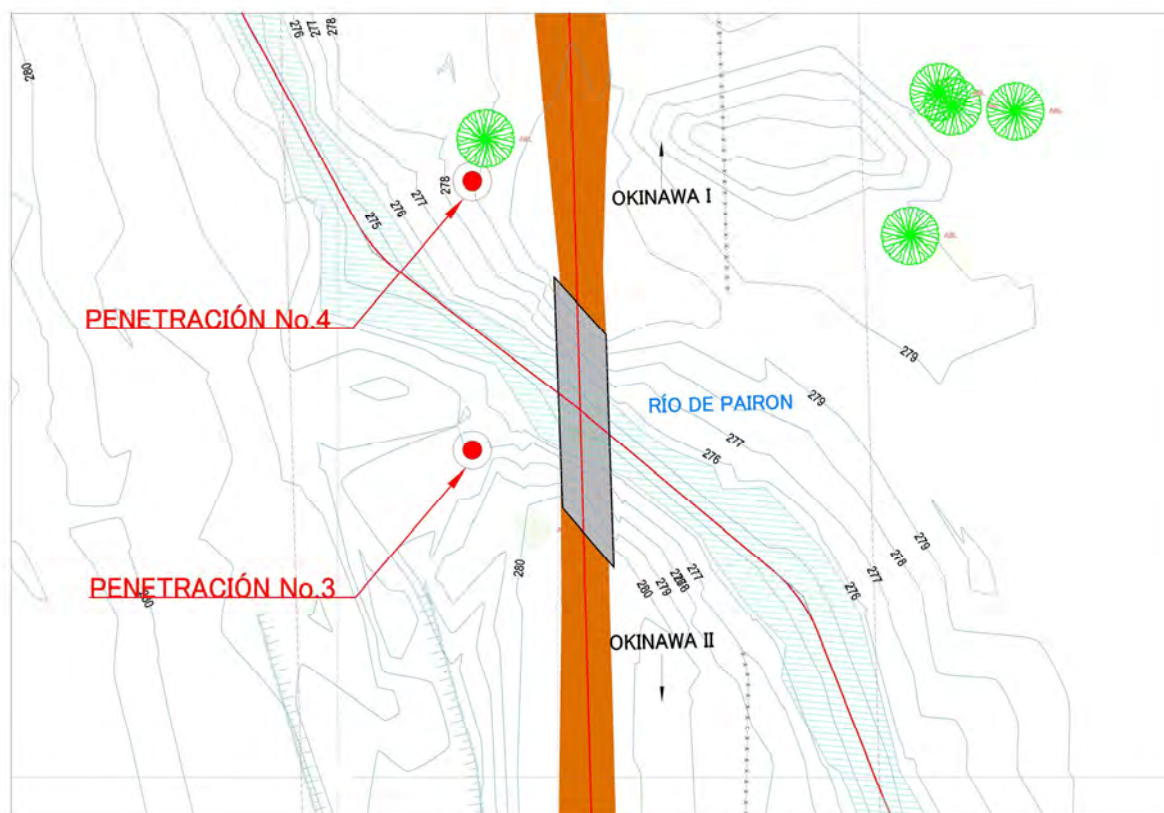
Listado de materiales recopilados

Proyecto de Pavimentación de la Carretera Okinawa en el Estado Plurinacional de Bolivia

No.	Nombre	Tipo (libro/video/mapa/foto ,etc.)	Original/copia	Organización de publicación	Año de publicación
1	Datos de observación meteorológica (2007-2014)	EXCEL	Copia	Centro Tecnológico Agropecuario en Bolivia (CETABOL)	-
2	Datos de observación de ríos en PACAY o PAILAS (nivel de agua, temperatura) (2010-2014)	EXCEL	Copia	SEARPI (Servicio de Encauzamiento de Aguas y Regularización del Río Pirai)	2014
3	Datos de precipitación en la Colonia Okinawa I (1977-2013)	EXCEL	Copia	SENAMHI (Servicio Nacional de Meteorología e Hidrología)	2014
4	Balance Hídrico Superficial de Bolivia	PDF	Copia	Ministerio de Medio Ambiente y Agua	1992
5	Instituto Nacional de Estadística 2011	Libro	Copia	Instituto Nacional de Estadística	2012
6	Ley No.1333 del Medio Ambiente	PDF	Copia	Estado Plurinacional de Bolivia	1992
7	Libro Rojo Flora Amenazada	PDF	Copia	Ministerio de Medio Ambiente y Agua	2012
8	Libro Rojo Completo	PDF	Copia	Ministerio de Medio Ambiente y Agua	2009
9	Ley Forestal	PDF	Copia	Estado Plurinacional de Bolivia	2001
10	Mapa de Red Vial Departamental de Santa Cruz	PDF	Copia	Departamento de Santa Cruz	2017, etc.
11	Nuevos Manuales ABC	PDF	Copia	ABC	2008

8. Material Técnico

8-1 Resultado de ensayo de SPT



El resultado del ensayo de SPT (P3)

FIELD REGISTER				OFF-SITE REGISTER																	
Scale	Depth (m)	Geotechnical Profile	Visual Description of the Material	Soil Classif. System USCS & AASHTO	Friction Angle (°)	Strength of Soils Parameters Cohesion (kg/cm ²)	Soil Density γd (t/m ³)	Effective Pressure (kg/cm ²)	Correction Factor Cf	Number of Blows			Penetration Resistance Index						Depth (m)	Penetration Resistance Chart Number of Blows Vs Depth	Allowable Stress (Kg/cm ²)
										15 cm Initiales	30 cm Finales	Ng 60- depth	Ng cor- pressure blows	Ng scale							
	0.00																				
	1.00	1.30	Clay with medium to high plasticity, in weak in-situ condition, with soft consistency, in saturated state and of dark brown coloration with reddish patinas. Alluvial Fan Geological Interpretation	CL A-7-6 (14)	1	0.370	1.680	0.185	1.000	2	5	5	5.00	5	5	1.10					
	2.00		Clay with low plasticity, in weak in-situ condition, with soft consistency, in saturated state and of dark brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-6 (8)	2	0.340	1.700	0.354	1.349	2	5	5	6.74	7	6	2.10					
	3.00	2.60	Silt with very fine sand mixtures, in weak in-situ condition, with soft consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	ML A-4 (7)	10	0.130	1.800	0.529	1.214	2	6	6	7.29	7	7	3.10					
	4.00	N.F.	Silty sand with no plasticity, in firm in-situ condition, with medium compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	28	0.000	1.900	0.619	1.162	6	13	13	15.11	15	14	4.10					
	5.00							4.90	0.707	1.118	6	12	12	13.41	13	12	5.10				
	6.00	6.50	Clay with low plasticity, in weak to firm in-situ condition, with soft to medium consistency, in saturated state and of brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-4 (8)	2	0.360	1.780	0.785	1.083	5	8	8	8.66	9	8	6.10					
	7.00							8.30	0.867	1.050	2	4	4	4.20	4	4	7.10				
	8.00	8.30	Silt with very fine sand mixtures, in weak to partially firm in-situ condition, with soft to medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	ML A-4 (4)	13	0.150	1.840	0.942	1.022	3	9	9	9.20	9	8	8.00					
	9.00							9.40	1.043	0.988	12	16	16	15.81	15	14	9.10				
	10.00	10.50	Silt with very fine sand mixtures, in partially firm in-situ condition, with soft to medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	ML A-4 (8)	14	0.170	1.860	1.122	0.963	4	9	9	8.67	9	8	10.00					
	11.00							12.10	1.218	0.936	6	13	13	12.17	12	11	11.10				
	12.00	12.10	Clay with medium plasticity, in firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-6 (13)	2	0.390	1.880	1.306	0.912	5	17	17	15.51	15	14	12.10					
	13.00							13.50	1.393	0.891	10	49	49	43.66	29	26	13.00				
	14.00	13.50	Silty sand with no plasticity, in firm in-situ condition, with medium to dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-4 (1)	30	0.000	1.960	1.485	0.870	8	18	18	15.65	15	14	14.00					
	15.00							15.20	1.573	0.850	5	19	19	16.16	16	14	15.00				
	16.00	16.60	Clay with low plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (7)	4	0.420	1.880	1.661	0.832	6	20	20	16.64	16	14	16.00					
	17.00							18.50	1.766	0.812	3	11	11	8.93	9	8	17.20				
	18.00	18.50	Clay with low plasticity, firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (10)	4	0.420	1.880	1.837	0.799	4	15	15	11.98	12	11	18.00					
	19.00							19.80	1.925	0.783	5	20	20	15.66	15	14	19.00				
	20.00	19.80	Clay with medium to high plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-7-6 (16)	4	0.420	1.880	2.022	0.766	6	18	17	13.03	13	12	20.10					
	21.00							20.60	2.103	0.753	5	17	16	12.05	12	11	21.00				
	22.00	22.20	Clay with low plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	CL A-4 (8)	4	0.490	1.900	2.193	0.739	6	21	20	14.79	15	13	22.00					
	23.00							23.40	2.283	0.726	9	41	40	29.04	22	20	23.00				
	24.00	23.40	Clay with medium to high plasticity, firm in-situ condition, with very compacted to heavy consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	CL A-7-6 (18)	4	0.490	1.900	2.375	0.712	Penetro 30 cm con 38						24.00					
	25.00							25.60	2.469	0.699	20	56	55	38.48	27	24	25.00				
	26.00	25.60	Silt with very fine sand mixtures, in firm to consolidated in-situ condition, with very compacted to heavy consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	ML A-4 (8)	20	0.230	1.940	2.563	0.687	Penetro 15 cm con 25						26.00					
	27.00							26.80	2.659	0.675	Penetro 15 cm con 20						27.00				
	28.00	28.20	Silty sand with no plasticity, in consolidated to firm in-situ condition, with medium to dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-4 (1)	31	0.000	2.030	2.762	0.662	21	21	20	13.26	13	12	28.00					
	29.00							30.10	2.855	0.651	6	13	12	7.83	8	7	29.00				
	30.00	30.10	Clay with medium plasticity, firm in-situ condition, with medium consistency, in saturated state and of brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (12)	6	0.490	1.900	2.954	0.640	7	16	15	9.61	10	9	30.10					
END OF BOREHOLE																					

FIELD REGISTER				OFF-SITE REGISTER																
Scale	Depth (m)	Geotechnical Profile	Visual Description of the Material	Soil Classif. System USCS & AASHTO	Friction Angle (°)	Strength of Soils Parameters Cohesion (kg/cm ²)	Soil Density γd (t/m ³)	Effective Pressure (kg/cm ²)	Correction Factor CF	Number of Blows	Penetration Resistance Index				Depth (m)	Penetration Resistance Chart Number of Blows Vs Depth	Allowable Stress (Kg/cm ²)			
										15 cm	30 cm	Ng 60- depth	Ng corr.- pressure	Ng corr.- blows				Ng scale		
	0.00																			
	1.00		Clay with medium to high plasticity, in weak in-situ condition, with soft consistency, in saturated state and of reddish coloration. Alluvial Fan Geological Interpretation	CL A-7-6 (17)	1	0.370	1.680	0.185	1.000	2	6	6	6.00	6	6	1.10				
	1.50							0.354	1.349	2	9	9	12.14	12	12	2.10				
	2.00		Clay with medium plasticity, in partially firm in-situ condition, with soft to medium consistency, in saturated state and of brown coloration with light gray patinas. Alluvial Fan Geological Interpretation	CL A-6 (10)	2	0.340	1.700	0.524	1.218	2	5	5	6.09	6	6	3.10				
	3.00		Clay with low plasticity, in weak in-situ condition, with soft consistency, in saturated state and of reddish brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (9)	2	0.340	1.700	0.638	1.152	10	27	27	31.11	23	21	4.10				
	3.40							0.728	1.108	8	33	33	36.56	26	23	5.10				
	4.00	N.F.	Silty sand with no plasticity, in firm in-situ condition, with medium compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	28	0.000	1.900	0.817	1.069	10	36	36	38.50	27	24	6.10				
	5.00							0.905	1.035	8	18	18	18.63	17	15	7.10				
	6.00		Poorly graded sand with little fine-grained soils, in firm in-situ condition, with medium compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SP-SM A-2-4 (0)	28	0.000	1.890	0.981	1.008	3	4	4	4.03	4	4	8.00				
	7.00							1.075	0.977	3	7	7	6.84	7	6	9.10				
	8.00		Silt with no to low plasticity, in weak to firm in-situ condition, with soft to medium consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	ML A-4 (5)	13	0.150	1.840	1.160	0.952	4	8	8	7.62	8	7	10.00				
	8.90							1.259	0.925	4	11	11	10.17	10	9	11.10				
	10.00		Silty sand with no plasticity, in loose in-situ condition, with low compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	29	0.000	1.940	1.347	0.902	4	16	16	14.44	14	13	12.10				
	11.00		Clay with medium plasticity, firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (11)	2	0.390	1.880	1.433	0.881	15	45	45	39.67	27	25	13.00				
	12.00		Clay with low plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-6 (11)	2	0.390	1.880	1.529	0.860	Penetro 30 cm con 53						14.00				
	12.10							1.625	0.839	Penetro 15 cm con 24						15.00				
	13.00		Silty sand with no plasticity, in firm to consolidated in-situ condition, with medium to dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	30	0.000	1.960	1.716	0.821	7	21	21	17.24	16	15	16.00				
	14.00							1.822	0.801	7	22	22	17.63	16	15	17.20				
	15.00		Silty sand with no plasticity, in consolidated in-situ condition, with dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	30	0.000	1.960	1.892	0.789	6	21	21	16.56	16	14	18.00				
	16.00		Clay with high plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	CH A-7-5 (19)	3	0.460	1.880	1.982	0.773	8	22	22	17.01	16	14	19.00				
	17.00		Clay with medium to high plasticity, with the presence of isolated clasts in small percentage, in firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	CL A-7-6 (17)	4	0.420	1.880	2.081	0.757	9	28	27	20.43	18	16	20.10				
	18.00							2.162	0.744	11	20	19	14.14	14	13	21.00				
	19.00		Clay with high plasticity, with the presence of isolated clasts in small percentage, in firm in-situ condition, with medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CH A-7-6 (20)	4	0.490	1.900	2.252	0.730	7	17	16	11.69	12	11	22.00				
	20.00							2.342	0.717	8	21	20	14.35	14	13	23.00				
	21.00		Clay with medium to high plasticity, firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration. Alluv																	

8-2 Estimación de los Cudares de Diseño

(1) Datos De Precipitación Diaria

Fuente: Servicio Nacional de Meteorología e Hidrología (SENAMHI)

Período: 1987~2013

AÑO: 1987

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	50.8	0.0	0.0	0.0	68.2	0.0	41.5	0.0	0.0	0.0	86.7	21.0	268.2
2	0.0	0.0	38.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.1
3	10.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2
4	10.3	0.0	70.5	0.0	8.5	27.3	0.0	0.0	0.0	0.0	0.0	0.0	116.6
5	0.0	5.1	0.0	0.0	0.0	80.3	0.0	95.5	0.0	0.0	0.0	0.0	180.9
6	0.0	4.4	10.5	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.4
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.5	0.0	80.0	0.0	110.5
8	0.0	4.0	0.0	0.0	12.1	0.0	0.0	0.0	0.0	16.0	0.0	15.8	47.9
9	0.0	0.0	31.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.5
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
13	21.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5	0.0	46.4
14	60.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.2
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	53.0	0.0	57.1
16	4.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.0	80.0
18	23.3	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	58.3
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	13.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.6
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.1	0.0	0.0	17.1
22	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	100.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.0	0.0	131.9
25	39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.1	92.1
26	4.1	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	37.1
27	10.2	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	72.3	102.5
28	0.0	0.0	0.0	0.0	0.0	0.0	50.5	0.0	0.0	0.0	0.0	0.0	50.5
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	****	18.0	0.0	0.0	0.0	0.0	0.0	49.0	0.0	0.0	0.0	67.0
31	35.1	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	10.0	45.1
SUM	380.3	33.5	188.6	4.0	114.1	107.6	112.0	95.5	79.5	70.2	275.2	252.2	1712.7
MED	29.2	6.7	31.4	4.0	19.0	53.8	37.3	95.5	39.8	14.0	55.0	42.0	35.6
MAX	100.9	15.0	70.5	4.0	68.2	80.3	50.5	95.5	49.0	20.0	86.7	80.0	100.9
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	13.0	5.0	6.0	1.0	6.0	2.0	3.0	1.0	2.0	5.0	5.0	6.0	55.0

ANO: 1988

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.8	0.0	0.0	43.8
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	52.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.2
6	53.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3
7	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	7.2
8	0.0	0.0	0.0	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	27.6
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.9	2.3	0.0	0.0	18.2
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	30.5	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.3
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	20.1	0.0	0.0	0.0	27.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.6	0.0	0.0	16.6
16	0.0	38.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.1
17	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.1	0.0	41.1
19	0.0	0.0	0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.8
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	1.9
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0
23	47.5	0.0	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.6
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.5
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	44.5	0.0	70.0
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.0	0.0	27.0
30	0.0	****	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
31	5.0	****	0.0	****	0.0	****	0.0	10.0	****	8.5	****	0.0	23.5
SUM	158.0	58.3	52.6	85.3	0.0	0.0	0.0	10.0	36.0	98.6	112.6	17.5	628.9
MED	39.5	29.2	13.2	14.2	0.0	0.0	0.0	10.0	18.0	16.4	37.5	8.8	20.8
MAX	53.3	38.1	30.5	29.5	0.0	0.0	0.0	10.0	20.1	43.8	44.5	12.3	53.3
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	4.0	2.0	4.0	6.0	0.0	0.0	0.0	1.0	2.0	6.0	3.0	2.0	30.0

ANO: 1989

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0
3	0.0	0.0	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.1
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
6	51.6	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	111.6
7	0.0	19.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.4	0.0	46.4
9	0.0	0.0	13.5	15.1	0.0	0.0	22.5	0.0	0.0	0.0	0.0	0.0	51.1
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.5	0.0	10.2	43.7
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	20.1
13	0.0	42.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2	62.4
14	10.3	0.0	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	30.1
15	50.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.2
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.5	62.5
18	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.6	0.0	0.0	0.0	0.0	88.6
21	51.2	0.0	0.0	0.0	0.0	0.0	0.0	39.3	0.0	6.5	4.5	0.0	101.5
22	0.0	21.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.9
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.9	0.0	0.0	0.0	0.0	63.9
24	10.0	0.0	0.0	0.0	0.0	27.3	0.0	13.5	0.0	0.0	0.0	99.5	150.3
25	0.0	0.0	13.8	44.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.3
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.2	0.0	15.2
27	0.0	0.0	0.0	0.0	0.0	0.0	9.5	25.5	0.0	0.0	0.0	0.0	35.0
28	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5	28.3
29	0.0	****	0.0	11.5	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5
30	0.0	****	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
31	14.5	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	14.5
SUM	210.8	143.1	86.4	86.5	0.0	40.3	32.0	230.8	0.0	40.0	66.1	247.3	1183.3
MED	30.1	35.8	12.3	17.3	0.0	20.2	16.0	46.2	0.0	20.0	22.0	35.3	25.5
MAX	51.6	60.0	23.5	44.5	0.0	27.3	22.5	88.6	0.0	33.5	46.4	99.5	99.5
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	7.0	4.0	7.0	5.0	0.0	2.0	2.0	5.0	0.0	2.0	3.0	7.0	44.0

ANO: 1990

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2
2	0.0	10.0	6.5	0.0	0.0	53.1	0.0	0.0	0.0	0.0	0.0	0.0	69.6
3	88.5	0.0	4.5	0.0	20.3	0.0	0.0	0.0	0.0	6.0	0.0	0.0	119.3
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.2	7.2	48.4
5	0.0	0.0	0.0	0.0	0.0	30.8	0.0	0.0	0.0	0.0	0.0	0.0	30.8
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.8	0.0	0.0	0.0	23.8
7	27.4	43.0	0.0	0.0	40.3	0.0	0.0	0.0	0.0	0.0	0.0	12.1	122.8
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	100.3	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.0	0.0	0.0	108.7
10	10.1	23.3	0.0	14.5	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.9
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	6.1
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	31.5	7.5	0.0	0.0	17.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.2
16	0.0	0.0	0.0	71.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.5
17	90.9	0.0	46.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	137.7
18	0.0	6.1	0.0	0.0	0.0	0.0	0.0	23.0	0.0	83.5	0.0	0.0	112.6
19	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	27.3
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.0	14.5	0.0	0.0	0.0	0.0	8.3	0.0	0.0	0.0	62.5	0.0	85.3
22	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	18.9
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	4.9	0.0	17.3	0.0	0.0	0.0	0.0	0.0	0.0	22.2
25	0.0	10.0	82.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.4
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	7.0	0.0	0.0	8.0	13.2	0.0	0.0	30.5	58.7
28	0.0	0.0	0.0	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	****	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0
31	7.8	****	9.8	****	50.0	****	0.0	0.0	****	12.7	****	0.0	80.3
SUM	363.7	114.4	162.0	99.4	195.0	101.2	16.7	31.0	37.0	108.3	110.6	69.9	1409.2
MED	45.5	16.3	27.0	24.8	24.4	33.7	8.3	15.5	18.5	27.1	36.9	17.5	24.6
MAX	100.3	43.0	82.4	71.5	50.0	53.1	8.4	23.0	23.8	83.5	62.5	30.5	100.3
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	8.0	7.0	6.0	4.0	8.0	3.0	2.0	2.0	2.0	4.0	3.0	4.0	53.0

ANO: 1991

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	1.0	****	5.2
2	25.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	****	30.7
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	****	3.4
5	0.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0	11.5	0.0	0.0	****	71.5
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	****	13.0
7	18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	18.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
9	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	6.4	0.0	0.0	****	14.8
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	****	11.9
11	0.0	50.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	50.3
12	100.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	100.2
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
14	92.3	68.6	23.5	17.5	33.8	0.0	0.0	0.0	0.0	0.0	0.0	****	235.7
15	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	****	12.5
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
18	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.5	****	29.5
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
21	0.0	0.0	0.0	0.0	0.0	8.4	3.2	0.0	0.0	0.0	0.0	****	11.6
22	0.0	0.0	28.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	28.5
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.2	0.0	****	39.2
24	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	7.8
25	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	29.5
26	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	56.5	****	59.0
27	68.3	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	0.0	****	94.8
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	****	3.5
29	6.3	****	0.0	0.0	4.2	0.0	0.0	0.0	5.0	0.0	0.0	****	15.5
30	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5	0.0	****	19.5
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	****	0.0
SUM	340.4	144.2	52.0	80.0	38.0	16.8	3.2	0.0	26.4	83.8	121.3	****	906.1
MED	48.6	24.0	26.0	26.7	19.0	8.4	3.2	0.0	6.6	16.8	17.3	****	19.7
MAX	100.2	68.6	28.5	60.0	33.8	8.4	3.2	0.0	11.5	39.2	56.5	****	100.2
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
N	7.0	6.0	2.0	3.0	2.0	2.0	1.0	0.0	4.0	5.0	7.0	****	39.0

ANO: 1992

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	4.4	0.0	0.0	0.0	122.5	0.0	6.0	0.0	17.8	10.1	0.0	0.0	160.8
2	0.0	49.7	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.1
3	0.0	0.0	0.0	1.1	0.5	0.0	0.0	0.0	0.0	0.0	24.5	0.0	26.1
4	0.0	17.9	3.2	0.0	0.0	0.0	0.0	0.0	0.0	10.4	0.0	0.0	31.5
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.6	28.6
6	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
7	0.0	0.0	0.0	43.1	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.1
8	12.3	0.0	1.5	10.5	11.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	35.8
9	7.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	120.0	127.8
10	55.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	29.5	0.0	0.0	8.5	96.9
11	0.0	21.7	0.0	38.5	0.0	0.0	0.0	0.0	49.5	0.0	0.0	0.0	109.7
12	0.0	10.7	0.0	17.5	0.0	0.0	0.0	0.0	21.5	0.0	0.0	0.0	49.7
13	55.5	10.0	5.1	0.0	6.8	0.0	0.0	0.0	9.5	0.0	0.0	0.0	86.9
14	203.5	0.0	0.0	0.0	0.0	0.5	6.5	0.0	0.0	0.0	0.0	0.0	210.5
15	23.9	53.1	4.2	0.0	0.0	0.0	1.0	0.0	0.0	0.0	30.6	0.0	112.8
16	0.0	45.1	0.0	0.0	0.0	0.0	0.0	1.5	0.0	9.5	0.0	0.0	56.1
17	0.0	15.0	0.0	0.0	8.9	0.0	0.0	43.0	0.0	0.0	0.0	3.6	70.5
18	0.0	55.0	0.0	0.0	0.6	0.0	0.0	21.5	3.1	0.0	0.0	0.0	80.2
19	0.0	53.0	0.0	9.1	0.0	0.0	0.0	10.3	0.0	0.0	0.0	0.0	72.4
20	15.5	0.0	0.0	70.1	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	95.6
21	0.0	0.0	70.8	4.5	0.0	4.0	0.0	0.9	0.0	0.0	0.0	0.0	80.2
22	0.0	0.0	5.0	24.5	0.0	0.0	0.0	0.0	0.0	0.0	18.0	0.0	47.5
23	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	12.7
24	0.0	0.0	0.0	10.5	3.0	0.0	0.0	0.0	66.6	0.0	0.0	0.0	80.1
25	3.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	9.5	0.0	0.0	0.0	20.5
26	0.0	10.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0
27	0.0	0.0	75.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	75.4
28	0.0	0.0	16.0	1.0	16.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.6
29	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	19.8	16.7	0.0	40.5
30	0.0	****	0.0	0.0	0.0	10.3	0.0	0.0	77.5	0.0	0.0	0.0	87.8
31	0.0	****	0.0	****	11.9	****	0.0	0.2	****	0.0	****	80.3	92.4
SUM	380.1	341.7	183.3	248.9	209.6	16.5	13.5	87.4	284.5	49.8	92.0	241.0	2148.3
MED	42.2	31.1	20.4	19.2	15.0	2.8	4.5	12.5	31.6	12.4	18.4	48.2	21.5
MAX	203.5	55.0	75.0	70.1	122.5	10.3	6.5	43.0	77.5	19.8	30.6	120.0	203.5
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	9.0	11.0	9.0	13.0	14.0	6.0	3.0	7.0	9.0	4.0	5.0	5.0	95.0

ANO: 1993

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.5	3.2	20.7
2	0.0	15.5	16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.0
3	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
4	24.6	0.0	4.8	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.1
5	0.0	10.0	0.0	6.6	0.0	0.0	14.4	0.0	0.0	0.0	20.0	0.0	51.0
6	15.2	120.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	6.2	0.0	145.9
7	32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	32.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0	5.2
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	7.2
12	0.0	0.0	0.0	0.0	0.0	0.0	24.5	0.0	0.0	0.0	0.0	0.0	24.5
13	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5
14	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
15	12.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.9
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	7.0	13.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0	0.0	18.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	20.0	0.0	28.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.7
20	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	5.2	9.7
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.5	0.0	26.5	0.0	0.0	43.0
22	0.0	0.0	4.0	0.0	0.0	0.0	0.0	2.2	0.0	4.5	0.0	15.5	26.2
23	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
24	7.1	0.0	8.8	0.0	7.5	0.0	0.0	0.0	13.5	0.0	34.0	0.0	70.9
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	8.0	22.0
28	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	6.5
29	0.0	****	0.0	0.0	0.0	0.0	10.5	0.0	5.1	0.0	0.0	0.0	15.6
30	0.0	****	0.0	0.0	0.0	0.0	0.0	13.6	0.0	0.0	0.0	0.0	13.6
31	0.0	****	6.8	****	0.0	****	0.0	0.0	****	0.0	****	0.0	6.8
SUM	110.9	156.0	69.6	13.3	29.9	0.0	60.4	37.5	19.4	31.0	122.9	38.9	689.8
MED	18.5	39.0	11.6	6.6	4.3	0.0	12.1	9.4	4.8	15.5	15.4	7.8	13.2
MAX	32.0	120.0	28.7	6.7	7.5	0.0	24.5	16.5	13.5	26.5	34.0	15.5	120.0
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	6.0	4.0	6.0	2.0	7.0	0.0	5.0	4.0	4.0	2.0	8.0	5.0	53.0

ANO: 1994

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	20.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	49.0	0.0	0.0	73.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.2	32.2
5	0.0	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	41.5
6	0.0	0.0	0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	17.8
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	26.5	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.3
10	0.0	30.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.2
11	0.0	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.3
12	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	7.5	13.5
13	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
14	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	19.3
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	12.9	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.3	10.1	59.1
17	0.0	3.9	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	16.4
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	14.4	0.0	0.0	0.0	0.0	100.2	0.0	0.0	0.0	0.0	0.0	0.0	114.6
20	12.0	0.0	12.9	0.0	0.0	100.1	0.0	0.0	0.0	0.0	0.0	0.0	125.0
21	19.5	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	40.0	65.6
22	0.0	32.5	0.0	0.0	0.0	0.0	42.0	0.0	0.0	2.5	0.0	0.0	77.0
23	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	10.1
25	12.4	0.0	0.1	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	14.6
26	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6
27	0.0	0.0	0.0	0.0	131.0	0.0	0.0	0.0	0.0	0.0	0.2	27.1	158.3
28	0.0	23.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	0.0	18.9	55.1
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	****	26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.0
31	4.9	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	4.9
SUM	117.6	180.9	50.8	15.1	137.1	202.4	42.0	0.0	15.0	75.4	40.5	142.3	1019.1
MED	13.1	18.1	10.2	5.0	68.5	67.5	42.0	0.0	15.0	15.1	13.5	17.8	26.0
MAX	26.5	41.0	26.0	11.8	131.0	100.2	42.0	0.0	15.0	49.0	28.3	40.0	131.0
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	9.0	10.0	5.0	3.0	2.0	3.0	1.0	0.0	1.0	5.0	3.0	8.0	50.0

ANO: 1995

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4
5	2.9	0.0	0.0	0.0	9.5	0.0	1.0	0.0	0.0	0.0	10.5	0.0	23.9
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	23.0	24.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	3.1
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	25.6	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	38.6
11	0.0	55.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.5	0.0	77.8
12	0.0	15.0	22.9	0.0	0.0	0.0	1.0	0.0	0.0	10.3	0.0	0.0	49.2
13	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.5	0.0	20.5
17	0.0	10.1	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.6
18	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	5.0
19	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	5.7	0.0	0.0	0.0	11.2
20	0.0	0.0	0.0	35.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.5
21	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	7.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	15.5	16.0
23	24.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.1
24	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0.0	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2
28	0.0	0.0	14.5	0.0	0.0	0.0	0.0	0.0	41.1	0.0	0.0	2.5	58.1
29	64.1	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.1
30	0.0	****	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	3.8
31	0.0	****	9.5	****	0.0	****	0.0	0.0	****	0.0	****	0.0	9.5
SUM	101.1	147.5	69.5	35.5	14.9	1.5	10.8	0.0	59.8	10.8	58.0	44.1	553.5
MED	25.3	21.1	9.9	35.5	7.4	1.5	2.7	0.0	19.9	5.4	14.5	11.0	14.0
MAX	64.1	55.3	22.9	35.5	9.5	1.5	5.0	0.0	41.1	10.3	22.5	23.0	64.1
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	4.0	7.0	7.0	1.0	2.0	1.0	4.0	0.0	3.0	2.0	4.0	4.0	39.0

ANO: 1996

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0	0.0	18.0
3	0.0	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.5
4	72.5	7.0	0.0	0.0	0.0	0.0	0.0	0.0	104.1	0.0	0.0	0.0	183.6
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	0.0	0.0	7.9
6	0.0	11.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0	0.0	0.0	0.0	18.5
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	54.2	57.8
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	9.2
10	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	14.2	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.0	0.0	0.0	58.2
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	11.9	0.0	0.0	78.5	0.0	0.0	0.0	0.0	90.4
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	17.3	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.6
17	0.0	0.0	29.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	0.0	39.8
18	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.9	0.0	0.0	35.9
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.8	0.0	0.0	0.0	26.3
23	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	10.9
24	0.0	18.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.1
25	0.0	0.0	7.5	14.5	0.0	0.0	0.0	0.0	0.0	61.0	0.0	0.0	83.0
26	0.0	18.2	0.0	0.0	0.0	0.0	0.0	20.0	0.0	12.0	0.0	8.5	58.7
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.0	0.0	72.0
30	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
SUM	110.1	91.8	37.4	37.9	56.2	0.0	0.0	106.0	123.5	152.8	99.9	101.8	917.4
MED	22.0	15.3	18.7	12.6	14.0	0.0	0.0	35.3	41.2	30.6	33.3	20.4	24.3
MAX	72.5	29.5	29.9	17.3	30.3	0.0	0.0	78.5	104.1	61.0	72.0	54.2	104.1
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	5.0	6.0	2.0	3.0	4.0	0.0	0.0	3.0	3.0	5.0	3.0	5.0	39.0

ANO: 1997

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	30.0	0.0	0.0	0.0	0.0	4.5	****	0.0	0.0	0.0	0.0	12.9	47.4
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0	0.0	0.0	0.0	7.5
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	21.8	0.0	0.0	0.0	21.3	0.0	0.0	0.0	0.0	0.0	0.0	43.1
6	0.0	0.0	0.0	0.0	0.0	42.3	0.0	0.0	0.0	67.5	2.4	0.0	112.2
7	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	8.4	13.7
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9
10	0.0	0.0	5.3	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.2
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0	14.0
13	0.0	0.0	20.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0	0.0	83.5	113.6
14	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	27.5	17.0	57.5	0.0	109.1
15	30.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.2
16	0.0	3.6	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	10.8
17	1.2	0.0	0.0	0.0	0.0	10.3	0.0	0.0	0.0	0.0	0.0	0.0	11.5
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	42.0	3.3	0.0	106.1	0.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0	211.4
20	0.0	0.0	0.0	2.5	0.0	0.0	0.0	12.0	14.0	0.0	0.0	0.0	28.5
21	0.0	0.0	0.0	0.0	20.3	0.0	0.0	0.0	1.0	0.0	0.0	0.0	21.3
22	0.0	0.0	0.0	0.0	16.4	0.0	5.3	0.0	0.0	0.0	0.0	0.0	21.7
23	0.0	0.0	20.4	0.0	9.5	0.0	7.2	0.0	0.0	24.0	0.0	7.8	68.9
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	10.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	20.0	0.0	8.9	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	35.9
27	0.0	0.0	18.5	0.0	0.0	9.4	0.0	0.0	0.0	0.0	6.1	0.0	34.0
28	0.0	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	7.8	0.0	20.3
29	0.0	****	0.0	0.0	0.0	1.0	0.0	0.0	4.6	0.0	0.0	0.0	5.6
30	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.0	0.0	52.0
31	42.0	****	0.0	****	0.0	****	7.1	0.0	****	0.0	****	0.0	49.1
SUM	154.3	48.7	65.5	167.4	46.2	132.7	19.6	79.5	47.1	122.5	139.8	112.6	1135.9
MED	25.7	12.2	13.1	41.8	15.4	12.1	6.5	26.5	11.8	30.6	20.0	28.2	20.3
MAX	42.0	21.8	20.4	106.1	20.3	42.3	7.2	60.0	27.5	67.5	57.5	83.5	106.1
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	6.0	4.0	5.0	4.0	3.0	11.0	3.0	3.0	4.0	4.0	7.0	4.0	58.0

ANO: 1998

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.4
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	20.1
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.8	0.0	0.0	0.0	0.0	10.8
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	2.7
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.5	25.5	32.6
7	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	23.3
8	0.0	0.0	0.0	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2
9	0.0	35.4	0.0	0.0	0.0	0.0	0.0	2.0	4.9	0.0	0.0	0.0	42.3
10	0.0	6.1	21.1	0.0	0.0	7.5	0.0	0.0	0.0	0.0	29.0	0.0	63.7
11	0.0	0.0	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.2
12	8.3	0.0	0.0	0.0	5.4	0.0	0.0	0.0	3.2	0.0	0.0	0.0	16.9
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.7	0.0	0.0	27.7
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	0.0	11.2
15	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
16	0.0	0.0	0.0	54.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.1	70.6
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	5.9	0.0	0.0	0.0	11.4
19	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.0
22	38.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1	0.0	0.0	0.0	0.0	14.1
24	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	63.1	0.0	65.6
25	0.0	0.0	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.1
26	0.0	36.5	0.0	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.4
27	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	20.0	0.0	0.0	12.0	42.5
28	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	62.0	0.0	0.0	0.0	68.9
29	7.7	****	0.0	0.0	3.3	0.0	0.0	0.0	6.1	0.0	29.5	0.0	46.6
30	10.2	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2
31	4.8	****	24.3	****	0.0	****	0.0	0.0	****	0.0	****	0.0	29.1
SUM	73.1	114.0	106.5	78.7	26.8	13.0	0.0	27.0	122.1	48.2	122.1	73.7	805.2
MED	12.2	28.5	17.8	19.7	5.4	6.5	0.0	6.8	17.4	12.0	30.5	18.4	15.9
MAX	38.8	36.5	30.1	54.5	7.9	7.5	0.0	14.1	62.0	27.7	63.1	25.5	63.1
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	6.0	4.0	6.0	4.0	5.0	2.0	0.0	4.0	7.0	4.0	4.0	4.0	50.0

ANO: 1999

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	24.6
2	0.0	0.0	5.1	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	18.1
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	46.1	0.0	0.0	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	41.1	95.4
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	77.0	0.0	75.2	0.0	152.2
9	9.1	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.1
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	77.9	79.1
12	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3
13	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	14.5	34.5
15	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
16	0.0	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	11.5	0.0	0.0	40.5
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	66.0	0.0	0.0	0.0	0.0	0.0	0.0	66.0
19	29.8	36.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.5	35.0	160.5
20	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.1	0.0	56.1
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0.0	2.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
28	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.5
29	0.0	****	23.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.8
30	36.9	****	0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	0.0	47.0
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
SUM	175.1	51.5	81.4	29.0	8.3	66.0	13.0	0.0	107.1	11.5	190.8	188.5	922.2
MED	21.9	10.3	20.4	29.0	4.2	66.0	13.0	0.0	35.7	11.5	63.6	37.7	28.5
MAX	46.1	36.2	40.0	29.0	8.2	66.0	13.0	0.0	77.0	11.5	75.2	77.9	77.9
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	8.0	5.0	4.0	1.0	2.0	1.0	1.0	0.0	3.0	1.0	3.0	5.0	34.0

ANO: 2000

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	17.5	0.0	0.0	3.6	0.0	0.0	0.0	0.0	21.1
2	0.0	0.0	7.7	0.0	0.0	0.0	3.0	0.0	14.0	0.0	0.0	0.0	24.7
3	0.0	30.2	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.8	46.8
5	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
6	0.0	72.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.5
7	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2	12.2
9	0.0	0.0	24.2	0.0	0.0	0.0	103.6	0.0	0.0	0.0	0.0	0.0	127.8
10	0.0	0.0	24.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.3
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	40.0
12	0.0	0.0	53.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.2
13	0.0	12.2	0.0	17.9	0.0	0.0	0.0	5.1	0.0	0.0	119.0	0.0	154.2
14	0.0	0.0	63.2	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0	19.8	92.0
15	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
16	0.0	0.0	0.0	0.0	0.0	12.2	0.0	0.0	0.0	0.0	0.0	0.0	12.2
17	0.0	0.0	0.0	26.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7
18	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	3.8
21	0.0	110.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.2
22	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
23	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	44.6
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	20.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	20.0	0.0	0.0	7.3	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	32.8
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.3	0.0	0.0	0.0	0.0	23.3
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	1.3
29	0.0	15.5	0.0	0.0	0.0	0.0	19.1	0.0	0.0	0.0	99.1	0.0	133.7
30	8.5	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
SUM	68.5	240.6	184.7	56.4	31.6	19.7	125.7	33.3	23.0	60.0	226.5	78.8	1148.8
MED	22.8	48.1	26.4	14.1	10.5	6.6	41.9	8.3	11.5	30.0	56.6	26.3	25.3
MAX	40.0	110.2	63.2	26.7	17.5	12.2	103.6	23.3	14.0	40.0	119.0	46.8	119.0
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	3.0	5.0	7.0	4.0	3.0	3.0	3.0	4.0	2.0	2.0	4.0	3.0	43.0

ANO: 2001

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	0.0	11.9
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	7.5
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	10.9	0.0	0.0	0.0	0.0	7.5	0.0	0.0	6.7	0.0	0.0	25.1
6	0.0	0.0	0.0	45.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.3
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0
9	24.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.2
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.9	17.9
12	33.9	0.0	23.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.0
13	0.0	0.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	0.0	0.0	29.3
14	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.1	40.1	106.2
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	0.0	21.0
16	16.0	0.0	0.0	0.0	0.0	13.3	0.0	0.0	0.0	0.0	8.2	0.0	37.5
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	0.0	0.0	0.0	8.5
19	0.0	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.3
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	2.9
21	0.0	72.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	76.4
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5
24	0.0	0.0	0.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0
25	0.0	0.0	0.0	0.0	58.4	0.0	0.0	0.0	76.9	0.0	0.0	0.0	135.3
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	13.0
27	0.0	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.1
28	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	22.7
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.5	0.0	28.5
30	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9	28.9
31	4.8	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	3.5	8.3
SUM	98.9	116.1	93.4	120.3	68.9	13.3	7.5	8.5	76.9	28.8	133.3	101.4	867.3
MED	19.8	29.0	23.4	60.2	34.4	13.3	7.5	8.5	76.9	7.2	22.2	16.9	26.6
MAX	33.9	72.9	42.3	75.0	58.4	13.3	7.5	8.5	76.9	11.9	60.1	40.1	76.9
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	5.0	4.0	4.0	2.0	2.0	1.0	1.0	1.0	1.0	4.0	6.0	6.0	37.0

ANO: 2002

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	16.8	0.0	25.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	76.6	119.1
2	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	29.9	33.4
3	0.0	29.7	0.0	0.0	0.0	0.0	10.5	0.0	0.0	0.0	15.8	5.5	61.5
4	0.0	4.9	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.5	6.6
5	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.9
6	0.0	0.0	0.0	0.0	0.0	17.1	0.0	0.0	0.0	0.0	0.0	0.0	17.1
7	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	71.1	77.0
8	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	8.8
9	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.0	45.7
10	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	9.2
11	0.0	0.0	0.0	2.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	3.1
12	0.0	0.2	30.3	13.9	0.0	0.0	0.0	0.0	3.0	0.0	0.0	17.5	64.9
13	0.0	0.0	0.0	22.5	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4	23.1
14	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	10.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	7.2	8.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	4.7	9.7
17	0.0	0.5	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	4.8
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	0.0	49.1	9.5	0.0	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.1
20	0.0	0.0	0.0	0.0	6.5	0.0	0.0	10.3	0.0	0.0	0.0	70.6	87.4
21	0.0	49.9	1.0	0.0	0.0	0.0	0.0	3.3	0.0	0.4	2.2	0.0	56.8
22	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.1	0.0	0.0	0.0	0.0	9.6
23	0.0	4.9	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	9.0	15.9
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5
25	0.0	0.0	0.0	16.9	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	17.4
26	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.7
28	0.0	2.5	0.0	0.0	0.0	0.0	0.0	23.1	0.0	0.0	7.6	0.0	33.2
29	0.0	****	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	5.8	5.0	12.0
30	0.0	****	0.0	1.2	20.1	0.0	0.0	0.0	0.0	2.8	5.0	0.0	29.1
31	27.7	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	1.5	29.2
SUM	65.9	144.2	83.7	61.2	36.1	24.1	24.2	37.5	4.0	9.0	36.9	355.5	882.3
MED	16.5	16.0	10.5	8.7	12.0	8.0	4.8	7.5	1.3	2.2	6.2	19.8	9.5
MAX	27.7	49.9	30.3	22.5	20.1	17.1	10.5	23.1	3.0	5.0	15.8	76.6	76.6
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	4.0	9.0	8.0	7.0	3.0	3.0	5.0	5.0	3.0	4.0	6.0	18.0	75.0

ANO: 2003

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	5.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.7	5.4	16.2
2	5.7	11.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	3.4	0.0	2.1	29.1
3	5.3	0.0	108.7	16.0	0.0	5.5	0.0	0.0	0.0	3.8	0.0	6.2	145.5
4	0.0	0.0	0.0	8.9	0.0	0.8	0.0	0.0	0.0	0.0	0.0	21.6	31.3
5	0.6	1.7	0.0	2.1	0.0	0.0	0.0	0.0	0.0	108.8	0.0	9.5	122.7
6	0.4	3.9	4.4	0.0	0.0	0.0	0.0	14.6	0.0	0.0	0.0	3.7	27.0
7	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	2.4
8	0.0	0.2	7.5	0.0	0.0	0.0	5.1	0.0	34.6	0.0	0.0	0.0	47.4
9	0.0	0.3	8.5	42.5	0.0	0.0	0.0	0.0	0.9	8.3	0.0	1.7	62.2
10	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.7	45.2	0.1	48.2
11	97.5	1.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	107.5
12	28.1	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0	50.7
13	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.5
14	2.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	6.8
15	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
16	0.0	12.6	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	27.1
17	0.0	7.0	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	8.0
18	56.2	0.1	0.0	34.9	0.0	0.0	0.0	0.0	0.0	0.0	28.3	0.0	119.5
19	8.7	0.0	0.2	2.5	0.0	0.0	0.0	0.0	0.0	33.7	0.0	0.0	45.1
20	0.0	15.5	18.0	0.0	0.0	0.0	0.0	0.0	8.5	5.0	0.0	0.0	47.0
21	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.5
22	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.6	0.0	30.0	33.5
23	29.0	0.0	0.0	0.0	0.5	0.0	0.0	13.6	0.0	0.0	0.0	0.0	43.1
24	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.6
25	0.0	0.2	18.7	0.0	0.0	0.0	0.0	12.3	0.0	0.0	7.8	1.0	40.0
26	0.0	0.2	0.0	0.0	2.7	0.0	0.0	0.0	0.0	4.0	0.0	0.0	6.9
27	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.9
28	1.1	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.6	0.0	12.8	3.5	19.8
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	4.3
30	0.0	****	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.4	0.0	70.1
31	0.0	****	3.4	****	0.0	****	0.0	0.0	****	5.3	****	0.0	8.7
SUM	250.3	63.7	178.3	114.4	6.1	8.1	7.5	40.5	45.3	175.6	191.0	105.9	1186.7
MED	17.9	4.5	11.1	12.7	2.0	2.7	3.8	13.5	7.6	17.6	21.2	7.1	10.1
MAX	97.5	15.5	108.7	42.5	2.9	5.5	5.1	14.6	34.6	108.8	68.4	30.0	108.8
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	14.0	14.0	16.0	9.0	3.0	3.0	2.0	3.0	6.0	10.0	9.0	15.0	104.0

ANO: 2004

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2	0.0	0.0	8.2
2	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	4.2
3	0.0	0.0	60.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	63.2
4	0.0	1.1	0.0	0.0	14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6
5	3.0	37.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	44.6
6	0.0	0.4	0.0	0.4	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2
7	0.0	0.0	0.0	0.0	0.0	0.0	52.9	0.0	0.0	0.0	0.0	0.0	52.9
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0
9	0.0	0.0	2.4	0.0	0.0	0.0	6.2	0.0	0.0	7.7	0.0	31.9	48.2
10	0.0	0.0	0.0	0.0	0.0	44.9	0.0	0.0	0.0	0.0	29.1	0.3	74.3
11	11.3	0.0	6.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.0	19.0
12	0.0	2.2	0.0	8.6	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	28.3
13	1.9	3.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	39.5	0.0	11.9	57.1
14	4.0	0.0	16.6	2.1	0.0	0.0	0.0	0.0	0.0	1.3	0.0	1.1	25.1
15	0.0	0.4	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	14.0	27.5
16	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	17.9	2.4	21.4
17	0.0	0.0	8.3	3.6	0.0	0.0	0.0	0.0	0.0	69.8	13.8	0.0	95.5
18	0.0	144.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	144.6
19	37.4	0.1	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.8
20	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.8
21	9.9	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	12.1
22	0.2	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	1.8
23	0.0	0.0	0.0	4.9	0.0	4.7	0.0	0.0	0.0	44.5	0.0	0.0	54.1
24	0.0	0.0	0.0	0.0	1.7	1.0	0.0	0.0	0.0	45.2	0.0	0.0	47.9
25	0.0	0.0	0.0	0.0	22.1	6.6	0.0	0.0	0.0	1.3	2.0	0.0	32.0
26	0.0	0.0	0.0	0.0	4.8	26.5	0.0	0.0	0.0	5.6	0.0	0.0	36.9
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	10.2	0.0	12.5
28	2.2	0.0	0.0	0.0	0.0	0.0	53.5	0.0	64.1	0.0	0.0	0.0	119.8
29	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	5.1	12.7	22.5
30	0.0	****	2.0	0.0	0.0	0.0	0.0	0.0	****	0.0	0.0	25.8	27.8
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
SUM	71.8	189.1	104.0	26.1	64.5	88.0	112.6	0.0	67.8	226.5	89.1	120.4	1159.9
MED	8.0	23.6	10.4	3.3	10.8	11.0	37.5	0.0	33.9	20.6	11.1	9.3	16.3
MAX	37.4	144.2	60.3	8.6	22.1	44.9	53.5	0.0	64.1	69.8	29.1	31.9	144.2
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	9.0	8.0	10.0	8.0	6.0	8.0	3.0	0.0	2.0	11.0	8.0	13.0	86.0

ANO: 2005

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.7	44.7
2	4.3	0.0	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	3.2
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.6	0.0	42.6
6	0.0	0.7	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	57.1	59.0
7	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	3.5
9	0.0	52.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	54.7
10	24.8	6.7	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0	82.2	2.6	123.8
11	1.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	10.5	0.0	13.0
12	0.0	0.0	0.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.5
13	5.8	0.0	44.3	0.0	0.0	44.5	0.0	0.0	0.0	0.0	0.1	1.0	95.7
14	0.6	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	18.2	0.0	0.0	19.3
15	7.6	0.0	0.0	0.0	23.1	0.0	0.0	0.0	0.0	2.0	0.0	0.0	32.7
16	0.0	0.0	0.0	0.0	9.4	0.0	12.2	0.0	0.0	8.2	3.2	0.0	33.0
17	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	24.6	0.0	2.5	28.9
18	0.0	0.0	0.0	0.0	0.5	0.0	5.5	0.0	0.0	0.0	0.2	0.0	6.2
19	0.0	0.0	3.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	15.7	1.0	20.4
20	0.0	0.0	0.0	0.0	30.9	1.3	0.0	0.0	0.0	0.0	0.0	0.3	32.5
21	0.0	0.0	1.4	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	6.1	0.3	0.0	0.0	2.0	0.0	0.0	0.0	0.0	8.4
24	0.0	0.0	0.0	4.4	0.0	0.0	0.0	0.0	58.0	0.0	17.0	38.0	117.4
25	20.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.1	27.5	0.0	0.7	52.6
26	0.0	3.2	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.2	10.3
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	4.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	4.0	0.0	4.7	13.5
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	2.6	14.5
30	0.0	****	5.0	0.0	0.0	0.0	0.0	31.5	9.8	0.0	0.0	0.0	46.3
31	8.9	****	0.0	****	0.0	****	0.0	36.2	****	0.0	****	40.1	85.2
SUM	73.2	67.9	53.7	43.3	69.3	56.1	17.7	69.7	75.9	103.1	171.5	195.5	996.9
MED	9.2	11.3	13.4	7.2	6.9	11.2	8.8	23.2	15.2	11.5	21.4	15.0	12.9
MAX	24.8	52.0	44.3	23.5	30.9	44.5	12.2	36.2	58.0	27.5	82.2	57.1	82.2
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	8.0	6.0	4.0	6.0	10.0	5.0	2.0	3.0	5.0	9.0	8.0	13.0	79.0

ANO: 2006

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.0	0.0	0.0	15.4
2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
3	15.0	0.0	0.0	0.2	0.0	30.7	0.0	0.0	0.0	0.0	4.0	37.0	86.9
4	0.0	0.0	13.9	43.3	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	58.2
5	0.0	0.0	0.0	1.9	0.0	0.3	0.0	0.0	0.0	10.1	19.0	0.0	31.3
6	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
7	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.2
8	0.0	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	13.9
9	6.7	34.2	0.0	0.0	0.0	74.0	0.0	1.1	4.5	0.0	0.0	44.5	165.0
10	7.2	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9
11	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	8.0
12	40.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.1
13	2.5	68.7	3.7	0.0	0.0	0.0	11.5	0.0	0.0	0.3	0.0	0.0	86.7
14	0.0	0.0	2.4	1.5	0.0	0.0	3.1	0.0	0.0	32.5	0.0	0.0	39.5
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	22.1	0.0	0.0	24.1
16	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
17	0.0	28.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.3
18	0.0	0.0	2.5	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7
19	20.5	0.0	0.0	0.0	10.5	0.0	0.0	0.0	26.8	4.7	0.0	1.0	63.5
20	2.3	0.0	88.5	0.0	1.4	4.1	0.0	0.0	3.5	0.0	0.0	47.5	147.3
21	3.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	7.4
22	12.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2
23	0.0	24.8	0.0	0.0	0.0	0.0	10.2	0.0	13.0	14.6	0.0	0.0	62.6
24	1.0	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	11.8
25	0.0	0.0	4.1	0.0	0.0	11.7	0.0	0.0	0.0	0.0	0.0	12.5	28.3
26	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
27	0.0	19.7	0.0	0.0	0.0	0.0	0.0	0.1	27.3	0.0	0.0	0.0	47.1
28	0.0	3.4	8.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	1.1	0.0	16.8
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	7.5
30	0.0	****	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
31	0.0	****	1.5	****	0.0	****	0.0	0.0	****	20.2	****	0.0	21.7
SUM	122.0	201.2	134.0	46.9	20.1	124.0	24.8	1.2	90.9	108.5	24.1	157.2	1054.9
MED	9.4	22.4	10.3	11.7	6.7	15.5	8.3	0.6	11.4	13.6	8.0	17.5	11.3
MAX	40.1	68.7	88.5	43.3	10.5	74.0	11.5	1.1	27.3	32.5	19.0	47.5	88.5
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	13.0	9.0	13.0	4.0	3.0	8.0	3.0	2.0	8.0	8.0	3.0	9.0	83.0

ANO: 2007

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	5.8
2	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	18.5
3	8.2	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5	0.0	45.0
4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.1	10.2
5	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.3	73.3
6	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.5	0.0	0.0	57.4
7	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	7.8	8.4	23.2
8	2.6	0.0	0.0	0.0	1.7	0.0	0.5	0.0	0.0	0.0	11.8	0.0	16.6
9	11.9	15.3	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.4
10	0.0	0.3	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	11.9
11	1.3	0.5	1.1	44.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	63.4
12	1.5	66.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.6
13	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	5.8	11.9
14	0.6	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	18.7
15	2.1	41.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5	59.8
16	65.5	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.8
17	5.2	0.0	0.0	0.0	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.7
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5	0.0	14.5
20	15.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	21.8
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	7.1	0.0	0.5	62.1	0.0	13.5	0.0	0.0	0.0	0.0	0.0	83.2
23	0.0	0.0	0.0	3.7	0.0	0.0	31.5	0.0	0.0	0.0	25.0	0.0	60.2
24	45.5	0.0	0.0	0.0	0.0	0.0	19.1	0.0	0.0	0.0	0.0	0.0	64.6
25	4.4	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	15.5	0.0	0.0	24.4
26	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.9
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.2	44.2
28	63.1	4.1	35.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	102.7
29	7.3	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3
30	187.3	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	187.6
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	18.5	****	0.0	18.5
SUM	423.7	176.4	62.6	53.6	88.3	0.0	64.6	0.5	0.0	91.9	112.7	171.8	1246.1
MED	24.9	14.7	8.9	10.7	22.1	0.0	16.1	0.5	0.0	18.4	14.1	19.1	15.0
MAX	187.3	66.1	35.5	44.5	62.1	0.0	31.5	0.5	0.0	55.5	32.5	72.3	187.3
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	17.0	12.0	7.0	5.0	4.0	0.0	4.0	1.0	0.0	5.0	8.0	9.0	72.0

ANO: 2008

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	1.9	3.6	0.0	69.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0
2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.7	0.0	0.0	8.3	0.0	9.2
3	78.6	0.0	9.0	0.0	0.0	0.0	0.0	0.0	18.3	7.3	0.0	0.0	113.2
4	0.0	0.0	26.2	0.0	0.0	0.0	0.0	0.0	20.2	62.0	0.0	0.0	108.4
5	10.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	15.2
6	0.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	7.3	0.0	18.8
7	0.0	0.0	21.1	0.0	0.0	0.0	24.4	10.5	0.0	0.0	0.0	0.0	56.0
8	0.0	0.0	3.7	0.0	0.0	0.5	2.2	0.0	0.0	0.0	0.0	5.1	11.5
9	0.0	11.2	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	0.0	59.0
10	0.0	0.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.6	47.1
11	0.0	0.0	0.6	0.0	4.9	0.0	0.0	0.0	0.0	0.0	25.6	2.7	33.8
12	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
13	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
14	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	5.5	0.0	6.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.2
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	17.0
20	90.3	9.5	2.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	102.7
21	54.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	69.0
22	4.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	22.8	29.7
23	3.8	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	28.0
24	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	9.6	0.0	0.0	0.0	10.5
25	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	4.2
26	12.2	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	42.9
27	0.0	13.0	1.9	5.4	18.4	0.0	0.0	0.0	0.0	4.4	0.0	0.0	43.1
28	14.0	62.2	0.0	0.0	0.0	0.0	0.0	11.5	0.0	0.0	0.0	0.0	87.7
29	0.0	29.2	0.0	5.4	0.0	0.0	16.5	0.0	0.0	35.5	1.5	0.0	88.1
30	0.0	****	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.9
31	11.0	****	69.5	****	0.0	****	12.2	0.0	****	0.0	****	0.0	92.7
SUM	314.9	189.1	197.4	82.1	24.5	0.5	55.3	22.7	49.6	118.5	69.1	89.9	1213.6
MED	24.2	15.8	15.2	20.5	8.2	0.5	13.8	7.6	9.9	14.8	9.9	11.2	12.6
MAX	90.3	62.2	69.5	69.5	18.4	0.5	24.4	11.5	20.2	62.0	25.6	23.6	90.3
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	13.0	12.0	13.0	4.0	3.0	1.0	4.0	3.0	5.0	8.0	7.0	8.0	81.0

ANO: 2009

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.7	0.0	0.0	0.0	3.0	32.7
2	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	31.9
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.0	5.7	0.0	0.0	0.0	10.1
5	0.0	0.0	0.0	1.1	0.0	0.0	8.0	0.0	0.0	0.0	3.5	0.0	12.6
6	0.0	0.2	0.0	1.0	0.0	0.0	0.0	0.0	0.0	39.0	0.0	0.0	40.2
7	0.0	24.1	0.0	16.0	0.9	0.0	1.6	0.0	0.0	0.0	7.7	2.0	52.3
8	0.7	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	16.5	0.0	21.2
9	0.0	3.5	0.0	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	10.8
10	0.0	2.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
11	0.0	103.1	11.5	0.0	0.0	0.0	6.9	0.0	0.0	17.2	0.0	5.3	144.0
12	0.0	0.0	0.5	0.0	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.7
13	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	15.3
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	2.5	9.0	5.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	17.8
18	39.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.3
19	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.9	0.0	0.0	24.4
20	0.0	0.0	17.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.3
21	0.0	0.3	0.0	0.0	0.0	0.0	3.0	6.6	0.0	0.0	0.0	0.0	9.9
22	0.0	0.0	0.5	0.0	0.0	0.0	32.8	0.0	20.0	0.0	0.0	0.0	53.3
23	0.0	13.0	0.0	0.0	0.0	10.2	4.3	0.0	0.0	0.0	0.0	4.0	31.5
24	0.0	0.0	0.7	12.1	0.0	31.4	0.0	0.0	0.0	9.5	0.0	0.0	53.7
25	58.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.1
26	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	50.5
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	68.0	0.0	0.0	79.0
28	9.3	0.0	0.0	0.0	52.4	0.0	0.0	0.0	0.0	0.0	5.0	0.0	66.7
29	0.0	****	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
30	0.0	****	0.1	0.0	0.0	****	0.0	0.0	0.0	0.0	55.5	7.0	62.6
31	0.0	****	41.5	****	0.0	****	0.0	0.0	****	0.0	****	0.0	41.5
SUM	148.9	159.2	120.6	30.2	67.7	45.6	68.3	37.6	40.6	158.9	88.2	31.8	997.6
MED	21.3	17.7	11.0	7.6	16.9	15.2	8.5	12.5	10.2	26.5	17.6	5.3	14.2
MAX	58.1	103.1	41.5	16.0	52.4	31.4	32.8	29.7	20.0	68.0	55.5	10.5	103.1
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	7.0	9.0	11.0	4.0	4.0	3.0	8.0	3.0	4.0	6.0	5.0	6.0	70.0

ANO: 2010

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	7.0
2	84.9	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.5	0.0	0.0	89.2
3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	4.3	0.0	10.6	0.0	0.0	0.0	0.0	0.0	0.0	12.6	0.0	27.5
6	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
7	3.5	0.0	0.0	0.0	0.4	0.0	24.0	0.0	0.0	0.0	0.0	0.0	27.9
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	4.2	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	6.2
10	0.0	40.0	78.0	78.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	196.0
11	0.0	0.5	37.5	37.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.5
12	100.9	1.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	37.7	141.7
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	6.7
14	0.0	20.0	1.6	1.6	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	34.2
15	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
16	0.0	5.5	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	18.0
17	5.5	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	47.5	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.5
20	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	2.0
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	65.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	90.0
23	0.0	0.0	65.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	10.2	0.0	79.1
24	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
25	0.0	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.8	35.3
26	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
27	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.2	0.0	130.2
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	40.0	41.8
29	0.0	****	1.0	0.0	0.0	0.0	0.0	12.9	6.0	6.2	0.0	0.0	26.1
30	0.0	****	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
31	0.0	****	0.0	****	****	****	0.0	0.0	****	0.0	****	0.0	0.0
SUM	249.8	132.6	183.6	199.2	11.3	0.0	51.6	12.9	14.5	31.7	121.0	103.5	1111.7
MED	35.7	11.0	30.6	28.5	2.3	0.0	10.3	12.9	4.8	10.6	24.2	34.5	18.7
MAX	100.9	40.0	78.0	78.0	3.9	0.0	24.0	12.9	6.7	25.0	90.2	40.0	100.9
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	7.0	12.0	6.0	7.0	5.0	0.0	5.0	1.0	3.0	3.0	5.0	3.0	57.0

ANO: 2011

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	2.7
2	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	9.0
3	0.0	0.0	5.7	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.7
4	1.5	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	10.6
5	5.0	23.6	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	38.8	0.0	67.9
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	49.5	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	49.6
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0	0.0	0.0	18.2
9	0.0	0.0	27.8	0.0	0.0	17.6	0.0	0.0	0.0	0.0	0.0	31.5	76.9
10	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2	0.0	11.7
11	0.0	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	0.0	22.8
12	12.0	0.0	0.0	2.5	0.0	8.5	2.7	0.0	0.0	0.0	0.0	31.5	57.2
13	3.5	3.5	8.5	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	35.5
14	60.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	23.5	0.0	0.0	83.7
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	17.0
16	60.7	0.0	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.5	69.8
17	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0	14.4	0.0	0.0	0.0	19.8
18	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
19	0.0	13.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4
20	0.0	8.5	0.0	0.0	0.0	0.0	26.2	0.0	0.0	0.0	0.0	0.0	34.7
21	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	4.7
22	0.0	35.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.5
23	0.0	30.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.6
24	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
25	1.3	5.2	0.0	0.0	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.5
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	1.7
27	18.1	0.0	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.3
28	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
29	0.0	****	0.0	0.0	0.0	5.2	2.3	0.0	0.0	60.2	0.0	0.0	67.7
30	0.0	****	0.0	****	0.0	****	3.5	0.0	0.0	0.0	0.0	0.0	3.5
31	0.0	****	****	****	****	****	12.9	0.0	****	0.0	****	0.0	12.9
SUM	166.1	195.0	65.7	19.7	17.0	31.4	56.2	1.7	32.6	117.4	52.2	86.5	841.5
MED	16.6	16.2	9.4	3.3	17.0	7.8	9.4	1.7	16.3	23.5	13.0	17.3	12.6
MAX	60.7	49.5	27.8	13.0	17.0	17.6	26.2	1.7	18.2	60.2	38.8	31.5	60.7
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	10.0	12.0	7.0	6.0	1.0	4.0	6.0	1.0	2.0	5.0	4.0	5.0	63.0

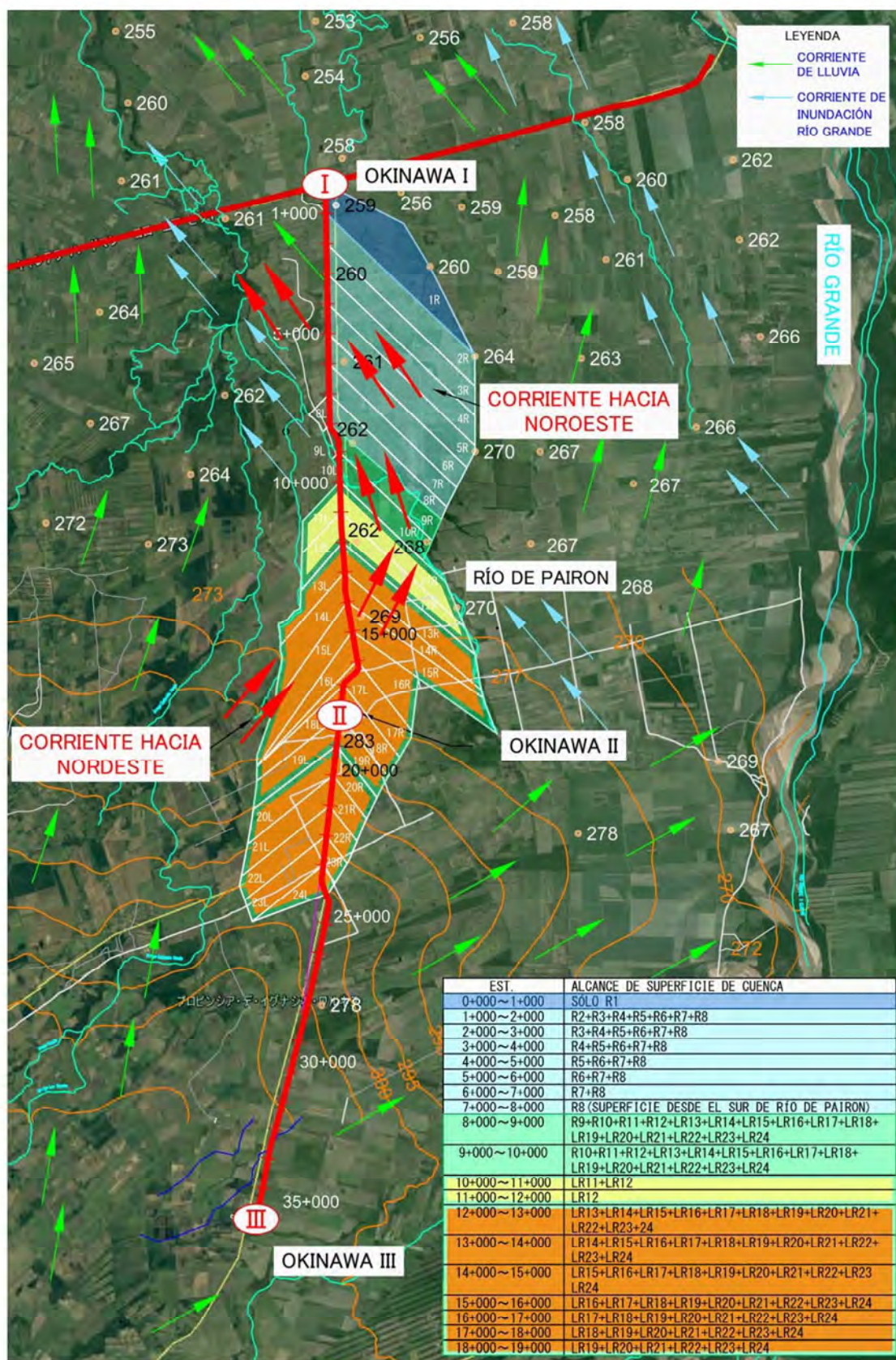
ANO: 2012

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0
2	0.0	0.5	5.3	0.0	0.0	0.0	0.0	0.0	0.0	25.9	0.0	0.0	31.7
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.3	0.0	0.0	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	35.3
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	12.5	0.0	0.0	0.0	0.0	3.6	3.6	0.0	0.0	0.0	23.5	0.0	43.2
7	0.0	0.0	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.5	67.5
8	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5
9	0.0	49.1	0.0	14.9	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0	78.0
10	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0
11	30.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0
12	1.5	0.0	0.0	0.0	40.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.6
13	0.0	0.0	37.2	0.0	41.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.7
14	0.0	67.5	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.5
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	0.0	8.5
17	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.7
18	0.0	0.0	0.0	0.0	13.2	0.0	0.0	42.3	30.1	0.0	0.0	0.0	85.6
19	0.0	0.0	5.5	0.0	0.0	58.4	0.0	0.0	0.0	0.0	90.5	0.0	154.4
20	0.0	0.0	0.0	0.0	0.0	58.6	0.0	0.0	40.1	0.0	0.0	0.0	98.7
21	0.0	13.1	0.0	0.0	5.5	35.0	0.0	0.0	0.0	0.0	0.0	0.0	53.6
22	0.0	0.0	63.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.1
23	0.0	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.5	0.0	60.6
24	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
25	64.5	3.0	6.5	34.0	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	120.0
26	0.0	64.2	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2	89.6
27	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	12.5
30	0.0	****	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
SUM	145.0	221.8	157.8	62.4	100.3	191.3	15.6	42.3	70.2	48.4	179.5	52.7	1287.3
MED	20.7	18.5	22.5	12.5	25.1	31.9	7.8	42.3	35.1	16.1	44.9	26.4	25.3
MAX	64.5	67.5	63.1	34.0	41.5	58.6	12.0	42.3	40.1	25.9	90.5	39.5	90.5
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	7.0	12.0	7.0	5.0	4.0	6.0	2.0	1.0	2.0	3.0	4.0	2.0	55.0

ANO: 2013

DIA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	TOTAL
1	25.5	43.9	0.0	0.0	****	55.1	0.0	0.0	0.0	0.0	19.3	0.0	143.8
2	0.0	0.0	0.0	26.5	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.5
3	0.0	0.0	8.5	0.0	****	0.0	0.0	0.0	6.0	0.0	0.0	0.0	14.5
4	0.0	0.0	0.0	20.5	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.5
5	0.0	0.0	0.0	40.4	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.4
6	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	22.5	0.0	0.0	0.0	****	0.0	0.0	0.0	1.5	0.0	0.0	0.0	24.0
9	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	2.7	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
11	0.0	28.5	0.0	0.0	****	1.5	0.0	0.0	0.0	0.0	0.0	0.0	30.0
12	0.0	0.0	0.0	32.5	****	0.0	0.0	0.0	5.7	0.0	0.0	13.3	51.5
13	0.0	1.5	39.6	0.0	****	0.0	0.0	0.0	5.3	0.0	0.0	14.2	60.6
14	0.0	0.0	0.0	24.5	****	0.0	0.0	0.0	0.0	6.5	9.3	0.0	40.3
15	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	13.2	13.2
17	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	30.1	0.0	0.0	30.1
18	0.0	0.0	0.0	0.0	****	12.2	0.0	0.0	0.0	12.2	0.0	0.0	24.4
19	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	4.2	0.0	4.2
20	0.0	8.5	0.0	0.0	****	0.0	14.6	0.0	0.0	0.0	11.4	16.5	51.0
21	0.0	0.0	0.0	0.0	****	4.5	0.0	0.0	0.0	0.0	0.0	0.0	4.5
22	0.0	0.0	0.0	0.0	****	8.0	0.0	0.0	0.0	38.2	0.0	20.2	66.4
23	0.0	0.0	11.2	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2
24	0.0	0.0	9.1	0.0	****	20.7	0.0	0.0	0.0	20.1	0.0	14.8	64.7
25	20.1	6.5	0.0	0.0	****	25.0	0.0	0.0	0.0	0.0	0.0	0.0	51.6
26	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	0.0	****	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	29.0	0.0	29.0
30	0.0	****	0.0	0.0	****	7.9	0.0	0.0	0.0	1.5	0.0	0.0	9.4
31	0.0	****	0.0	****	****	****	0.0	0.0	****	0.0	****	15.5	15.5
SUM	68.1	88.9	71.1	144.4	****	134.9	14.6	0.0	18.5	108.6	73.2	107.7	830.0
MED	22.7	17.8	14.2	28.9	****	16.9	14.6	0.0	4.6	18.1	14.6	15.4	16.8
MAX	25.5	43.9	39.6	40.4	****	55.1	14.6	0.0	6.0	38.2	29.0	20.2	55.1
MIN	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N	3.0	5.0	5.0	5.0	****	8.0	1.0	0.0	4.0	6.0	5.0	7.0	49.0

(2) Superficie de la Cuenca



(3) Estimación de los Caudales de Diseño por Método de “Gumbel”

Estimación de los Caudales de Diseño por Método de “Gumbel”					
(1) Orden i	(2) Año	Precipitación x' (mm)	(3) F(x) ^{*1}	(4) x ²	(5) yn ^{*2}
1	1992	203.5	0.96429	41,412.25	3.3142
2	2007	187.3	0.92857	35,081.29	2.6022
3	2004	144.2	0.89286	20,793.64	2.1775
4	1994	131	0.85714	17,161.00	1.8698
5	1993	120	0.82143	14,400.00	1.6260
6	2000	110.2	0.78571	12,144.04	1.4223
7	2003	108.8	0.75000	11,837.44	1.2459
8	1997	106.1	0.71429	11,257.21	1.0893
9	1996	104.1	0.67857	10,836.81	0.9473
10	2009	103.1	0.64286	10,629.61	0.8168
11	2010	100.9	0.60714	10,180.81	0.6952
12	1987	100.9	0.57143	10,180.81	0.5805
13	1990	100.3	0.53571	10,060.09	0.4713
14	1991	100.2	0.50000	10,040.04	0.3665
15	1989	99.5	0.46429	9,900.25	0.2649
16	2012	90.5	0.42857	8,190.25	0.1657
17	2008	90.3	0.39286	8,154.09	0.0680
18	2006	88.5	0.35714	7,832.25	-0.0292
19	2005	82.2	0.32143	6,756.84	-0.1266
20	1999	77.9	0.28571	6,068.41	-0.2254
21	2001	76.9	0.25000	5,913.61	-0.3266
22	2002	76.6	0.21429	5,867.56	-0.4321
23	1995	64.1	0.17857	4,108.81	-0.5439
24	1998	63.1	0.14286	3,981.61	-0.6657
25	2011	60.7	0.10714	3,684.49	-0.8036
26	2013	55.1	0.07143	3,036.01	-0.9704
27	1988	53.3	0.03571	2,840.89	-1.2037
Total		2,699.3		302,350.11	
Promedio $\Sigma x/N=$		99.97	$\Sigma x^2/N=$	11198.152	

$$F(x)=1-j/(N+1)$$

$$S_x = (\overline{x^2} - (\overline{x})^2)^{0.5} = 34.7009$$

$$N = 27$$

$$\overline{y} = 0.5332$$

$$S_y = 1.1004$$

$$1/a = S_x/S_y = 31.5348$$

$$x_0 = \overline{x} - (1/a) * \overline{y} = 83.156$$

Siendo

$$x = 83.156 + 31.5348 * y$$

Se muestra la relación de período de retorno y "y" en la fórmula que está escrito en abajo.

Se calcula la probabilidad de precipitación "x" por esa fórmula.

$$F(x) = 1 - \exp(-e^{-y}) = 1 - j/(N+1)$$

Período de Retorno	F(%)	$\overline{y}$	$(1/a) * \overline{y}$	Probabilidad de Precipitación
3	66.7	0.9027	28.467	112
10	90	2.2504	70.965	154
20	95	2.9702	93.665	177
25	96	3.1985	100.865	184
30	96.7	3.3843	106.723	190
40	97.5	3.6763	115.930	199
50	98	3.9019	123.047	206
100	99	4.6002	145.065	228

*1 F(x) = La función densidad de probabilidades

*2 yn valor que se obtiene a partir del número de años de la serie, mediante tablas.

*3 yt variable de Gumbel para el período de retorno T. Se determina a partir del valor de período de retorno. El valor de puede obtener de la tabla adjunta.

Tabla de Datos (N) y $\overline{y}$, Sy

Datos N	$\overline{y}$	Sy
20	0.5236	1.0628
21	0.5252	1.0696
22	0.5268	1.0754
23	0.5283	1.0811
24	0.5296	1.0864
25	0.5309	1.0915
26	0.5320	1.0961
27	0.5332	1.1004
28	0.5343	1.1047
29	0.5353	1.1086
30	0.5362	1.1124

Valores de “yt” para distintos
periodos de retorno T

Períodos de Retorno (T)	1/T= 1 - F	yt ^{*3}
500	0.00200	6.21361
400	0.00250	5.99021
300	0.00333	5.70213
250	0.00400	5.51946
200	0.00500	5.29581
150	0.00667	5.00729
100	0.01000	4.60015
80	0.01250	4.37574
60	0.01667	4.08595
50	0.02000	3.90194
40	0.02500	3.67625
30	0.03333	3.38429
25	0.04000	3.19853
20	0.05000	2.97020
15	0.06667	2.67375
10	0.10000	2.25037
8	0.12500	2.01342
7	0.14286	1.86983
6	0.16667	1.70198
5	0.20000	1.49940
4	0.25000	1.24590
3	0.33333	0.90272
2	0.50000	0.36651

⇐ Se aplica retorno de 50 años para las
alcantarillas

(4) Diseño Hidráulico

EST.	Izquierda	Derecha	Superficie de Cuenca (km2)	Área total (km2)	Longitud de corriente de cada área (km) : L	Altura(m)	Diferencia de altura(m)	Pendiente	Velocidad(k m/hr) : W	Tiempo llegada calculado (hr) : Tc	Tiempo llegada hipotético (min)	Tiempo llegada (min)	Intensidad de precipitación en tiempo para llegar (mm/h)	Coeficiente de escorrentía :C	Caudal estimado (m3/s)	Capacidad de caudal de diseño(m3/s)			
																Alcantarilla	Cantidad de Adicional DP800	Additional DP800	Total
1	0.48	6.736	6.736	6.736	10.10	274.49	0.50	0.0007	0.95	10.00	636	636	14.80	0.1	2.27	4.98	0.00	4.98	
2	2.417	4.935	4.935	27.49	3.26	276.90	1.00	0.006	0.88	10.74	632	632	14.88	0.1	11.36	35.93	0.00	30.93	
3	2.102	4.802	4.802	22.55	8.43	277.12	4.38	0.0006	0.82	10.28	614	614	15.17	0.1	2.50	0.00	11	10.34	16.04
4	1.772	4.808	4.808	17.53	7.63	277.37	4.65	0.0065	0.85	9.62	541	541	16.50	0.1	8.14	1.66	8	7.30	8.96
5	1.37	4.684	4.684	12.945	6.88	277.42	4.38	0.0007	0.89	7.70	462	462	18.33	0.1	6.59	1.66	6	5.48	7.14
6	1.141	4.322	4.322	8.261	6.21	277.78	4.22	0.0007	0.91	6.85	411	411	19.22	0.1	4.55	10.37	0.00	0.90	10.37
7	0.869	3.939	3.939	7.319	5.63	278.70	3.30	0.0006	0.83	5.89	408	408	19.92	0.1	4.05	3.60	5	4.57	4.57
8	0.44	2.94	3.38	3.38	5.17	279.04	2.36	0.0006	0.82	6.33	380	380	20.88	0.1	1.96	15.04	10	9.13	25.07
9	0.341	2.069	3.01	63.669	16.15	279.63	35.37	0.0009	1.70	10.66	640	640	14.78	0.1	26.10	84.33	10	9.13	93.46
10	0.076	2.873	2.888	60.679	17.29	280.37	34.63	0.0050	1.73	9.99	598	598	15.49	0.1	25.99	15.99	11	10.04	26.04
11	1.207	3.644	3.644	6.099	6.53	280.90	24.05	0.0021	1.78	9.18	551	551	16.20	0.1	3.15	0.00	3	4.27	2.57
12	1.567	3.265	3.265	4.565	15.34	281.63	33.30	0.0022	1.82	8.42	505	505	17.28	0.1	1.57	3.34	0.00	3.52	3.52
13	1.947	6.328	6.273	50.882	14.56	282.87	32.19	0.0092	1.85	7.75	465	465	18.25	0.1	2.38	25.40	3	8.22	33.62
14	3.968	2.576	5.641	44.607	15.41	284.28	30.72	0.0023	1.88	7.14	428	428	19.99	0.1	22.90	21.14	3	2.74	43.68
15	3.522	3.989	7.511	41.06	12.48	284.91	39.00	0.0024	1.94	6.42	385	385	20.70	0.1	23.96	25.40	7	6.33	31.59
16	1.389	2.769	4.655	31.455	11.54	283.80	27.20	0.0024	1.91	6.09	369	362	21.70	0.1	14.83	0.37	13	9.73	19.50
17	6.643	2.506	3.139	26.8	14.64	290.80	25.00	0.0053	1.91	5.59	335	335	22.71	0.1	16.31	3.03	19	1.32	17.65
18	1.923	1.977	3.902	22.631	9.71	291.87	23.19	0.0024	1.92	5.05	303	303	24.20	0.1	15.96	0.00	18	16.43	16.43
19	2.107	1.671	4.004	19.749	8.76	295.33	19.68	0.0022	1.86	4.71	283	283	25.42	0.1	13.94	0.00	0.00	0.00	0.00

(5) Calculo del Tamaño de las Alcantarillas

Capacidad de las alcantarillas se calcula 80 porciento de caudal del agua por la Fórmula de Manning.

$$Q_c = 0.8 \times V \times A$$

$$V = 1/n \times R^{(2/3)} \times I^{(1/2)}$$

Siendo:

Qc: Volumen de flujo que puede pasar por las obras de drenaje (m3/seg)

V: Velocidad de flujo (m/seg)

n: Coeficiente de rugosidad (tubos de hormigón: 0,013, cunetas de hormigón: 0,015, cunetas de mampostería: 0,025)

R: Radio hidráulico (m), $R = A/S$

I: Pendiente del canal

A: Sección hidráulica transversal de la obra de drenaje (m²)

S: Perímetro mojado (m)

#	Tamaño	Ancho (m)	Altura (m)	Perímetro mojado: S (m)	Profundidad de agua: h (m)	Área transversal: A (m ²)	Velocidad de flujo: v (m/s)	Coeficiente de rugosidad: n	Pendiente del canal: I	Radio hidráulico: R (m)	Caudal del agua: Q _c (m ³ /s)
PC 1	DP800	Dimensión 0.80		1.77	0.64	0.43	2.12	0.013	0.01	0.24	0.91
PC 2	DP1000	Dimensión 1.00		2.21	0.80	0.67	2.46	0.013	0.01	0.30	1.65
BC 1	2.0×1.0	2.00	1.00	3.60	0.80	1.60	2.75	0.015	0.01	0.44	4.39
BC 2	3.0×1.0	3.00	1.00	4.60	0.80	2.40	3.06	0.015	0.01	0.52	7.33
BC 3	3.0×1.30	3.00	1.30	5.08	1.04	3.12	3.41	0.015	0.01	0.61	10.63
BC 4	2*2.5×1.30	2.50	1.30	4.58	1.04	2.60	3.23	0.015	0.01	0.57	16.80
BC 5	1.5×1.5	1.50	1.50	3.90	1.20	1.80	2.82	0.015	0.01	0.46	5.07
BC 6	2*2.5×1.5	2.50	1.50	4.90	1.20	3.00	3.40	0.015	0.01	0.61	20.39

(6) Longitud y Caudal de agua de las Alcantarillas

Progresiva	Existente		Nuevo		Longitud (m)		Caudal del agua (m ³ /seg)		
	Tubo	Caja	Tubo	Caja	Tubo	Caja	Tubo	Caja	Total
Est. 0+016	1000		1000		18.24		1.66		4.98
Est. 0+025	1000		1000		18.24		1.66		
Est. 0+937	800		1000		20.06		1.66		
Est. 1+121	1200			1.5×1.5		18.61		7.17	30.93
Est. 1+154		2*1.8×1.4		2*2.5×1.30		17.25		23.77	
Est. 3+200	1000		1000		17.62		1.66		1.66
Est. 4+819	800		1000		19.41		1.66		1.66
Est. 5+026		1.5×1.3		3.0×1.0		18.43		10.37	10.37
Est. 7+010	800		800		15.94		0.91		15.94
Est. 7+972		1.6×1.2		3.0×1.30		18.09		15.03	
Est. 8+012	600		1000		18.74		1.66		84.33
Est. 8+047		1.4×1.6		3.0×1.30		16.97		15.03	
Est. 8+429		2.0×1.6		3.0×1.30		17.70		15.03	
Est. 8+664		2*1.8×1.6		2*2.5×1.30		18.51		23.77	
Est. 8+815		2*2.0×1.6		2*2.5×1.5		16.11		28.84	
Est. 9+132	1000			1.5×1.5		21.51		7.17	15.99
Est. 9+223	1500			1.5×1.5		20.83		7.17	
Est. 9+330	600		1000		17.26		1.66		
Est.11+742	1000		1000		17.82		1.66		3.32
Est.11+935	1000		1000		19.27		1.66		
Est.12+330	1200			3.0×1.0		16.88		10.37	25.40
Est.12+982	1200			3.0×1.30		17.88		15.03	
Est.13+035	800			2.0×1.0		18.95		6.21	41.14
Est.13+356	1000			2.0×1.0		19.81		6.21	
Est.13+437	1000		1000		16.09		1.66		
Est.13+630	1500			3.0×1.30		19.24		15.03	
Est.13+782	1000		1000		18.27		1.66		
Est.13+894	800			3.0×1.0		18.81		10.37	25.40
Est.13+994	800			3.0×1.0	16.35			10.37	
Est.14+200	800			3.0×1.30		17.54		15.03	25.40
Est.15+261		1.6×1.0		3.0×1.0		15.68		10.37	10.37

8-3 Análisis de escurrimiento (Río Pailón y puente)

1) Organización de los datos de precipitación

Se organizaron los datos de precipitación de CETABOL y de SENAMHI, y finalmente se realizaron los preparativos del procesamiento estadístico hidrológico utilizando la precipitación máxima de los datos de SENAMHI.

2) Cálculo de la probabilidad de excedencia

Se calculó la precipitación probable utilizando los métodos de distribución logarítmica normal y de Gumbel. A continuación se presentan los principales resultados. Para el cálculo del caudal se utilizó el método Gumbel.

Tabla 2-2-14 Precipitación diaria probable

Período de retorno	Precipitación diaria probable (mm/día)	
	Distribución logarítmica normal	Método Gumbel
10	146	154
20	168	177
25	175	184
30	181	190
40	190	199
50	198	206
100	221	228

Fuente: Equipo de Estudio

3) Cálculo del período de retorno de precipitación

Se determinó la precipitación diaria probable con período de retorno de 100 años de 228 mm/día aplicando las normas del Departamento de Santa Cruz.

4) Cálculo del área de la cuenca

El área de la cuenca se determinó en 30,5 km² utilizando el mapa topográfico del Instituto Geográfico Militar.

5) Determinación del coeficiente de escurrimiento

Dado que la cuenca del Río Pailón es una zona agrícola, el coeficiente de escurrimiento se determinó en 0,45 con base en las Normas Técnicas para las Obras Fluviales (borrador) del Ministerio de Construcción.

6) Cálculo del tiempo de llegada de las crecidas

Se determinó el tiempo de llegada de crecidas a partir de la altitud y la longitud del canal de la cuenca del Río Pailón. Según el cual, el tiempo de llegada se determinó en 110 minutos comparando con los resultados de varias fórmulas matemáticas indicadas en la Tabla 2-2-15.

Tabla 0-15 Tiempo de llegada de las crecidas

Método de cálculo	Velocidad de flujo uniforme	Método Doken	Método Kadoya	Método de Onda Cinemática
Tiempo de llegada de las crecidas (min)	80	140	110	90

Fuente: Equipo de Estudio

7) Cálculo de la precipitación media en el tiempo de llegada de las crecidas

En la Tabla 2-2-16 se presentan los resultados del cálculo de la intensidad media de lluvias para las crecidas lleguen en 110 minutos. Para el Proyecto se adoptó el valor calculado con el método Mononobe que es el método más comúnmente utilizado y que arroja los valores prudenciales.

Tabla 0-16 Intensidad media de lluvias en el tiempo de llegada de crecidas

	Método Ito	Método Mononobe
Intensidad media de lluvias en el tiempo de llegada de crecidas (mm/h)	38,2	52,8

Fuente: Equipo de Estudio

8) Cálculo del caudal de crecidas

Se determinó el caudal de crecida de análisis utilizando el método racional.

$$Q_p = 1/3,6 * f_p * r * A = 201 \text{ m}^3/\text{s}$$

Q_p : Caudal del pico de crecida (m^3/s)

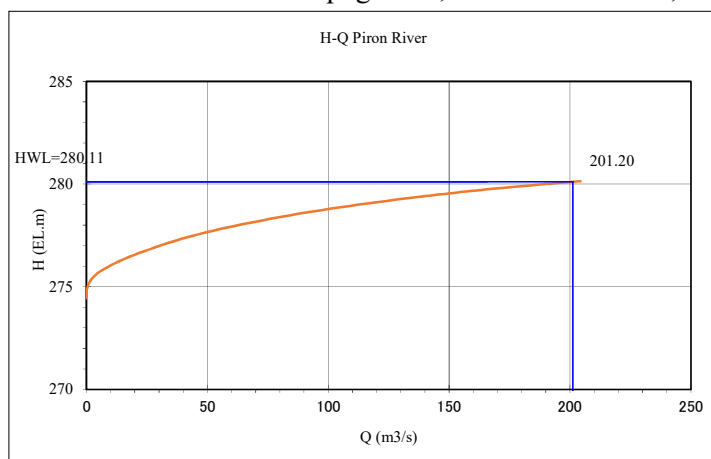
r : Intensidad media de lluvias en el tiempo de llegada de crecidas

f_p : Coeficiente de escurrimiento

A : Área de la cuenca (km^2)

9) Cálculo del nivel de crecida

Se determinó el caudal utilizando la precipitación diaria probable del período de retorno de 100 años ($201 \text{ m}^3/\text{s}$). Al aplicar la curva de nivel y caudal de agua preparada a partir de la sección del río preparada con los datos del levantamiento topográfico, se obtuvo $H = 280,11$.



Resultado del ensayo CBR (estación seca)

Client: KATAHIRA & Engineers International.															Project: Preparatory Study of the Oknawa I - II and III Road Paving Project															00
Location: Municipality of Oknawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City																														210414
																														02/09/2014
N° POLL	SAMPLES	Progresivas	HUMEDAD NATURAL	GRANULOMETRIA				LIMITES DE ATTERBERG				CLASIFICACION	Proctor	HUMEDAD OPTIMA	% DE CIER. P.O. IMPENETRACION		OBSERVACIONES													
				Grating	4	10	40	200	L.L	I.P	1-P				1-100 MOD	Opt.		95%	100%											
01	01	0+030	19.97%	100.00	100.00	99.57	98.60	88.79	26.54%	0.00%	N.P.	N.P.	ML	1.835	15.79%	1.41	2.16	Observations												
02	01	1+000	21.90%	100.00	100.00	99.92	99.64	97.92	24.93%	0.00%	N.P.	N.P.	ML	1.804	14.37%	0.74	1.43													
03	01	2+000	16.54%	100.00	100.00	99.69	98.51	85.11	20.45%	0.00%	N.P.	N.P.	ML	1.920	12.43%	4.03	10.04													
04	01	3+000	18.04%	100.00	100.00	99.77	97.55	97.55	0.00%	0.00%	N.P.	N.P.	ML	1.754	13.01%	7.01	13.07													
05	01	4+000	30.26%	100.00	100.00	99.85	99.67	97.56	24.48%	0.00%	N.P.	N.P.	ML	1.804	14.37%	2.68	5.48													
06	01	5+000	20.24%	100.00	100.00	99.95	99.71	99.15	27.01%	0.00%	N.P.	N.P.	ML	1.817	16.31%	1.36	2.49													
07	01	6+000	24.86%	100.00	100.00	99.95	99.72	97.22	0.00%	0.00%	N.P.	N.P.	ML	1.843	12.41%	4.25	11.06													
08	01	7+000	19.35%	100.00	100.00	99.82	98.12	91.13	0.00%	0.00%	N.P.	N.P.	ML	1.916	13.14%	7.40	12.32													
09	01	8+000	20.24%	100.00	100.00	99.95	99.71	99.15	22.34%	0.00%	N.P.	N.P.	ML	1.832	14.44%	2.05	5.06													
10	01	9+100	22.31%	100.00	100.00	99.87	99.62	97.15	40.84%	21.74%	19.10%	N.P.	CL	1.742	17.35%	0.86	1.34													
11	01	10+000	12.58%	100.00	100.00	99.67	97.48	49.95%	28.53%	21.41%	N.P.	N.P.	ML	1.726	16.34%	0.77	1.17													
12	01	11+000	12.74%	100.00	100.00	99.81	98.50	93.64	56.84%	24.49%	32.35%	N.P.	CH	1.754	15.81%	0.59	1.72													
13	01	12+000	13.46%	100.00	100.00	99.53	96.91	61.75%	26.54%	35.21%	N.P.	CH	1.608	20.27%	0.92	1.47														
14	01	13+000	7.94%	100.00	100.00	99.40	96.20	67.23	35.96%	16.09%	19.88%	N.P.	CL	1.912	14.08%	1.52	2.40													
15	01	14+000	26.50%	100.00	100.00	99.92	99.64	97.25	49.93%	25.78%	24.15%	N.P.	CL	1.625	22.65%	0.69	1.44													
16	01	15+000	17.21%	100.00	100.00	99.41	99.04	71.73	22.11%	11.24%	10.87%	N.P.	CL	2.024	8.03%	2.41	5.22													
17	01	16+000	14.88%	100.00	100.00	99.56	97.95	62.69	20.44%	0.00%	N.P.	N.P.	ML	2.060	9.43%	4.57	8.62													
18	01	17+000	13.61%	100.00	100.00	99.32	93.23	0.00%	0.00%	0.00%	N.P.	N.P.	ML	1.982	8.43%	11.79	26.30													
19	01	18+000	24.10%	100.00	100.00	99.70	93.88	41.22%	21.36%	19.86%	N.P.	N.P.	CL	1.828	15.91%	1.56	2.83													
20	01	19+000	13.17%	100.00	100.00	99.71	45.18	26.85%	0.00%	0.00%	N.P.	N.P.	SM	1.958	7.67%	8.57	18.73													
21	01	20+000	17.03%	100.00	100.00	99.95	98.45	60.63	0.00%	0.00%	N.P.	N.P.	ML	2.057	9.46%	6.40	11.80													
22	01	21+000	18.25%	100.00	100.00	99.68	94.19	35.73%	17.64%	18.09%	N.P.	N.P.	CL	1.922	12.23%	1.61	3.19													
23	01	22+000	13.49%	100.00	100.00	99.95	99.50	61.64	20.04%	0.00%	N.P.	N.P.	ML	2.058	9.31%	10.49	16.38													
24	01	23+000	14.52%	100.00	100.00	99.92	48.04	18.62%	0.00%	0.00%	N.P.	N.P.	SM	2.013	6.79%	15.07	24.26													
25	01	24+000	13.11%	100.00	100.00	99.58	64.56	18.12%	0.00%	0.00%	N.P.	N.P.	ML	2.061	9.36%	11.16	17.88													
26	01	25+000	13.01%	100.00	100.00	99.97	96.20	67.95	18.02%	0.00%	N.P.	N.P.	ML	2.076	9.07%	9.35	13.09													
27	01	26+000	10.15%	100.00	100.00	99.32	48.04	0.00%	0.00%	0.00%	N.P.	N.P.	SM	2.046	8.27%	9.90	15.52													
28	01	27+000	20.02%	100.00	100.00	97.30	84.24	38.80%	20.44%	0.00%	N.P.	N.P.	CL	1.805	14.99%	1.08	2.43													
29	01	28+000	24.77%	100.00	100.00	99.03	96.98	46.79%	22.60%	24.20%	N.P.	N.P.	CL	1.786	15.82%	1.58	2.58													
30	01	29+000	20.11%	100.00	100.00	99.89	99.28	90.36	39.23%	18.45%	20.78%	N.P.	CL	1.764	16.78%	1.77	2.74													
31	01	30+000	25.93%	100.00	100.00	99.98	98.56	94.51	44.85%	23.63%	N.P.	N.P.	CL	1.844	14.77%	1.26	2.04													
32	01	31+000	15.50%	100.00	100.00	99.70	72.40	24.17%	12.18%	11.98%	N.P.	N.P.	CL	2.073	7.97%	3.33	5.87													
33	01	32+000	16.30%	100.00	100.00	100.00	72.41	25.22%	13.66%	11.55%	N.P.	N.P.	CL	2.036	9.28%	5.15	10.09													
34	01	33+000	21.14%	100.00	100.00	99.87	96.33	37.31%	18.84%	18.47%	N.P.	N.P.	CL	1.791	14.61%	1.46	2.08													
35	01	34+000	11.71%	100.00	100.00	98.24	35.50	0.00%	0.00%	0.00%	N.P.	N.P.	SM	1.864	7.15%	12.47	22.77													

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		CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMIRA & Engineers Internacional. Preparatory Study of the Okiñawa I - II and III Road Paving Project Municipality of Okiñawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City		REV: 00 Date: 03/09/2014 RP 00 PAGE: 01 de 01							
DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03													
TEST DATA				DCP N°: 02									
PROGRESSIVE: 0+545				X Coordinate: 17°13'36.80"S Y Coordinate: 62°54'09.20"W									
WATER TABLE: not Applicable				WEIGHT HAMMER: 8 Kg.									
RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	CATEGORY	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Factor of Hammer E	DCP Index (mm / Punches) F	QBR % G	AVERAGE QBR %	observations		
0.20	0.20		Filled with Granular Base Layer Material Type	19	60	3.16	1	52.96					
0.30				43	140	80	1.86	1	1.86	95.79	72.52		
0.40				24	200	60	2.50	1	2.50	68.80			
0.50													
0.60			Limo, in-situ condition firm, medium bodied, partially dry and light gray coloring.	12	60	60	5.00	1	5.00	31.68			
0.70	0.70			16	130	70	4.38	1	4.38	36.76	36.79		
0.80				18	200	70	3.89	1	3.89	41.95			
0.90													
1.00			Limo, in-situ condition firm, medium bodied, partially dry and light gray coloring.	26	50	50	1.92	1	1.92	92.30			
1.10	1.00			29	110	60	2.07	1	2.07	85.05	80.77		
1.20				19	160	50	2.63	1	2.63	64.96			
1.30			Clayey silt with plasticity condition in-situ firm, medium compact, partially dry and light gray color with redish patina.	5	40	40	8.00	1	8.00	18.70			
1.40	1.40			11	100	60	5.45	1	5.45	28.72	21.44		
1.50				8	170	70	8.75	1	8.75	16.91			
1.60													
1.70			Clayey silt with plasticity condition in-situ firm, medium compact, partially dry and light brown coloring.	4	60	60	15.00	1	15.00	9.25			
1.80				6	130	70	11.67	1	11.67	12.26	11.42		
1.90				8	220	50	11.25	1	11.25	12.76			
2.00	1.90												
2.10			Clayey silt with plasticity condition in-situ firm, medium compact, partially dry and light brown coloring.	6	40	40	6.67	1	6.67	22.94			
2.20	2.10			8	50	50	6.25	1	6.25	24.66	25.44		
2.30				11	150	60	5.45	1	5.45	28.72			
2.40	A.C.		Silty Sand with no plasticity condition in-situ firm, medium compact, saturated state and light brown coloring.	3	50	50	16.67	1	16.67	8.22			
2.50	2.50			4	110	60	15.00	1	15.00	9.25	11.46		
2.60				8	180	70	8.75	1	8.75	16.91			
2.70				5	60	60	12.00	1	12.00	11.87			
2.80			Clayey silt with plasticity condition in-situ firm, medium bodied, partially saturated condition and light brown coloring.	5	130	70	14.00	1	14.00	9.99	10.81		
2.90				6	210	80	13.33	1	13.33	10.55			
3.00	3.00												
OBSERVACIONES:				A= Number of hammer blows between readings B= Penetration accumulated after each series of blows C= Penetration between consecutive readings (mm) D= Hole C coefficient A Note E= Coefficient of the hammer is 8 Kg., And "half" if the hammer is 4.5 Kg. F= Coefficient of the hammer is 8 Kg., And "half" if the hammer is 4.5 Kg. G= Correlation between QBR and DCP index									
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done. He hung evidenced waters of 2.10 m to 2.50 m.				DATE OF CREATION OF TEST: 23/08/2014				CLOSING DATE OF TEST: 23/08/2014				LABORATORY MANAGER	

		CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMIRA & Engineers International. Preparatory Study of the Okinawa I - II and III Road Paving Project Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City DCP N°: 01		REV: 00 Date: 20/09/2014 RP 001/14 PAGE: 01 de 01	
		0-042		X Coordinate: 17°14'09.30"S Y Coordinate: 62°54'08.60"W			
PROGRESSIVE:		1.70 m.		WEIGHT HAMMER:		8 Kg.	
WATER TABLE:		1.70 m.		WEIGHT HAMMER:		8 Kg.	
RECORD FIELD		TEST RESULTS		TEST RESULTS		TEST RESULTS	
GEOTECHNICAL PROFILE		VISUAL DESCRIPTION OF THE MATERIAL		Penetration Between Readings (mm)		Factor of Hammer E	
DEPTH (m)		Penetration Between Readings (mm)		Factor of Hammer E		Factor of Hammer E	
SCALE		Penetration Between Readings (mm)		Factor of Hammer E		Factor of Hammer E	
0.20		50		1		1	
0.30		110		1		1	
0.40		150		1		1	
0.50		30		1		1	
0.60		30		1		1	
0.70		30		1		1	
0.80		30		1		1	
0.90		30		1		1	
1.00		30		1		1	
1.10		30		1		1	
1.20		30		1		1	
1.30		30		1		1	
1.40		30		1		1	
1.50		30		1		1	
1.60		30		1		1	
1.70		30		1		1	
N.F.		30		1		1	
2.00		30		1		1	
2.10		30		1		1	
2.20		30		1		1	
2.30		30		1		1	
2.40		30		1		1	
2.50		30		1		1	
2.60		30		1		1	
2.70		30		1		1	
2.80		30		1		1	
2.90		30		1		1	
3.00		30		1		1	
OBSERVATIONS:		OBSERVATIONS:		OBSERVATIONS:		OBSERVATIONS:	
The presence of the Water Table at a depth of 1.70 m was evident, until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.		The presence of the Water Table at a depth of 1.70 m was evident, until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.		The presence of the Water Table at a depth of 1.70 m was evident, until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.		The presence of the Water Table at a depth of 1.70 m was evident, until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.	
DATE OF CREATION OF TEST:		23/08/2014		DATE OF CREATION OF TEST:		23/08/2014	
CLOSING DATE OF TEST:		23/08/2014		CLOSING DATE OF TEST:		23/08/2014	
LABORATORY MANAGER:		LABORATORY MANAGER:		LABORATORY MANAGER:		LABORATORY MANAGER:	

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 03/09/2014 REPORT RP 00 PAGE: 01 de 01
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAYUNA & Engineers International. Preparatory Study of the Okiwawa I - II and III Road Paving Project Municipality of Okiwawa I - II, 2° Section, Vares Province, Northern Region of Santa Cruz de la Sierra City		
PROPOSITIVE:		TEST DATA		
WATER TABLE:		not Applicable		
RECORD FIELD		TEST RESULTS		
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RECORD FIELD				

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		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT RP 00 PAGE 01 de 01				
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study of the Chiriquí 1-1 and 1/1 Road Boring Project Municipality of Chiriquí 1-1, 2° Section, Veraguas Province, Northern Region of Santa Cruz de la Sierra City						
4+025		TEST DATA Coordinates: X: 17°15'30.00"S Y: 62°54'06.90"W						
1.60 m.		WEIGHT HAMMER: 8 Kg.						
TEST RESULTS		TEST RESULTS						
DEPTH (m)	VELOCITY (mm/s)	Number of Blows A	Cumulative penetration (mm) B	Penetration Rate (mm/s) C	Factor Hammer E	DCP Index (Punches) F	AVERAGE CBR% G	observations
0.30		11	60	30	2.73	1	47.04	Due to the characteristics of the material, the average CBR value is greater than 100%, so the test was not performed. This is an inconsistent data. This is because the test was conducted on a material with a higher average CBR of the last two tests.
0.60		18	90	30	1.67	1	108.36	
0.90		7	30	30	4.29	1	37.62	
1.20		13	60	30	2.31	1	75.26	
1.50		7	40	40	5.71	1	5.71	
1.80		6	80	40	6.67	1	6.67	
2.10		8	130	50	6.25	1	6.25	
2.40		5	50	50	10.00	1	10.00	
2.70		5	110	60	12.00	1	12.00	
3.00		5	180	70	14.00	1	14.00	
3.30		6	70	70	11.67	1	11.67	
3.60		6	150	80	13.33	1	13.33	
3.90		5	250	100	20.00	1	20.00	
4.20								
4.50		5	60	60	12.00	1	12.00	
4.80		4	130	70	17.50	1	17.50	
5.10		7	230	100	14.29	1	14.29	
5.40		6	80	80	13.33	1	13.33	
5.70		6	170	90	15.00	1	15.00	
6.00		7	270	100	14.29	1	14.29	
6.30		7	90	90	12.86	1	12.86	
6.60		8	190	100	12.50	1	12.50	
6.90		11	250	100	9.09	1	9.09	
7.20								
OBSERVATIONS								
The presence of the Water Table at a depth of 1.40 m was evident, until the end of Geotechnical Study. For the study it is considered the mouth 0.00 level of survey dome.								
A. Number of Blows: 180 (Average) (Note: 180 blows is the maximum value for the test) B. Penetration Rate: 1.67 mm/s (Average) (Note: 1.67 mm/s is the maximum value for the test) C. Notes: Consistency A 1000 D. Notes: Consistency A 1000 E. Notes: Consistency A 1000 F. Notes: Consistency A 1000 G. Notes: Consistency A 1000 H. Notes: Consistency A 1000 I. Notes: Consistency A 1000 J. Notes: Consistency A 1000 K. Notes: Consistency A 1000 L. Notes: Consistency A 1000 M. Notes: Consistency A 1000 N. Notes: Consistency A 1000 O. Notes: Consistency A 1000 P. Notes: Consistency A 1000 Q. Notes: Consistency A 1000 R. Notes: Consistency A 1000 S. Notes: Consistency A 1000 T. Notes: Consistency A 1000 U. Notes: Consistency A 1000 V. Notes: Consistency A 1000 W. Notes: Consistency A 1000 X. Notes: Consistency A 1000 Y. Notes: Consistency A 1000 Z. Notes: Consistency A 1000 AA. Notes: Consistency A 1000 AB. Notes: Consistency A 1000 AC. Notes: Consistency A 1000 AD. Notes: Consistency A 1000 AE. Notes: Consistency A 1000 AF. Notes: Consistency A 1000 AG. Notes: Consistency A 1000 AH. Notes: Consistency A 1000 AI. Notes: Consistency A 1000 AJ. Notes: Consistency A 1000 AK. Notes: Consistency A 1000 AL. Notes: Consistency A 1000 AM. Notes: Consistency A 1000 AN. Notes: Consistency A 1000 AO. Notes: Consistency A 1000 AP. Notes: Consistency A 1000 AQ. Notes: Consistency A 1000 AR. Notes: Consistency A 1000 AS. Notes: Consistency A 1000 AT. Notes: Consistency A 1000 AU. Notes: Consistency A 1000 AV. Notes: Consistency A 1000 AW. Notes: Consistency A 1000 AX. Notes: Consistency A 1000 AY. Notes: Consistency A 1000 AZ. Notes: Consistency A 1000 BA. Notes: Consistency A 1000 BB. Notes: Consistency A 1000 BC. Notes: Consistency A 1000 BD. Notes: Consistency A 1000 BE. Notes: Consistency A 1000 BF. Notes: Consistency A 1000 BG. Notes: Consistency A 1000 BH. Notes: Consistency A 1000 BI. Notes: Consistency A 1000 BJ. Notes: Consistency A 1000 BK. Notes: Consistency A 1000 BL. Notes: Consistency A 1000 BM. Notes: Consistency A 1000 BN. Notes: Consistency A 1000 BO. Notes: Consistency A 1000 BP. Notes: Consistency A 1000 BQ. Notes: Consistency A 1000 BR. Notes: Consistency A 1000 BS. Notes: Consistency A 1000 BT. Notes: Consistency A 1000 BU. Notes: Consistency A 1000 BV. Notes: Consistency A 1000 BW. Notes: Consistency A 1000 BX. Notes: Consistency A 1000 BY. Notes: Consistency A 1000 BZ. Notes: Consistency A 1000 CA. Notes: Consistency A 1000 CB. Notes: Consistency A 1000 CC. Notes: Consistency A 1000 CD. Notes: Consistency A 1000 CE. Notes: Consistency A 1000 CF. Notes: Consistency A 1000 CG. Notes: Consistency A 1000 CH. Notes: Consistency A 1000 CI. Notes: Consistency A 1000 CJ. Notes: Consistency A 1000 CK. Notes: Consistency A 1000 CL. Notes: Consistency A 1000 CM. Notes: Consistency A 1000 CN. Notes: Consistency A 1000 CO. Notes: Consistency A 1000 CP. Notes: Consistency A 1000 CQ. Notes: Consistency A 1000 CR. Notes: Consistency A 1000 CS. Notes: Consistency A 1000 CT. Notes: Consistency A 1000 CU. Notes: Consistency A 1000 CV. Notes: Consistency A 1000 CW. Notes: Consistency A 1000 CX. Notes: Consistency A 1000 CY. Notes: Consistency A 1000 CZ. Notes: Consistency A 1000 DA. Notes: Consistency A 1000 DB. Notes: Consistency A 1000 DC. Notes: Consistency A 1000 DD. Notes: Consistency A 1000 DE. Notes: Consistency A 1000 DF. Notes: Consistency A 1000 DG. Notes: Consistency A 1000 DH. Notes: Consistency A 1000 DI. Notes: Consistency A 1000 DJ. Notes: Consistency A 1000 DK. Notes: Consistency A 1000 DL. Notes: Consistency A 1000 DM. Notes: Consistency A 1000 DN. Notes: Consistency A 1000 DO. Notes: Consistency A 1000 DP. Notes: Consistency A 1000 DQ. Notes: Consistency A 1000 DR. Notes: Consistency A 1000 DS. Notes: Consistency A 1000 DT. Notes: Consistency A 1000 DU. Notes: Consistency A 1000 DV. Notes: Consistency A 1000 DW. Notes: Consistency A 1000 DX. Notes: Consistency A 1000 DY. Notes: Consistency A 1000 DZ. Notes: Consistency A 1000 EA. Notes: Consistency A 1000 EB. Notes: Consistency A 1000 EC. Notes: Consistency A 1000 ED. Notes: Consistency A 1000 EE. Notes: Consistency A 1000 EF. Notes: Consistency A 1000 EG. Notes: Consistency A 1000 EH. Notes: Consistency A 1000 EI. Notes: Consistency A 1000 EJ. Notes: Consistency A 1000 EK. Notes: Consistency A 1000 EL. Notes: Consistency A 1000 EM. Notes: Consistency A 1000 EN. Notes: Consistency A 1000 EO. Notes: Consistency A 1000 EP. Notes: Consistency A 1000 EQ. Notes: Consistency A 1000 ER. Notes: Consistency A 1000 ES. Notes: Consistency A 1000 ET. Notes: Consistency A 1000 EU. Notes: Consistency A 1000 EV. Notes: Consistency A 1000 EW. Notes: Consistency A 1000 EX. Notes: Consistency A 1000 EY. Notes: Consistency A 1000 EZ. Notes: Consistency A 1000 FA. Notes: Consistency A 1000 FB. Notes: Consistency A 1000 FC. Notes: Consistency A 1000 FD. Notes: Consistency A 1000 FE. Notes: Consistency A 1000 FF. Notes: Consistency A 1000 FG. Notes: Consistency A 1000 FH. Notes: Consistency A 1000 FI. Notes: Consistency A 1000 FJ. Notes: Consistency A 1000 FK. Notes: Consistency A 1000 FL. Notes: Consistency A 1000 FM. Notes: Consistency A 1000 FN. Notes: Consistency A 1000 FO. Notes: Consistency A 1000 FP. Notes: Consistency A 1000 FQ. Notes: Consistency A 1000 FR. Notes: Consistency A 1000 FS. Notes: Consistency A 1000 FT. Notes: Consistency A 1000 FU. Notes: Consistency A 1000 FV. Notes: Consistency A 1000 FW. Notes: Consistency A 1000 FX. Notes: Consistency A 1000 FY. Notes: Consistency A 1000 FZ. Notes: Consistency A 1000 GA. Notes: Consistency A 1000 GB. Notes: Consistency A 1000 GC. Notes: Consistency A 1000 GD. Notes: Consistency A 1000 GE. Notes: Consistency A 1000 GF. Notes: Consistency A 1000 GG. Notes: Consistency A 1000 GH. Notes: Consistency A 1000 GI. Notes: Consistency A 1000 GJ. Notes: Consistency A 1000 GK. Notes: Consistency A 1000 GL. Notes: Consistency A 1000 GM. Notes: Consistency A 1000 GN. Notes: Consistency A 1000 GO. Notes: Consistency A 1000 GP. Notes: Consistency A 1000 GQ. Notes: Consistency A 1000 GR. Notes: Consistency A 1000 GS. Notes: Consistency A 1000 GT. Notes: Consistency A 1000 GU. Notes: Consistency A 1000 GV. Notes: Consistency A 1000 GW. Notes: Consistency A 1000 GX. Notes: Consistency A 1000 GY. Notes: Consistency A 1000 GZ. Notes: Consistency A 1000 HA. Notes: Consistency A 1000 HB. Notes: Consistency A 1000 HC. Notes: Consistency A 1000 HD. Notes: Consistency A 1000 HE. Notes: Consistency A 1000 HF. Notes: Consistency A 1000 HG. Notes: Consistency A 1000 HH. Notes: Consistency A 1000 HI. Notes: Consistency A 1000 HJ. Notes: Consistency A 1000 HK. Notes: Consistency A 1000 HL. Notes: Consistency A 1000 HM. Notes: Consistency A 1000 HN. Notes: Consistency A 1000 HO. Notes: Consistency A 1000 HP. Notes: Consistency A 1000 HQ. Notes: Consistency A 1000 HR. Notes: Consistency A 1000 HS. Notes: Consistency A 1000 HT. Notes: Consistency A 1000 HU. 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A-1245 kg.

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		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01					
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Okinawa I - II and III Road Boring Project UBICACIÓN / Location: Municipality of Okinawa I - II, 2° Section, Varones Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 21							
TEST DATA									
PROFESIONISTA:	10+000	X Coordinate: 17°18'41.60"S Y Coordinate: 62°53'52.80"W	WEIGHT HAMMER: 8 Kg.						
WATER TABLE:		not Applicable							
REF. CORD FIELD		TEST RESULTS							
DEPTH (m)	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Factor E	DCP Index (mm / Pundada) D	CBR %	AVERAGE CBR %	observations
0.10	Filled with Granular Base Layer Material Type	15	31	30	1	2.00	83.34	88.34	(For the first item) Due to the characteristics of the material (Blue Layer) damaged by the hammer, the test was not considered an isolated test. The average CBR is 83.34%.
0.60	Clay in-situ condition dense, compact consistency, dry and light gray coloring.	6	40	40	667	1	31.66	28.75	
1.20	Clay in-situ condition dense, compact consistency, dry and light gray coloring.	10	40	40	1	4.00	40.64	68.08	
1.60	Clay in-situ condition firm, medium bodied, partially saturated state and light gray coloring.	6	30	30	5.00	1	31.66		
2.00	Clay in-situ condition firm, medium bodied, partially saturated state and light gray coloring.	15	70	30	2.00	1	88.34	66.17	
2.40	Clay in-situ condition firm, medium bodied, partially saturated state and light gray coloring.	18	110	40	2.22	1	2.22	76.51	
2.80	Clay in-situ condition firm, medium bodied, partially saturated state and light gray coloring.	14	40	40	2.86	1	2.86	59.25	
3.20	Clay, strong in-situ condition, consistency, partially dry and reddish coloration gray skate.	15	110	40	2.50	1	2.50	68.80	
3.60	Clay, strong in-situ condition, consistency, partially dry and reddish coloration gray skate.	12	40	40	3.33	1	3.33	48.85	
4.00	Clay, strong in-situ condition, consistency, partially dry and reddish coloration gray skate.	15	80	40	2.67	1	2.67	64.01	
4.40	Clay, strong in-situ condition, consistency, partially dry and reddish coloration gray skate.	13	110	30	2.31	1	2.31	76.26	
4.80	Clay, strong in-situ condition, consistency, partially dry and reddish coloration gray skate.	11	30	30	2.73	1	2.73	62.41	
5.20	Clay, strong in-situ condition, consistency, partially dry and reddish coloration gray skate.	19	70	40	2.11	1	2.11	83.41	
5.60	Clay, strong in-situ condition, consistency, partially dry and reddish coloration gray skate.	15	110	40	2.67	1	2.67	64.01	
CONCLUSIONS		A= Number of hammer blows between readings B= Cumulative penetration (mm) between readings C= Penetration between readings (mm) D= Position "n" of the hammer in a kg. And "m" of the hammer in a kg. E= Factor G= Correlation between CBR and DCP index.							
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey data.									
		DATE OF CREATION OF TEST: 28/08/2014			LABORATORY MANAGER				
		CLOSING DATE OF TEST: 28/08/2014							

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01					
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Chiriquí 1-1 and III Road Paving Project UBICACIÓN / Location: Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 22							
TEST DATA									
PROFESIONISTA:	10+500	X Coordinate: 17°18'57.80"S Y Coordinate: 62°53'52.50"W	WEIGHT HAMMER: 8 Kg.						
WATER TABLE:		not Applicable							
REF. CORD FIELD		TEST RESULTS							
DEPTH (m)	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Factor E	DCP Index (mm / Pundada) D	CBR %	AVERAGE CBR %	observations
0.10	Filled with Granular Base Layer Material Type	24	30	30	1	1.25	149.54	148.54	(For the Closed) Due to the characteristics of the material (Blue Layer) damaged by the hammer, the test was not considered an isolated test. The average CBR is 148.54%.
0.60	Clay in-situ condition dense, compact consistency, dryness and reddish coloration gray patina.	11	40	40	3.64	1	3.64	45.22	
1.00	Clay in-situ condition dense, compact consistency, dry and light brown and gray coloring.	9	70	30	3.33	1	3.33	49.65	
1.40	Clay in-situ condition dense, compact consistency, dry and light brown and gray coloring.	14	110	40	2.86	1	2.86	59.25	
1.80	Clay in-situ condition dense, compact consistency, dry and light brown and gray coloring.	9	40	40	4.44	1	4.44	36.12	
2.20	Clay in-situ condition dense, compact consistency, dry and light brown and gray coloring.	6	70	30	5.00	1	5.00	31.66	
2.60	Clay in-situ condition dense, compact consistency, dry and light brown and gray coloring.	11	120	50	4.55	1	4.55	35.22	
3.00	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	11	40	40	3.64	1	3.64	45.22	
3.40	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	10	70	30	3.00	1	3.00	56.10	
3.80	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	11	100	30	2.73	1	2.73	62.41	
4.20	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	15	50	50	3.33	1	3.33	49.65	
4.60	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	13	80	30	2.31	1	2.31	76.26	
5.00	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	12	110	30	2.50	1	2.50	68.80	
5.40	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.								
5.80	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	9	40	40	4.44	1	4.44	36.12	
6.20	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	8	70	30	3.75	1	3.75	43.69	
6.60	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	12	100	30	2.50	1	2.50	68.80	
7.00	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	12	50	50	4.17	1	4.17	38.83	
7.40	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	11	90	40	3.64	1	3.64	45.22	
7.80	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	13	140	50	3.85	1	3.85	42.47	
8.20	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	8	40	40	5.00	1	5.00	31.66	
8.60	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	8	70	30	3.75	1	3.75	43.69	
9.00	Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	8	100	30	3.75	1	3.75	43.69	
CONCLUSIONS		A= Number of hammer blows between readings B= Cumulative penetration (mm) between readings C= Penetration between readings (mm) D= Position "n" of the hammer in a kg. And "m" of the hammer in a kg. E= Factor G= Correlation between CBR and DCP index.							
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the amount 0.00 level survey data.		DATE OF CREATION OF TEST: 28/08/2014			LABORATORY MANAGER				
		CLOSING DATE OF TEST: 28/08/2014							

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 RP 00 PAGE: 01 de 01
CLIENTE / Client: KATAMIRA & Engineers International. PROYECTO / Project: Preparatory Study of the Okinawa 1- II and III Road Paving Project UBICACIÓN / Location: Municipality of Okinawa 1- II, 2° Section, Varadero Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 28		
TEST DATA				
PROFESOR: 13-480				
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.		
TEST RESULTS		TEST RESULTS		
WATER TABLE: not Applicable		TEST RESULTS		
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		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 RP 00 REVISIT: 01 de 01					
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study of the Olinas 1 - II and III Road Boring Project Municipality of Olinas 1 - II, 2° Section, Varadero Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 29					
TEST DATA									
PROFESIONISTA: 13-4980		X Coordinate: 1720196.60°S Y Coordinate: 62°53'44.70°O							
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.							
TEST RESULTS									
DEPTH (mm)	COEFFICIENT OF CORRELATION	VISUAL DESCRIPTION OF THE MATERIAL	Factor Penetration (mm / Pundada)	DCP Index (mm / Pundada)	Factor Penetration (mm / Pundada)	DCP Index (mm / Pundada)	AVERAGE CBR %	observations	
0.10		Firm presence of clay in-situ gravelly isolated condition, compact consistency, dry and dark brown coloration.	30	1.03	1	1.03	194.85	210.17	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, 100% on average, inconsistent data. The is because the test was conducted on an isolated fissure stone.
0.40		Firm clay in-situ condition, medium bodied, dry and light brown with gray patinas.	30	3.75	1	3.75	43.69	37.66	
0.80		Firm clay in-situ condition, dense consistency, dry and light brown with gray patinas.	30	4.29	1	4.29	37.62	35.17	
1.20		Firm clay in-situ condition, medium bodied, dry and light brown and gray coloring.	30	7.50	1	7.50	20.10		
1.60		Firm clay in-situ condition, soft consistency, partially dry, reddish brown with presence of small clasts.	30	4.44	1	4.44	36.12	30.78	
2.00		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	3.33	1	3.33	48.85	42.20	
2.40		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	6.67	1	6.67	22.94		
2.80		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	6.67	1	6.67	22.94		
3.20		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	8.00	1	8.00	18.70		
3.60		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	6.00	1	6.00	25.81	21.54	
4.00		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	7.50	1	7.50	20.10		
4.40		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	7.50	1	7.50	20.10		
4.80		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	8.00	1	8.00	18.70	17.79	
5.20		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	8.00	1	8.00	18.70		
5.60		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	10.00	1	10.00	14.56		
CONCLUSIONS					A= Number of hammer blows between readings B= Penetration accumulated after each series of blows C= Linear cumulative penetration (New Blows) between readings D= Position "n" of the hammer is 8 Kg. And "n" of the hammer is 4 Kg. E= Correlation between CBR and DCP index.				
DATE OF CREATION OF TEST:			CLOSING DATE OF TEST:		LABORATORY MANAGER				

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 RP 00 REVISIT: 01 de 01					
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study of the Chiriquí 1-1 and III Road Boring Project Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 30					
TEST DATA									
PROFESIONISTA: 14-475		X Coordinate: 1721106.60°S Y Coordinate: 62°53'42.10°O							
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.							
TEST RESULTS									
DEPTH (mm)	COEFFICIENT OF CORRELATION	VISUAL DESCRIPTION OF THE MATERIAL	Factor Penetration (mm / Pundada)	DCP Index (mm / Pundada)	Factor Penetration (mm / Pundada)	DCP Index (mm / Pundada)	AVERAGE CBR %	observations	
0.10		Silty Sand condition in-situ Firm, compact consistency, dry and dark brown coloration.	30	1.07	1	1.07	177.72	56.10	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, 100% on average, inconsistent data. This is because the test was conducted on an isolated fissure stone.
0.40		Limo Clay of Firm in-situ condition, medium bodied, dry and light brown and gray coloring.	30	3.33	1	3.33	10.55	10.55	
0.80		Limo Clay of Firm in-situ condition, medium bodied, dry and light brown and gray coloring.	30	10.00	1	10.00	14.56	13.23	
1.20		Limo Clay of Firm in-situ condition, medium bodied, dry, reddish and gray coloring.	30	8.33	1	8.33	17.86		
1.60		Limo Clay of Firm in-situ condition, medium bodied, dry, reddish and gray coloring.	30	6.67	1	6.67	22.94	21.25	
2.00		Limo Clay of Firm in-situ condition, medium bodied, dry and reddish brown with gray patinas.	30	10.00	1	10.00	14.56		
2.40		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	30	6.67	1	6.67	22.94	15.48	
2.80		Sandy Limo Firm condition in-situ soft compactness, partially dry and reddish brown coloration.	30	14.00	1	14.00	9.99		
3.20		Sandy Limo Firm condition in-situ soft compactness, partially dry and reddish brown coloration.	30	14.00	1	14.00	9.99	9.53	
3.60		Sandy Limo Firm condition in-situ soft compactness, partially dry and reddish brown coloration.	30	16.00	1	16.00	8.60		
4.00		Sandy Limo Firm condition in-situ soft compactness, partially dry and reddish brown coloration.	30	10.00	1	10.00	14.56		
4.40		Sandy Limo Firm condition in-situ soft compactness, partially dry and reddish brown coloration.	30	7.78	1	7.78	19.30	18.62	
4.80		Sandy Limo Firm condition in-situ soft compactness, partially dry and reddish brown coloration.	30	6.92	1	6.92	21.98		
CONCLUSIONS					A= Number of hammer blows between readings B= Number of hammer blows between readings C= Linear cumulative penetration (New Blows) between readings D= Position "n" of the hammer is 8 Kg. And "n" of the hammer is 4 Kg. E= Correlation between CBR and DCP index.				
DATE OF CREATION OF TEST:		CLOSING DATE OF TEST:		LABORATORY MANAGER					

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Chiriquí 1-1 and 1/1 Road Boring Project UBICACIÓN / Location: Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 31		
TEST DATA				
PROFESOR: 14-970		X Coordinate: 1721122.40°S Y Coordinate: 62°53'39.00"O		
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.		
TEST RESULTS				
DEPTH (m)	VISUAL DESCRIPTION OF THE MATERIAL	Factor E (mm)	Factor D (mm)	Factor C (mm)
0.15	Filled with Granular Base Layer	1.68	1.68	1.68
0.30		1.58	1.58	1.58
0.45		1.47	1.47	1.47
0.60		1.39	1.39	1.39
0.75		1.25	1.25	1.25
0.90		1.00	1.00	1.00
1.05		1.00	1.00	1.00
1.20		1.00	1.00	1.00
1.35		1.00	1.00	1.00
1.50		1.00	1.00	1.00
1.65		1.00	1.00	1.00
1.80		1.00	1.00	1.00
1.95		1.00	1.00	1.00
2.10		1.00	1.00	1.00
2.25		1.00	1.00	1.00
2.40		1.00	1.00	1.00
2.55		1.00	1.00	1.00
2.70		1.00	1.00	1.00
2.85		1.00	1.00	1.00
3.00		1.00	1.00	1.00
3.15		1.00	1.00	1.00
3.30		1.00	1.00	1.00
3.45		1.00	1.00	1.00
3.60		1.00	1.00	1.00
3.75		1.00	1.00	1.00
3.90		1.00	1.00	1.00
4.05		1.00	1.00	1.00
4.20		1.00	1.00	1.00
4.35		1.00	1.00	1.00
4.50		1.00	1.00	1.00
4.65		1.00	1.00	1.00
4.80		1.00	1.00	1.00
4.95		1.00	1.00	1.00
5.10		1.00	1.00	1.00
5.25		1.00	1.00	1.00
5.40		1.00	1.00	1.00
5.55		1.00	1.00	1.00
5.70		1.00	1.00	1.00
5.85		1.00	1.00	1.00
6.00		1.00	1.00	1.00
6.15		1.00	1.00	1.00
6.30		1.00	1.00	1.00
6.45		1.00	1.00	1.00
6.60		1.00	1.00	1.00
6.75		1.00	1.00	1.00
6.90		1.00	1.00	1.00
7.05		1.00	1.00	1.00
7.20		1.00	1.00	1.00
7.35		1.00	1.00	1.00
7.50		1.00	1.00	1.00
7.65		1.00	1.00	1.00
7.80		1.00	1.00	1.00
7.95		1.00	1.00	1.00
8.10		1.00	1.00	1.00
8.25		1.00	1.00	1.00
8.40		1.00	1.00	1.00
8.55		1.00	1.00	1.00
8.70		1.00	1.00	1.00
8.85		1.00	1.00	1.00
9.00		1.00	1.00	1.00
9.15		1.00	1.00	1.00
9.30		1.00	1.00	1.00
9.45		1.00	1.00	1.00
9.60		1.00	1.00	1.00
9.75		1.00	1.00	1.00
9.90		1.00	1.00	1.00
10.05		1.00	1.00	1.00
10.20		1.00	1.00	1.00
10.35		1.00	1.00	1.00
10.50		1.00	1.00	1.00
10.65		1.00	1.00	1.00
10.80		1.00	1.00	1.00
10.95		1.00	1.00	1.00
11.10		1.00	1.00	1.00
11.25		1.00	1.00	1.00
11.40		1.00	1.00	1.00
11.55		1.00	1.00	1.00
11.70		1.00	1.00	1.00
11.85		1.00	1.00	1.00
12.00		1.00	1.00	1.00
12.15		1.00	1.00	1.00
12.30		1.00	1.00	1.00
12.45		1.00	1.00	1.00
12.60		1.00	1.00	1.00
12.75		1.00	1.00	1.00
12.90		1.00	1.00	1.00
13.05		1.00	1.00	1.00
13.20		1.00	1.00	1.00
13.35		1.00	1.00	1.00
13.50		1.00	1.00	1.00
13.65		1.00	1.00	1.00
13.80		1.00	1.00	1.00
13.95		1.00	1.00	1.00
14.10		1.00	1.00	1.00
14.25		1.00	1.00	1.00
14.40		1.00	1.00	1.00
14.55		1.00	1.00	1.00
14.70		1.00	1.00	1.00
14.85		1.00	1.00	1.00
15.00		1.00	1.00	1.00
15.15		1.00	1.00	1.00
15.30		1.00	1.00	1.00
15.45		1.00	1.00	1.00
15.60		1.00	1.00	1.00
15.75		1.00	1.00	1.00
15.90		1.00	1.00	1.00
16.05		1.00	1.00	1.00
16.20		1.00	1.00	1.00
16.35		1.00	1.00	1.00
16.50		1.00	1.00	1.00
16.65		1.00	1.00	1.00
16.80		1.00	1.00	1.00
16.95		1.00	1.00	1.00
17.10		1.00	1.00	1.00
17.25		1.00	1.00	1.00
17.40		1.00	1.00	1.00
17.55		1.00	1.00	1.00
17.70		1.00	1.00	1.00
17.85		1.00	1.00	1.00
18.00		1.00	1.00	1.00
18.15		1.00	1.00	1.00
18.30		1.00	1.00	1.00
18.45		1.00	1.00	1.00
18.60		1.00	1.00	1.00
18.75		1.00	1.00	1.00
18.90		1.00	1.00	1.00
19.05		1.00	1.00	1.00
19.20		1.00	1.00	1.00
19.35		1.00	1.00	1.00
19.50		1.00	1.00	1.00
19.65		1.00	1.00	1.00
19.80		1.00	1.00	1.00
19.95		1.00	1.00	1.00
20.10		1.00	1.00	1.00
20.25		1.00	1.00	1.00
20.40		1.00	1.00	1.00
20.55		1.00	1.00	1.00
20.70		1.00	1.00	1.00
20.85		1.00	1.00	1.00
21.00		1.00	1.00	1.00
21.15		1.00	1.00	1.00
21.30		1.00	1.00	1.00
21.45		1.00	1.00	1.00
21.60		1.00	1.00	1.00
21.75		1.00	1.00	1.00
21.90		1.00	1.00	1.00
22.05		1.00	1.00	1.00
22.20		1.00	1.00	1.00
22.35		1.00	1.00	1.00
22.50		1.00	1.00	1.00
22.65		1.00	1.00	1.00
22.80		1.00	1.00	1.00
22.95		1.00	1.00	1.00
23.10		1.00	1.00	1.00
23.25		1.00	1.00	1.00
23.40		1.00	1.00	1.00
23.55		1.00	1.00	1.00
23.70		1.00	1.00	1.00
23.85		1.00	1.00	1.00
24.00		1.00	1.00	1.00
24.15		1.00	1.00	1.00
24.30		1.00	1.00	1.00
24.45		1.00	1.00	1.00
24.60		1.00	1.00	1.00
24.75		1.00	1.00	1.00
24.90		1.00	1.00	1.00
25.05		1.00	1.00	1.00
25.20		1.00	1.00	1.00
25.35		1.00	1.00	1.00
25.50		1.00	1.00	1.00
25.65		1.00	1.00	1.00
25.80		1.00	1.00	1.00
25.95		1.00	1.00	1.00
26.10		1.00	1.00	1.00
26.25		1.00	1.00	1.00
26.40		1.00	1.00	1.00
26.55		1.00	1.00	1.00
26.70		1.00	1.00	1.00
26.85		1.00	1.00	1.00
27.00		1.00	1.00	1.00
27.15		1.00	1.00	1.00
27.30		1.00	1.00	1.00
27.45		1.00	1.00	1.00
27.60		1.00	1.00	1.00
27.75		1.00	1.00	1.00
27.90		1.00	1.00	1.00
28.05		1.00	1.00	1.00
28.20		1.00	1.00	1.00
28.35		1.00	1.00	1.00
28.50		1.00	1.00	1.00
28.65		1.00	1.00	1.00
28.80		1.00	1.00	1.00
28.95		1.00	1.00	1.00
29.10		1.00	1.00	1.00
29.25		1.00	1.00	1.00
29.40		1.00	1.00	1.00
29.55		1.00	1.00	1.00
29.70		1.00	1.00	1.00
29.85		1.00	1.00	1.00
30.00		1.00	1.00	1.00
30.15		1.00	1.00	1.00
30.30		1.00	1.00	1.00
30.45		1.00	1.00	1.00
30.60		1.00	1.00	1.00
30.75		1.00	1.00	1.00
30.90		1.00	1.00	1.00
31.05		1.00	1.00	1.00
31.20		1.00	1.00	1.00
31.35		1.00	1.00	1.00
31.50		1.00	1.00	1.00
31.65		1.00	1.00	1.00
31.80		1.00	1.00	1.00
31.95		1.00	1.00	1.00
32.10		1.00	1.00	1.00
32.25		1.00	1.00	1.00
32.40		1.00	1.00	1.00
32.55		1.00	1.00	1.00
32.70		1.00	1.00	1.00
32.85		1.00	1.00	1.00
33.00		1.00	1.00	1.00
33.15		1.00	1.00	1.00
33.30		1.00	1.00	1.00
33.45		1.00	1.00	1.00
33.60		1.00	1.00	1.00
33.75		1.00	1.00	1.00
33.90		1.00	1.00	1.00
34.05		1.00	1.00	1.00
34.20		1.00	1.00	1.00
34.35		1.00	1.00	1.00
34.50		1.00	1.00	1.00
34.65		1.00	1.00	1.00
34.80		1.00	1.00	1.00
34.95		1.00	1.00	1.00
35.10		1.00	1.00	1.00
35.25		1.00	1.00	1.00
35.40		1.00	1.00	1.00
35.55		1.00	1.00	1.00
35.70		1.00	1.00	1.00
35.85		1.00	1.00	1.00
36.00		1.00	1.00	1.00
36.15		1.00	1.00	1.00
36.30		1.00	1.00	1.00
36.45		1.00	1.00	1.00
36.60		1.00	1.00	1.00
36.75		1.00	1.00	1.00
36.90		1.00	1.00	1.00
37.05		1.00	1.00	1.00
37.20		1.00	1.00	1.00
37.35		1.00	1.00	1.00
37.50		1.00	1.00	1.00
37.65		1.00	1.00	1.00
37.80		1.00	1.00	1.00
37.95		1.00	1.00	1.00
38.10		1.00	1.00	1.00
38.25		1.00	1.00	1.00
38.40		1.00	1.00	1.00
38.55		1.00	1.00	1.00
38.70		1.00	1.00	1.00
38.85		1.00	1.00	1.00
39.00		1.00	1.00	1.00
39.15		1.00	1.00	1.00
39.				

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01						
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study of the Chiriquí - 1 and III Road Boring Project Municipality of Chiriquí - 1, 1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City								
PROYECTIVO: 15+480		TEST DATA Coordinates: X: 1721154.30°W Y: 6275333.30°N		DCP N°: 33						
WATER TABLE:		not Applicable		WEIGHT HAMMER: 8 Kg.						
TEST FIELD FIELD		TEST RESULTS								
DATE	DEPTH (m)	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Rate (mm) C	Gr Hils (mm) D	Factor E	DCP Index (Hilts Points) F	AVERAGE GMR %	observations
0.10		Filled with Granular Base Layer Material Type	9	60	30	3.00	1	3.00	95.10	(For the second point) Given the characteristics of these soils (BGR) values greater than 100% on average, since that is the reason for the data. This is because the test was conducted on a loose soil surface.
			11	90	30	2.73	1	2.73	49.85	
			42	50	50	1.19	1	1.19	62.41	
		Silty Sand condition in-situ Firm, dense compactness of dry and gray coloring.	40	100	50	1.25	1	1.25	149.54	173.70
0.20			44	140	40	0.91	1	0.91	213.63	
			4	40	40	10.00	1	10.00	14.56	
			3	80	40	13.33	1	13.33	10.55	11.89
0.30		Clayey Sand weak condition in-situ, soft consistency, partially dry and light gray coloring.	3	120	40	13.33	1	13.33	10.55	
			4	70	70	17.50	1	17.50	7.78	
			4	140	70	17.50	1	17.50	7.78	8.27
1.40			4	200	60	15.00	1	15.00	9.25	
			2	40	40	20.00	1	20.00	6.70	
1.70		Clayey Sand weak condition in-situ, soft consistency, partially dry and reddish brown coloration.	3	80	40	13.33	1	13.33	10.55	9.53
			4	130	50	12.50	1	12.50	11.34	
			8	60	60	7.50	1	7.50	20.10	
			13	120	60	4.62	1	4.62	34.02	26.85
2.30			10	180	60	3.00	1	3.00	23.81	
A.C.		Lime weak in-situ condition, soft consistency, saturated state and light brown coloring.	2	30	30	15.00	1	15.00	9.25	
2.60			2	70	40	20.00	1	20.00	6.70	8.83
			3	110	40	13.33	1	13.33	10.55	
			5	70	70	14.00	1	14.00	9.56	
		Weak clay in-situ condition, soft consistency, partially saturated state, light brown with presence of lath.	7	140	70	10.00	1	10.00	14.56	13.04
3.80			7	210	70	10.00	1	10.00	14.56	
OBSERVATIONS:		The presence of the Water Table was not evidenced until the end of Geotechnical Study. For this study is considered the mouth level water survey during the winter of 2016 at water level 1.6 to 2.7 m.			a) North of Verano Station between readings b) Penetration accumulated after each meter of shafts c) Penetration of the Water Table (Water Table) made up d) Note C between A and B e) Note D between A and B f) Note E between A and B g) Note F between A and B h) Note G between A and B i) Note H between A and B j) Note I between A and B k) Note J between A and B l) Note K between A and B m) Note L between A and B n) Note M between A and B o) Note N between A and B p) Note O between A and B q) Note P between A and B r) Note Q between A and B s) Note R between A and B t) Note S between A and B u) Note T between A and B v) Note U between A and B w) Note V between A and B x) Note W between A and B y) Note X between A and B z) Note Y between A and B aa) Note Z between A and B ab) Note A between A and B ac) Note B between A and B ad) Note C between A and B ae) Note D between A and B af) Note E between A and B ag) Note F between A and B ah) Note G between A and B ai) Note H between A and B aj) Note I between A and B ak) Note J between A and B al) Note K between A and B am) Note L between A and B an) Note M between A and B ao) Note N between A and B ap) Note O between A and B aq) Note P between A and B ar) Note Q between A and B as) Note R between A and B at) Note S between A and B au) Note T between A and B av) Note U between A and B aw) Note V between A and B ax) Note W between A and B ay) Note X between A and B az) Note Y between A and B ba) Note Z between A and B bb) Note A between A and B bc) Note B between A and B bd) Note C between A and B be) Note D between A and B bf) Note E between A and B bg) Note F between A and B bh) Note G between A and B bi) Note H between A and B bj) Note I between A and B bk) Note J between A and B bl) Note K between A and B bm) Note L between A and B bn) Note M between A and B bo) Note N between A and B bp) Note O between A and B bq) Note P between A and B br) Note Q between A and B bs) Note R between A and B bt) Note S between A and B bu) Note T between A and B bv) Note U between A and B bw) Note V between A and B bx) Note W between A and B by) Note X between A and B bz) Note Y between A and B ca) Note Z between A and B cb) Note A between A and B cc) Note B between A and B cd) Note C between A and B ce) Note D between A and B cf) Note E between A and B cg) Note F between A and B ch) Note G between A and B ci) Note H between A and B cj) Note I between A and B ck) Note J between A and B cl) Note K between A and B cm) Note L between A and B cn) Note M between A and B co) Note N between A and B cp) Note O between A and B cq) Note P between A and B cr) Note Q between A and B cs) Note R between A and B ct) Note S between A and B cu) Note T between A and B cv) Note U between A and B cw) Note V between A and B cx) Note W between A and B cy) Note X between A and B cz) Note Y between A and B da) Note Z between A and B db) Note A between A and B dc) Note B between A and B dd) Note C between A and B de) Note D between A and B df) Note E between A and B dg) Note F between A and B dh) Note G between A and B di) Note H between A and B dj) Note I between A and B dk) Note J between A and B dl) Note K between A and B dm) Note L between A and B dn) Note M between A and B do) Note N between A and B dp) Note O between A and B dq) Note P between A and B dr) Note Q between A and B ds) Note R between A and B dt) Note S between A and B du) Note T between A and B dv) Note U between A and B dw) Note V between A and B dx) Note W between A and B dy) Note X between A and B dz) Note Y between A and B ea) Note Z between A and B eb) Note A between A and B ec) Note B between A and B ed) Note C between A and B ee) Note D between A and B ef) Note E between A and B eg) Note F between A and B eh) Note G between A and B ei) Note H between A and B ej) Note I between A and B ek) Note J between A and B el) Note K between A and B em) Note L between A and B en) Note M between A and B eo) Note N between A and B ep) Note O between A and B eq) Note P between A and B er) Note Q between A and B es) Note R between A and B et) Note S between A and B eu) Note T between A and B ev) Note U between A and B ew) Note V between A and B ex) Note W between A and B ey) Note X between A and B ez) Note Y between A and B fa) Note Z between A and B fb) Note A between A and B fc) Note B between A and B fd) Note C between A and B fe) Note D between A and B ff) Note E between A and B fg) Note F between A and B fh) Note G between A and B fi) Note H between A and B fj) Note I between A and B fk) Note J between A and B fl) Note K between A and B fm) Note L between A and B fn) Note M between A and B fo) Note N between A and B fp) Note O between A and B fq) Note P between A and B fr) Note Q between A and B fs) Note R between A and B ft) Note S between A and B fu) Note T between A and B fv) Note U between A and B fw) Note V between A and B fx) Note W between A and B fy) Note X between A and B fz) Note Y between A and B ga) Note Z between A and B gb) Note A between A and B gc) Note B between A and B gd) Note C between A and B ge) Note D between A and B gf) Note E between A and B gg) Note F between A and B gh) Note G between A and B gi) Note H between A and B gj) Note I between A and B gk) Note J between A and B gl) Note K between A and B gm) Note L between A and B gn) Note M between A and B go) Note N between A and B gp) Note O between A and B gq) Note P between A and B gr) Note Q between A and B gs) Note R between A and B gt) Note S between A and B gu) Note T between A and B gv) Note U between A and B gw) Note V between A and B gx) Note W between A and B gy) Note X between A and B gz) Note Y between A and B ha) Note Z between A and B hb) Note A between A and B hc) Note B between A and B hd) Note C between A and B he) Note D between A and B hf) Note E between A and B hg) Note F between A and B hh) Note G between A and B hi) Note H between A and B hj) Note I between A and B hk) Note J between A and B hl) Note K between A and B hm) Note L between A and B hn) Note M between A and B ho) Note N between A and B hp) Note O between A and B hq) Note P between A and B hr) Note Q between A and B hs) Note R between A and B ht) Note S between A and B hu) Note T between A and B hv) Note U between A and B hw) Note V between A and B hx) Note W between A and B hy) Note X between A and B hz) Note Y between A and B ia) Note Z between A and B ib) Note A between A and B ic) Note B between A and B id) Note C between A and B ie) Note D between A and B if) Note E between A and B ig) Note F between A and B ih) Note G between A and B ii) Note H between A and B ij) Note I between A and B ik) Note J between A and B il) Note K between A and B im) Note L between A and B in) Note M between A and B io) Note N between A and B ip) Note O between A and B iq) Note P between A and B ir) Note Q between A and B is) Note R between A and B it) Note S between A and B iu) Note T between A and B iv) Note U between A and B iw) Note V between A and B ix) Note W between A and B iy) Note X between A and B iz) Note Y between A and B ja) Note Z between A and B jb) Note A between A and B jc) Note B between A and B jd) Note C between A and B je) Note D between A and B jf) Note E between A and B jg) Note F between A and B jh) Note G between A and B ji) Note H between A and B jj) Note I between A and B jk) Note J between A and B jl) Note K between A and B jm) Note L between A and B jn) Note M between A and B jo) Note N between A and B jp) Note O between A and B jq) Note P between A and B jr) Note Q between A and B js) Note R between A and B jt) Note S between A and B ju) Note T between A and B jv) Note U between A and B jw) Note V between A and B jx) Note W between A and B jy) Note X between A and B jz) Note Y between A and B ka) Note Z between A and B kb) Note A between A and B kc) Note B between A and B kd) Note C between A and B ke) Note D between A and B kf) Note E between A and B kg) Note F between A and B kh) Note G between A and B ki) Note H between A and B kj) Note I between A and B kk) Note J between A and B kl) Note K between A and B km) Note L between A and B kn) Note M between A and B ko) Note N between A and B kp) Note O between A and B kq) Note P between A and B kr) Note Q between A and B ks) Note R between A and B kt) Note S between A and B ku) Note T between A and B kv) Note U between A and B kw) Note V between A and B kx) Note W between A and B ky) Note X between A and B kz) Note Y between A and B la) Note Z between A and B lb) Note A between A and B lc) Note B between A and B ld) Note C between A and B le) Note D between A and B lf) Note E between A and B lg) Note F between A and B lh) Note G between A and B li) Note H between A and B lj) Note I between A and B lk) Note J between A and B ll) Note K between A and B lm) Note L between A and B ln) Note M between A and B lo) Note N between A and B 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na) Note Z between A and B nb) Note A between A and B nc) Note B between A and B nd) Note C between A and B ne) Note D between A and B nf) Note E between A and B ng) Note F between A and B nh) Note G between A and B ni) Note H between A and B nj) Note I between A and B nk) Note J between A and B nl) Note K between A and B nm) Note L between A and B nn) Note M between A and B no) Note N between A and B np) Note O between A and B nq) Note P between A and B nr) Note Q between A and B ns) Note R between A and B nt) Note S between A and B nu) Note T between A and B nv) Note U between A and B nw) Note V between A and B nx) Note W between A and B ny) Note X between A and B nz) Note Y between A and B oa) Note Z between A and B ob) Note A between A and B oc) Note B between A and B od) Note C between A and B oe) Note D between A and B of) Note E between A and B og) Note F between A and B oh) Note G between A and B oi) Note H between A and B oj) Note I between A and B ok) Note J between A and B ol) Note K between A and B om) Note L between A and B on) Note M between A and B oo) Note N between A and B op) Note O between A and B oq) Note P between A and B or) Note Q between A and B os) Note R between A and B ot) Note S between A and B ou) Note T between A and B ov) Note U between A and B ow) Note V between A and B ox) Note W between A and B oy) Note X between A and B oz) Note Y between A and B pa) Note Z between A and B pb) Note A between A and B pc) Note B between A and B pd) Note C between A and B pe) Note D between A and B pf) Note E between A and B pg) Note F between A and B ph) Note G between A and B pi) Note H between A and B pj) Note I between A and B pk) Note J between A and B pl) Note K between A and B pm) Note L between A and B pn) Note M between A and B po) Note N between A and B pp) Note O between A and B pq) Note P between A and B pr) Note Q between A and B ps) Note R between A and B pt) Note S between A and B pu) Note T between A and B pv) Note U between A and B 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ss) Note R between A and B st) Note S between A and B su) Note T between A and B sv) Note U between A and B sw) Note V between A and B sx) Note W between A and B sy) Note X between A and B sz) Note Y between A and B ta) Note Z between A and B tb) Note A between A and B tc) Note B between A and B td) Note C between A and B te) Note D between A and B tf) Note E between A and B tg) Note F between A and B th) Note G between A and B ti) Note H between A and B tj) Note I between A and B tk) Note J between A and B tl) Note K between A and B tm) Note L between A and B tn) Note M between A and B to) Note N between A and B tp) Note O between A and B tq) Note P between A and B tr) Note Q between A and B ts) Note R between A and B tt) Note S between A and B tu) Note T between A and B tv) Note U between A and B tw) Note V between A and B tx) Note W between A and B ty) Note X between A and B tz) Note Y between A and B ua) Note Z between A and B ub) Note A between A and B uc) Note B between A and B 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yk) Note J between A and B yl) Note K between A and B ym) Note L between A and B yn) Note M between A and B yo) Note N between A and B yp) Note O between A and B yq) Note P between A and B yr) Note Q between A and B ys) Note R between A and B yt) Note S between A and B yu) Note T between A and B yv) Note U between A and B yw) Note V between A and B yx) Note W between A and B yz) Note Y between A and B za) Note Z between A and B zb) Note A between A and B zc) Note B between A and B zd) Note C between A and B ze) Note D between A and B zf) Note E between A and B zg) Note F between A and B zh) Note G between A and B zi) Note H between A and B zj) Note I between A and B zk) Note J between A and B zl) Note K between A and B zm) Note L between A and B zn) Note M between A and B zo) Note N between A and B zp) Note O between A and B zq) Note P between A and B zr) Note Q between A and B zs) Note R between A and B zt) Note S between A and B zu) Note T between A and B zv) Note U between A and B zw) Note V between A and B zx) Note W between A and B zy) Note X between A and B zz) Note Y between A and B					
DATE OF CREATION OF TEST:		CLOSING DATE OF TEST:		LABORATORY MANAGER						

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-4951-03		REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01						
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study of the Chiriquí 1-1 and 1/1 Road Boring Project Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 35						
TEST DATA										
PROYECTIVE: 17+020		X Coordinate: 172222.30°S Y Coordinate: 62°53'49.00"W								
WATER TABLE:		1.50 m.		WEIGHT HAMMER: 8 Kg.						
TEST RESULTS										
DEPTH (m)	DEPTH (ft)	Visual Description of the Material	Factor E (mm / Pundada)	Factor D (mm)	Factor C (mm)	Factor B (mm)	Factor A (mm)	Factor G (mm)	Average CBR %	Observations
0.10	0.30	Silty sand, in-situ condition compact, dense compaction of dry and light gray coloring.	1.07	1.07	1	1.07	1.07	1.07	192.04	
0.30	1.00									
0.50	1.65	Silty sand, in-situ condition compact, dense compaction of dry and gray coloring.	3.75	3.75	1	3.75	3.75	3.75	43.69	
0.70	2.30									
0.90	2.95	Silty sand, firm-situ, on average compaction, partially dry and gray coloring condition.	3.57	3.57	1	3.57	3.57	3.57	42.89	
1.10	3.60									
1.30	4.25									
1.50	4.90									
1.70	5.55									
1.90	6.20									
2.10	6.85									
2.30	7.50									
2.50	8.15									
2.70	8.80									
2.90	9.45									
3.10	10.10									
3.30	10.75									
3.50	11.40									
3.70	12.05									
3.90	12.70									
4.10	13.35									
4.30	14.00									
4.50	14.65									
4.70	15.30									
4.90	15.95									
5.10	16.60									
5.30	17.25									
5.50	17.90									
5.70	18.55									
5.90	19.20									
6.10	19.85									
6.30	20.50									
6.50	21.15									
6.70	21.80									
6.90	22.45									
7.10	23.10									
7.30	23.75									
7.50	24.40									
7.70	25.05									
7.90	25.70									
8.10	26.35									
8.30	27.00									
8.50	27.65									
8.70	28.30									
8.90	28.95									
9.10	29.60									
9.30	30.25									
9.50	30.90									
9.70	31.55									
9.90	32.20									
10.10	32.85									
10.30	33.50									
10.50	34.15									
10.70	34.80									
10.90	35.45									
11.10	36.10									
11.30	36.75									
11.50	37.40									
11.70	38.05									
11.90	38.70									
12.10	39.35									
12.30	40.00									
12.50	40.65									
12.70	41.30									
12.90	41.95									
13.10	42.60									
13.30	43.25									
13.50	43.90									
13.70	44.55									
13.90	45.20									
14.10	45.85									
14.30	46.50									
14.50	47.15									
14.70	47.80									
14.90	48.45									
15.10	49.10									
15.30	49.75									
15.50	50.40									
15.70	51.05									
15.90	51.70									
16.10	52.35									
16.30	53.00									
16.50	53.65									
16.70	54.30									
16.90	54.95									
17.10	55.60									
17.30	56.25									
17.50	56.90									
17.70	57.55									
17.90	58.20									
18.10	58.85									
18.30	59.50									
18.50	60.15									
18.70	60.80									
18.90	61.45									
19.10	62.10									
19.30	62.75									
19.50	63.40									
19.70	64.05									
19.90	64.70									
20.10	65.35									
20.30	66.00									
20.50	66.65									
20.70	67.30									
20.90	67.95									
21.10	68.60									
21.30	69.25									
21.50	69.90									
21.70	70.55									
21.90	71.20									
22.10	71.85									
22.30	72.50									
22.50	73.15									
22.70	73.80									
22.90	74.45									
23.10	75.10									
23.30	75.75									
23.50	76.40									
23.70	77.05									
23.90	77.70									
24.10	78.35									
24.30	79.00									
24.50	79.65									
24.70	80.30									
24.90	80.95									
25.10	81.60									
25.30	82.25									
25.50	82.90									
25.70	83.55									
25.90	84.20									
26.10	84.85									
26.30	85.50									
26.50	86.15									
26.70	86.80									
26.90	87.45									
27.10	88.10									
27.30	88.75									
27.50	89.40									
27.70	90.05									
27.90	90.70									
28.10	91.35									
28.30	92.00									
28.50	92.65									
28.70	93.30									
28.90	93.95									
29.10	94.60									
29.30	95.25									
29.50	95.90									
29.70	96.55									
29.90	97.20									
30.10	97.85									
30.30	98.50									
30.50	99.15									
30.70	99.80									
30.90	100.45									
31.10	101.10									
31.30	101.75									
31.50	102.40									
31.70	103.05									
31.90	103.70									
32.10	104.35									
32.30	105.00									
32.50	105.65									
32.70	106.30									
32.90	106.95									
33.10	107.60									
33.30	108.25									
33.50	108.90									
33.70	109.55									
33.90	110.20									
34.10	110.85									
34.30	111.50									
34.50	112.15									
34.70	112.80									
34.90	113.45									
35.10	114.10									
35.30	114.75									
35.50	115.40									
35.70	116.05									
35.90	116.70									
36.10	117.35									
36.30	118.00									
36.50	118.65									
36.70	119.30									
36.90	119.95									

CAEM ISO		DYNAMIC PENETRATION TESTING (DCP)		REV: 00 Date: 20/09/2014 RP 00 REVISIT: 01 de 01	
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Channel 1 - II and III Road Bypass Project UBICACIÓN / Location: Municipality of Chiriquí - II, 2° Section, Verano Province, Northern Region of San José de la Sierra City		NORMA ASTM-D-4951-03		DCP N°: 37	
PROYECTIVO: 18-015		TEST DATA			
WATER TABLE: 2.60 m.		WEIGHT HAMMER: 8 Kg.			
X Coordinate: 62°53'52.80" S		Y Coordinate: 17°22'54.90" S			
TEST RESULTS		TEST RESULTS		TEST RESULTS	
DEPTH (m)	DEPTH (m)	DEPTH (m)	DEPTH (m)	DEPTH (m)	DEPTH (m)
0.15	0.15	0.15	0.15	0.15	0.15
0.30	0.30	0.30	0.30	0.30	0.30
0.45	0.45	0.45	0.45	0.45	0.45
0.60	0.60	0.60	0.60	0.60	0.60
0.75	0.75	0.75	0.75	0.75	0.75
0.90	0.90	0.90	0.90	0.90	0.90
1.05	1.05	1.05	1.05	1.05	1.05
1.20	1.20	1.20	1.20	1.20	1.20
1.35	1.35	1.35	1.35	1.35	1.35
1.50	1.50	1.50	1.50	1.50	1.50
1.65	1.65	1.65	1.65	1.65	1.65
1.80	1.80	1.80	1.80	1.80	1.80
1.95	1.95	1.95	1.95	1.95	1.95
2.10	2.10	2.10	2.10	2.10	2.10
2.25	2.25	2.25	2.25	2.25	2.25
2.40	2.40	2.40	2.40	2.40	2.40
2.55	2.55	2.55	2.55	2.55	2.55
2.70	2.70	2.70	2.70	2.70	2.70
2.85	2.85	2.85	2.85	2.85	2.85
3.00	3.00	3.00	3.00	3.00	3.00
3.15	3.15	3.15	3.15	3.15	3.15
3.30	3.30	3.30	3.30	3.30	3.30
3.45	3.45	3.45	3.45	3.45	3.45
3.60	3.60	3.60	3.60	3.60	3.60
3.75	3.75	3.75	3.75	3.75	3.75
3.90	3.90	3.90	3.90	3.90	3.90
4.05	4.05	4.05	4.05	4.05	4.05
4.20	4.20	4.20	4.20	4.20	4.20
4.35	4.35	4.35	4.35	4.35	4.35
4.50	4.50	4.50	4.50	4.50	4.50
4.65	4.65	4.65	4.65	4.65	4.65
4.80	4.80	4.80	4.80	4.80	4.80
4.95	4.95	4.95	4.95	4.95	4.95
5.10	5.10	5.10	5.10	5.10	5.10
5.25	5.25	5.25	5.25	5.25	5.25
5.40	5.40	5.40	5.40	5.40	5.40
5.55	5.55	5.55	5.55	5.55	5.55
5.70	5.70	5.70	5.70	5.70	5.70
5.85	5.85	5.85	5.85	5.85	5.85
6.00	6.00	6.00	6.00	6.00	6.00
6.15	6.15	6.15	6.15	6.15	6.15
6.30	6.30	6.30	6.30	6.30	6.30
6.45	6.45	6.45	6.45	6.45	6.45
6.60	6.60	6.60	6.60	6.60	6.60
6.75	6.75	6.75	6.75	6.75	6.75
6.90	6.90	6.90	6.90	6.90	6.90
7.05	7.05	7.05	7.05	7.05	7.05
7.20	7.20	7.20	7.20	7.20	7.20
7.35	7.35	7.35	7.35	7.35	7.35
7.50	7.50	7.50	7.50	7.50	7.50
7.65	7.65	7.65	7.65	7.65	7.65
7.80	7.80	7.80	7.80	7.80	7.80
7.95	7.95	7.95	7.95	7.95	7.95
8.10	8.10	8.10	8.10	8.10	8.10
8.25	8.25	8.25	8.25	8.25	8.25
8.40	8.40	8.40	8.40	8.40	8.40
8.55	8.55	8.55	8.55	8.55	8.55
8.70	8.70	8.70	8.70	8.70	8.70
8.85	8.85	8.85	8.85	8.85	8.85
9.00	9.00	9.00	9.00	9.00	9.00
9.15	9.15	9.15	9.15	9.15	9.15
9.30	9.30	9.30	9.30	9.30	9.30
9.45	9.45	9.45	9.45	9.45	9.45
9.60	9.60	9.60	9.60	9.60	9.60
9.75	9.75	9.75	9.75	9.75	9.75
9.90	9.90	9.90	9.90	9.90	9.90
10.05	10.05	10.05	10.05	10.05	10.05
10.20	10.20	10.20	10.20	10.20	10.20
10.35	10.35	10.35	10.35	10.35	10.35
10.50	10.50	10.50	10.50	10.50	10.50
10.65	10.65	10.65	10.65	10.65	10.65
10.80	10.80	10.80	10.80	10.80	10.80
10.95	10.95	10.95	10.95	10.95	10.95
11.10	11.10	11.10	11.10	11.10	11.10
11.25	11.25	11.25	11.25	11.25	11.25
11.40	11.40	11.40	11.40	11.40	11.40
11.55	11.55	11.55	11.55	11.55	11.55
11.70	11.70	11.70	11.70	11.70	11.70
11.85	11.85	11.85	11.85	11.85	11.85
12.00	12.00	12.00	12.00	12.00	12.00
12.15	12.15	12.15	12.15	12.15	12.15
12.30	12.30	12.30	12.30	12.30	12.30
12.45	12.45	12.45	12.45	12.45	12.45
12.60	12.60	12.60	12.60	12.60	12.60
12.75	12.75	12.75	12.75	12.75	12.75
12.90	12.90	12.90	12.90	12.90	12.90
13.05	13.05	13.05	13.05	13.05	13.05
13.20	13.20	13.20	13.20	13.20	13.20
13.35	13.35	13.35	13.35	13.35	13.35
13.50	13.50	13.50	13.50	13.50	13.50
13.65	13.65	13.65	13.65	13.65	13.65
13.80	13.80	13.80	13.80	13.80	13.80
13.95	13.95	13.95	13.95	13.95	13.95
14.10	14.10	14.10	14.10	14.10	14.10
14.25	14.25	14.25	14.25	14.25	14.25
14.40	14.40	14.40	14.40	14.40	14.40
14.55	14.55	14.55	14.55	14.55	14.55
14.70	14.70	14.70	14.70	14.70	14.70
14.85	14.85	14.85	14.85	14.85	14.85
15.00	15.00	15.00	15.00	15.00	15.00
15.15	15.15	15.15	15.15	15.15	15.15
15.30	15.30	15.30	15.30	15.30	15.30
15.45	15.45	15.45	15.45	15.45	15.45
15.60	15.60	15.60	15.60	15.60	15.60
15.75	15.75	15.75	15.75	15.75	15.75
15.90	15.90	15.90	15.90	15.90	15.90
16.05	16.05	16.05	16.05	16.05	16.05
16.20	16.20	16.20	16.20	16.20	16.20
16.35	16.35	16.35	16.35	16.35	16.35
16.50	16.50	16.50	16.50	16.50	16.50
16.65	16.65	16.65	16.65	16.65	16.65
16.80	16.80	16.80	16.80	16.80	16.80
16.95	16.95	16.95	16.95	16.95	16.95
17.10	17.10	17.10	17.10	17.10	17.10
17.25	17.25	17.25	17.25	17.25	17.25
17.40	17.40	17.40	17.40	17.40	17.40
17.55	17.55	17.55	17.55	17.55	17.55
17.70	17.70	17.70	17.70	17.70	17.70
17.85	17.85	17.85	17.85	17.85	17.85
18.00	18.00	18.00	18.00	18.00	18.00
18.15	18.15	18.15	18.15	18.15	18.15
18.30	18.30	18.30	18.30	18.30	18.30
18.45	18.45	18.45	18.45	18.45	18.45
18.60	18.60	18.60	18.60	18.60	18.60
18.75	18.75	18.75	18.75	18.75	18.75
18.90	18.90	18.90	18.90	18.90	18.90
19.05	19.05	19.05	19.05	19.05	19.05
19.20	19.20	19.20	19.20	19.20	19.20
19.35	19.35	19.35	19.35	19.35	19.35
19.50	19.50	19.50	19.50	19.50	19.50
19.65	19.65	19.65	19.65	19.65	19.65
19.80	19.80	19.80	19.80	19.80	19.80
19.95	19.95	19.95	19.95	19.95	19.95
20.10	20.10	20.10	20.10	20.10	20.10
20.25	20.25	20.25	20.25	20.25	20.25
20.40	20.40	20.40	20.40	20.40	20.40
20.55	20.55	20.55	20.55	20.55	20.55
20.70	20.70	20.70	20.70	20.70	20.70
20.85	20.85	20.85	20.85	20.85	20.85
21.00	21.00	21.00	21.00	21.00	21.00
21.15	21.15	21.15	21.15	21.15	21.15
21.30	21.30	21.30	21.30	21.30	21.30
21.45	21.45	21.45	21.45	21.45	21.45
21.60	21.60	21.60	21.60	21.60	21.60
21.75	21.75	21.75	21.75	21.75	21.75
21.90	21.90	21.90	21.90	21.90	21.90
22.05	22.05	22.05	22.05	22.05	22.05
22.20	22.20	22.20	22.20	22.20	22.20
22.35	22.35	22.35	22.35	22.35	22.35
22.50	22.50	22.50	22.50	22.50	22.50
22.65	22.65	22.65	22.65	22.65	22.65
22.80	22.80	22.80	22.80	22.80	22.80
22.95	22.95	22.95	22.95	22.95	22.95
23.10	23.10	23.10	23.10	23.10	23.10
23.25	23.25	23.25	23.25	23.25	23.25
23.40	23.40	23.40	23.40	23.40	23.40
23.55	23.55	23.55	23.55	23.55	23.55
23.70	23.70	23.70	23.70	23.70	23.70
23.85	23.85	23.85	23.85	23.85	23.85
24.00	24.00	24.00	24.00	24.00	24.00
24.15	24.15	24.15	24.15	24.15	24.15
24.30	24.30	24.30	24.30	24.30	24.30
24.45	24.45	24.45	24.45	24.45	24.45
24.60	24.60	24.60	24.60	24.60	24.60
24.75	24.75	24.75	24.75	24.75	24.75
24.90	24.90	24.90	24.90	24.90	24.90
25.05	25.05	25.05	25.05	25.05	25.05
25.20	25.20	25.20	25.20	25.20	25.20
25.35	25.35	25.35	25.35	25.35	25.35
25.50	25.50	25.50	25.50	25.50	25.50
25.65	25.65	25.65	25.65	25.65	25.65
25.80	25.80	25.80	25.80	25.80	25.80
25.95	25.95	25.95	25.95	25.95	25.95
26.10	26.10	26.10	26.10	26.10	26.10
26.25	26.25	26.25	26.25	26.25	26.25
26.40	26.40	26.40	26.40	26.40	26.40
26.55	26.55	26.55	26.55	26.55	26.55
26.70	26.70	26.70	26.70	26.70	26.70
26.85	26.85	26.85	26.85	26.85	26.85
27.00	27.00	27.00	27.00	27.00	27.00
27.15	27.15	27.15	27.15	27.15	27.15
27.30	27.30	27.30	27.30	27.30	27.30
27.45	27.45	27.45	27.45	27.45	27.45
27.60	27.60	27.60			

[illegible]

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				DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03				REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01					
CLIENTE / Client: KATAMBA & Engineers International				Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City									
PROYECTO / Project: Preparatory Study of the Chiriquí 1-1 and III Road Boring Project				DCP N°: 47									
UBICACIÓN / Location:				TEST DATA									
PROFESOR: 22+100				X Coordinate: 17°25'06.60"S Y Coordinate: 62°54'08.10"W				WEIGHT HAMMER: 8 Kg.					
WATER TABLE:				not Applicable				TEST RESULTS					
DEPTH (m)	COORDINATE (m)	VISUAL DESCRIPTION OF THE MATERIAL		Cumulative penetration (mm) A	Number of Blows B	Factor Between Readings E	Factor Between Readings D	Factor Between Readings C	DCP Index (mm / Pundada) G	CBR %	AVERAGE CBR %	observations	
0.10		Filled with Gravel Base Layer		26	70	40	1.54	1	1.54	118.51	121.92	(For the first point) Given the characteristics of the material, the CBR values are considered greater than 100%, on the basis of the second point to CBR 73.64 was adopted.	
0.20		Silty Sand, firm condition in-situ, dense consistency of dry and reddish brown coloration.		30	100	30	1.50	1	1.50	121.92			
0.30				27	80	40	1.08	1	1.08	175.96	73.64		
0.40				17	120	40	1.48	1	1.48	123.63			
0.50				7	50	50	2.35	1	2.35	73.64			
0.60		Limo Clay of strong in-situ condition, soft consistency, dryness and reddish coloration with dark gray patina.		6	100	50	8.33	1	8.33	17.86	18.70		
0.70				5	140	40	8.00	1	8.00	18.70			
0.80		Limo Clay of strong in-situ condition, soft consistency to medium partially dry and reddish coloration.		5	40	40	8.00	1	8.00	18.70			
0.90				5	80	40	8.00	1	8.00	18.70	14.56		
1.00				4	120	40	10.00	1	10.00	14.56			
1.10		Limo firm in-situ condition, soft consistency to medium partially dry and light brown color.		9	70	70	7.78	1	7.78	19.30			
1.20				7	140	70	10.00	1	10.00	14.56	9.89		
1.30				5	210	70	14.00	1	14.00	9.99			
1.40													
1.50		Limo firm in-situ condition, soft consistency to medium partially dry and light brown color.		8	60	60	7.50	1	7.50	20.10			
1.60				6	120	60	10.00	1	10.00	14.56	14.56		
1.70				6	180	60	10.00	1	10.00	14.56			
1.80		Limo Clay of strong in-situ condition, soft consistency to medium partially saturated state, light brown with light gray patina and small clasts of clayey silt condition		9	70	70	7.78	1	7.78	19.30			
1.90				9	130	60	6.67	1	6.67	22.94	19.30		
2.00				9	200	70	7.78	1	7.78	19.30			
2.10													
2.20		Limo Clay of strong in-situ condition, soft consistency to medium partially saturated state and light brown coloring and small clasts.		8	80	60	7.50	1	7.50	20.10	21.23		
2.30				9	120	60	6.67	1	6.67	22.94			
2.40				7	170	50	7.14	1	7.14	21.23			
OBSERVATIONS: The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey done.													
LABORATORY				DATE OF CREATION OF TEST: 05/09/2014				CLOSING DATE OF TEST: 05/09/2014				LABORATORY MANAGER	

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01					
CLIENTE / Client: KATAMBA & Engineers International. PROYECTO / Project: Preparatory Study of the Chiriquí 1- II and III Road Paving Project UBICACIÓN / Location: Municipality of Chiriquí 1 - II, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 48							
TEST DATA									
PROFESOR: 22+600		X Cord. state: 17°25'22.70"S Y Cord. state: 62°54'10.20"W							
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.							
TEST RESULTS									
DEPTH (m)	COORDEINATE (m)	VISUAL DESCRIPTION OF THE MATERIAL	Cumulative Penetration Between Readings (mm) B	Penetration Of Hts. (mm) E	Ratio Hammer Penetration (mm) F	DCP Index (mm / Pundada) G	CBR %	AVERAGE CBR %	observations
0.15		Silty Sand condition in-situ firm, dense consistency of dryness and light gray coloring.	40	40	0.95	1	0.95	202.78	(For the first item) Due to the characteristics of these soils (Silty Sand) the CBR values are considered greater than 100%, on average, more than 100%, on the basis of the second point to CBR 43.88 was adopted.
0.20			43	70	0.70	1	0.70	287.35	
0.30			40	100	0.75	1	0.75	264.99	
0.40									
0.50		Silty Sand condition in-situ firm, dense consistency of dryness and dark brown coloration.	10	50	5.00	1	5.00	31.66	
0.60			12	100	50	4.17	1	4.17	38.83
0.70			18	130	50	2.78	1	2.78	61.14
0.80									
0.90			9	50	50	5.56	1	5.56	28.13
1.00		Clayey Sand weak condition in-situ, soft consistency, partially dry and dark brown coloration.	9	100	50	5.56	1	5.56	28.13
1.10			5	140	40	8.00	1	8.00	18.70
1.20									
1.30			4	40	40	10.00	1	10.00	14.56
1.40		Clayey Sand weak condition in-situ, soft consistency, partially dry and reddish coloration.	5	80	40	8.00	1	8.00	18.70
1.50			7	130	50	7.14	1	7.14	21.23
1.60									
1.70			9	70	70	7.78	1	7.78	19.30
1.80			7	140	70	10.00	1	10.00	14.56
1.90			6	200	60	10.00	1	10.00	14.56
2.00		Silty Sand firm condition in-situ, on average compactness, partially saturated state and light brown color.	6	40	40	6.67	1	6.67	22.94
2.10		Firm, silty, on average compactness, partially saturated state and brown sandy. Firm clay condition	5	50	50	10.00	1	10.00	14.56
2.20			7	150	60	8.57	1	8.57	17.31
2.30									
2.40		Silty Sand, fine-grained condition in-situ, firm, medium compact, saturated state and light brown color	4	60	60	15.00	1	15.00	9.25
2.50			3	120	60	20.00	1	20.00	6.70
2.60			4	150	70	17.50	1	17.50	7.78
2.70									
2.80		Weak clay (in-situ, partially saturated soft consistency), medium compact, light brown color with small clasts.	7	50	50	7.14	1	7.14	21.23
2.90			7	100	50	7.14	1	7.14	21.23
3.00			7	130	50	7.14	1	7.14	21.23
OBSERVATIONS A: Number of blows between readings B: Cumulative penetration between readings C: Penetration of the cone D: Uniformly compacted penetration (used to obtain readings) E: Penetration of the cone F: Ratio of penetration between readings G: Normalized CBR index Note: If the hammer is 4.0 Kg. and the penetration is greater than 100 mm, the CBR is considered greater than 100%.									
DATE OF CREATION OF TEST: 05/09/2014			CLOSING DATE OF TEST: 05/09/2014			LABORATORY MANAGER			

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Chiriquí 1-1 and III Road Boring Project UBICACIÓN / Location: Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
PROYECTIVO: 23+100		TEST DATA		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
TEST RESULTS		TEST RESULTS		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
VISUAL DESCRIPTION OF THE MATERIAL: Material Type Filled with Gravel Base Layer		VISUAL DESCRIPTION OF THE MATERIAL: Material Type Filled with Gravel Base Layer		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
0.15		0.15		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
0.40		0.40		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
0.90		0.90		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
1.40		1.40		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
1.70		1.70		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
2.20		2.20		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
2.40		2.40		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
3.00		3.00		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
OBSERVATIONS: The presence of the Water Table at a depth of 2.40 m was not observed. The test was conducted on the month 0.00 level survey date.		OBSERVATIONS: The presence of the Water Table at a depth of 2.40 m was not observed. The test was conducted on the month 0.00 level survey date.		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
DATE OF CREATION OF TEST: 06/09/2014		CLOSING DATE OF TEST: 06/09/2014		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
LABORATORY MANAGER		LABORATORY MANAGER		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Chiriquí 1-1 and III Road Boring Project UBICACIÓN / Location: Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
PROYECTIVO: 23+595		TEST DATA		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
WATER TABLE: 2.60 m.		WEIGHT HAMMER: 8 Kg.		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
TEST RESULTS		TEST RESULTS		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
VISUAL DESCRIPTION OF THE MATERIAL: Material Type Silty sand with gravel isolated presence of strong in-situ condition, dense compactness of dry and gray coloring.		VISUAL DESCRIPTION OF THE MATERIAL: Material Type Silty sand with gravel isolated presence of strong in-situ condition, dense compactness of dry and gray coloring.		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
0.40		0.40		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
0.40		0.40		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
0.90		0.90		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
1.20		1.20		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
1.50		1.50		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
2.00		2.00		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
2.50		2.50		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
N.F.		N.F.		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
3.00		3.00		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
OBSERVATIONS: The presence of the Water Table at a depth of 2.60 m was not observed. The test was conducted on the month 0.00 level survey date.		OBSERVATIONS: The presence of the Water Table at a depth of 2.60 m was not observed. The test was conducted on the month 0.00 level survey date.		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
DATE OF CREATION OF TEST: 05/09/2014		CLOSING DATE OF TEST: 05/09/2014		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01
LABORATORY MANAGER		LABORATORY MANAGER		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAUL: 01 de 01

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT RP 00 PAGE 01 de 01
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Chiriquí 1-1 and 1/1 Road Boring Project UBICACIÓN / Location: Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 51		
TEST DATA				
PROFESOR: 24+100		X Coordinate: 17°26'10.20"S Y Coordinate: 62°54'06.90"W		
WATER TABLE: REC-ORD FIELD		2.30 m.		WEIGHT HAMMER: 8 Kg.
TEST RESULTS				
DEPTH (m)	VISUAL DESCRIPTION OF THE MATERIAL	Factor Penetration E	DCP Index (mm / Punteria)	AVERAGE CBR %
0.00	Filled with Gravel Base Layer	1	2.00	88.34
0.10		1	1.30	142.85
0.20		1	1.03	184.85
0.30		1	1.03	184.85
0.40		1	1.03	184.85
0.50		1	1.03	184.85
0.60		1	1.03	184.85
0.70		1	1.03	184.85
0.80		1	1.03	184.85
0.90		1	1.03	184.85
1.00		1	1.03	184.85
1.10		1	1.03	184.85
1.20		1	1.03	184.85
1.30		1	1.03	184.85
1.40		1	1.03	184.85
1.50		1	1.03	184.85
1.60		1	1.03	184.85
1.70		1	1.03	184.85
1.80		1	1.03	184.85
1.90		1	1.03	184.85
2.00		1	1.03	184.85
2.10		1	1.03	184.85
2.20		1	1.03	184.85
2.30		1	1.03	184.85
2.40		1	1.03	184.85
2.50		1	1.03	184.85
2.60		1	1.03	184.85
2.70		1	1.03	184.85
2.80		1	1.03	184.85
2.90		1	1.03	184.85
3.00		1	1.03	184.85
3.10		1	1.03	184.85
3.20		1	1.03	184.85
3.30		1	1.03	184.85
3.40		1	1.03	184.85
3.50		1	1.03	184.85
3.60		1	1.03	184.85
3.70		1	1.03	184.85
3.80		1	1.03	184.85
3.90		1	1.03	184.85
4.00		1	1.03	184.85
4.10		1	1.03	184.85
4.20		1	1.03	184.85
4.30		1	1.03	184.85
4.40		1	1.03	184.85
4.50		1	1.03	184.85
4.60		1	1.03	184.85
4.70		1	1.03	184.85
4.80		1	1.03	184.85
4.90		1	1.03	184.85
5.00		1	1.03	184.85
5.10		1	1.03	184.85
5.20		1	1.03	184.85
5.30		1	1.03	184.85
5.40		1	1.03	184.85
5.50		1	1.03	184.85
5.60		1	1.03	184.85
5.70		1	1.03	184.85
5.80		1	1.03	184.85
5.90		1	1.03	184.85
6.00		1	1.03	184.85
6.10		1	1.03	184.85
6.20		1	1.03	184.85
6.30		1	1.03	184.85
6.40		1	1.03	184.85
6.50		1	1.03	184.85
6.60		1	1.03	184.85
6.70		1	1.03	184.85
6.80		1	1.03	184.85
6.90		1	1.03	184.85
7.00		1	1.03	184.85
7.10		1	1.03	184.85
7.20		1	1.03	184.85
7.30		1	1.03	184.85
7.40		1	1.03	184.85
7.50		1	1.03	184.85
7.60		1	1.03	184.85
7.70		1	1.03	184.85
7.80		1	1.03	184.85
7.90		1	1.03	184.85
8.00		1	1.03	184.85
8.10		1	1.03	184.85
8.20		1	1.03	184.85
8.30		1	1.03	184.85
8.40		1	1.03	184.85
8.50		1	1.03	184.85
8.60		1	1.03	184.85
8.70		1	1.03	184.85
8.80		1	1.03	184.85
8.90		1	1.03	184.85
9.00		1	1.03	184.85
9.10		1	1.03	184.85
9.20		1	1.03	184.85
9.30		1	1.03	184.85
9.40		1	1.03	184.85
9.50		1	1.03	184.85
9.60		1	1.03	184.85
9.70		1	1.03	184.85
9.80		1	1.03	184.85
9.90		1	1.03	184.85
10.00		1	1.03	184.85
10.10		1	1.03	184.85
10.20		1	1.03	184.85
10.30		1	1.03	184.85
10.40		1	1.03	184.85
10.50		1	1.03	184.85
10.60		1	1.03	184.85
10.70		1	1.03	184.85
10.80		1	1.03	184.85
10.90		1	1.03	184.85
11.00		1	1.03	184.85
11.10		1	1.03	184.85
11.20		1	1.03	184.85
11.30		1	1.03	184.85
11.40		1	1.03	184.85
11.50		1	1.03	184.85
11.60		1	1.03	184.85
11.70		1	1.03	184.85
11.80		1	1.03	184.85
11.90		1	1.03	184.85
12.00		1	1.03	184.85
12.10		1	1.03	184.85
12.20		1	1.03	184.85
12.30		1	1.03	184.85
12.40		1	1.03	184.85
12.50		1	1.03	184.85
12.60		1	1.03	184.85
12.70		1	1.03	184.85
12.80		1	1.03	184.85
12.90		1	1.03	184.85
13.00		1	1.03	184.85
13.10		1	1.03	184.85
13.20		1	1.03	184.85
13.30		1	1.03	184.85
13.40		1	1.03	184.85
13.50		1	1.03	184.85
13.60		1	1.03	184.85
13.70		1	1.03	184.85
13.80		1	1.03	184.85
13.90		1	1.03	184.85
14.00		1	1.03	184.85
14.10		1	1.03	184.85
14.20		1	1.03	184.85
14.30		1	1.03	184.85
14.40		1	1.03	184.85
14.50		1	1.03	184.85
14.60		1	1.03	184.85
14.70		1	1.03	184.85
14.80		1	1.03	184.85
14.90		1	1.03	184.85
15.00		1	1.03	184.85
15.10		1	1.03	184.85
15.20		1	1.03	184.85
15.30		1	1.03	184.85
15.40		1	1.03	184.85
15.50		1	1.03	184.85
15.60		1	1.03	184.85
15.70		1	1.03	184.85
15.80		1	1.03	184.85
15.90		1	1.03	184.85
16.00		1	1.03	184.85
16.10		1	1.03	184.85
16.20		1	1.03	184.85
16.30		1	1.03	184.85
16.40		1	1.03	184.85
16.50		1	1.03	184.85
16.60		1	1.03	184.85
16.70		1	1.03	184.85
16.80		1	1.03	184.85
16.90		1	1.03	184.85
17.00		1	1.03	184.85
17.10		1	1.03	184.85
17.20		1	1.03	184.85
17.30		1	1.03	184.85
17.40		1	1.03	184.85
17.50		1	1.03	184.85
17.60		1	1.03	184.85
17.70		1	1.03	184.85
17.80		1	1.03	184.85
17.90		1	1.03	184.85
18.00		1	1.03	184.85
18.10		1	1.03	184.85
18.20		1	1.03	184.85
18.30		1	1.03	184.85
18.40		1	1.03	184.85
18.50		1	1.03	184.85
18.60		1	1.03	184.85
18.70		1	1.03	184.85
18.80		1	1.03	184.85
18.90		1	1.03	184.85
19.00		1	1.03	184.85
19.10		1	1.03	184.85
19.20		1	1.03	184.85
19.30		1	1.03	184.85
19.40		1	1.03	184.85
19.50		1	1.03	184.85
19.60		1	1.03	184.85
19.70		1	1.03	184.85
19.80		1	1.03	184.85
19.90		1	1.03	184.85
20.00		1	1.03	184.85
20.10		1	1.03	184.85
20.20		1	1.03	184.85
20.30		1	1.03	184.85
20.40		1	1.03	184.85
20.50		1	1.03	184.85
20.60		1	1.03	184.85
20.70		1	1.03	184.85
20.80		1	1.03	184.85
20.90		1	1.03	184.85
21.00		1	1.03	184.85
21.10		1	1.03	184.85
21.20		1	1.03	184.85
21.30		1	1.03	184.85
21.40		1	1.03	184.85
21.50		1	1.03	184.85
21.60		1	1.03	184.85
21.70		1	1.03	184.85
21.80		1	1.03	184.85
21.90		1	1.03	184.85
22.00		1	1.03	184.85
22.10		1	1.03	184.85
22.20		1	1.03	184.85
22.30		1	1.03	184.85
22.40		1	1.03	184.85
22.50		1	1.03	184.85
22.60		1	1.03	184.85
22.70		1	1.03	184.85
22.80		1	1.03	184.85
22.90		1	1.03	184.85
23.00		1	1.03	184.85
23.10		1	1.03	184.85
23.20		1	1.03	184.85
23.30		1	1.03	184.85
23.40		1	1.03	184.85
23.50		1	1.03	184.85
23.60		1	1.03	184.85
23.70		1	1.03	184.85
23.80		1	1.03	184.85
23.90		1	1.03	184.85
24.00		1	1.03	184.85
24.10		1	1.03	184.85
24.20		1	1.03	184.85
24.30		1	1.03	184.85
24.40		1	1.03	184.85
24.50		1	1.03	184.85
24.60		1	1.03	184.85
24.70		1	1.03	184.85
24.80		1	1.03	184.85
24.90		1	1.03	184.85
25.00		1	1.03	184.85
25.10		1	1.03	184.85
25.20		1	1.03	184.85
25.30		1	1.03	184.85
25.40		1		

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01							
CLIENTE / Client: KATAMIRA & Engineers International		Municipality of Chiriquí 1 - II, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City									
PROYECTO / Project: Preparatory Study of the Chiriquí 1 - II and III Road Boring Project											
UBICACIÓN / Location:											
DCP N°: 55											
TEST DATA											
PROFESOR: 28+110		Coordinates: X: 62°54'16.70"W Y: 17°27'14.40"S									
WATER TABLE: 1.80 m.		WEIGHT HAMMER: 8 Kg.									
TEST RESULTS											
DEPTH (m)	COORDEINATE X (m)	COORDEINATE Y (m)	Visual Description of the Material	Factor E (mm / Pundras)	Penetration Between Readings (mm) C	Cumulative penetration (mm) D	Number of Blows A	DCP Index (mm / Pundras)	CBR %	AVERAGE CBR %	Observations
0.05			Filled with Granular Base Layer Material Type	1	1.33	1.33	15	1.33	139.11	153.17	(For the first item) Due to the characteristics of the material, the test was conducted on an isolated hammer on store or consolidated, dry ground.
0.20			Silty sand, firm-situ, dense compaction of dry brown coloration and condition.	1	1.05	2.38	19	1.05	181.28		
0.40				1	2.31	4.69	13	2.31	75.26		
0.60				1	1.78	6.47	17	1.78	101.63	84.05	
0.80				1	2.31	8.78	13	2.31	75.26		
1.00			Silty fine-grained sand, partially in-situ firm condition, compactness loose to medium partially dry and dark brown coloration.	1	10.00	18.78	3	10.00	14.56	14.56	
1.20				1	10.00	28.78	3	10.00	14.56		
1.40				1	10.00	38.78	3	10.00	14.56		
1.60			Silty sand, partly in-situ final condition of average compactness, partially saturated state and reddish brown coloration.	1	12.50	51.28	5	12.50	10.55	12.15	
1.80				1	12.50	63.78	4	12.50	11.34		
2.00			Sandy loam, partially solid in-situ condition, loose to medium compact, saturated state and light brown color.	1	10.00	73.78	4	10.00	11.34	13.49	
2.20				1	10.00	83.78	5	10.00	14.56		
2.40			Silty fine-grained sand, firm condition in-situ, on average compactness, saturated state and brown.	1	25.00	108.78	2	25.00	5.22	7.26	
2.60				1	25.00	133.78	2	25.00	5.22		
2.80				1	12.50	146.28	4	12.50	11.34		
3.00			Silty fine-grained sand, firm condition in-situ, on average compactness, saturated state and brown.	1	8.33	154.61	6	8.33	17.86	15.66	
3.20				1	10.00	164.61	5	10.00	14.56		
CONCLUSIONS					As the presence of brown stains between readings is observed, the test was conducted on an isolated hammer on store or consolidated, dry ground.						
The presence of the Water Table at a depth of 1.80 m was evident, until the end of Geotechnical Study. For the study it is considered the month 0.00 to end of survey date.					Note C between A and B Note D between A and B Note E between A and B Note F between A and B Note G between A and B Note H between A and B Note I between A and B Note J between A and B Note K between A and B Note L between A and B Note M between A and B Note N between A and B Note O between A and B Note P between A and B Note Q between A and B Note R between A and B Note S between A and B Note T between A and B Note U between A and B Note V between A and B Note W between A and B Note X between A and B Note Y between A and B Note Z between A and B Note AA between A and B Note AB between A and B Note AC between A and B Note AD between A and B Note AE between A and B Note AF between A and B Note AG between A and B Note AH between A and B Note AI between A and B Note AJ between A and B Note AK between A and B Note AL between A and B Note AM between A and B Note AN between A and B Note AO between A and B Note AP between A and B Note AQ between A and B Note AR between A and B Note AS between 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Note QS between A and B Note QT between A and B Note QU between A and B Note QV between A and B Note QW between A and B Note QX between A and B Note QY between A and B Note QZ between A and B Note RA between A and B Note RB between A and B Note RC between A and B Note RD between A and B Note RE between A and B Note RF between A and B Note RG between A and B Note RH between A and B Note RI between A and B Note RJ between A and B Note RK between A and B Note RL between A and B Note RM between A and B Note RN between A and B Note RO between A and B Note RP between A and B Note RQ between A and B Note RR between A and B Note RS between A and B Note RT between A and B Note RU between A and B Note RV between A and B Note RW between A and B Note RX between A and B Note RY between A and B Note RZ between A and B Note SA between A and B Note SB between A and B Note SC between A and B Note SD between A and B Note SE between A and B Note SF between A and B Note SG between A and B Note SH between A and B Note SI between A and B Note SJ between A and B Note SK between A and B Note SL between A and B Note SM between A and B Note SN between A and B Note SO between A and B Note SP between A and B Note SQ between A and B Note SR between A and B Note SS between A and B Note ST between A and B Note SU between A and B Note SV between A and B Note SW between A and B Note SX between A and B Note SY between A and B Note SZ between A and B Note TA between A and B Note TB between A and B Note TC between A and B Note TD between A and B Note TE between A and B Note TF between A and B Note TG between A and B Note TH between A and B Note TI between A and B Note TJ between A and B Note TK between A and B Note TL between A and B Note TM between A and B Note TN between A and B Note TO between A and B Note TP between A and B Note TQ between A and B Note TR between A and B Note TS between A and B Note TU between A and B Note TV between A and B Note TW between A and B Note TX between A and B Note TY between A and B Note TZ between A and B Note UA between A and B Note UB between A and B Note UC between A and B Note UD between A and B Note UE between A and B Note UF between A and B Note UG between A and B Note UH between A and B Note UI between A and B Note UJ between A and B Note UK between A and B Note UL between A and B Note UM between A and B Note UN between A and B Note UO between A and B Note UP between A and B Note UQ between A and B Note UR between A and B Note US between A and B Note UT between A and B Note UV between A and B						

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 20/09/2014 RP 00 01 de 01							
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Chiriquí 1- II and III Road Paving Project UBICACIÓN / Location: Municipality of Chiriquí 1- II, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City				DCP N°: 56							
TEST DATA											
PROFESOR: 28+610		Coordinates: X: 62°54'26.40"W Y: 17°27'30.30"S		WEIGHT HAMMER: 8 Kg.							
WATER TABLE: 2.50 m.		TEST RESULTS									
DEPTH (m)	COORDEINATE X (m)	COORDEINATE Y (m)	Visual Description of the Material	Factor E (mm / Pundras)	Penetration Between Readings (mm) C	Cumulative penetration (mm) D	Number of Blows A	DCP Index (mm / Pundras)	CBR %	AVERAGE CBR %	Observations
0.20			Filled with Granular Base Layer Material Type	1	0.34	0.34	58	0.34	632.88	524.45	(For the first three points) Given the characteristics of the material, the test was conducted on an isolated hammer on store or consolidated, dry ground.
0.40				1	0.48	0.82	42	0.48	440.74		
0.60			Silty fine-grained sand, firm in-situ condition, dense compactness of dry and dark brown coloration.	1	2.50	3.32	12	2.50	68.80		
0.80				1	1.20	4.52	25	1.20	156.94	68.80	
1.00				1	0.73	5.25	41	0.73	272.42		
1.20			Clayey sand, partially solid in-situ condition, average compactness, partially dry and reddish brown coloration.	1	2.50	7.75	8	2.50	68.80	68.80	
1.40				1	1.54	9.29	13	1.54	118.51		
1.60				1							
1.80			Silty sand, firm-situ, on average compactness, partially dry and brown coloration.	1	6.00	16.83	5	6.00	25.81	25.81	
2.00				1	6.00	22.83	5	6.00	25.81		
2.20			Silty fine-grained sand, firm condition in-situ, on average compactness, saturated state and brown.	1	16.67	39.50	3	16.67	8.22		
2.40				1	25.00	64.50	2	25.00	5.22	7.22	
2.60				1	16.67	81.17	6	16.67	8.22		
2.80				1							
3.00			Silty fine-grained sand, firm condition in-situ, on average compactness, saturated state and brown.	1	25.00	106.17	4	25.00	5.22	6.21	
3.20				1	20.00	126.17	5	20.00	6.70		
3.40				1	20.00	146.17	5	20.00	6.70		
3.60				1							
3.80			Limo Sandy, in-situ condition firm, medium compactness, saturated state and brown.	1	15.00	161.17	6	15.00	9.25	8.60	
4.00				1	25.00	186.17	4	25.00	5.22		
4.20				1	12.50	198.67	8	12.50	11.34		
CONCLUSIONS					At: Number of Blows Water between readings B: Penetration accumulated after each series of blows C: Penetration between readings (mm) between readings D: Note C subtracted A below E: Note C divided by A below F: Note D note E G: Note D note E H: Correlation between CBR and DCP index						
The presence of the Water Table is at a depth of 2.50 m was evident, until the end of the test. For the study it is considered the month 0.00 to end of survey date.		DATE OF CREATION OF TEST: 09/09/2014		CLOSING DATE OF TEST: 09/09/2014		LABORATORY MANAGER					

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-4951-03		REV: 00 Date: 20/09/2014 RP 00 REVISIT PAUL 01 de 01
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study of the Chiriquí 1-1 and III Road Boring Project Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		
PROFESIONISTA: 27+100		TEST DATA		
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.		
TEST RESULTS		TEST RESULTS		
DEPTH (m)	DEPTH (m)	DEPTH (m)	DEPTH (m)	DEPTH (m)
0.05	0.05	0.05	0.05	0.05
0.10	0.10	0.10	0.10	0.10
0.15	0.15	0.15	0.15	0.15
0.20	0.20	0.20	0.20	0.20
0.25	0.25	0.25	0.25	0.25
0.30	0.30	0.30	0.30	0.30
0.35	0.35	0.35	0.35	0.35
0.40	0.40	0.40	0.40	0.40
0.45	0.45	0.45	0.45	0.45
0.50	0.50	0.50	0.50	0.50
0.55	0.55	0.55	0.55	0.55
0.60	0.60	0.60	0.60	0.60
0.65	0.65	0.65	0.65	0.65
0.70	0.70	0.70	0.70	0.70
0.75	0.75	0.75	0.75	0.75
0.80	0.80	0.80	0.80	0.80
0.85	0.85	0.85	0.85	0.85
0.90	0.90	0.90	0.90	0.90
0.95	0.95	0.95	0.95	0.95
1.00	1.00	1.00	1.00	1.00
1.05	1.05	1.05	1.05	1.05
1.10	1.10	1.10	1.10	1.10
1.15	1.15	1.15	1.15	1.15
1.20	1.20	1.20	1.20	1.20
1.25	1.25	1.25	1.25	1.25
1.30	1.30	1.30	1.30	1.30
1.35	1.35	1.35	1.35	1.35
1.40	1.40	1.40	1.40	1.40
1.45	1.45	1.45	1.45	1.45
1.50	1.50	1.50	1.50	1.50
1.55	1.55	1.55	1.55	1.55
1.60	1.60	1.60	1.60	1.60
1.65	1.65	1.65	1.65	1.65
1.70	1.70	1.70	1.70	1.70
1.75	1.75	1.75	1.75	1.75
1.80	1.80	1.80	1.80	1.80
1.85	1.85	1.85	1.85	1.85
1.90	1.90	1.90	1.90	1.90
1.95	1.95	1.95	1.95	1.95
2.00	2.00	2.00	2.00	2.00
2.05	2.05	2.05	2.05	2.05
2.10	2.10	2.10	2.10	2.10
2.15	2.15	2.15	2.15	2.15
2.20	2.20	2.20	2.20	2.20
2.25	2.25	2.25	2.25	2.25
2.30	2.30	2.30	2.30	2.30
2.35	2.35	2.35	2.35	2.35
2.40	2.40	2.40	2.40	2.40
2.45	2.45	2.45	2.45	2.45
2.50	2.50	2.50	2.50	2.50
2.55	2.55	2.55	2.55	2.55
2.60	2.60	2.60	2.60	2.60
2.65	2.65	2.65	2.65	2.65
2.70	2.70	2.70	2.70	2.70
2.75	2.75	2.75	2.75	2.75
2.80	2.80	2.80	2.80	2.80
2.85	2.85	2.85	2.85	2.85
2.90	2.90	2.90	2.90	2.90
2.95	2.95	2.95	2.95	2.95
3.00	3.00	3.00	3.00	3.00
CONCLUSIONS		CONCLUSIONS		
The presence of the Water Table was not observed until the end of the test. The test was conducted at the mouth 0.00 level survey date.		The presence of the Water Table was not observed until the end of the test. The test was conducted at the mouth 0.00 level survey date.		
DATE OF CREATION OF TEST: 10/09/2014		DATE OF CREATION OF TEST: 10/09/2014		
CLOSING DATE OF TEST: 10/09/2014		CLOSING DATE OF TEST: 10/09/2014		
LABORATORY MANAGER		LABORATORY MANAGER		

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-4951-03		REV: 00 Date: 20/09/2014 RP 00 REVISIT PAUL 01 de 01
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study of the Chiriquí 1-1 and III Road Boring Project Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		
PROFESIONISTA: 27+600		TEST DATA		
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.		
TEST RESULTS		TEST RESULTS		
DEPTH (m)	DEPTH (m)	DEPTH (m)	DEPTH (m)	DEPTH (m)
0.05	0.05	0.05	0.05	0.05
0.10	0.10	0.10	0.10	0.10
0.15	0.15	0.15	0.15	0.15
0.20	0.20	0.20	0.20	0.20
0.25	0.25	0.25	0.25	0.25
0.30	0.30	0.30	0.30	0.30
0.35	0.35	0.35	0.35	0.35
0.40	0.40	0.40	0.40	0.40
0.45	0.45	0.45	0.45	0.45
0.50	0.50	0.50	0.50	0.50
0.55	0.55	0.55	0.55	0.55
0.60	0.60	0.60	0.60	0.60
0.65	0.65	0.65	0.65	0.65
0.70	0.70	0.70	0.70	0.70
0.75	0.75	0.75	0.75	0.75
0.80	0.80	0.80	0.80	0.80
0.85	0.85	0.85	0.85	0.85
0.90	0.90	0.90	0.90	0.90
0.95	0.95	0.95	0.95	0.95
1.00	1.00	1.00	1.00	1.00
1.05	1.05	1.05	1.05	1.05
1.10	1.10	1.10	1.10	1.10
1.15	1.15	1.15	1.15	1.15
1.20	1.20	1.20	1.20	1.20
1.25	1.25	1.25	1.25	1.25
1.30	1.30	1.30	1.30	1.30
1.35	1.35	1.35	1.35	1.35
1.40	1.40	1.40	1.40	1.40
1.45	1.45	1.45	1.45	1.45
1.50	1.50	1.50	1.50	1.50
1.55	1.55	1.55	1.55	1.55
1.60	1.60	1.60	1.60	1.60
1.65	1.65	1.65	1.65	1.65
1.70	1.70	1.70	1.70	1.70
1.75	1.75	1.75	1.75	1.75
1.80	1.80	1.80	1.80	1.80
1.85	1.85	1.85	1.85	1.85
1.90	1.90	1.90	1.90	1.90
1.95	1.95	1.95	1.95	1.95
2.00	2.00	2.00	2.00	2.00
2.05	2.05	2.05	2.05	2.05
2.10	2.10	2.10	2.10	2.10
2.15	2.15	2.15	2.15	2.15
2.20	2.20	2.20	2.20	2.20
2.25	2.25	2.25	2.25	2.25
2.30	2.30	2.30	2.30	2.30
2.35	2.35	2.35	2.35	2.35
2.40	2.40	2.40	2.40	2.40
2.45	2.45	2.45	2.45	2.45
2.50	2.50	2.50	2.50	2.50
2.55	2.55	2.55	2.55	2.55
2.60	2.60	2.60	2.60	2.60
2.65	2.65	2.65	2.65	2.65
2.70	2.70	2.70	2.70	2.70
2.75	2.75	2.75	2.75	2.75
2.80	2.80	2.80	2.80	2.80
2.85	2.85	2.85	2.85	2.85
2.90	2.90	2.90	2.90	2.90
2.95	2.95	2.95	2.95	2.95
3.00	3.00	3.00	3.00	3.00
CONCLUSIONS		CONCLUSIONS		
The presence of the Water Table was not observed until the end of the test. The test was conducted at the mouth 0.00 level survey date.		The presence of the Water Table was not observed until the end of the test. The test was conducted at the mouth 0.00 level survey date.		
DATE OF CREATION OF TEST: 10/09/2014		DATE OF CREATION OF TEST: 10/09/2014		
CLOSING DATE OF TEST: 10/09/2014		CLOSING DATE OF TEST: 10/09/2014		
LABORATORY MANAGER		LABORATORY MANAGER		

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study of the Chiriquí 1-1 and 1/1 Road Bypass Project Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		
PROFESOR: 28+100		TEST DATA X Coordinate: 17°28'17.40"N Y Coordinate: 62°54'32.00"W		
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.		
TEST RESULTS		TEST RESULTS		
REF. CORD FIELD ID	VISUAL DESCRIPTION OF THE MATERIAL	Factor E (mm / Pound)	Factor D (mm / Pound)	Factor C (mm / Pound)
0.10	Filled with Granular Base Layer Material Type	0.95	0.74	0.74
0.40	Clay, in-situ condition firm, dense consistency, dry and reddish coloration with reddish patinas.	2.67	2.35	2.35
1.00	Clay, strong in-situ condition, a dense medium consistency, dry state and reddish coloration with dark gray slate.	2.67	2.35	2.35
1.60	Silty clay, firm condition in-situ, medium consistency, dry and reddish coloration with brown patinas.	8.33	8.33	8.33
2.10	Clay, in-situ condition firm, dense consistency, partially dry and reddish coloration light gray patinas.	10.00	10.00	10.00
2.60	Clay, strong in-situ condition, a dense medium consistency, partially saturated state and reddish coloration yellowish brown patinas.	5.56	5.56	5.56
3.00	Clay, strong in-situ condition, a dense medium consistency, partially saturated state and reddish coloration yellowish brown patinas.	5.56	5.56	5.56
OBSERVATIONS		The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey done.		
DATE OF CREATION OF TEST: 10/09/2014		CLOSING DATE OF TEST: 10/09/2014		
LABORATORY MANAGER		LABORATORY MANAGER		

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03		REV: 00 Date: 20/09/2014 REPORT: RP 00 PAGE: 01 de 01
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study of the Chiriquí 1-1 and 1/1 Road Bypass Project Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		
PROFESOR: 28+605		TEST DATA X Coordinate: 17°28'33.40"N Y Coordinate: 62°54'36.10"W		
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.		
TEST RESULTS		TEST RESULTS		
REF. CORD FIELD ID	VISUAL DESCRIPTION OF THE MATERIAL	Factor E (mm / Pound)	Factor D (mm / Pound)	Factor C (mm / Pound)
0.10	Filled with Granular Base Layer Material Type	0.95	0.74	0.74
0.40	Clay, in-situ condition firm, dense consistency, dry and reddish coloration with reddish patinas.	2.67	2.35	2.35
0.60	Clay, strong in-situ condition, a dense medium consistency, dry state and reddish coloration with dark gray slate.	2.67	2.35	2.35
1.20	Silty clay, firm condition in-situ, medium consistency, dry and reddish coloration light gray patinas.	8.33	8.33	8.33
1.70	Clay, in-situ condition firm, dense consistency, partially dry and reddish coloration light gray patinas.	10.00	10.00	10.00
2.10	Clay, strong in-situ condition, a dense medium consistency, partially saturated state and reddish coloration yellowish brown patinas.	5.56	5.56	5.56
2.60	Clay, strong in-situ condition, a dense medium consistency, partially saturated state and reddish coloration yellowish brown patinas.	5.56	5.56	5.56
3.00	Clay, strong in-situ condition, a dense medium consistency, partially saturated state and reddish coloration yellowish brown patinas.	5.56	5.56	5.56
OBSERVATIONS		The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey done.		
DATE OF CREATION OF TEST: 10/09/2014		CLOSING DATE OF TEST: 10/09/2014		
LABORATORY MANAGER		LABORATORY MANAGER		

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-4951-03		REV: 00 Date: 20/09/2014 REPORT RP 00 PAGE 01 de 01							
CLIENTE / Client: KATAMBA & Engineers International. PROYECTO / Project: Preparatory Study of the Olinalta 1- II and III Road Boring Project UBICACIÓN / Location: Municipality of Olinalta 1- II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 61									
TEST DATA											
Profesor: 29+100		X Coordinate: 17°28'49.00"S Y Coordinate: 62°54'40.00"W		8 Kg.							
WATER TABLE: not Applicable		WEIGHT HAMMER:									
TEST RESULTS											
DEPTH (m)	COEFFICIENT OF CORRELATION (R)	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows (A)	Cumulative penetration (mm) (B)	Penetration Between Readings (mm) (C)	Factor (mm / E)	DCP Index (mm / Pounds) (D)	Factor (mm / E)	AVERAGE CBR %	observations	
0.00		Filled with Granular Base Layer Material Type	39	30	30	0.77	1	0.77	267.98		
0.05			23	50	20	0.87	1	0.87	224.53	239.20	
0.10			24	70	20	0.83	1	0.83	235.50		
0.15											
0.20											
0.25			9	40	40	4.44	1	4.44	36.12		
0.30		Clay, in-situ condition firm, dense consistency, dry and dark brown with reddish patina.	9	80	40	4.44	1	4.44	36.12	36.15	
0.35			11	120	40	3.64	1	3.64	45.22		
0.40											
0.45											
0.50											
0.55											
0.60											
0.65											
0.70											
0.75											
0.80											
0.85											
0.90											
0.95											
1.00											
1.05											
1.10											
1.15											
1.20											
1.25											
1.30											
1.35											
1.40											
1.45											
1.50											
1.55											
1.60											
1.65											
1.70											
1.75											
1.80											
1.85											
1.90											
1.95											
2.00											
2.05											
2.10											
2.15											
2.20											
2.25											
2.30											
2.35											
2.40											
2.45											
2.50											
2.55											
2.60											
2.65											
2.70											
2.75											
2.80											
2.85											
2.90											
2.95											
3.00											
OBSERVATIONS: The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey done.					A= Number of blows taken between readings B= Penetration measurement after seven series of blows C= Penetration measurement after 100 series of blows D= Net C between A and B E= Net C between A and B F= Net C between A and B G= Correlation between CBR and DCP index					DATE OF CREATION OF TEST: 10/09/2014 CLOSING DATE OF TEST: 10/09/2014 LABORATORY MANAGER:	

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-4951-03		REV: 00 Date: 20/09/2014 REPORT RP 00 PAGE: 01 de 01							
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Chiriquí 1- II and III Road Paving Project UBICACIÓN / Location: Municipality of Chiriquí 1 - II, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 62									
TEST DATA											
PROFESOR: 29+600		X Coordinate: 17°29'04.70"S Y Coordinate: 62°54'44.60"W		8 Kg.							
WATER TABLE: 2.70 m.		WEIGHT HAMMER:									
TEST RESULTS											
DEPTH (m)	COEFFICIENT OF CORRELATION (R)	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows (A)	Cumulative penetration (mm) (B)	Penetration Between Readings (mm) (C)	Factor (mm / E)	DCP Index (mm / Pounds) (D)	Factor (mm / E)	DCP Index (mm / Pounds) (D)	AVERAGE CBR %	observations
0.00		Filled with Granular Base Layer Material Type	21	20	20	0.95	1	0.95	202.78	221.16	
0.05		Clay, in-situ condition firm, medium bedded, dry and dark brown with reddish patina.	27	40	20	0.74	1	0.74	268.70		
0.10			6	30	30	5.00	1	5.00	31.66	29.71	(for the first item) Due to the drop in values of this test, the data obtained is greater than 100% on the average consistency, therefore CBR values will be inconsistent data. This is because the test was conducted on a consolidated sample and not on a consolidated, dry ground.
0.15			5	50	30	6.00	1	6.00	26.81		
0.20		Clay, strong in-situ condition, medium consistency, dry, reddish brown with dark gray slate.	4	50	50	12.50	1	12.50	11.34	10.30	
0.25			3	100	50	16.67	1	16.67	8.22		
0.30			2	150	50	25.00	1	25.00	5.22		
0.35											
0.40											
0.45											
0.50											
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2.95											
3.00											
OBSERVATIONS: The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level of survey done.					A= Number of blows taken between readings B= Penetration measurement after seven series of blows C= Penetration measurement after 100 series of blows D= Net C between A and B E= Net C between A and B F= Net C between A and B G= Correlation between CBR and DCP index					DATE OF CREATION OF TEST: 10/09/2014 CLOSING DATE OF TEST: 10/09/2014 LABORATORY MANAGER:	

[illegible]

		CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Chiriquí 1-1 and III Road Boring Project UBICACIÓN / Location: Municipality of Chiriquí 1-1, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		REV: 00 Date: 20/09/2014 REPORT RP 00 PAGE 01 de 01							
PROFESIVO: 32-480		X Coordinate: 17°30'23.10"S Y Coordinate: 62°55'05.40"W		DCP N°: 67							
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.									
TEST RESULTS		TEST RESULTS		TEST RESULTS							
STATION	DEPTH (m)	COOR. (m)	Visual Description of the Material	Factor E (mm / Pundras)	Penetration C (mm)	Factor D (mm)	Factor E (mm / Pundras)	DCP Index (mm / Pundras)	CBR %	AVERAGE CBR %	Observations
15	0.10	30	Filled with Gravel Base Layer	1	2.00	1.67	1	2.00	98.34	97.22	
16		30		1	1.68	1.67	1	1.68	94.96		
18		30		1	1.67	1.67	1	1.67	108.35		
12		30	Clay, in-situ condition firm, medium consistency to dense, dry and brown with dark gray patina and red.	1	2.50	2.22	1	2.50	68.80	75.27	
18		40		1	2.22	2.22	1	2.22	78.51		
18		110		1	2.22	2.22	1	2.22	78.51		
6	0.90	40	Clayey sand, in-situ condition firm, medium compactness, partially dry and brown with reddish patina and presence of small clasts.	1	6.67	5.71	1	6.67	22.94	26.82	
7	1.20	40		1	5.71	5.71	1	5.71	27.26		
3		50	Clay, in-situ condition firm, medium bodied, partially dry, reddish brown patina coloration with dark gray.	1	16.67	12.50	1	16.67	8.22	9.28	
4		100		1	12.50	12.50	1	12.50	11.34		
3	1.80	50		1	16.67	16.67	1	16.67	8.22		
4		60	Limo Sandy fine-grained in-situ condition firm, medium compactness, partially saturated state and brown with dark gray patina.	1	15.00	15.00	1	15.00	9.25	10.12	
5		120		1	12.00	12.00	1	12.00	11.87		
4		180		1	15.00	15.00	1	15.00	9.25		
3		80	Silty Sand, fine-grained, firm condition in-situ, on average compactness, partially saturated state and brown.	1	26.67	33.33	1	26.67	4.88	4.14	
3		180		1	33.33	33.33	1	33.33	3.78		
3		280		1	33.33	33.33	1	33.33	3.78		
OBSERVATIONS:			A= Number of hammer blows between readings B= Penetration measurement after even surface of blows C= Net C between A and B D= Net C between A and B E= Net C Value F= Net C Value G= Correlation between CBR and DCP index								
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 01/01 level survey done.			DATE OF CREATION OF TEST: 11/09/2014		CLOSING DATE OF TEST: 11/09/2014		LABORATORY MANAGER				

		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-4951-03		REV: 00 20/09/2014 RP 00 PAGE: 01 de 01							
CLIENTE / Client: KATAMBA & Engineers International. PROYECTO / Project: Preparatory Study of the Okinawa 1- II and III Road Paving Project UBICACION / Location: Municipality of Okinawa 1- II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 68									
TEST DATA											
32-490		17°30'38.70"S 62°55'10.80"W									
not Applicable		WEIGHT HAMMER: 8 Kg.									
TEST RESULTS											
STATION	DEPTH (m)	COOR. (m)	VISUAL DESCRIPTION OF THE MATERIAL	Factor E (mm / Pundras)	Penetration C (mm)	Factor D (mm)	Factor E (mm / Pundras)	DCP Index (mm / Pundras)	CBR %	AVERAGE CBR %	observations
20	0.12	20	Filled with Gravel Base Layer	1	1.00	1.00	1	1.00	192.00	192.00	(for the first item) Due to the dispersion of the test results, the CBR value is greater than 100% on the test results. The CBR value

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		DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D4951-03		REV: 00 Date: 20/09/2014 REVISIT: RP 00 PAGE: 01 de 01				
CLIENTE / Client: KATAMBA & Engineers International PROYECTO / Project: Preparatory Study of the Otiliana I - II and III Road Boring Project UBICACIÓN / Location: Municipality of Otiliana I - II, 2° Section, Verano Province, Northern Region of Santa Cruz de la Sierra City		DCP N°: 73						
TEST DATA		TEST DATA						
PROFUNDIDAD: 35+100		COORDINADAS: X: 173159.087°N Y: 62°55'27.26"O						
WATER TABLE: not Applicable		WEIGHT HAMMER: 8 Kg.						
TEST RESULTS		TEST RESULTS						
DEPTH (m) 0.15	VISUAL DESCRIPTION OF THE MATERIAL Filled with Gravel Base Layer Material Type	Cumulative penetration (mm) 31	Penetration Between Readings (mm) 31	Penetration (mm) 31	DCP Index (mm / Puntero) 4.29	Penetration (mm) 31	AVERAGE CBR % 56.96	observations (For the second point) Given the characteristics of this type of soil (Sandy LIMO) designated CBR values greater than 100% would be inconsistent. This is because the data. This is because the test was conducted on an undisturbed, consolidated, dry ground. CBR of 88.34 was adopted.
0.80	Limo Sandy, in-situ condition firm, dense compactness of dry and dark brown coloring containing small clasts.	40	9	40	2.00	40	88.34	
1.60	Silty Clay, firm condition in-situ, medium bodied, partially dry and brown color.	80	40	80	1.60	80	88.34	
2.20	Limo Clay, in-situ condition firm, medium bodied, partially saturated state and brownish.	100	40	100	1.38	100	133.55	
2.20	Sandy Silt, firm partially saturated condition and light brown color in-situ, on average compactness of state.	150	50	150	8.33	150	17.86	
2.20	Sandy Silt, firm partially saturated condition and light brown color in-situ, on average compactness of state.	200	50	200	10.00	200	14.56	
3.00		250	50	250	8.33	250	17.86	
OBSERVATIONS: The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey done.								

Resultado del ensayo DCP (estación lluviosa)

		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA	REV: 00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 02 de 35
CLIENTE / Client: KATAMBA & Engineers International		PROYECTO / Project: Preparatory Study for the Highway Obispo L. II and III		UBICACIÓN / Location: Municipality Obispo L. II and III	
PROGRESIVO: 2 + 020		TEST DATA		DCP No.: 02	
COORDINATE: 17°14'24.81"S 62°54'12.70"W		TYPE OF MATERIAL: Not Applicable		WGT OF HAMMER: 8 Kg.	
WATER TABLE: 1.60 mts.		REGISTER FIELD		TEST RESULTS	
VISUAL DESCRIPTION OF THE MATERIAL: Artificial fill, consisting of clay and with no plasticity and low cohesion, compactness and medium to dark brown geological interpretation alluvial fan.		Number of Blows A		Penetration B (mm)	
12		30		2.50	
15		60		2.00	
17		90		1.76	
12		30		2.50	
14		60		2.14	
15		100		2.67	
6		40		6.67	
7		90		7.14	
7		140		7.14	
5		50		10.00	
6		100		8.33	
6		150		8.33	
5		70		14.00	
6		140		11.67	
7		210		10.00	
5		70		14.00	
6		140		11.67	
6		210		11.67	
5		60		12.00	
5		120		12.00	
6		180		10.00	
6		60		14.56	
6		180		14.56	
6		60		14.56	
6		180		14.56	
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6		60		14.56	
6		180		14.56	
6		60			

		CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA		REV: 00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 03 de 35													
KATAMBA & Engineers International Preparatory Study Parking Project Highway Odonato I - II and III Municipality Odonato One, 2nd Section of the Province Ignacia Vinales, Santa Cruz Department								DCP Nº: 03													
PROGRESSIVE		3 + 020		COORDINATE		SIDE		Not Applicable													
WATER TABLE:		2.00 mts.		17°14'57.36"S 62°54'7.52"O		TYPE OF MATERIAL:		Not Applicable													
REGISTERS FIELD		VISUAL DESCRIPTION OF THE MATERIAL		NUMBER OF BLOWS A		CONSOLIDATION PENETRATION (mm) B		PENETRATION BETWEEN READINGS (mm) C		PERCENTAGE OF HITS D		DEGREE OF HAMMER E (Pascals)		CORR. FACTOR F		CH. C% G		AVERAGE CBR H %		OTHER DATA	
0.80		Artificial fill, consisting of silty sand with no plasticity given in situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		10	30	30	3.00	1	3.00	56.10	77.59	Due to the characteristics of these soils (Blastosol) all regard CBR values greater than 100% on average, since that would mean that the test is because the test was conducted on an isolated subgrade stone. Adopted CBR = 77.59%									
0.70		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		8	30	30	3.75	1	3.75	43.69	54.07										
0.70		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		10	60	30	3.00	1	3.00	36.10											
1.00		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		11	90	30	2.73	1	2.73	62.41											
1.00		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		8	40	40	5.00	1	5.00	31.66	36.18										
1.00		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		8	80	40	5.00	1	5.00	31.66											
1.00		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		11	120	40	3.64	1	3.64	45.22											
1.00		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		5	70	70	14.00	1	14.00	9.99	11.52										
1.00		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		5	140	70	14.00	1	14.00	9.99											
1.00		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan		7	210	70	10.00	1	10.00	14.56											
2.00		Limo Clay, in-situ condition weak, partially saturated soft consistency, state and browsing geological interpretation alluvial-fan		2	50	50	25.00	1	25.00	5.22	7.06										
2.00		Limo Clay, in-situ condition weak, partially saturated soft consistency, state and browsing geological interpretation alluvial-fan		3	110	60	20.00	1	20.00	6.70											
2.00		Limo Clay, in-situ condition weak, partially saturated soft consistency, state and browsing geological interpretation alluvial-fan		4	170	60	15.00	1	15.00	9.25											
2.00		Limo Clay, in-situ condition weak, soft consistency, saturated state and geological interpretation alluvial-fan		7	80	80	11.43	1	11.43	12.54											
2.00		Limo Clay, in-situ condition weak, soft consistency, saturated state and geological interpretation alluvial-fan		7	160	80	11.43	1	11.43	12.54	13.22										
2.00		Limo Clay, in-situ condition weak, soft consistency, saturated state and geological interpretation alluvial-fan		8	240	80	10.00	1	10.00	14.56											
2.00		Limo Clay, in-situ condition firm, medium consistency, saturated state and geological interpretation alluvial-fan		10	60	60	6.00	1	6.00	25.81	30.70										
2.00		Limo Clay, in-situ condition firm, medium consistency, saturated state and geological interpretation alluvial-fan		12	120	60	5.00	1	5.00	31.66											
2.00		Limo Clay, in-situ condition firm, medium consistency, saturated state and geological interpretation alluvial-fan		13	180	60	4.62	1	4.62	34.62											
3.00		Limo Clay, in-situ condition firm, medium consistency, saturated state and geological interpretation alluvial-fan		13	180	60	4.62	1	4.62	34.62											
OBSERVATIONS		The presence of the water table was evident at a depth of 2.00 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.																			
		DATE OF CREATION OF TEST: 11/02/2015										DATE OF CONCLUSION OF TEST: 11/02/2015									
HEAD OF LABORATORY		HEAD OF LABORATORY										HEAD OF LABORATORY									

		CLIENTE / Client: PROYECTO / Project: UBICACION / Location:		KATAMBA & Engineers International Preparatory Study Parking Project Highway Odonato I - II and III Municipality Odonato One, 2nd Section of the Province Ignacio Vinales, Santa Cruz Department	
DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA		REV: 00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 04 de 35	
TEST DATA		COORDINATE 4 + 000		SIDE: Not Applicable	
PROGRESSIVE		COORDINATE 17°15'29.00"S		TYPE OF MATERIAL: Not Applicable	
WATER TABLE: 1.50 mts.		COORDINATE X 62°54'6.93"O		WEIGHT OF HAMMER: 8 Kg.	
TEST RESULTS					
SCALAR	0.80	0.80	0.80	0.80	0.80
0.80	0.80	0.80	0.80	0.80	0.80
0.70	0.70	0.70	0.70	0.70	0.70
0.70	0.70	0.70	0.70	0.70	0.70
1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00
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1.00	1.00	1.00	1.00	1.00	1.00
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		DYNAMIC PENETRATION TESTING (DPT) ASTM-D-6951-03		NORMA	REV: 00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 09 de 35						
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Enguerra International Preparatory Study Peñon Project Highway Olancho I - II and III Municipality Olancho One, 2nd Section of the Province Ignacia Vianes, Santa Cruz Department			DPT Nº: 09						
PROGRESSIVE: 9 + 020		COORDINATE:		SIDE: Not Applicable	Not Applicable						
WATER TABLE: 0.00 mts.		17°18'42.79"S 62°53'53.87"O		TYPE OF MATERIAL:	Not Applicable						
8 kg		TEST RESULTS		WEIGHT OF HAMMER: 8 Kg.							
DEPTH (m)	TYPE OF MATERIAL	Visual Description of the Material	Number of Blows (A)	Penetration (B) (mm)	Penetration (C) (mm)	Penetration (D) (mm)	Penetration (E) (mm)	Penetration (F) (mm)	Penetration (G) (mm)	AVERAGE CBR (%)	Observations
0.00	Artificial fill, consisting of dry sand with no plasticity gravel, medium brown to brown color, compacted and geological interpretation alluvial fan		11	30	30	2.73	1	2.73	62.41	81.90	Due to the characteristics of the test, the CBR values are greater than 100%, on average, since this would be the best result. This is because the test was conducted on an isolated homogeneous sample. Adopt CBR = 81.90%
0.30	Limo Clay, in-situ condition firm, medium consistency, partially dry and brown coloration geological interpretation alluvial fan		12	40	40	3.33	1	3.33	49.85	46.78	
0.70	Limo with mixtures of very fine sand, weak in-situ condition geological interpretation alluvial fan		5	30	30	6.00	1	6.00	25.81	25.33	
0.80	Low plasticity clay, feeble condition in-situ firm, soft consistency half, partially dry and brown coloration geological interpretation alluvial fan		7	110	40	6.67	1	6.67	22.94	27.26	
1.20	Limo with mixtures of very fine sand, strong in-situ condition, medium bodied, dry and brown coloration geological interpretation alluvial fan		9	40	40	4.44	1	4.44	36.12	36.14	
	Limo with mixtures of very fine sand, strong in-situ condition, medium bodied, dry and brown coloration geological interpretation alluvial fan		10	120	40	4.00	1	4.00	40.64		
	Limo with mixtures of very fine sand, strong in-situ condition, medium bodied, dry and brown coloration geological interpretation alluvial fan		9	40	40	4.44	1	4.44	36.12	39.14	
2.00	Low plasticity clay, light in-situ firm, soft consistency, dry and brown coloration geological interpretation alluvial fan status		10	30	30	3.00	1	3.00	56.10		
2.30	Limo with mixtures of very fine sand, clear firm condition in-situ, medium bodied, dry and brown coloration geological interpretation alluvial fan		12	60	30	2.50	1	2.50	68.80	61.38	
2.40	Clay of low plasticity, firm-situ, soft consistency, dry and brown coloration geological interpretation alluvial fan status		14	100	40	2.86	1	2.86	59.25		
	Limo with mixtures of very fine sand, clear firm condition in-situ, medium bodied, dry and brown coloration geological interpretation alluvial fan		12	30	30	2.50	1	2.50	68.80		
	Limo with mixtures of very fine sand, clear firm condition in-situ, medium bodied, dry and brown coloration geological interpretation alluvial fan		10	60	30	3.00	1	3.00	56.10	62.44	
	Clay of low plasticity, firm-situ, soft consistency, dry and brown coloration geological interpretation alluvial fan status		11	90	30	2.73	1	2.73	62.41		
	Clay of low plasticity, firm-situ, soft consistency, dry and brown coloration geological interpretation alluvial fan status		9	30	30	3.33	1	3.33	49.85		
	Clay of low plasticity, firm-situ, soft consistency, dry and brown coloration geological interpretation alluvial fan status		10	60	30	3.00	1	3.00	56.10	48.86	
			10	100	40	4.00	1	4.00	40.64		
OBSERVATIONS:		The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.									
CAEM ISO		DATE OF CREATION OF TEST: 11/02/2015		DATE OF CONCLUSION OF TEST: 11/02/2015		HEAD OF LABORATORY					

		DYNAMIC PENETRATION TESTING (DPT) ASTM-D-6951-03		NORMA	REV: 00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 10 de 35						
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Enguerra International Preparatory Study Peñon Project Highway Olancho I - II and III Municipality Olancho One, 2nd Section of the Province Ignacia Vianes, Santa Cruz Department									
PROGRESSIVE:		COORDINATE:		SIDE: Not Applicable							
WATER TABLE:		17°18'42.79"S 62°53'52.94"O		TYPE OF MATERIAL: WEIGHT OF HAMMER: 8 Kg.							
0.00 mts.		TEST RESULTS									
DEPTH (m)	TYPE OF MATERIAL	Visual Description of the Material	Number of Blows (A)	Penetration (B) (mm)	Penetration (C) (mm)	Penetration (D) (mm)	Penetration (E) (mm)	Penetration (F) (mm)	Penetration (G) (mm)	AVERAGE CBR (%)	Observations
0.00	Artificial fill, consisting of clay and soft to plastic gravel, medium brown to brown color, compacted and geological interpretation alluvial fan		13	30	30	2.31	1	2.31	73.20	81.79	(For the First Point) Due to the characteristics of the test, the CBR values are greater than 100%, on average, since this would be the best result. This is because the test was conducted on an isolated homogeneous sample. Adopt CBR = 81.79%
0.30	Limo Clay, in-situ condition weak, partially dry, soft consistency, half, and brown coloration geological interpretation alluvial fan		5	30	30	6.00	1	6.00	25.81	28.24	
0.80	Limo Clay, in-situ condition firm, medium bodied, dry and brown coloration geological interpretation alluvial fan		12	30	30	2.50	1	2.50	68.80	65.60	
1.20	Limo Clay, weak condition to sign in-situ, soft consistency half, partially dry and reddish coloration geological interpretation alluvial fan		15	110	40	2.67	1	2.67	64.01	34.65	
1.70	Clay of low plasticity, firm-situ, medium bodied, dry and reddish coloration geological interpretation alluvial fan status		10	30	30	3.00	1	3.00	56.10	68.89	
2.10	Clay of low plasticity, firm-situ, medium bodied, dry and dark brown coloration geological interpretation alluvial fan status		12	60	30	2.50	1	2.50	68.80	73.13	
2.40	Limo Clay, in-situ condition firm, medium bodied, dry and dark brown coloration geological interpretation alluvial fan		14	90	30	2.14	1	2.14	81.77	69.93	
3.00	Limo Clay, in-situ condition firm, medium bodied, dry and dark brown coloration geological interpretation alluvial fan		15	110	40	2.67	1	2.67	64.01	64.01	
OBSERVATIONS:		The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.									
		DATE OF CREATION OF TEST:		DATE OF CONCLUSION OF TEST:		HEAD OF LABORATORY					

		CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMIRA & Engwena International Propagatory Study Peving Project Highway Okavango I - II and III Municipality Okavango One, 2nd Section of the Province Iganga Vornnes, Santa Cruz Department		NORMA		REV: 00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 13 de 35				
DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03								DCP Nº: 13				
TEST DATA												
PROGRESSIVE		13 + 000		COORDINATE:		SIDE:		Not Applicable				
WATER TABLE:		0.00 mts.		CONULADA X 1720°19'08"S		TYPE OF MATERIAL:		Not Applicable				
				CONULADA Y 62°53'47.46°O		WEIGHT OF HAMMER:		8 Kg.				
REGISTERS FIELD		TEST RESULTS		TEST RESULTS								
SCALE	DEPTH (m)	COLOR INDEX	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Percent of Blows Between Readings C	Penetration of Hammer (mm) D	DCP Rate (Punches / Feet) E	DCP Rate (Punches / Feet) F	CHAR % G	AVERAGE CBR %	Observation
0.00	0.30	0.30	Artificial fill, consisting of clay soil with no plasticity grade mixture of medium brownes Sirexcl Ype strong in-situ condition, medium									

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		CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMIRA & Engenheiros Internacionais Preparatory Study: Pontal Project Highway Okolonal I - II and III Municipality Okolonal One, 2nd Section of the Province Iguaçu Varnes, Santa Cruz Department		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA		00 14/02/2015 EDCDPS: 002-14 PAG: 17 de 35	
PROGRESSIVE:		17 + 010		COORDINATE:		TEST DATA		Not Applicable		Not Applicable	
WATER TABLE:		120 mts.		17°22'21.96"S 62°53'49.12"W		TYPE OF MATERIAL:		Not Applicable		8 Kg.	
REGISTERS FIELD		VISUAL DESCRIPTION OF THE MATERIAL		TEST RESULTS		WEIGHT OF HAMMER:		Not Applicable		8 Kg.	
SCALA	0.00	Artificial fill, consisting of clay and with no plasticity, gravel condition, medium brown color compactness and geological interpretation alluvial-fan		Number of Blows A: 20 B: 27 C: 31 D: 11 E: 11 F: 6 G: 5	Penetration of H (mm) 30 60 90 120 150 180 210 240 270 300 330 360 390 420 450 480 510 540 570 600 630 660 690 720 750 780 810 840 870 900 930 960 990 1020 1050 1080 1110 1140 1170 1200 1230 1260 1290 1320 1350 1380 1410 1440 1470 1500 1530 1560 1590 1620 1650 1680 1710 1740 1770 1800 1830 1860 1890 1920 1950 1980 2010 2040 2070 2100 2130 2160 2190 2220 2250 2280 2310 2340 2370 2400 2430 2460 2490 2520 2550 2580 2610 2640 2670 2700 2730 2760 2790 2820 2850 2880 2910 2940 2970 3000 3030 3060 3090 3120 3150 3180 3210 3240 3270 3300 3330 3360 3390 3420 3450 3480 3510 3540 3570 3600 3630 3660 3690 3720 3750 3780 3810 3840 3870 3900 3930 3960 3990 4020 4050 4080 4110 4140 4170 4200 4230 4260 4290 4320 4350 4380 4410 4440 4470 4500 4530 4560 4590 4620 4650 4680 4710 4740 4770 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50490 50520 50550 50580 50610 50640 50670 50700 50730 50760 50790 50820 50850 50880 50910 50940 50970 51000 51030 51060 51090 51120 51150 51180 51210 51240 51270 51300 51330 51360 51390 51420 51450 51480 51510 51540 51570 51600 51630 51660 51690 51720 51750 51780 51810 51840 51870 51900 51930 51960 51990 52020 52050 52080 52110 52140 						

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		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA	REV: 00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 21 de 35
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study Paving Project Highway Okinawa I - II and III Marikupili Okinawa One, 2nd Section of the Province Ignacio Wermes, Santa Cruz Department		DCP Nº: 21	
PROGRESSIVE		TEST DATA			
WATER TABLE:		COORDINATED:		TYPE OF MATERIAL: WEIGHT OF HAMMER:	Not Applicable 8 Kg.
REGISTERED FIELD		TEST RESULTS			
VISUAL DESCRIPTION OF THE MATERIAL		TEST RESULTS			
Observations:		TEST RESULTS			

Nº	MATERIAL	CLASIFICACIÓN	VISUAL DESCRIPTION OF THE MATERIAL	TEST RESULTS										OBSERVATIONS
				Number of Blows A	Cumulative penetration (mm)	Penetration Rate (mm/min)	Factor of Friction F	Factor of Friction F (Pascals)	CBR % G	AVERAGE CBR %	Observations			
1	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	7	30	30	4.29	1	4.29	37.62	37.62			
2	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	7	60	30	4.29	1	4.29	37.62	37.62			
3	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	7	90	30	4.29	1	4.29	37.62	37.62			
4	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	7	40	40	5.71	1	5.71	27.26	27.26			
5	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	8	80	40	5.00	1	5.00	31.66	31.66	30.19		
6	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	8	120	40	5.00	1	5.00	31.66	31.66			
7	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	8	50	50	6.25	1	6.25	24.66	24.66			
8	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	10	100	50	5.00	1	5.00	31.66	31.66	29.32		
9	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	10	150	50	5.00	1	5.00	31.66	31.66			
10	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	7	50	50	7.14	1	7.14	21.23	21.23			
11	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	8	100	50	6.25	1	6.25	24.66	24.66	25.85		
12	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	10	150	50	5.00	1	5.00	31.66	31.66			
13	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	6	40	40	6.67	1	6.67	22.84	22.84			
14	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	8	80	40	5.00	1	5.00	31.66	31.66	33.27		
15	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	11	120	40	3.64	1	3.64	48.22	48.22			
16	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	8	50	50	6.25	1	6.25	24.66	24.66			
17	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	10	100	50	5.00	1	5.00	31.66	31.66	31.71		
18	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	12	150	50	4.17	1	4.17	38.83	38.83			
19	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	10	60	60	6.00	1	6.00	25.81	25.81			
20	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	12	120	60	5.00	1	5.00	31.66	31.66	31.70		
21	0.00	0.00	Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Svedel type Single In-situ condition, loose, brown coloration geological interpretation alluvial fan	14	180	60	4.29	1	4.29	37.62	37.62			
OBSERVATIONS														
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey done.														

		DATE OF CREATION OF TEST: 22/02/2014		22/02/2014
DATE OF CONCLUSION OF TEST:				

		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA	REV: 00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 22 de 35
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study Paving Project Highway Okinawa I - II and III Marikupili Okinawa One, 2nd Section of the Province Ignacio Wermes, Santa Cruz Department			DCP Nº: 22
PROGRESSIVE:		TEST DATA			Not Applicable
WATER TABLE:		COORDINATED:			Not Applicable
REGISTERED FIELD		TEST RESULTS			Not Applicable
Visual Description of the Material:		TEST RESULTS			Not Applicable
Observations:		TEST RESULTS			Not Applicable

TEST NO	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT DESCRIPTION	TEST POINT LOCATION	TEST POINT 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CAEM ISO		DYNAMIC PENETRATION TESTING (DPT) ASTM-D-6951-03		NORMA		EVALUATION	
CLIENTE / Client:		KATHIRIA & Engineers International		EVALUATION		EVALUATION	
PROYECTO / Project:		Preparatory Study-Posting Project Highway Olaveola - II and III		EVALUATION		EVALUATION	
UBICACION / Location:		Municipality Olaveola One, 2nd Section of the Province Ignacio Warnes, Santa Cruz Department		EVALUATION		EVALUATION	
PROGRESSIVE: 25 + 000 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Artificial fill consisting of dry weak sand, plasticity gained by the addition of 10% of Type I Portland Cement, loose condition, loose brown color compactness and geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arenas Limosa without plasticity, firm condition in-situ, on average compactness of dry and brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arenas Limosa without plasticity condition in-situ loose, loose compactness of dry and brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arenas Limosa without plasticity condition in-situ loose, loose compactness of dry and brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q	
WATER TABLE: 2.90 mts.		REGISTERS FIELD VISUAL DESCRIPTION OF THE MATERIAL Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial fan.		TEST RESULTS TYPE OF MATERIAL: WEIGHT OF HAMMER: 62.54/9.39" Q		TEST RESULTS TYPE OF MATERIAL: 	

		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA	00 14/02/2015 EDC/PS-002-14 Page: 27 de 35
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study Paving Project Highway Okiñona I - II and III Municipality Okiñona One - 2nd Section of the Province Igape & Veranes, Santa Cruz Department		DCP Nº: 27	
PROGRESSIVE:		TEST DATA		Not Applicable	
WATER TABLE:		COORDINATE:		SLIDE:	
0.00 mts.		17°27'42.67"S		Not Applicable	
0.00 mts.		62°54'23.39"O		Not Applicable	
REGISTER FIELD		TEST RESULTS		WATER TABLE:	
Visual Description of the Material:		Number of Blows:		Penetration of Hammer:	
Artificial fill, consisting of clay and with no plasticity gravel mixtures of different measures. Screened type in-situ condition, medium to dark brown coloration and reddish interpretation alluvial-fan.		7		4.29	
Artificial fill, consisting of clay and with no plasticity gravel mixtures of different measures. Screened type in-situ condition, medium to dark brown coloration and reddish interpretation alluvial-fan.		7		4.29	
Artificial fill, consisting of clay and with no plasticity gravel mixtures of different measures. Screened type in-situ condition, medium to dark brown coloration and reddish interpretation alluvial-fan.		9		3.33	
Limo Clay, weak condition to sign in-situ, soil consistency "half", partially dry and reddish coloration geological interpretation alluvial-fan.		8		6.25	
Limo Clay, weak condition to sign in-situ, soil consistency "half", partially dry and reddish coloration geological interpretation alluvial-fan.		11		4.55	
Limo Clay, weak condition to sign in-situ, soil consistency "half", partially dry and reddish coloration geological interpretation alluvial-fan.		13		3.85	
Limo Clay, n-situ condition firm, medium bodied, dry and reddish coloration geological interpretation alluvial-fan.		10		6.00	
Limo with mixtures of very fine sand, weak condition partially firm, firm soil consistency "half", partially dry and reddish coloration geological interpretation alluvial-fan.		7		5.71	
Limo with mixtures of very fine sand, weak condition partially firm, firm soil consistency "half", partially dry and reddish coloration geological interpretation alluvial-fan.		8		5.00	
Limo with mixtures of very fine sand, weak condition partially firm, firm soil consistency "half", partially dry and reddish coloration geological interpretation alluvial-fan.		9		4.44	
Limo with mixtures of very fine sand, weak condition partially firm, firm soil consistency "half", partially dry and reddish coloration geological interpretation alluvial-fan.		8		6.25	
Limo with mixtures of very fine sand, weak condition partially firm, firm soil consistency "half", partially dry and reddish coloration geological interpretation alluvial-fan.		8		6.25	
Limo Clay, n-situ condition weak, partially saturated soft consistency, state and dark brown coloration geological interpretation alluvial-fan.		4		15.00	
Limo Clay, n-situ condition weak, partially saturated soft consistency, state and dark brown coloration geological interpretation alluvial-fan.		6		10.00	
Limo Clay, n-situ condition weak, partially saturated soft consistency, state and dark brown coloration geological interpretation alluvial-fan.		6		10.00	
Limo Clay, n-situ condition weak, partially saturated soft consistency, state and dark brown coloration geological interpretation alluvial-fan.		6		11.67	
Limo Clay, n-situ condition weak, partially saturated soft consistency, state and dark brown coloration geological interpretation alluvial-fan.		7		10.00	
Limo Clay, n-situ condition weak, partially saturated soft consistency, state and dark brown coloration geological interpretation alluvial-fan.		7		10.00	
Observations:		Number of hammer blows between readings:		ASTM DCP	
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey date.		24/2014		24/2014	
CAEM ISO		DATE OF CREATION OF TEST:		HEAD OF LABORATORY	
24/2014		24/2014		24/2014	

		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA	00 14/02/2015 EDC/PS-002-14 Page: 28 de 35
CLIENTE / Client: PROYECTO / Project: UBICACIÓN / Location:		KATAMBA & Engineers International Preparatory Study Paving Project Highway Okiñona I - II and III Municipality Okiñona One - 2nd Section of the Province Igape & Veranes, Santa Cruz Department		DCP Nº: 28	
PROGRESSIVE:		TEST DATA		Not Applicable	
WATER TABLE:		COORDINATE:		SLIDE:	
0.00 mts.		17°28'14.33"S		Not Applicable	
0.00 mts.		62°54'31.24"O		Not Applicable	
REGISTER FIELD		TEST RESULTS		WATER TABLE:	
Visual Description of the Material:		Number of Blows:		Penetration of Hammer:	
Artificial fill, consisting of clay and with no plasticity gravel mixtures of different measures. Screened type in-situ condition, medium to dark brown coloration and reddish interpretation alluvial-fan.		18		20	
Artificial fill, consisting of clay and with no plasticity gravel mixtures of different measures. Screened type in-situ condition, medium to dark brown coloration and reddish interpretation alluvial-fan.		22		0.91	
Artificial fill, consisting of clay and with no plasticity gravel mixtures of different measures. Screened type in-situ condition, medium to dark brown coloration and reddish interpretation alluvial-fan.		30		0.67	
Low plasticity clay, firm-situ, soil consistency, dry and brown coloration geological interpretation alluvial-fan status.		6		30	
Low plasticity clay, firm-situ, soil consistency, dry and brown coloration geological interpretation alluvial-fan status.		6		30	
Low plasticity clay, firm-situ, soil consistency, dry and brown coloration geological interpretation alluvial-fan status.		8		3.75	
Low plasticity clay, firm-situ, soil consistency, dry and brown coloration geological interpretation alluvial-fan status.		13		2.31	
Low plasticity clay, firm-situ, soil consistency, dry and brown coloration geological interpretation alluvial-fan status.		15		2.67	
Low plasticity clay, firm-situ, soil consistency, dry and brown coloration geological interpretation alluvial-fan status.		17		2.35	
Shale Arena, in-situ condition firm, medium compactness of dry and brown coloration geological interpretation alluvial-fan.		17		50	
Shale Arena, in-situ condition firm, medium compactness of dry and brown coloration geological interpretation alluvial-fan.		15		50	
Shale Arena, in-situ condition firm, medium compactness of dry and brown coloration geological interpretation alluvial-fan.		18		60	
Clayey sand, loose in-situ condition, loose compactness of dry and dark brown coloration geological interpretation alluvial-fan.		6		50	
Clayey sand, loose in-situ condition, loose compactness of dry and dark brown coloration geological interpretation alluvial-fan.		6		100	
Clayey sand, loose in-situ condition, loose compactness of dry and dark brown coloration geological interpretation alluvial-fan.		6		150	
Low plasticity clay, in-situ condition weak, partially dry soil consistency, state and reddish coloration geological interpretation alluvial-fan.		5		50	
Low plasticity clay, in-situ condition weak, partially dry soil consistency, state and reddish coloration geological interpretation alluvial-fan.		6		100	
Low plasticity clay, in-situ condition weak, partially dry soil consistency, state and reddish coloration geological interpretation alluvial-fan.		6		150	
Clay of low plasticity, firm-situ, medium consistency, partially dry and reddish coloration geological interpretation alluvial-fan status.		8		60	
Clay of low plasticity, firm-situ, medium consistency, partially dry and reddish coloration geological interpretation alluvial-fan status.		10		120	
Clay of low plasticity, firm-situ, medium consistency, partially dry and reddish coloration geological interpretation alluvial-fan status.		12		100	
Observations:		Number of hammer blows between readings:		ASTM DCP	
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey date.		12/02/2015		12/02/2015	
CAEM ISO		DATE OF CREATION OF TEST:		HEAD OF LABORATORY	
12/02/2015		12/02/2015		12/02/2015	

		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA	REV: 00 DATE: 14/02/2015 EDC/PS: 002-14 PÁG: 30 de 35						
KATIMBA & Engineers International Preparatory Study-Posing Project Highway Okinawa I - II and III Municipality Okinawa One - 2nd Section of the Province Ignacio Wermes, Santa Cruz Department											
TEST DATA											
30 + 0.00		COORDINATE: Coordinates X: 17°29'17.73"S Coordinates Y: 62°54'48.00"O		SIDE: Not Applicable	Not Applicable 8 Kg.						
WATER TABLE: 2.90 mts.											
REGISTERS FIELD											
ELEVATION IV (meters)	0.00	VISUAL DESCRIPTION OF THE MATERIAL		Number of Blows A	Cumulative penetration (mm)	Penetration Between Readings C	Factor of Hammer E	CBR Index (Punches) G	CBR % G	AVERAGE CBR %	Observations
0.00	0.00	Artificial fill, consisting of the sand with no plasticity (grayed mixtures of different measures Screen Type strong in-situ conditions, medium brown color compacted and geological interpretation alluvial fan		11	30	30	2.73	1	2.73	62.41	(For the first point) Because of the difference of these values greater than 100% (Sand) divergent CBR values greater than 100% on average, since that data. This is because the test was conducted on an isolated heterogeneous state or non-homogeneous state or consolidated, dry ground, CBR is adopted 68.82%.
0.00	0.00	Low plasticity clay, light-situ firm, medium bodied, dry and brown coloration geological interpretation alluvial fan status		12	60	30	2.50	1	2.50	68.80	
0.00	0.00			13	90	30	2.31	1	2.31	75.26	
0.00	0.00			7	40	40	5.71	1	5.71	27.26	
0.00	0.00			10	80	40	4.00	1	4.00	40.64	37.71
0.00	0.70			11	120	40	3.64	1	3.64	45.22	
0.00	1.70	Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial fan		7	50	50	7.14	1	7.14	21.23	21.23
0.00	1.70			7	100	50	7.14	1	7.14	21.23	21.23
0.00	1.70			7	150	50	7.14	1	7.14	21.23	21.23
0.00	1.70										
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		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA	REV: 00 DATE: 14/02/2015 EDC/PS: 002-14 PÁG: 29 de 35						
CLIENTE / Client: KATIMBA & Engineers International PROYECTO / Project: Preparatory Study-Posing Project Highway Okinawa I - II and III UBICACIÓN / Location: Municipality Okinawa One - 2nd Section of the Province Ignacio Wermes, Santa Cruz Department											
TEST DATA											
PROGRESSIVE: 29 + 0.00		COORDINATE: 17°29'45.90"S 62°54'39.45"O		SIDE: Not Applicable	Not Applicable 8 Kg.						
WATER TABLE: 0.00 mts.											
REGISTERS FIELD											
SCALE	DEPTH (m)	COLOUR	DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative Penetration (mm)	Penetration Between Readings (mm)	Factor of Hammer F	CBR Index (Punches)	CBR % G	AVERAGE CBR % H	Observation
0.00	0.00		Artificial fill, consisting of clay and without plasticity (grayed mixtures of different measures Screen Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial fan	25	20	20	0.80	0.80	246.51		(For the first point) Because of the difference of these values greater than 100% (Sand) divergent CBR values greater than 100% on average, since that data. This is because the test was conducted on an isolated heterogeneous state or non-homogeneous state or consolidated, dry ground.
0.00	0.00		Clay of low plasticity, firm-situ, medium bodied, dry and reddish coloration clear geological interpretation alluvial fan status	10	40	40	4.00	4.00	40.64		
0.00	0.00		Clay of low plasticity, firm-situ, medium bodied, dry and brown coloration geological interpretation alluvial fan status	11	80	40	3.64	3.64	45.22	40.36	
0.00	0.00		Clay of low plasticity, firm-situ, medium bodied, dry and light reddish coloration geological interpretation alluvial fan status	16	130	50	3.13	3.13	53.49	51.11	
0.00	0.00		Low plasticity clay, firm-situ, soft consistency, dry and light reddish coloration geological interpretation alluvial fan status	6	40	40	6.67	6.67	22.94		
0.00	0.00		Low plasticity clay, firm-situ, soft consistency, dry and brown coloration geological interpretation alluvial fan status	6	80	40	6.67	6.67	22.94	21.25	
0.00	0.00		Limos with mixtures of very fine sand, clear frial condition in-situ, soft consistency, dry and brown coloration geological interpretation alluvial fan	6	130	50	8.33	8.33	17.86		
0.00	0.00		Limos with mixtures of very fine sand, clear frial condition in-situ, soft consistency, dry and brown coloration geological interpretation alluvial fan	6	50	50	8.33	8.33	17.86		
0.00	0.00		Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial fan	6	100	50	8.33	8.33	17.86	17.86	
0.00	0.00		Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial fan	6	150	50	8.33	8.33	17.86		
0.00	0.00		Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial fan	2	80	80	40.00	40.00	3.08		
0.00	0.00		Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial fan	3	160	80	26.67	26.67	4.86		
0.00	0.00		Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial fan	5	240	80	16.00	16.00	8.60	5.51	
OBSERVATIONS: The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey done.											
CAEM ISO											
DATE OF CREATION OF TEST: 12/02/2015											
DATE OF CONCLUSION OF TEST: 12/02/2015											
HEAD OF LABORATORY											

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		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA	00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 33 de 35
CLIENTE / Client: KAYAHUA & Engineers International PROYECTO / Project: Preparatory Study Paving Project Highway Olanillo I - II and III UBICACIÓN / Location: Marik Gully, Olanillo One - 2nd Section of the Province Iguala de Vermeas, Santa Cruz Department		DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03		NORMA	00 DATE: 14/02/2015 REPORT: EDCDPS-002-14 PAGE: 33 de 35
PROGRESSIVE:		COORDINATED:		SIDE:	Not Applicable
WATER TABLE:		WATER TABLE:		WATER TABLE:	WATER TABLE:
REGISTERED FIELD		REGISTERED FIELD		REGISTERED FIELD	REGISTERED FIELD
VISUAL DESCRIPTION OF THE MATERIAL:		VISUAL DESCRIPTION OF THE MATERIAL:		VISUAL DESCRIPTION OF THE MATERIAL:	VISUAL DESCRIPTION OF THE MATERIAL:
Artificial fill, consisting of clay sand with no plasticity gravels mixtures of different measures Scaled type in-situ condition partially loose firm, medium and weak compactness brownish geological interpretation alluvial fan		Artificial fill, consisting of clay sand with no plasticity gravels mixtures of different measures Scaled type in-situ condition partially loose firm, medium and weak compactness brownish geological interpretation alluvial fan		Artificial fill, consisting of clay sand with no plasticity gravels mixtures of different measures Scaled type in-situ condition partially loose firm, medium and weak compactness brownish geological interpretation alluvial fan	Artificial fill, consisting of clay sand with no plasticity gravels mixtures of different measures Scaled type in-situ condition partially loose firm, medium and weak compactness brownish geological interpretation alluvial fan
LIMO with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial fan		LIMO with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial fan		LIMO with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial fan	LIMO with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial fan
LIMO with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial fan		LIMO with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial fan		LIMO with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial fan	LIMO with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial fan
Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial fan		Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial fan		Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial fan	Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial fan
Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and dark brown coloration geological interpretation alluvial fan		Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and dark brown coloration geological interpretation alluvial fan		Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and dark brown coloration geological interpretation alluvial fan	Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and dark brown coloration geological interpretation alluvial fan
Arena Limosa without plasticity condition in-situ loose, loose compactness, partially saturated state and dark brown coloration geological interpretation alluvial fan		Arena Limosa without plasticity condition in-situ loose, loose compactness, partially saturated state and dark brown coloration geological interpretation alluvial fan		Arena Limosa without plasticity condition in-situ loose, loose compactness, partially saturated state and dark brown coloration geological interpretation alluvial fan	Arena Limosa without plasticity condition in-situ loose, loose compactness, partially saturated state and dark brown coloration geological interpretation alluvial fan
Observations:		Observations:		Observations:	Observations:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey date.		The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey date.		The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey date.	The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level survey date.
					
DATE OF CREATION OF TEST:		DATE OF CREATION OF TEST:		DATE OF CREATION OF TEST:	DATE OF CREATION OF TEST:
DATE OF CONCLUSION OF TEST:		DATE OF CONCLUSION OF TEST:		DATE OF CONCLUSION OF TEST:	DATE OF CONCLUSION OF TEST:
HEAD OF LABORATORY		HEAD OF LABORATORY		HEAD OF LABORATORY	HEAD OF LABORATORY

		DYNAMIC PENETRATION TESTING (DPT) ASTM-D-6951-03		NORMA		00 DATE: 14/02/2015 REPORT: EDCPS-002-14 Page: 35 de 35	
CLIENTE / Client: KAYAHUA & Engenheiros Internacionais		PROYECTO / Project: Preparatory Study Paving Project Highway Oklahoma I - Hand III					
UBICACIÓN / Location:		Municipality Oklahoma One, 2nd Section of the Province Ignacio Wiermas, Santa Cruz Department					
		DCP No.: 35					

PROGRESSIVE: 35 + 000		COORDINATE: 17°31'55.70"S Coordinate X: 62°52'26.49"O Coordinate Y:		SIDE: Not Applicable		TYPE OF MATERIAL: Not Applicable	
WATER TABLE: 0.00 mts.		REGISTERED FIELD		TEST RESULTS		WEIGHT OF HAMMER: 8 Kg.	
VISUAL DESCRIPTION OF THE MATERIAL: Artificial fill consisting of clay and with no plasticity gravel mixtures of different measures Seced type in situ condition partially fine firm, medium and weak compaction brown fine geological interpretation alluvial fan		Number of Blows A: 9 Cumulative Penetration (mm) Penetration of Hammer (mm) Factor of Hammer (F)		Penetration of Hammer (mm) Factor of Hammer (F)		CBR % CBR % CBR %	
Lims with mixtures of very fine sand, strong in situ condition, medium bodied, dry and gray coloring geological interpretation alluvial fan		11 60 30 30 3.33 1 2.73 62.41 56.12		1 3.33 49.85		49.85	
Clayey sand with presence of clasts in minimum percentage isolated, light situ loose, loose compaction, partially dry and brown coloration geological interpretation alluvial fan status		16 60 30 30 3.33 1 2.50 68.40 84.03		1 3.33 49.85		49.85	
Low plasticity clay, flimsy-situ, soft consistency, partially dry and light brown with gray patinas alluvial fan-colored geological interpretation condition		6 110 60 10.00 1 10.00 14.56 15.48		1 10.00 14.56		14.56	
Lims with mixtures of very fine sand, weak in situ condition, soft consistency, partially dry and light brown with gray patinas geological interpretation alluvial fan		6 150 50 8.33 1 8.33 17.86 17.86		1 8.33 17.86		17.86	
Lims with mixtures of very fine sand, weak in situ condition, soft consistency, partially saturated state, light brown with brown patinas geological interpretation alluvial fan		6 150 50 8.33 1 8.33 17.86 17.86		1 8.33 17.86		17.86	

CONCLUSIONS: The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the month 0.00 level carry by date.		DATE OF CREATION OF TEST: 13/02/2015 DATE OF CONCLUSION OF TEST: 13/02/2015		HEAD OF LABORATORY	
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Resultado del ensayo de materiales

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														REV: 00				
														REPORT: 308-14				
														DATE: 20/01/2015				
Client: KATAHIRA & Engineers International. Project: Preparatory Study of the Okinawa I - II and III Road Paving Project Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City																		
N° POLL	N° SAMPLES	Progresivas	HUMEDAD NATURAL	GRANULOMETRIA				LIMITES DE ATTERBERG			CLASIFICACION	CLASIFICACION	Proctor	HUMEDAD OPTIMA	% DE C.B.R. P/ 0.10° PENETRATION			OSERVACIONES
		Progressive	Moisture	4	10	40	200	L.L.	L.P	I.P	A.A.S.H.T.O.	S.U.S.C.	T-180 MOD.	Opt.	95%	100%		Observations
01	01	BANCO 1	6.68%	100.00	99.91	99.31	55.15	0.00%	0.00%	N.P.	A-4 (0)	ML	2.097	7.75%	24.48	34.99		Material Natural
02	02	BANCO 1	3.56%	100.00	99.91	99.50	55.76	0.00%	0.00%	N.P.	A-4 (0)	ML	2.099	7.75%	25.64	36.94		Material Natural
03	01	BANCO 1	3.22%	100.00	99.69	98.51	51.45	0.00%	0.00%	N.P.	A-4 (0)	ML	2.029	8.79%	34.74	47.27		Mezcla con Cal al 4%
04	02	BANCO 1	3.07%	100.00	99.95	97.79	56.43	0.00%	0.00%	N.P.	A-4 (0)	ML	2.043	8.70%	37.65	48.78		Mezcla con Cal al 4%
05	01	BANCO 1	2.83%	100.00	99.79	99.13	54.51	0.00%	0.00%	N.P.	A-4 (0)	ML	2.016	8.62%	45.94	57.27		Mezcla con Cal al 6%
06	02	BANCO 1	2.72%	100.00	99.88	99.33	55.81	0.00%	0.00%	N.P.	A-4 (0)	ML	2.035	8.51%	41.22	55.88		Mezcla con Cal al 6%
07	01	BANCO 1	2.73%	100.00	99.88	98.94	58.77	0.00%	0.00%	N.P.	A-4 (0)	ML	2.009	8.69%	40.56	49.29		Mezcla con Cal al 8%
08	02	BANCO 1	2.72%	100.00	99.75	99.27	58.40	0.00%	0.00%	N.P.	A-4 (0)	ML	2.010	8.46%	34.12	46.82		Mezcla con Cal al 8%
09	01	BANCO 1	3.28%	100.00	99.78	99.35	56.38	0.00%	0.00%	N.P.	A-4 (0)	ML	2.102	8.60%	74.77	92.81		Mezcla con Cemento al 4%
10	02	BANCO 1	2.89%	100.00	99.90	99.39	56.85	0.00%	0.00%	N.P.	A-4 (0)	ML	2.098	8.47%	66.73	90.20		Mezcla con Cemento al 4%
11	01	BANCO 1	2.87%	100.00	99.95	99.34	56.08	0.00%	0.00%	N.P.	A-4 (0)	ML	2.057	8.66%	70.36	92.30		Mezcla con Cemento al 6%
12	02	BANCO 1	3.26%	100.00	99.90	99.90	56.43	0.00%	0.00%	N.P.	A-4 (0)	ML	2.065	8.86%	69.89	90.54		Mezcla con Cemento al 6%
13	01	BANCO 1	4.14%	100.00	99.84	99.41	59.56	0.00%	0.00%	N.P.	A-4 (0)	ML	2.104	9.54%	57.88	80.63		Mezcla con Cemento al 8%
14	02	BANCO 1	2.70%	100.00	99.88	99.38	57.52	0.00%	0.00%	N.P.	A-4 (0)	ML	2.123	9.73%	67.83	83.08		Mezcla con Cemento al 8%

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														REV: 00				
														REPORT: 308-14				
														DATE: 14/01/2015				
Client: KATAHIRA & Engineers International.														Project: Preparatory Study of the Okinawa I - II and III Road Paving Project				
Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City																		
N° POLL	N° SAMPLES	Progresivas	HUMEDAD NATURAL	GRANULOMETRIA				LIMITES DE ATTERBERG			CLASIFICACION	CLASIFICACION	Proctor	HUMEDAD OPTIMA	% DE C.B.R. P/ 0.10° PENETRATION			OSERVACIONES
		Progressive	Moisture	4	10	40	200	L.L.	L.P	I.P	A.A.S.H.T.O.	S.U.S.C.	grs/cm3	Moisture	95%	100%		Observations
01	01	BANCO 2	4.97%	100.00	100.00	99.45	38.17	0.00%	0.00%	N.P.	A-4 (0)	SM	1.941	9.46%	18.86	25.45		Material Natural
02	02	BANCO 2	4.80%	100.00	100.00	99.67	38.60	0.00%	0.00%	N.P.	A-4 (0)	SM	1.977	8.60%	21.07	26.42		Material Natural
03	01	BANCO 2	4.93%	100.00	99.69	98.51	41.54	0.00%	0.00%	N.P.	A-4 (0)	SM	1.982	8.44%	29.73	39.17		Mezcla con Cal al 4%
04	02	BANCO 2	4.56%	100.00	100.00	99.64	41.79	0.00%	0.00%	N.P.	A-4 (0)	SM	1.975	8.38%	26.98	36.15		Mezcla con Cal al 4%
05	01	BANCO 2	4.32%	100.00	100.00	99.46	41.65	0.00%	0.00%	N.P.	A-4 (0)	SM	1.968	8.36%	38.52	50.14		Mezcla con Cal al 6%
06	02	BANCO 2	5.14%	100.00	100.00	99.16	40.26	0.00%	0.00%	N.P.	A-4 (0)	SM	1.933	8.36%	34.69	47.12		Mezcla con Cal al 6%
07	01	BANCO 2	4.73%	100.00	100.00	99.63	70.52	0.00%	0.00%	N.P.	A-4 (0)	SM	1.953	7.76%	29.37	38.99		Mezcla con Cal al 8%
08	02	BANCO 2	4.07%	100.00	100.00	98.22	38.92	0.00%	0.00%	N.P.	A-4 (0)	SM	1.964	7.48%	27.72	35.50		Mezcla con Cal al 8%
09	01	BANCO 2	4.75%	100.00	100.00	98.90	39.69	0.00%	0.00%	N.P.	A-4 (0)	SM	2.068	8.70%	38.86	52.58		Mezcla con Cemento al 4%
10	02	BANCO 2	5.33%	100.00	100.00	99.24	39.21	0.00%	0.00%	N.P.	A-4 (0)	SM	2.018	7.96%	37.61	48.57		Mezcla con Cemento al 4%
11	01	BANCO 2	4.95%	100.00	100.00	95.88	39.77	0.00%	0.00%	N.P.	A-4 (0)	SM	2.065	8.86%	48.00	65.07		Mezcla con Cemento al 6%
12	02	BANCO 2	4.43%	100.00	100.00	98.52	40.98	0.00%	0.00%	N.P.	A-4 (0)	SM	2.034	9.02%	43.11	58.85		Mezcla con Cemento al 6%
13	01	BANCO 2	5.08%	100.00	100.00	99.29	39.37	0.00%	0.00%	N.P.	A-4 (0)	SM	2.062	8.78%	62.86	79.42		Mezcla con Cemento al 8%
14	02	BANCO 2	4.02%	100.00	100.00	99.33	40.27	0.00%	0.00%	N.P.	A-4 (0)	SM	2.042	8.53%	51.40	70.73		Mezcla con Cemento al 8%

														REV: 00				
														REPORT: 308-14				
														DATE: 26/01/2015				
Client: KATAHIRA & Engineers International.														Project: Preparatory Study of the Okinawa I - II and III Road Paving Project				
														Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City				
N° POLL	N° SAMPLES	Progresivas	HUMEDAD NATURAL	GRANULOMETRIA				LIMITES DE ATTERBERG			CLASIFICACION	CLASIFICACION	Proctor	HUMEDAD OPTIMA	% DE C.B.R. P/0.10" PENETRATION			OSERVACIONES
		Progressive	Moisture	4	10	40	200	L.L.	L.P	I.P	A.A.S.H.T.O.	Clasificatio	T-180 MOD.	Moisture	95%	100%		Observations
01	01	BANCO 3	5.39%	100.00	100.00	99.33	26.58	0.00%	0.00%	N.P	A-2-4 (0)	SM	1.985	9.47%	22.48	32.71		Material Natural
02	02	BANCO 3	5.04%	100.00	100.00	99.40	24.02	0.00%	0.00%	N.P	A-2-4 (0)	SM	1.974	9.13%	23.62	32.19		Material Natural
03	01	BANCO 3	1.25%	100.00	99.69	98.51	27.04	0.00%	0.00%	N.P	A-2-4 (0)	SM	2.012	8.86%	22.49	33.70		Mezcla con Cal al 4%
04	02	BANCO 3	1.11%	100.00	100.00	99.39	27.46	0.00%	0.00%	N.P	A-2-4 (0)	SM	2.021	8.57%	23.97	32.70		Mezcla con Cal al 4%
05	01	BANCO 3	1.10%	100.00	99.96	99.34	30.19	0.00%	0.00%	N.P	A-2-4 (0)	SM	2.049	8.62%	32.32	39.79		Mezcla con Cal al 6%
06	02	BANCO 3	1.14%	100.00	99.91	99.35	30.66	0.00%	0.00%	N.P	A-2-4 (0)	SM	2.058	8.51%	31.91	38.48		Mezcla con Cal al 6%
07	01	BANCO 3	2.02%	100.00	100.00	99.39	30.96	0.00%	0.00%	N.P	A-2-4 (0)	SM	2.038	8.69%	24.36	33.15		Mezcla con Cal al 8%
08	02	BANCO 3	2.29%	100.00	100.00	99.38	29.98	0.00%	0.00%	N.P	A-2-4 (0)	SM	2.045	8.55%	23.72	32.30		Mezcla con Cal al 8%
09	01	BANCO 3	1.53%	100.00	99.80	99.06	26.51	0.00%	0.00%	N.P	A-2-4 (0)	SM	1.966	9.39%	44.12	56.86		Mezcla con Cemento al 4%
10	02	BANCO 3	2.05%	100.00	100.00	99.13	32.61	0.00%	0.00%	N.P	A-2-4 (0)	SM	1.975	9.42%	46.88	53.94		Mezcla con Cemento al 4%
11	01	BANCO 3	1.15%	100.00	100.00	99.34	30.93	0.00%	0.00%	N.P	A-2-4 (0)	SM	1.981	8.97%	47.20	62.99		Mezcla con Cemento al 6%
12	02	BANCO 3	1.33%	100.00	100.00	98.93	30.73	0.00%	0.00%	N.P	A-2-4 (0)	SM	1.975	9.14%	53.84	65.42		Mezcla con Cemento al 6%
13	01	BANCO 3	1.21%	100.00	100.00	99.30	33.15	0.00%	0.00%	N.P	A-2-4 (0)	SM	2.041	8.99%	57.62	73.02		Mezcla con Cemento al 8%
14	02	BANCO 3	1.19%	100.00	100.00	99.30	33.30	0.00%	0.00%	N.P	A-2-4 (0)	SM	2.031	9.03%	59.60	74.88		Mezcla con Cemento al 8%

														REV: 00				
														REPORT: 308-14				
														DATE: 08/01/2015				
Client: KATAHIRA & Engineers International.														Project: Preparatory Study of the Okinawa I - II and III Road Paving Project				
Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City																		
N° POLL	N° SAMPLES	Progresivas	HUMEDAD NATURAL	GRANULOMETRIA				LIMITES DE ATTERBERG			CLASIFICACION	CLASIFICACION	Proctor T-180 MOD.	HUMEDAD OPTIMA	% DE C.B.R. P/0.10" PENETRATION			OSERVACIONES
		Progressive	Moisture	4	10	40	200	L.L.	L.P	I.P	A.A.S.H.T.O.	Clasificación		Opt.	95%	100%		Observations
01	01	1+000	11.19%	100.00	100.00	99.38	97.03	21.75%	0.00%	N.P.	A-4 (8)	ML	1.876	13.16%	1.34	2.66		Material Natural
02	02	1+000	11.20%	100.00	100.00	99.14	96.82	21.51%	0.00%	N.P.	A-4 (8)	ML	1.886	13.00%	1.32	2.49		Material Natural
03	01	1+000	12.16%	100.00	99.69	98.51	96.74	28.98%	0.00%	N.P.	A-4 (8)	ML	1.847	14.74%	14.08	26.48		Mezcla con Cal al 4%
04	02	1+000	12.56%	100.00	99.93	99.22	97.18	28.43%	0.00%	N.P.	A-4 (8)	ML	1.848	14.53%	13.86	26.16		Mezcla con Cal al 4%
05	01	1+000	13.84%	100.00	99.93	99.21	96.35	29.15%	0.00%	N.P.	A-4 (8)	ML	1.825	15.77%	17.46	32.31		Mezcla con Cal al 6%
06	02	1+000	12.91%	100.00	99.84	99.23	96.30	29.81%	0.00%	N.P.	A-4 (8)	ML	1.817	14.71%	16.75	31.80		Mezcla con Cal al 6%
07	01	1+000	11.74%	100.00	99.90	99.06	95.72	29.95%	0.00%	N.P.	A-4 (8)	ML	1.796	15.94%	18.89	35.21		Mezcla con Cal al 8%
08	02	1+000	11.45%	100.00	99.59	98.04	95.52	31.04%	0.00%	N.P.	A-4 (8)	ML	1.795	16.08%	18.41	33.21		Mezcla con Cal al 8%
09	01	1+000	14.35%	100.00	99.86	99.37	97.09	25.12%	0.00%	N.P.	A-4 (8)	ML	1.783	15.62%	19.82	30.36		Mezcla con Cemento al 4%
10	02	1+000	14.65%	100.00	99.92	99.25	96.61	24.27%	0.00%	N.P.	A-4 (8)	ML	1.784	14.96%	21.39	31.73		Mezcla con Cemento al 4%
11	01	1+000	13.85%	100.00	99.89	99.33	96.96	25.31%	0.00%	N.P.	A-4 (8)	ML	1.801	15.82%	22.83	36.59		Mezcla con Cemento al 6%
12	02	1+000	14.44%	100.00	99.90	99.34	96.92	25.89%	0.00%	N.P.	A-4 (8)	ML	1.781	16.28%	20.30	35.38		Mezcla con Cemento al 6%
13	01	1+000	14.51%	100.00	99.95	99.02	96.37	25.99%	0.00%	N.P.	A-4 (8)	ML	1.800	15.35%	29.24	41.24		Mezcla con Cemento al 8%
14	02	1+000	13.99%	100.00	99.88	99.28	97.28	24.76%	0.00%	N.P.	A-4 (8)	ML	1.802	15.28%	29.15	41.32		Mezcla con Cemento al 8%

															REV: 00			
															REPORT: 308-14			
															DATE: 08/01/2015			
Client: KATAHIRA & Engineers International. Project: Preparatory Study of the Okinawa I - II and III Road Paving Project Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City																		
N° POLL	N° SAMPLES	Progresivas	HUMEDAD NATURAL	GRANULOMETRIA				LIMITES DE ATTERBERG			CLASIFICACION	CLASIFICACION	Proctor T-180 MOD.	HUMEDAD OPTIMA	% DE C.B.R. P 0.10*PENETRATION			OSERVACIONES
		Progressive	Moisture	4	10	40	200	L.L.	L.P	I.P	A.A.S.H.T.O.	S.U.S.C.		Moisture	95%	100%		Observations
01	01	11+200	7.05%	100.00	99.77	98.81	93.21	49.94%	24.53%	25.41%	A-7-6 (17)	CL	1.783	17.35%	0.97	1.96		Material Natural
02	02	11+200	10.24%	100.00	99.54	98.67	93.22	48.88%	23.86%	25.02%	A-7-6 (16)	CL	1.724	17.48%	1.36	1.95		Material Natural
03	01	11+200	9.54%	100.00	99.95	99.17	93.97	48.24%	0.00%	N.P.	A-5 (10)	ML	1.752	19.06%	5.67	9.76		Mezcla con Cal al 4%
04	02	11+200	9.53%	100.00	99.88	99.26	93.72	47.24%	0.00%	N.P.	A-5 (10)	ML	1.755	18.97%	5.83	9.62		Mezcla con Cal al 4%
05	01	11+200	16.33%	100.00	99.95	98.98	93.33	45.82%	0.00%	N.P.	A-5 (10)	ML	1.739	20.02%	8.63	14.46		Mezcla con Cal al 6%
06	02	11+200	16.86%	100.00	99.89	99.07	93.83	45.36%	0.00%	N.P.	A-5 (10)	ML	1.738	19.49%	7.13	13.05		Mezcla con Cal al 6%
07	01	11+200	8.57%	100.00	99.84	98.97	93.88	42.74%	0.00%	N.P.	A-5 (9)	ML	1.725	19.25%	9.32	18.01		Mezcla con Cal al 8%
08	02	11+200	8.31%	100.00	99.88	98.62	93.83	42.33%	0.00%	N.P.	A-5 (9)	ML	1.729	19.35%	9.79	19.17		Mezcla con Cal al 8%
09	01	11+200	9.92%	100.00	99.94	99.02	93.71	36.64%	19.58%	17.06%	A-6 (11)	CL	1.752	17.50%	4.26	6.47		Mezcla con Cemento al 4%
10	02	11+200	9.73%	100.00	99.78	98.97	93.58	37.38%	20.48%	16.90%	A-6 (11)	CL	1.750	17.43%	3.97	6.06		Mezcla con Cemento al 4%
11	01	11+200	9.64%	100.00	99.86	99.02	93.54	35.76%	22.47%	13.29%	A-6 (10)	CL	1.750	16.75%	7.35	10.03		Mezcla con Cemento al 6%
12	02	11+200	9.96%	100.00	99.93	99.34	94.86	34.50%	21.50%	13.00%	A-6 (10)	CL	1.754	16.41%	7.00	10.04		Mezcla con Cemento al 6%
13	01	11+200	9.12%	100.00	99.85	99.09	93.92	39.41%	24.21%	15.20%	A-6 (11)	CL	1.750	16.93%	9.83	16.00		Mezcla con Cemento al 8%
14	02	11+200	9.03%	100.00	99.89	99.03	94.18	39.79%	24.21%	15.58%	A-6 (11)	CL	1.759	17.15%	10.72	17.03		Mezcla con Cemento al 8%

															REV: 00			
															REPORT: 308-14			
															DATE: 17/01/2015			
Client: KATAHIRA & Engineers International.															Project: Preparatory Study of the Okinawa I - II and III Road Paving Project			
Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City																		
N° POLL	N° SAMPLES	Progresivas	HUMEDAD NAT. Moisture	GRANULOMETRIA Grading				LIMITES DE ATTERBERG Atterberg Limits			CLASIFICACION Clasification A.A.S.H.T.O.	CLASIFICACION Clasification S.U.S.C.	Proctor T-180 MOD. grs/cm3	HUMEDAD OPTIMA Opt. Moisture	% DE C.B.R. P/0.10*PENETRATION			OSERVACIONES Observations
		Progressive		4	10	40	200	L.L.	L.P	I.P					95%	100%		
01	01	28+000	11.35%	100.00	99.86	98.26	93.31	50.79%	24.91%	25.89%	A-7-6 (17)	CH	1.734	15.40%	1.23	1.62		Material Natural
02	01	28+000	11.19%	100.00	100.00	99.38	97.03	47.50%	23.79%	23.71%	A-7-6 (15)	CL	1.749	15.60%	0.94	1.20		Material Natural
03	01	28+000	10.47%	100.00	99.69	98.51	94.61	36.38%	0.00%	N.P.	A-4 (8)	ML	1.748	16.66%	3.02	3.76		Mezcla con Cal al 4%
04	02	28+000	10.83%	100.00	99.83	98.88	95.92	29.56%	0.00%	N.P.	A-4 (8)	ML	1.757	17.22%	3.09	3.88		Mezcla con Cal al 4%
05	01	28+000	9.81%	100.00	99.90	98.97	94.48	34.66%	0.00%	N.P.	A-4 (8)	ML	1.719	16.37%	4.53	6.04		Mezcla con Cal al 6%
06	02	28+000	13.10%	100.00	99.81	98.84	95.16	37.30%	0.00%	N.P.	A-4 (8)	ML	1.721	17.42%	4.13	5.68		Mezcla con Cal al 6%
07	01	28+000	10.08%	100.00	99.80	98.76	94.25	30.15%	0.00%	N.P.	A-4 (8)	ML	1.720	15.90%	5.83	7.86		Mezcla con Cal al 8%
08	02	28+000	10.81%	100.00	99.92	99.30	94.37	30.92%	0.00%	N.P.	A-4 (8)	ML	1.731	15.76%	5.65	7.46		Mezcla con Cal al 8%
09	01	28+100	10.86%	100.00	99.93	98.80	93.84	46.06%	24.54%	21.52%	A-7-6 (14)	CL	1.797	17.99%	6.26	8.04		Mezcla con Cemento al 4%
10	02	28+000	14.65%	100.00	99.92	99.25	96.61	45.93%	24.45%	21.48%	A-7-6 (14)	CL	1.792	17.53%	6.34	8.07		Mezcla con Cemento al 4%
11	01	28+000	10.02%	100.00	99.85	99.38	97.16	46.77%	25.56%	21.21%	A-7-6 (14)	CL	1.802	17.08%	7.02	9.37		Mezcla con Cemento al 6%
12	02	28+000	11.95%	100.00	99.93	98.91	95.24	42.88%	24.57%	18.31%	A-7-6 (12)	CL	1.807	17.49%	6.01	7.64		Mezcla con Cemento al 6%
13	01	28+000	11.32%	100.00	99.93	98.72	93.68	41.75%	24.36%	17.39%	A-7-6 (12)	CL	1.792	18.89%	11.66	14.72		Mezcla con Cemento al 8%
14	02	28+000	10.18%	100.00	99.84	98.71	94.73	38.16%	22.82%	15.34%	A-6 (11)	CL	1.752	18.58%	11.46	14.01		Mezcla con Cemento al 8%