APPENDIX 15-1

LIST OF FLORA

1 Riverside Vegetation in Corridor of Impact

Table 1 Name of Riverside Vegetation Species along Road from Thlea Ma'am to Battamabng
(Survey area: 20 m + 20 m from Road center, Survey Month: July and December, 2013)

Name of Riverside Vegetation along Northeast Side of Road (Width:20m)			
Kilometer Post (KP)	Communes	Scientific Name	Name of River (Ou) or Canals
177+177 to 177+263	Beung Kanthouth	*Euphorbia milii*	Ou Srang Thom
		Cassia alata, L.	
		Combretum trifoliatum	
		Ixora cuneifolia, varians	
		Bridelia ovata, var. Curtisis	
		Phyllanthus lasodiifolius	
		Hymnocardia wallichii	
		Barringtonia acutangula	
		Cratoxylum cochinchinese	
		Passiflora foetida Passifloraceae	
		Azadirachta indica Meliaceae	
		Streblus asper Lour. Moraceae	
		Sesbania grandiflora	
		Zizyphus jujube	
		Gmelina asiatica	
		Tertracera indica	
		Cayratia trifolia	
		Derris trifolia	
178+484 to 178+537	Prey Nhei	*Barringtonia acutangula*	Ou Srang Touch
		Ixora cuneifolia, varians	
		Euphorbia milii	
		Passiflora foetida Passifloraceae	
		Bridelia ovata, var. Curtisis	
		Phyllanthus lasodiifolius	
		Combretum trifoliatum	
		Streblus asper Lour. Moraceae	
		Zizyphus jujube	
		Gmelina asiatica	
		Derris trifolia	
		Tertracera indica	
		Cayratia trifolia	
190+727 to 190+785	Snam Preash	*Dalbergia herrida, Var.glabrescens*	Ou Svay At Khang Krom called Stung Touch
		Combretum trifoliatum	
		Phragmites karka Trin	
		Albizia myriophylla	
		Zizyphus oenoplia mill	
		Streblus asper Lour. Moraceae	
		Tertracera indica	
		Merremia hederacea	
208+378 to 208+457	Beung Khna	*Cassia alata, L.*	Ou Beung Khna
		Bridelia ovata, var. Curtisis	
		Cratoxylum cochinchinese	
		Zizyphus oenoplia mill	

		Azadirachta indica Meliaceae	
		Streblus asper Lour. Moraceae	
		Gmelina asiatica	
		Dalbergia herrida, Var.glabrescens	
		Combretum trifoliatum	
248+580 to 250+565	Kear	*Dalbergia herrida, Var.glabrescens*	Rigth Canal along Por 2 village road
		Uvaria rufa	
		Combretum trifoliatum	
		Phragmites karka Trin	
		Ixora cuneifolia, varians	
		Hydrolea zeylanica	
		Mimosa pigra Fabaceae	
		Mimosa pisdica	
		Mitragyna hirsuta Hav.	
		Phyllanthus lasodiifolius	
		Breynia rhamnoides	
		Barringtonia acutangula	
		Antidesma ghaesembilla, G	
		Passiflora foetida Passifloraceae	
		Streblus asper Lour. Moraceae	
		Sesbania grandiflora	
		Zizyphus jujube	
		Gmelina asiatica	
		Cayratia trifolia	
250+725 to 252+052, 252+169 to 252+938, 254+252 to 254+521, 254+578 to 254+884, 254+936 to 255+015, 255+024 to 255+088	Kor Koh	*Xanthophyllum glancam*	Rigth Canal along Kor Koh village road
		Uvaria rufa	
		Cynometra (inaequifolia)	
		Combretum trifoliatum	
		Ixora cuneifolia, varians	
		Hydrolea zeylanica	
		Maclura conchinchinensis	
		Mimosa pigra Fabaceae	
		Mimosa pisdica	
		Mitragyna hirsuta Hav.	
		Croton caudatus	
		Breynia rhamnoides	
		Barringtonia acutangula	
		Antidesma ghaesembilla, G	
		Zizyphus oenoplia mill	
		Passiflora foetida Passifloraceae	
		Gmelina asiatica	
		Cayratia trifolia	
		Merremia hederacea	
Name of Riverside Vegetation along Southwest Side of Road (Width:20m)			
Kilometer Post (KP)	Communes	Scientific Name	Name of River (Ou) or Canals
177+180 to 177+231	Thoth Choum	*Cassia alata, L.*	Ou Srang Thom
		Combretum trifoliatum	
		Bridelia ovata, var. Curtisis	
		Cratoxylum cochinchinese	

		Antidesma ghaesembilla, G	
		Zizyphus oenoplia mill	
		Passiflora foetida Passifloraceae	
		Streblus asper Lour. Moraceae	
		Gmelina asiatica	
		Tertracera indica	
178+488 to 178+530	Prey Nhei	*Barringtonia acutangula*	Ou Srang Touch
		Ixora cuneifolia, varians	
		Euphorbia milii	
		Bridelia ovata, var. Curtisis	
		Phyllanthus lasodiifolius	
		Combretum trifoliatum	
		Streblus asper Lour. Moraceae	
		Gmelina asiatica	
		Derris trifolia	
		Cayratia trifolia	
190+727 to 190+772	Snam Preash	*Cassia alata, L.*	Ou Svay At Khang Krom called Stung Touch
		Bridelia ovata, var. Curtisis	
		Breynia rhamnoides	
		Cratoxylum cochinchinese	
		Zizyphus oenoplia mill	
		Azadirachta indica Meliaceae	
		Streblus asper Lour. Moraceae	
		Sesbania grandiflora	
		Gmelina asiatica	
		Cynometra (inaequifolia)	
208+382 to 208+460	Beung Khna	*Bridelia ovata, var. Curtisis*	Ou Beung Khna
		Cratoxylum cochinchinese	
		Zizyphus oenoplia mill	
		Streblus asper Lour. Moraceae	
		Gmelina asiatica	
		Dalbergia herrida, Var.glabrescens	
		Combretum trifoliatum	
248+580 to 250+123	Maung	*Uvaria rufa*	Left Canal along Maung village road
		Combretum trifoliatum	
		Mimosa pigra Fabaceae	
		Mimosa pisdica	
		Mitragyna hirsuta Hav.	
		Antidesma ghaesembilla, G	
		Passiflora foetida Passifloraceae	
		Streblus asper Lour. Moraceae	
		Ixora cuneifolia, varians	
		Cayratia trifolia	
250+123 to 250+573, 250+730 to 252+054, 252+184 to 252+938, 254+261 to 254+914, 254+948 to 255+121	Kor Koh	*Combretum trifoliatum*	Left Canal along Kor Koh village road
		Mimosa pigra Fabaceae	
		Mimosa pisdica	
		Schleichera oleosa (Lour) Oken	
		Breynia rhamnoides	
		Xanthophyllum glancam	

		Barringtonia acutangula	
		Ficus racemosa	
		Ixora cuneifolia, varians	
		Dalbergia herrida, Var.glabrescens	
		Zizyphus jujube	
		Gmelina asiatica	
		Hydrolea zeylanica	
		Cynometra (inaequifolia)	
		Merremia hederacea	
		Cayratia trifolia	

Table 2 Name of Riverside Vegetation Species along Road from Sri Sophorn to Poipet

(Survey area: 20 m + 20 m from Road center, Survey Month: August and December, 2013)

Kilometer Post (KP)	Communes	Scientific Name	Name of River (Ou) or Canals
366+250 to 366+685	Teuk Thla	*Xanthophyllum glancam*	Along the road on the left hand in Teuk Thla village
		Mitragyna hirsuta Hav.	
		Dalbergia herrida, Var.glabrescens	
		Raphanus sativus	
		Samandura harmandii Pierre	
		Phragmites karka	
		Crateva andansonii Subsp odorata	
		Ixora cuneifolia	
		Croton caudatus	
		Breynia rhamnoides	
		Hymnocardia wallichii	
		Barringtonia asiatica	
		Zizyphus oenoplia mill	
		Passiflora foetida Passifloraceae	
		Dalbergia nigrescens, Varsaigonensis	
		Sesbania javanica	
		Gmelina asiatica	
		(Stixis obusifolia)	
		Cayratia trifolia	
		Merremia hederacea	
		Derris trifolia	
		(3 unknown species)	

2 Planted Trees along Road

Table 3 Name and Numbers of Road Side Trees of NR5 from Tlea Ma'am to Battambang

(Survey Month: July and December, 2013)

Name and Number of Road Side Trees on Northeast Side of Road					
Kilometer Post (KP)	Communes	Provinces	Scientific Name	Diameter of Tree (m)	Quantity
171 to 177+280	Boeung Kantaout	Pursat (PST)	*Sindora cochinchinensis*	0.1 to 0.6	1
			Delonix regia, (Boj. Ex Hook)		2
			Feroniella lucida Scheff.		4
			Dialium cochinchinensis		11
			Borassus flabellifer		1

			Lagerstroemia floribunda		2
			Eucalyptus camaldulensis		42
			Azadirachta indica		1
			Acacia auriculiformis, A.		157
			Samanea saman		2
177+285 to 183	Prey Nhi	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 1	9
			Acacia auriculiformis, A..		392
190+200 to 191+132	Phtesh Prey	PST	*Dialium cochinchinensis*	0.1	1
191+132 to 198+875	Snam Preah	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.6	5
			Dialium cochinchinensis		2
			Combretum quadrangulare Kurz		1
			Acacia auriculiformis, A.		11
			Samanea saman		1
198+875 to 206+150	Trapaing Chong	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.2	1
			Dialium cochinchinensis		11
			Eucalyptus camaldulensis		2
			Acacia auriculiformis, A.		2
206+150 to 213+670	Boeung Khna	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.2	4
			Feroniella lucida Scheff.		1
			Acacia auriculiformis, A.		37
213+670 to 217+840	O-Tapaong	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.13	2
			Feroniella lucida Scheff.		1
			Butea monosperma (Lam.)		3
			Acacia auriculiformis, A.		4
			Samanea saman		5
217+840 to 221+470	Svay Daun Keo	PST	*Dialium cochinchinensis*	0.1 to 0.2	4
			Butea monosperma (Lam.)		1
			Eugenia sp.		1
			Acacia auriculiformis, A.		60
			Samanea saman		3
Total Quantity of Road Side Trees on Northeast Side in Pursat Province					787
221+470 to 228+040	Russei Kraing	Battambang (BTB)	*Leucaena glauca Benth.*	0.1 to 0.2	2
			Delonix regia, (Boj. Ex Hook)		38
			Dialium cochinchinensis		4
			Eucalyptus camaldulensis		120
			Eugenia sp.		6
			Acacia auriculiformis, A.		91
			Samanea saman		38
228+040 to 240+030	Prey Svay	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.3	100
			Dialium cochinchinensis		3
			Eucalyptus camaldulensis		25
			Eugenia sp.		1
			Acacia auriculiformis, A.		55
			Samanea saman		50
240+030 to 250+960	Kea	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.3	2
			Swietenia macrophylla King		2
			Terminalia catappa L.		2
			Borassus flabellifer		1
			Peltophorum ferrugineum		11

			Eucalyptus camaldulensis		1
			Barringtonia acutangula		4
			Acacia auriculiformis, A.		37
			Samanea saman		31
250+960 to 255+600	Kokoh	BTB	*Leucaena glauca Benth.*	0.1 to 0.6	2
			Delonix regia, (Boj. Ex Hook)		2
			Mitragyna hirsuta Hav.		1
			Butea monosperma (Lam.)		1
			Terminalia catappa L.		1
			Borassus flabellifer		1
			Peltophorum ferrugineum		8
			Eugenia sp.		1
			Combretum quadrangulare Kurz		6
			Acacia auriculiformis, A.		1
			Samanea saman		8
255+600 to 264+620	Prey Touch	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.4	38
			Ceiba pentandra, (L.) G		15
			Butea monosperma (Lam.)		7
			Borassus flabellifer		13
			Peltophorum ferrugineum		12
			Eucalyptus camaldulensis		1
			Eugenia sp.		11
			Bombax ceiba L.		1
			Combretum quadrangulare Kurz		3
			Azadirachta indica		1
			Acacia auriculiformis, A.		131
			Samanea saman		100
264+620 to 271+900	Kampong Preang	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.6	102
			Ceiba pentandra, (L.) G		4
			Butea monosperma (Lam.)		7
			Terminalia catappa L.		2
			Borassus flabellifer		13
			Peltophorum ferrugineum		13
			Eucalyptus camaldulensis		45
			Eugenia sp.		8
			Barringtonia acutangula		2
			Cassia fistula		41
			Azadirachta indica		1
			Sesbania grandiflora		1
			Acacia auriculiformis, A.		29
			Samanea saman		106
271+900 to 280+460	Kampong Preah	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.5	136
			Mitragyna hirsuta Hav.		1
			Feroniella lucida Scheff.		1
			Ceiba pentandra, (L.) G		4
			Butea monosperma (Lam.)		3
			Terminalia catappa L.		14
			Morinda citrifolia		2
			Borassus flabellifer		19

			Peltophorum ferrugineum		3
			Eucalyptus camaldulensis		4
			Eugenia sp.		4
			Tectona grandis L. f.		1
			Cassia fistula		96
			Combretum quadrangulare Kurz		6
			Azadirachta indica		2
			Streblus asper Lour.		1
			Cassia siamea		4
			Sesbania grandiflora		2
			Acacia auriculiformis, A.		39
			Samanea saman		52
			(Unknown Species)		2
280+460 to 282+200	Along Vill	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.4	35
			Ceiba pentandra, (L.) G		1
			Butea monosperma (Lam.)		1
			Terminalia catappa L.		1
			Eugenia sp.		2
			Cassia fistula		15
			Combretum quadrangulare Kurz		4
			Azadirachta indica		1
			Cassia siamea		1
			Acacia auriculiformis, A.		7
			Samanea saman		7
Total Quantity of Road Side Trees on Northeast Side in Battambang Province					1,834
Total on Northeast Side					2,621

Name and Number of Road Side Trees on Southwest Side of Road

Kilometer Post (KP)	Communes	Provinces	Scientific Name	Diameter of Tree (m)	Quantity
171 to 177+280	Tnaot Chum	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.2	1
			Dipterocarpus obtusifolou		2
			Eucalyptus camaldulensis		7
			Acacia auriculiformis, A.		37
177+280 to 183+000	Roleab	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.12	12
			Azadirachta indica		1
			Acacia auriculiformis, A.		291
190+200 to 191+138	Svay Ath	PST	*Dialium cochinchinensis*	0.1	5
191+138 to 198+875	Snam Preah	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.6	4
			Dialium cochinchinensis		1
			Acacia auriculiformis, A.		5
			Samanea saman		1
198+875 to 206+150	Trapaing Chuong	PST	*Delonix regia, (Boj. Ex Hook)*	0.1	1
			Dialium cochinchinensis		7
			Acacia auriculiformis, A.		4
206+150 to 213+460	Boeung Khna	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.2	2
			Feroniella lucida Scheff.		1
			Dialium cochinchinensis		3
			Eucalyptus camaldulensis		1
			Acacia auriculiformis, A.		7
213+460 to 217+840	O-Tapaong	PST	*Leucaena glauca Benth.*	0.1 to 0.2	1

			Ceiba pentandra, (L.) G		1
			Butea monosperma (Lam.)		14
			Eucalyptus camaldulensis		1
			Samanea saman		4
217+840 to 221+470	Svay Daun Keo	PST	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.2	1
			Butea monosperma (Lam.)		1
			Eucalyptus camaldulensis		1
			Acacia auriculiformis, A.		25
			Samanea saman		4
Total Quantity of Road Side Trees on Southwest Side in Pursat Province					446
221+470 to 228+040	Russei Kraing	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.2	6
			Feroniella lucida Scheff.		1
			Borassus flabellifer		18
			Eucalyptus camaldulensis		337
			Eugenia sp.		7
			Acacia auriculiformis, A.		44
			Samanea saman		15
228+040 to 240+030	Prey Svay	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.3	81
			Eucalyptus camaldulensis		46
			Eugenia sp.		2
			Acacia auriculiformis, A.		65
			Samanea saman		37
240+030 to 244+380	Kea	BTB	*Acacia auriculiformis, A.*	0.1 to 0.12	81
			Samanea saman		15
244+380 to 250+390	Moung	BTB	*Peltophorum ferrugineum*	0.1 to 0.4	8
			Combretum quadrangulare Kurz		1
			Acacia auriculiformis, A.		3
			Samanea saman		5
250+390 to 255+600	Kokoh	BTB	*Borassus flabellifer*	0.1 to 0.3	5
			Peltophorum ferrugineum		2
			Schleicheria trijuga, Wi		4
			Eugenia sp.		2
			Barringtonia acutangula		2
			Cassia fistula		1
			Combretum quadrangulare Kurz		1
			Acacia auriculiformis, A.		15
			Samanea saman		9
255+600 to 264+620	Prey Touch	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.4	27
			Ceiba pentandra, (L.) G		10
			Butea monosperma (Lam.)		5
			Terminalia catappa L.		3
			Borassus flabellifer		21
			Peltophorum ferrugineum		2
			Eucalyptus camaldulensis		17
			Eugenia sp.		9
			Cassia fistula		6
			Combretum quadrangulare Kurz		1
			Sesbania grandiflora		2
			Acacia auriculiformis, A.		110

			Samanea saman		83
			(Unknown Species)		3
264+620 to 272+950	Kampong Preang	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.6	105
			Ceiba pentandra, (L.) G		12
			Butea monosperma (Lam.)		6
			Terminalia catappa L.		4
			Borassus flabellifer		20
			Peltophorum ferrugineum		11
			Eucalyptus camaldulensis		43
			Eugenia sp.		18
			Cassia fistula		60
			Combretum quadrangulare Kurz		3
			Azadirachta indica		1
			Sesbania grandiflora		1
			Acacia auriculiformis, A.		47
			Samanea saman		133
272+950 to 280+245	Kampong Preah	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.5	142
			Mitragyna hirsuta Hav.		4
			Ceiba pentandra, (L.) G		12
			Swietenia macrophylla King		1
			Butea monosperma (Lam.)		5
			Terminalia catappa L.		7
			Borassus flabellifer		17
			Peltophorum ferrugineum		4
			Eucalyptus camaldulensis		8
			Eugenia sp.		12
			Barringtonia acutangula		4
			Cassia fistula		46
			Combretum quadrangulare Kurz		10
			Streblus asper Lour.		3
			Cassia siamea		6
			Sesbania grandiflora		1
			Acacia auriculiformis, A.		32
			Samanea saman		71
280+245 to 282+200	O-Tambang-2	BTB	*Delonix regia, (Boj. Ex Hook)*	0.1 to 0.5	17
			Feroniella lucida Scheff.		1
			Butea monosperma (Lam.)		1
			Terminalia catappa L.		4
			Borassus flabellifer		7
			Peltophorum ferrugineum		3
			Cassia fistula		3
			Combretum quadrangulare Kurz		1
			Acacia auriculiformis, A.		137
			Samanea saman		6
			(Unknown Species)		2
Total Quantity of Road Side Trees on Southwest Side in Battambang					2,143
Total on Southwest Side					2,589
Total on Both Sides					**5,210**

Table 4 Name and Numbers of Road Side Trees of NR5 from Sri Sophorn to Poipet

(Survey Month: August and December, 2013)

Name and Number of Road Side Trees on Northeast Side of Road				
Kilometer Post (KP)	Communes	Scientific Name	Diameter of Tree (m)	Number
366+250 to 371+477	Teuk Thla	*Delonix regia, (Boj. Ex Hook)*	0.10 to 0.52	1
		Cassia fistula		2
		Pinus merkusii		1
		Acacia auriculiformis, A.		76
		Samanea saman		12
371+477 to 372+931	Chang Ngha	*Acacia auriculiformis, A.*	0.10 to 0.30	3
		Samanea saman		4
372+931 to 383+497	Kob	*Ceiba pentandra, (L.) G*	0.10 to 0.83	12
		Terminalia catappa L.		4
		Morinda citrifolia		1
		Borassus flabellifer		1
		Peltophorum ferrugineum		33
		Eucalyptus camaldulensis		4
		Ficus religiosa, L.		3
		Eugenia sp.		18
		Bombax ceiba L.		1
		Cassia fistula		19
		Cassia siamea		3
		Sesbania grandiflora		13
		Acacia auriculiformis, A.		24
		Samanea saman		59
		(Unknown Species)		13
383+497 to 394+930	Nimith	*Delonix regia, (Boj. Ex Hook)*	0.10 to 0.79	11
		Dalbergia entadoides Pierre		2
		Ceiba pentandra, (L.) G		10
		Swietenia macrophylla King		1
		Butea monosperma (Lam.)		1
		Terminalia catappa L.		7
		Borassus flabellifer		6
		Lagerstroemia floribunda		1
		Peltophorum ferrugineum		11
		Eugenia sp.		17
		Bombax ceiba L.		2
		Cassia fistula		24
		Combretum quadrangulare Kurz		1
		Pinus merkusii		3
		Cassia siamea		1
		Sesbania grandiflora		9
		Acacia auriculiformis, A.		45
		Samanea saman		55
		(Unknown Species)		6
394+930 to 402+000	Phsa Kandal	*Ceiba pentandra, (L.) G*	0.10 to 1	1
		Swietenia macrophylla King		1
		Morinda citrifolia		1
		Ficus religiosa, L.		8
		Eugenia sp.		2

		Combretum quadrangulare Kurz		1
		Acacia auriculiformis, A.		65
		Samanea saman		4
		(Unknown Species)		16
			Total on Northeast Side	619
Name and Number of Road Side Trees on Southwest Side of Road				
	Communes	Scientific Name	Diameter of Tree (m)	Number
366+250 to 371+084	Teuk Thla	*Ceiba pentandra, (L.) G*	0.10 to 0.52	1
		Peltophorum ferrugineum		4
		Eugenia sp.		1
		Combretum quadrangulare Kurz		1
		Acacia auriculiformis, A.		30
		Samanea saman		8
371+084 to 372+931	Samrong	*Mitragyna hirsuta Hav.*	0.10 to 0.30	1
		Acacia auriculiformis, A.		3
		Samanea saman		3
372+931 to 383+497	Kob	*Delonix regia, (Boj. Ex Hook)*	0.10 to 0.83	12
		Ceiba pentandra, (L.) G		2
		Terminalia catappa L.		6
		Borassus flabellifer		3
		Peltophorum ferrugineum		15
		Eucalyptus camaldulensis		1
		Schleicheria trijuga, Wi		2
		Eugenia sp.		11
		Ficus sp		1
		Cassia fistula		9
		Pinus merkusii		4
		Cassia siamea		6
		Sesbania grandiflora		11
		Acacia auriculiformis, A.		20
		Samanea saman		40
		(Unknown Species)		3
383+497 to 397+000	Nimith	*Delonix regia, (Boj. Ex Hook)*	0.10 to 1	4
		Butea monosperma (Lam.)		4
		Terminalia catappa L.		20
		Bauhinia acuminata		1
		Morinda citrifolia		1
		Borassus flabellifer		4
		Diospyros helferi		1
		Peltophorum ferrugineum		4
		Ficus religiosa, L.		1
		Eugenia sp.		9
		Cassia fistula		23
		Combretum quadrangulare Kurz		2
		Azadirachta indica		1
		Cassia siamea		7
		Sesbania grandiflora		10
		Acacia auriculiformis, A.		13
		Samanea saman		21

		(Unknown Species)		9
		(Unknown Species)		2
397+000 to 402+000	Phsa Kandal	*Dalbergia entadoides Pierre*	0.10 to 1	1
		Ceiba pentandra, (L.) G		4
		Acacia intsii		1
		Peltophorum ferrugineum		12
		Dipterocarpus intricatus		1
		Pterocarpus pedatus		2
		Eucalyptus camaldulensis		18
		Ficus religiosa, L.		2
		Eugenia sp.		3
		Combretum quadrangulare Kurz		2
		Sesbania grandiflora		2
		Acacia auriculiformis, A.		32
			Total on Southwest Side	415
			Total on Both Sides	**1,034**

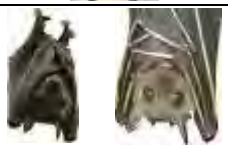
APPENDIX 15-2

LIST OF FAUNA

1 Mammal

Table 1 Identified Mammals in Project Area

(Survey area: 150 m + 150 m from Road center, Survey Month: July, August and December, 2013)

No.	Scientific Name	English Name	Kilometer Post (KP)	Remarks	Pictures
1	*Herpestes javanicus*	Small Asiun Mongoose	172 to 179 191 to 194		
2	*Tamiops rodolphii*	Cambodian Striped Tree Squirrel	171 to 175 277 to 282 373 to 392		
3	*(Order: CHIROPTERA)*	Bats	171 to 282+300 366 to 407+300 (Rattanak Nimit, Yeang Thmey village)		
4	*Otonops wroughtoni*	Wroughton's Free-tailed Bat	214 to 216 366 to 407+300 (Rattanak Nimit, Yeang Thmey village)	R	
5	*Pteropus lylei*	Lyle's Flying-fox	218 to 222	II	
6	*Pteropus hypomelanus*	Island Flying-fox	366 to 404	II	
7	*Cynopterus sphinx*	Lesser Short-nosed Fruit Bat	373 to 403		
8	*Cynopterus brachyotis*	Lesser Short-nosed Fruit Bat	373 to 405		

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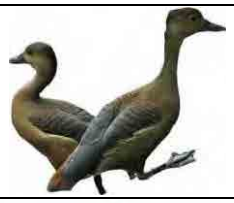
2 Bird

Table 2 Identified Birds in Project Area
(Survey area: 150 m + 150 m from Road center, Survey Month: July, August and December, 2013)

No.	Scientific Name	English Name	Kilometer Post (KP)	Remarks	Pictures
1	*Caprimulgus indicus*	Grey Nightjar	172 to 181, 192 to 194, 248 to 278		
2	*Emberiza aureola*	Yellow-breasted Bunting	217 to 236		
3	*Prinia rufescens*	Rufescent Prinia	171 to 282 366 to 407		
4	*Orthotomus sutorius*	Common Tailorbird	171 to 282 366 to 407		
5	*Passer montanus*	Eurasian Tree Sparrow	171 to 282 366 to 407		
6	*Passer flaveolus*	Plain-backed Sparrow	217 to 223 372 to 402		
7	*Passer domesticus*	House Sparrow	171 to 282 366 to 407		
8	*Pycnonotus goiavier*	Yellow-vented Bulbul	171 to 282 366 to 404		

9	*Anastomus oscitans*	Asian Openbill	217 to 230 397 to 402		
10	*Corvus macrohynchos*	Large-billed Crow	247 to 259 397 to 402		
11	*Dicrurus macrocercus*	Black Drongo	171 to 183 190 to 244 246 to 282 366 to 402		
12	*Tyto alba*	Barn Owl	171 to 282 366 to 402	II	
13	*Gallinago gallinago*	Common Snipe	217 to 224		
14	*Rhipidura javanica*	Pied Fantail	171 to 282 374 to 403		
15	*Rhipidura albicollis*	White-throated Fantail	171 to 282 374 to 402		
16	*Alcedo atthis*	Common Kingfisher	219 to 223 255 to 257 366 to 371		
17	*Lacedo pulchella*	Banded Kingfisher	219 to 223 255 to 257 366 to 371		

18	*Gallicrex cinerea*	Watercock	215 to 223 254 to 256 273 to 274 366 to 402		
19	*Bubulcus ibis*	Cattle Egret	172 to 179 215 to 223 254 to 256 273 to 274 366 to 402	III	
20	*Egretta alble*	Great Egret	221 to 224 370 to 375 397 to 402	III	
21	*Ixobrychus cinnamomeus*	Cinnamon Bittern	172 to 179 215 to 223 254 to 256 273 to 274 366 to 402		
22	*Ardeola bacchus*	Javan Pond Heron	172 to 179 215 to 223 254 to 256 273 to 274 366 to 383 388 to 402		
23	*Ixobrychus sinensis*	Yellow Bittern	172 to 179 215 to 223 254 to 256 273 to 274 370 to 375 397 to 402		
24	*Streptopelia chinensis*	Spotted Dove	171 to 282 366 to 405		
25	*Streptopelia tranquebarica*	Red Collared Dove	171 to 282 366 to 405		
26	*Geopelia striata*	Zebra Dove	173 to 179 192 to 200 214 to 221 245 to 260 366 to 405		

27	*Gallinula chloropus*	Common Moorhen	172 to 179 215 to 223 254 to 256 273 to 274 366 to 372 395to 402		
28	*Dendrocygna javanica*	Lesser Whistling Duck	217 to 223 254 to 258 273 to 274 366 to 372 395to 402		
29	*Cypsiurus balasiensis*	Asian Palm Swift	171 to 282 366 to 402		
30	*Acridotheres tristis*	Common Myna	171 to 282 366 to 402		
31	*Acridotheres javanicus*	White-vented Myna	214 to 223		
32	*Coracias benghalensis*	Indian Roller	171 to 183		
33	*Elanus coeruleus*	Black-shouldered Kite	214 to 216 366 to 402	II	
34	*Lanius cristatus*	Brown Shrike	216 to 219		
35	*Anthus rufulus*	Paddy field Pipit	366 to 403		

36	*Caprimulgus macrurus*	Large-tailed Nightjar	366 to 403		
37	*Ploceus philippinus*	Baya Weaver	366 to 403		
38	*Lonchura punctulata*	Scaly-breasted Munia	366 to 403		
39	*Acrocephalus bistrigiceps*	Black-browed Reed Warbler	366 to 403		
40	*Acrocephalus aedon*	Thick-billed Warbler	366 to 403		
41	*Dupetor flavicollis*	Black Bittern	396 to 402		
42	*Phalacrocorax niger*	Little Cormorant	366 to 383 388 to 402		
43	*Merops viridis*	Blue-throated Bee-eater	394 to 402		
44	*Hypsipetes leucocephalus*	Black Bulbul	394 to 402		

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3 Reptile and Amphibian

Table 3 Identified reptiles and amphibians in Project Area
(Survey area: 150 m + 150 m from Road center, Survey Month: July, August and December, 2013)

No.	Scientific Name	English Name	Kilometer Post (KP)	Remarks	Pictures
1	*Calotes versicolor*	Garden Fence Lizard	171 to 282 366 to 405		
2	*Ahaetulla nasuta*	Long-nosed Whip Snake	177 to 179 191 to194 246 to 258 366 to 405		
3	*Ahaetulla prasina*	Oriental Whip Snake	177 to 179 191 to194 246 to 258 366 to 372 389 to 402		
4	*Boiga cyanea*	Green Cat Snake	177 to 179 191 to194 246 to 258 366 to 372 389 to 402		
5	*Cylindrophis ruffus*	Red-tailed Pipe Snake	171 to 185 188 to 201 204 to 282 366 to 402		
6	*Daboia russelli*	Russell's Viper	212 to 243 246 to 282 366 to 370		
7	*Dendrelaphis subocularis*	Mountain Bronzeback	171 to 185 188 to 201 204 to 282 366 to 402		
8	*Chrysopelea ornata*	Golden Tree Snake	171 to 185 188 to 201 204 to 282 366 to 405		
9	*Naja kaouthia*	Monocled Cobra	171 to 185 188 to 201 204 to 282 366 to 372 388 to 402	II, R	
10	*Naja siamensis*	Indochinese Spitting Cobra	171 to 185 188 to 201 204 to 282 366 to 405	II	

11	*Oligodon taeniatus*	Striped Kukri Snake	171 to 185 188 to 201 204 to 282 366 to 405		
12	*Ptyas korros*	Indochinese Rat Snake	171 to 185 188 to 201 204 to 282 366 to 372 388 to 402		
13	*Xenochrophis piscator*	Chequered Keelback	171 to 282 366 to 372 388 to 402		
14	*Xenochrophis piscator*	Chequered Keelred	Pursat Bypass Section 366 to 372 388 to 402		
15	*Xenopeltis unicolor*	Sunbeam Snake	211 to 215 217 to 219 366 to 372 388 to 402		
16	*Enhydris bocourti*	Bocourt's Watersnake	177 to 179, 219 to 224, 247 to 256		
17	*Enhydris enhydris*	Rainbow Water Snake	171 to 185 188 to 201 204 to 282 366 to 372		
18	*Elaphe radiata*	Radiated Rat Snake	217 to 219 366 to 372 388 to 402		
19	*Enhydris longicauda*	Tonle Sap Watersnake	366 to 370		
20	*Ptyas carinata*	Keeled Rat Snake	366 to 372 388 to 402		
21	*Gekko gecko*	Tokay Gecko	171 to 282 366 to 405		
22	*Cosymbotus platyurus*	Flat-tailed Gecko	171 to 282 366 to 407		

23	*Scincella reevesii*	Speckled Leaf-litter Skink	171 to 282 366 to 405		
24	*Mabuya multifasciata*	Many-lined Sun Skink	171 to 282 366 to 405		
25	*Polypedates cf. leucomystax*	Common Tree Frog	171 to 282 366 to 404		
26	*Bufo melanosstictus*	Common Asian Toad	171 to 282 366 to 405		
27	*Kaloula pulchra*	Banded Bullfrog	171 to 282 366 to 405		
28	*Glyphoglossus molossus*	Truncate snouted spadefoot frog	212 to 243 246 to 282 366 to 405		
29	*Fejervarga limnocharis*	Rice Field Frog	171 to 185 187 to 243 246 to 282 366 to 405		
30	*Limnonectes ibanorum*	Rough Backed River Frog	171 to 185 187 to 243 246 to 282 366 to 372 388 to 402		
31	*Hoplobatrachus tigerinus*	Tiger Frog	171 to 185 187 to 243 246 to 282 366 to 372 388 to 402		

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4 Fish

Table 4 Identified Fishes in Project Area

Survey Rivers or Water Bodies

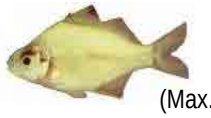
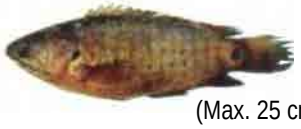
Middle Section: Pursat River, Svay Daun Keo River, Maung River, Chork River and Ou Sandas (Sandas Stream)

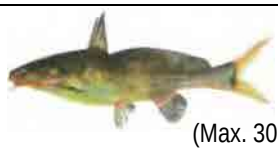
Sri Sophorn – Poipet Section (SPS): Sri Sophorn River and Agricultural canals

Survey Month

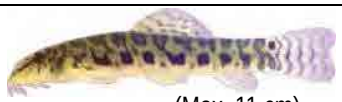
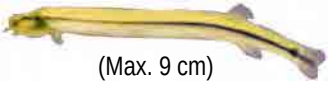
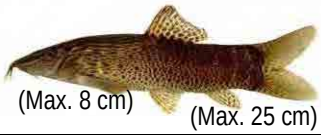
Middle Section: July, August, November and December, 2013

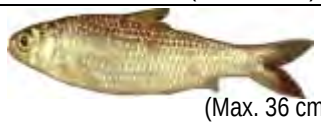
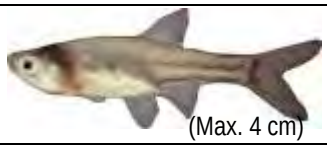
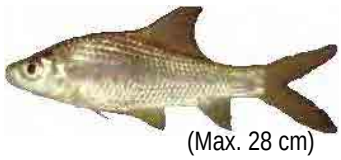
Sri Sophorn – Poipet Section (SPS): August, September, November and December, 2013

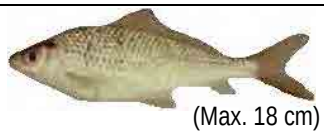
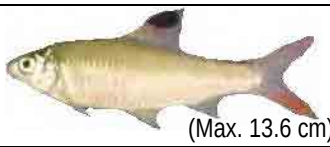
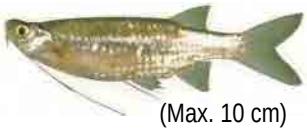
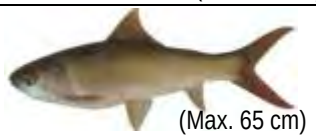
No	Food and Agriculture Organization name	Scientific Name	Family Name	River Name	Remarks	Picture
1	Duskyfin glassy perchlet	*Parambassis wolffii*	AMBASSIDAE	Pursat Moung Chork O Sandas		 (Max. 20 cm)
2	Siamese glassfish	*Pseudambassis siamensis*	AMBASSIDAE	Pursat Svay Donkeo Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 6 cm)
3	Inridescent glassy perclet	*Parambassis apogonoides*	AMBASSIDAE	Pursat Moung Sri Sophorn		 (Max. 10 cm)
4	Climbing perch	*Anabas testudineus*	ANABANTIDAE	Svay Donkeo Chork, Moung O Sandas Sri Sophorn Canals in SPS		 (Max. 25 cm)
5		*Mystus wolffi*	BAGRIDAE	Pursat Chork		 (Max. 20 cm)
6		*Mystus singaringan*	BAGRIDAE	Pursat Chork Sri Sophorn		 (Max. 35 cm)
7		*Mystus albolineatus*	BAGRIDAE	Moung Chork O Sandas		 (Max. 35 cm)
8		*Mystus bocouti*	BAGRIDAE	Svay Donkeo Moung Chork O Sandas Sri Sophorn		 (Max. 24 cm)

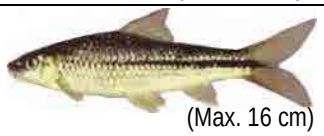
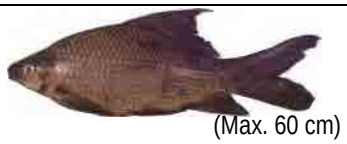
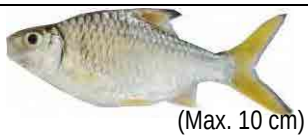
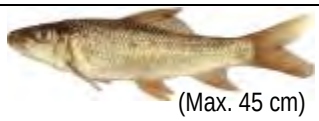
9	Asian bumblebee catfish	*Pseudomystus siamensis*	BAGRIDAE	Pursat Svay Donkeo Chork Sri Sophorn		 (Max. 20 cm)
10	false black lancer	*Bagrichthys obscurus*	BAGRIDAE	Svay Donkeo O Sandas		 (Max. 30 cm)
11		*Mystus atrifasciatus*	BAGRIDAE	Pursat O Sandas Sri Sophorn Canals in SPS		 (Max. 15 cm)
12	Striped catfish	*Mystus mysticetus*	BAGRIDAE	Svay Donkeo Moung O Sandas Sri Sophorn Canals in SPS		 (Max. 13 cm)
13	Striped catfish	*Mystus myaticetus*	BAGRIDAE	Sri Sophorn Canals in SPS		 (Max. 14 cm)
14		*Hemibagrus spilopterus*	BAGRIDAE	Pursat Svay Donkeo Moung Chork Sri Sophorn		 (Max. 31 cm)
15		*Hemibagrus filamentus*	BAGRIDAE	Pursat (Damnak Ampil upstream) O Sandas		 (Max. 60 cm)
16		*Hemibagrus nemurus*	BAGRIDAE	Sri Sophorn Canals in SPS		 (Max. 65 cm)
17		*Hemibagrus wyckioides*	BAGRIDAE	Pursat O Sandas Sri Sophorn		 (Max. 130 cm)
18		*Xenentodon cancila*	BELONIDAE	Pursat Svay Donkeo, Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 40 cm)
19	Talking gourami	*Trichopsis pumila*	BELONTIIDAE	Svay Donkeo Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 4 cm)

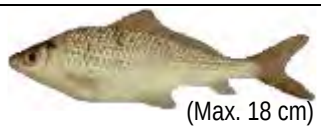
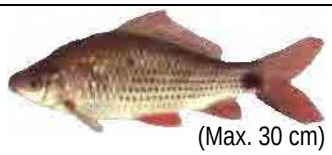
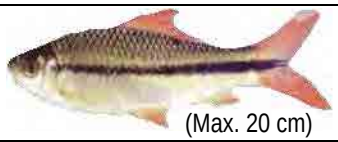
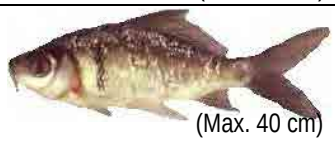
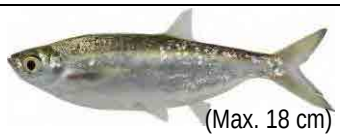
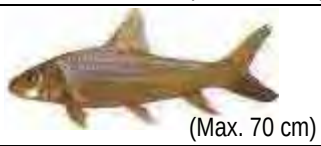
20	Croaking gourami	*Trichopsis vittata*	BELONTIIDAE	Svay Donkeo Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 7 cm)
21	Siamese fighting	*Batta splendens*	BELONTIIDAE	Svay Donkeo Chork Sri Sophorn		 (Max. 6.5 cm)
22	Walking snakehead	*Channa orientalis*	CHANNIDAE	Pursat Svay Donkeo Moung Chork Sri Sophorn Canals in SPS		 (Max. 20 cm)
23	Giant snakehead	*Channa micropeltes*	CHANNIDAE	Pursat Svay Donkeo Chork O Sandas Sri Sophorn		 (Max. 130 cm)
24	Snackehead murrel	*Channa striata*	CHANNIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 100 cm)
25	Nile tilapia	*Oreochromis niloticus*	CICHLIDAE	Pursat		 (Max. 46 cm)
26		*Clarias nieuhofi*	CLARIIDAE	Pursat O Sandas Sri Sophorn		 (Max. 50 cm)
27	Walking catfish	*Clarias batrachus*	CLARIIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 47 cm)
28	Broad head catfish	*Clarias macrocephalus*	CLARIIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 35 cm)
29	Blackskin catfish	*Clarias meladerma*	CLARIIDAE	Pursat Chork O Sandas Sri Sophorn		 (Max. 35 cm)

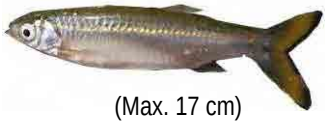
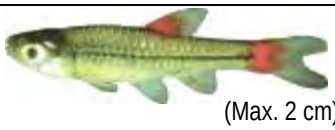
30	Dwaf houseface	*Lepidocephalichthys birmanicus*	COBITIDAE	Pursat		 (Max. 11 cm)
31		*Lepidocephalichthys berdmorei*	COBITIDAE	Pursat		 (Max. 11 cm)
32	Striped horseface loach	*Acantopsis sp. 2*	COBITIDAE	Pursat Sri Sophorn		 (Max. 13 cm)
33	Spotted horseface loach	*Acantopsis sp. "Large spot"*	COBITIDAE	Pursat		 (Max. 12 cm)
34		*Acantopsis sp. "Stripe"*	COBITIDAE	Pursat Chork		 (Max. 35 cm)
35		*Acanthopsoides hapalias*	COBITIDAE	Sri Sophorn		 (Max. 6 cm)
36		*Pangio anguillaris*	COBITIDAE	Pursat		 (Max. 9 cm)
37	Silver botia	*Botia lecontei*	COBITIDAE	Pursat		 (Max. 15 cm)
38	Chameleon botia	*Botia nigrolineata*	COBITIDAE	Sri Sophorn		 (Max. 8 cm)
39	Dwarf botia	*Yasuhikotakia sidthimunki*	COBITIDAE	Sri Sophorn		 (Max. 5.5 cm)
40	Chameleon botia	*Syncrossus beauforti*	COBITIDAE	Sri Sophorn		 (Max. 8 cm)
41	Chameleon loach	*Syncrossus beauforti*	COBITIDAE	Pursat (Damnak Ampil Upstream)		 (Max. 8 cm) (Max. 25 cm)
42	Skunk botia	*Yasuhikotakia morleti*	COBITIDAE	Pursat Sri Sophorn		 (Max. 9.5 cm)
43		*Yasuhikotakia caudipunctata*	COBITIDAE	Pursat		 (Max. 9 cm)

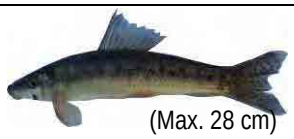
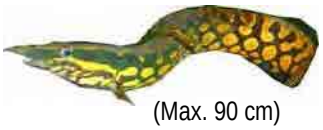
44	Speckletail botia	*Botia sp. juvenile*	COBITIDAE	Pursat Sri Sophorn		 (Max. 20 cm)
45	Tiger botia	*Syncrossus helodes*	COBITIDAE	Pursat		 (Max. 35 cm)
46	Orangefin loach	*Yasuhikotakia modesta*	COBITIDAE	Pursat Svay Donkeo Moung Chork Sri Sophorn		 (Max. 25 cm)
47		*Albulichthys albuloides*	CYPRINIDEA	Sri Sophorn		 (Max. 36 cm)
48		*Amblypharyngodon chulabomae*	CYPRINIDEA	Sri Sophorn		 (Max. 4 cm)
49	Tinfoil barb	*Barbodes schwanefeldi*	CYPRINIDAE	Pursat Moung Chork		 (Max. 30 cm)
50	Bangkok river sprat	*Corica laciniata*	CYPRINIDAE	Pursat Moung		 (Max. 7 cm)
51	Beardless barb	*Cyclocheilichthys apogon*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 15 cm)
52		*Cyclocheilicthys repasson*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 28 cm)
53		*Cyclocheilichthys lagleri*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork O Sandas		 (Max. 23 cm)
54		*Cyclocheilichthys enoplos*	CYPRINIDAE	Pursat Sri Sophorn		 (Max. 75 cm)

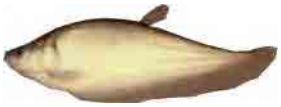
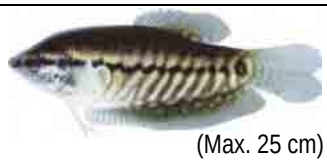
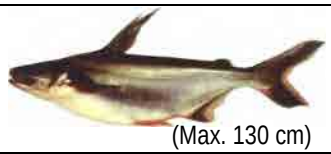
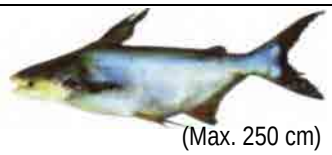
55		*Labiobarbus Lineatus*	CYPRINIDAE	Pursat Svay Donkeo Chork		 (Max. 18 cm)
56	Siamese long fin carp	*Labiobarbus siamensis*	CYPRINIDAE	Pursat Svay Donkeo Chork O Sandas		 (Max. 22 cm)
57	Redtail barb	*Discherodontus ashmeadi*	CYPRINIDAE	Moung Chork O Sandas		 (Max. 13.6 cm)
58	Esomus goddardi	*Esomus longimanus*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 10 cm)
59	Striped flying bard	*Esomus metallicus*	CYPRINIDAE	Sri Sophorn, Canals in SPS		 (Max. 7.5 cm)
60		*Crossocheilus reticulatus*	CYPRINIDAE	Pursat		 (Max. 15 cm)
61		*Crossocheilus atrilimes*	CYPRINIDEA	Sri Sophorn		 (Max. 16 cm)
62		*Hampala dispar*	CYPRINIDAE	Pursat Moung O Sandas		 (Max. 35 cm)
63		*Hampala macrolepidota*	CYPRINIDAE	Pursat Svay Donkeo O Sandas Sri Sophorn		 (Max. 70 cm)
64	Cirrhinus lineatus	*Henicorhynchus cryptopogon*	CYPRINIDAE	Pursat Svay Donkeo		 (Max. 15 cm)
65	Labeo pruol	*Cirrhinus microlepis*	CYPRINIDAE	Sri Sophorn		 (Max. 65 cm)

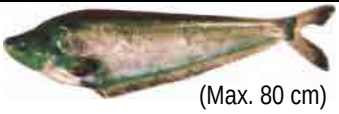
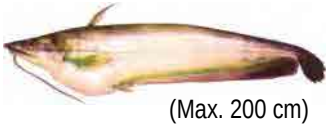
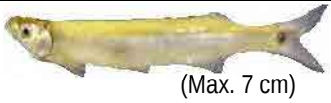
66	Siamese mud carp	*Henicorhynchus siamensis*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 20 cm)
67	Tawes	*Barbodes gonionotus*	CYPRINIDAE	Pursat Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 33 cm)
68	Goldfin tinfoil barb	*Hypsibarbus malcolmi*	CYPRINIDAE	Pursat O Sandas		 (Max. 50 cm)
69		*Hypsibarbus wetmorei*	CYPRINIDAE	Pursat Svay Donkeo O Sandas Sri Sophorn Canals in SPS		 (Max. 25 cm)
70	Mad barb	*Leptobarbus hoeveni*	CYPRINIDAE	Pursat Chork O Sandas Sri Sophorn		 (Max. 70 cm)
71	Loboheilus nigrovittantus	*Lobocheilos melanotaenia*	CYPRINIDAE	Pursat Svay Donkeo O Sandas Sri Sophorn Canals in SPS		 (Max. 16 cm)
72	Luciosoma bleekeri	*Luciosoma bleekeri*	CYPRINIDAE	Pursat Sri Sophorn		 (Max. 26 cm)
73	Black sharkminnow	*Morulius chrysophekadion*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork Sri Sophorn Canals in SPS		 (Max. 60 cm)
74	Mystacoleucus chilopterus	*Mystacoleucus marginatus*	CYPRINIDAE	Pursat		 (Max. 10 cm)
75		*Mystacoleucus sp.*	CYPRINIDAE	Pursat (Damnak Ampil upstream)		 (Max. 7 cm)
76		*Labeo erythropterus*	CYPRINIDAE	Sri Sophorn Canals in SPS		 (Max. 45 cm)

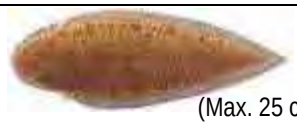
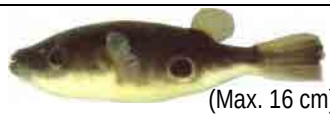
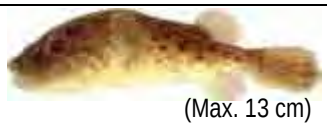
77		*Labiobarbus Lineatus*	CYPRINIDAE	Sri Sophorn, Canals in SPS		 (Max. 18 cm)
78	Silver sharkminnow	*Osteochilus hasselti*	CYPRINIDAE	Pursat Savy Donkeo Chork O Sandas Sri Sophorn		 (Max. 30 cm)
79	Labeo soplaoensis	*Osteochilus waandersi*	CYPRINIDAE	Pursat O Sandas		 (Max. 20 cm)
80	Bonylip barb	*Osteochilus microcephalus*	CYPRINIDAE	Say Donkeo Chork O Sandas Sri Sophorn		 (Max. 24 cm)
81		*Osteochilus melanopleurus*	CYPRINIDAE	Pursat Svay Donkeo O Sandas Sri Sophorn		 (Max. 40 cm)
82	Grey bony-lip carp	*Osteochilus schlegeli*	CYPRINIDAE	Svay Donkeo Chork Sri Sophorn		 (Max. 40 cm)
83		*Paralaubuca typus*	CYPRINIDAE	Pursat Moung Chork O Sandas Sri Sophorn		 (Max. 18 cm)
84	Thinlip barb	*Probarbus labeamamjor*	CYPRINIDAE	Sri Sophorn	En	 (Max. 150 cm)
85	Thicklip barb	*Probarbus labeamamjor*	CYPRINIDAE	Sri Sophorn	En	 (Max. 70 cm)
86		*Paralaubuca riveroi*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn		 (Max. 18 cm)
87		*Parachela oxygastroides*	CYPRINIDAE	Pursat		 (Max. 15 cm)
88		*Puntioplites falcifer*	CYPRINIDAE	Pursat Sri Sophorn		 (Max. 35 cm)

89	Puntioplites proctorysron	*Puntioplites proctozysron*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn		 (Max. 25 cm)
90	Swamp barb	*Puntius brevis*	CYPRINIDAE	Pursat Sri Sophorn Canals in SPS		 (Max. 12 cm)
91		*Systomus aurotaeniatus*	CYPRINIDAE	Pursat		 (Max. 2.5 cm)
92	Sidestripe rasbora	*Rasbora paviei*	CYPRINIDAE	Moung Chork		 (Max. 12 cm)
93	Pale rasbora	*Rasbora aurotaenia*	CYPRINIDAE	Pursat Svay Donkeo O Sandas Sri Sophorn Canals in SPS		 (Max. 17 cm)
94	Yellowtail rasbora	*Rasbora tornieri*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork O Sandas		 (Max. 17 cm)
95	Stoplight rasbora	*Rasbora sp.cf. beauforti*	CYPRINIDAE	Sri Sophorn Canals in SPS		 (Max. 2 cm)
96	Slender rasbora	*Rasbora daniconius*	CYPRINIDAE	Sri Sophorn, Canals in SPS		 (Max. 4.5 cm)
97	Puntius simus	*Puntius orphoides*	CYPRINIDAE	Pursat Svay Donkeo Moung Chork Sri Sophorn Canals in SPS		 (Max. 25 cm)
98	Puntius tetrazona	*Systomus partipentazona*	CYPRINIDAE	Pursat Sri Sophorn Canals in SPS	En	 (Max. 5 cm)
99		*Thynnichthys thynnoides*	CYPRINIDAE	Pursat O Sandas Sri Sophorn		 (Max. 25 cm)
100	Finescale tigerfish	*Datnioides undecimradiatus*	DATNIOIDIDAE	Pursat Svay Donkeo	Cr	 (Max. 40 cm)

101	Marbled sleeper	*Oxyeleotris marmorata*	ELEOTRIDAE	Pursat Svay Donkeo Moung Chork Sri Sophorn		 (Max. 30 cm)
102	Spotted algae eater	*Gyrinocheilus pennocki*	GYRINOCHELIDAE	Pursat		 (Max. 28 cm)
103	Siames algae eater	*Gyrinocheilus aymonieri*	GYRINOCHELIDAE	Pursat		 (Max. 28 cm)
104	Peacock eel	*Macrognathus siamensis*	MASTACEMBELIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 30 cm)
105		*Macrognathus taeniagaster*	MASTACEMBELIDAE	Svay Donkeo Moung Chork		 (Max. 16 cm)
106	Tiretrack spiny eel	*Mastacembelus armatus*	MASTACEMBELIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn		 (Max. 90 cm)
107		*Macrochirichthys macrochirus*	CYPRINIDAE	Moung		 (Max. 70 cm)
108	Catopra	*Pristolepis fasciata*	NANDIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 20 cm)
109	Gangetic leaffish	*Nandus nandus*	NANDIDAE	Sri Sophorn, Canals in SPS		 (Max. 10 cm)
110	Clown featherback	*Chitala ornata*	NOTOPTERIDAE	Pursat Sri Sophorn		 (Max. 100 cm)

111	Bronze featheback	*Notopterus notoperus*	NOTOPTERRUS	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 60 cm)
112	Moon light gourami	*Trichogaster microlepis*	BELONTIIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 15 cm)
113	Threespot gourami	*Trichogaster trichopterus*	BELONTIIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 15 cm)
114	Snakeskin gourami	*Trichogaster pectoralis*	BELONTIIDAE	Pursat Svay Donkeo Moung Chork O Sandas		 (Max. 25 cm)
115		*Pangasius larnaudii*	PANGASIIDAE	Pursat Svay Donkeo		 (Max. 130 cm)
116		*Pteropangasius micronema*	PANGASIIDAE	Pursat		 (Max. 100 cm)
117		*Pangasius sanitwongsei*	PANGASIIDAE	Pursat		 (Max. 250 cm)
118		*Pangasius macronema*	PANGASIIDAE	Pursat Moung		 (Max. 35 cm)
119		*Micronema micronema*	SILURIDAE	Pursat Moung Sri Sophorn		 (Max. 33 cm)
120		*Micronema bleekeri*	SILURIDAE	Svay Donkeo Chork O Sandas		 (Max. 60 cm)

121		*Kryptopterus hexapterus*	SILURIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn		 (Max. 24 cm)
123		*Kryptoperus cheveryi*	SILURIDAE	Pursat Moung Chork Sri Sophorn		 (Max. 35 cm)
124		*Hemisilurus mekongensis*	SILURIDAE	Pursat Moung		 (Max. 80 cm)
125	Butter catfish	*Ompok bimaculatus*	SILURIDAE	Pursat Svay Donkeo Moung Chork Sri Sophorn Canals in SPS		 (Max. 45 cm)
126		*Ompok hypophthalmus*	SILURIDAE	Svay Donkeo Chork		 (Max. 30 cm)
127		*Wallago attu*	SILURIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn		 (Max. 200 cm)
128		*Belodontichthys dinema*	SILURIDAE	Sri Sophorn		 (Max. 70 cm)
129		*Thryssocypeis tonlesapensis*	CYPRINIDAE	Moung O Sandas		 (Max. 7 cm)
130		*Euryglossa harmandi*	SOLEIDAE	Pursat		 (Max. 10 cm)
131		*Achiroides leucorhyncchos*	SOLEIDAE	Sri Sophorn		 (Max. 8 cm)
132	Whitelip sole	*Achiroides melanorthynchus*	SOLEIDAE	Sri Sophorn		 (Max. 14 cm)
133	Smallscale tonuesole	*Cynoglossus microlepis*	CYNOGLOSSIDAE	Moung		 (Max. 35 cm)

134	River tonguesole	*Cynoglossus feldmanni*	CYNOGLOSSIDAE	Sri Sophorn		 (Max. 25 cm)
135	Onegilled eel (Bengal mud eel)	*Ophisternon bengalense*	SYNBRANCHIDAE	Pursat Moung Chork Sri Sophorn Canals in SPS		 (Max. 100 cm)
136	Swamp eel	*Monopterus albus*	SYNBRANCHIDAE	Pursat Svay Donkeo Moung Chork O Sandas Sri Sophorn Canals in SPS		 (Max. 70 cm)
137		*Monotreta cambodgiensis*	TETRAODONTIDAE	Pursat Chork O Sandas		 (Max. 16 cm)
138	Redeye puffer	*Carinotetraodon lorteti*	TETRAODONTIDAE	Sri Sophorn		 (Max. 6 cm)
139		*Monotreta cambodgiensis*	TETRAODONTIDAE	Sri Sophorn Canals in SPS		 (Max. 16 cm)
140		*Monotreta leiurus*	TETRAODONTIDAE	Sri Sophorn		 (Max. 13 cm)

Note: Critically endangered species (Cr), Endangered species (En) and Vulnerable species (Vu) listed in "Sub decree No. 123 on Determination of Category/Type of Products and Endangered Fishery Products/Resources (August 12, 2009)"

APPENDIX 15-3

RESULT OF NOISE AND

VIBRATION SURVEY

1 Result of Noise Survey

Cross Section 1

Ra village, Phtaesh Prey Sangkat, Pursat Town, Pursat province (KP 187+560)

Time	Survey Period	Noise Level dB (A) 15 .July 2013 (Rainy Season)					Noise Level dB (A) 2 December. 2013 (Dry Season)				
		L Aeq	Standard L Aeq	L max	L min	Mean	L Aeq	Standard L Aeq	L max	L min	Mean
Day	6:00 - 7:00	65.7	70	81	40.7	65.67	66.7	70	87.3	44.8	66.72
	7:00 - 8:00	66.1		79.4	41.9		71.7		92.4	48.4	
	8:00 - 9:00	65.4		84.8	44		67.1		89	47.7	
	9:00 - 10:00	66.5		82.7	50.2		66.4		90.8	49.4	
	10:00 - 11:00	67.2		85.4	49.5		67.6		90.5	47.3	
	11:00 - 12:00	66		84.2	49.8		64		81.3	46.5	
	12:00 - 13:00	65.9		83.2	50		67.4		85.6	45.3	
	13:00 - 14:00	64.1		81.5	42.2		64.8		88.3	45.9	
	14:00 - 15:00	64.6		82.4	44.3		67		88.1	46	
	15:00 - 16:00	65.2		81.6	45.3		64.5		81.7	45	
	16:00 - 17:00	65.4		79.5	45.9		67.3		86.1	46.2	
	17:00 - 18:00	65.4		80.5	45.7		68.3		85.2	46.4	
	18:00 - 19:00	66.2		81.3	45.6		64.6		86.1	49.9	
Evening	19:00 - 20:00	65.1	65	81.5	43	63.23	64.1	65	81.2	47.7	64.30
	20:00 - 21:00	61.4		75.3	43.4		63.6		80.2	47.1	
	21:00 - 22:00	63.9		79.6	45.9		65.4		81.3	44.1	
	22:00 - 23:00	62.5		79.1	41.6		64.1		80.1	44.5	
Night	23:00 - 00:00	61.3	50	78.7	40.4	61.61	63.6	50	78.9	42.2	64.31
	00:00 - 1:00	60.9		76.8	40.1		64.8		81.4	42.6	
	1:00 - 2:00	59.8		76.6	40.6		63.9		80.6	42.8	
	2:00 - 3:00	59.9		77.5	40.7		64.4		84.1	42.7	
	3:00 - 4:00	61.6		80.4	40.1		64.2		78.3	44.4	
	4:00 - 5:00	63.4		81.7	40.6		63.7		79.6	44.6	
	5:00 - 6:00	64.4		81.4	40.3		65.6		80.3	45.8	
24 hours Average		64.08		80.67	43.83		65.62		84.10	45.72	

Cross Section 2

Pou Mouy village, Moung commune, Moung Russei district, Battambang province (KP 244+550)

Time	Survey Period	Noise Level dB (A) 17 July 2013 (Rainy Season)					Noise Level dB (A) 4 .December 2013 (Dry Season)				
		L Aeq	Standard L Aeq	L max	L min	Mean	L Aeq	Standard L Aeq	L max	L min	Mean
Day	6:00 - 7:00	67	70	86.6	51.2	65.8	63.7	70	77.2	52.1	66.79
	7:00 - 8:00	64.4		81.7	55.6		64.3		78.4	53.6	
	8:00 - 9:00	66		87.3	56.8		66.8		83.2	55.1	
	9:00 - 10:00	66.1		83	57.4		67.6		85.4	55.4	
	10:00 - 11:00	65.8		83.9	54.2		68.5		88.9	56.7	
	11:00 - 12:00	65.2		80.2	51		66.5		83.8	54.9	
	12:00 - 13:00	63.4		77.3	52.6		68		88.5	53.4	
	13:00 - 14:00	68.3		83	52.9		67.3		88.8	54.4	
	14:00 - 15:00	66.2		83.5	52.5		66.7		86.9	51.7	
	15:00 - 16:00	64.1		80.5	53.2		67		88.6	53.3	
	16:00 - 17:00	65.1		81.6	52.6		65.6		84.1	53.6	
	17:00 - 18:00	66.2		83.5	51.1		68.3		92.3	54.7	
	18:00 - 19:00	67.6		88.4	50.6		68		84.3	53.9	
Evening	19:00 - 20:00	63.1	65	84.7	54.4	62.3	68	65	86.6	53.9	66.18
	20:00 - 21:00	65.1		83.8	49.7		66.6		84.3	53.4	
	21:00 - 22:00	61.5		77.3	53.1		66.4		80.7	51.4	
	22:00 - 23:00	59.4		72	51.8		63.7		79.6	51.3	
Night	23:00 - 00:00	59.6	50	70.6	50.8	59.9	63.6	50	75.3	50.8	61.59
	00:00 - 1:00	58.9		70.2	49.5		62.8		75.1	50.6	
	1:00 - 2:00	59.1		74.5	46.7		60.1		72.1	50.1	
	2:00 - 3:00	58.8		72.6	46.6		60.3		76.4	50.6	
	3:00 - 4:00	60.6		78.4	48.8		60.4		72.3	50.4	
	4:00 - 5:00	61.8		80.7	48.6		61.6		73.4	51.6	
	5:00 - 6:00	60.4		78.9	49		62.3		78.9	51.7	
24 hours Average		63.49		80.18	51.7		65.17		81.88	52.86	

Cross Section 3

Dambouk Khpos village, Ou Dambang Pir commune, Sangkae district,
Battambang province (KP 282+78)

Time	Survey Period	Noise Level dB (A) 19 .July 2013 (Rainy Season)					Noise Level dB (A) 6 December. 2013 (Dry Season)				
		L Aeq	Standard L Aeq	L max	L min	Mean	L Aeq	Standard L Aeq	L max	L min	Mean
Day	6:00 - 7:00	65.7	70	81	40.7	65.7	66.4	70	82.6	47.1	67.75
	7:00 - 8:00	66.1		79.4	41.9		66.7		85.7	50.5	
	8:00 - 9:00	65.4		84.8	44		67.1		80.1	50.3	
	9:00 - 10:00	66.5		82.7	50.2		66.5		80.5	49.7	
	10:00 - 11:00	67.2		85.4	49.5		66.6		83.1	49.8	
	11:00 - 12:00	66		84.2	49.8		67.9		84.7	50.3	
	12:00 - 13:00	65.9		83.2	50		68.9		86.1	51.5	
	13:00 - 14:00	64.1		81.5	42.2		68.7		88.6	50.1	
	14:00 - 15:00	64.6		82.4	44.3		68.9		87.2	49.8	
	15:00 - 16:00	65.2		81.6	45.3		67.3		82.4	47.6	
	16:00 - 17:00	65.4		79.5	45.9		69.3		86.6	48.1	
	17:00 - 18:00	65.4		80.5	45.7		68.8		86	49	
	18:00 - 19:00	66.2		81.3	45.6		67.6		83.4	48.8	
Evening	19:00 - 20:00	65.1	65	81.5	43	63.2	63.7	65	79.6	45.4	61.20
	20:00 - 21:00	61.4		75.3	43.4		60.4		72.8	45.1	
	21:00 - 22:00	63.9		79.6	45.9		61.1		73.4	45.2	
	22:00 - 23:00	62.5		79.1	41.6		59.6		70.9	44.8	
Night	23:00 - 00:00	61.3	50	78.7	40.4	61.6	60.6	50	74.6	45.2	61.29
	00:00 - 1:00	60.9		76.8	40.1		60.7		72.4	44.8	
	1:00 - 2:00	59.8		76.6	40.6		58.8		73.6	44.7	
	2:00 - 3:00	59.9		77.5	40.7		58.7		74.3	44.4	
	3:00 - 4:00	61.6		80.4	40.1		59.6		77.1	44.6	
	4:00 - 5:00	63.4		81.7	40.6		64.1		82	44.3	
	5:00 - 6:00	64.4		81.4	40.3		66.5		85	44.6	
24 hours Average		64.08		80.67	43.83		64.77		80.53	47.32	

Cross Section 4

Kbal Spean village, Poipet Sangkat, Poipet City, Banteay Meanchey province (KP 407)

Time	Survey Period	Noise Level dB (A) Roadside Point, 19 Aug 2013					Noise Level dB (A) Background Point, 20 Aug 2013				
		L Aeq	Standard L Aeq	L max	L min	Mean	L Aeq	Standard L Aeq	L max	L min	Mean
Day	6:00 - 7:00	60.8	70	72.4	53.2	62.5	60.1	70	75.6	52.8	61.4
	7:00 - 8:00	65.2		78.9	55.1		60.3		75.7	52.1	
	8:00 - 9:00	61.9		81.3	55.9		62.6		79.3	55.9	
	9:00 - 10:00	62.0		82.0	58.4		60.9		77.2	55.5	
	10:00 - 11:00	61.9		75.0	58.3		63.3		76.5	56.0	
	11:00 - 12:00	64.4		80.4	58.7		63.1		78.2	57.1	
	12:00 - 13:00	63.4		80.7	58.0		61.3		81.5	54.6	
	13:00 - 14:00	63.6		78.8	58.1		62.4		77.6	54.3	
	14:00 - 15:00	62.8		78.7	58.4		60.2		77.6	53.8	
	15:00 - 16:00	62.3		79.6	58.2		61.6		78.0	54.0	
	16:00 - 17:00	62.1		77.0	58.3		62.7		78.1	54.9	
	17:00 - 18:00	61.8		74.3	56.4		60.1		75.3	53.9	
	18:00 - 19:00	60.2		76.3	55.3		59.2		76.7	54.1	
Evening	19:00 - 20:00	60.4	65	74.5	55.5	58.2	57.4	65	75.5	54.2	55.2
	20:00 - 21:00	61.1		73.4	55.2		56.6		70.9	53.7	
	21:00 - 22:00	55.8		69.0	49.9		54.3		70.9	50.5	
	22:00 - 23:00	55.5		63.9	49.3		54.2		73.6	50.6	
Night	23:00 - 00:00	55.0	50	68.0	48.2	54.2	52.3	50	77.7	50.9	52.5
	00:00 - 1:00	53.5		65.4	47.9		52.1		68.0	50.8	
	1:00 - 2:00	52.1		61.6	47.7		52.1		68.2	50.8	
	2:00 - 3:00	50.9		61.1	47.4		51.6		67.7	51.6	
	3:00 - 4:00	51.8		62.3	46.9		51.5		66.8	50.1	
	4:00 - 5:00	55.3		61.9	47.0		53.2		66.9	50.7	
	5:00 - 6:00	60.9		68.8	51.4		54.4		65.8	50.9	
24 hours Average		59.36		72.72	53.70		57.81		74.14	53.08	

2 Result of Vibration Survey

Cross Section 1

Ra village, Phtaesh Prey Sangkat, Pursat Town, Pursat province (KP 187+560)

Time	Survey Period	Vibration Level dB 15 .July 2013 (Rainy Season)					Vibration Level dB 2 December. 2013 (Dry Season)				
		L eq	Standard L eq	L max	L min	Mean	L eq	Standard L eq	L max	L min	Mean
Day	6:00 - 7:00	40.2	65	56.5	20.1	41.8	39.8	65	55.5	20.2	42.13
	7:00 - 8:00	39.5		56.8	21.8		41.9		57.6	21.2	
	8:00 - 9:00	42.3		57.8	21.4		41.5		59	21.3	
	9:00 - 10:00	41.8		59.1	20.6		40.9		58.3	25.3	
	10:00 - 11:00	41.5		59.5	23.4		42.9		60.7	22.4	
	11:00 - 12:00	43.3		59	21.8		45.6		61.8	23.5	
	12:00 - 13:00	41.6		58.2	19.7		42.2		61.3	23	
	13:00 - 14:00	40.2		60.3	18.5		42.6		62.9	25.9	
	14:00 - 15:00	42.4		60.6	19.6		40.7		58.8	24.9	
	15:00 - 16:00	42.7		59.7	18.7		42.2		60.7	23.2	
	16:00 - 17:00	43.5		60.1	20.9		43		61.3	24.6	
	17:00 - 18:00	43		57.9	20.3		42.2		65.4	24.8	
Night	18:00 - 19:00	41	60	56.4	18.2	35.1	40.1	60	57	20.5	39.85
	19:00 - 20:00	40.6		56.6	18.6		39.9		56.6	20.4	
	20:00 - 21:00	40		56.6	18.7		40.5		55.8	20.5	
	21:00 - 22:00	37.5		54.1	18.6		39.1		56	24.1	
	22:00 - 23:00	34.8		51.4	18.1		38.7		55.1	20.1	
	23:00 - 00:00	30.8		50.7	18.4		40.6		58.4	21.6	
	00:00 - 1:00	31		50.6	19		39.9		56.4	21.5	
	1:00 - 2:00	29.9		51.4	18.3		40.2		58.8	21.6	
	2:00 - 3:00	30.6		50.9	18.5		40.1		61.4	22.2	
	3:00 - 4:00	30.5		50.7	18.4		38.9		58.3	21.7	
	4:00 - 5:00	37.4		56.9	18.2		39.8		58.6	21.6	
	5:00 - 6:00	37.5		54.5	18.3		40.4		56.8	21.5	
24 hours Average		38.48		56.1	19.5		40.99		58.85	22.40	

Cross Section 2

Pou Mouy village, Moung commune, Moung Russei district, Battambang province (KP 244+550)

Time	Survey Period	Vibration Level dB 17 .July 2013 (Rainy Season)					Vibration Level dB 4 December. 2013 (Dry Season)				
		L eq	Standard L eq	L max	L min	Mean	L eq	Standard L eq	L max	L min	Mean
Day	6:00 - 7:00	35.8	65	56.3	24.6	35.7	32.3	65	55.6	21.9	34.77
	7:00 - 8:00	34.6		56.7	24.7		35.1		58.9	22.4	
	8:00 - 9:00	38		58.3	24.4		34.7		50.9	22	
	9:00 - 10:00	36.3		49.2	23.3		34.3		54.3	22.1	
	10:00 - 11:00	36.2		52.9	22.5		40.3		60.7	19.9	
	11:00 - 12:00	35.1		52.7	22		35.4		54.8	19.7	
	12:00 - 13:00	34.3		52.1	21.7		36.4		56.9	21.8	
	13:00 - 14:00	36.6		66.5	20		34.1		53.7	19.8	
	14:00 - 15:00	34.3		49.3	20.9		33.7		51.5	20.1	
	15:00 - 16:00	34.9		54.7	23.3		33.1		52.5	21	
	16:00 - 17:00	38.1		55.3	21		35.9		58.1	23.4	
	17:00 - 18:00	33.8		47.5	20.9		31.9		49.8	19.1	
Night	18:00 - 19:00	33.6	60	49.6	20.5	30.9	32.8	60	51.9	19.8	31.06
	19:00 - 20:00	31.8		48.1	20.6		31.8		59.2	19.8	
	20:00 - 21:00	31.6		49.4	20.1		32.6		50.7	19.1	
	21:00 - 22:00	33.3		51.7	21.2		32.3		47.7	17.1	
	22:00 - 23:00	28.5		55.4	20.1		30.9		49.5	17.4	
	23:00 - 00:00	28.9		49.3	20.2		30.1		48.4	16.7	
	00:00 - 1:00	29.7		49.2	19.6		30.8		51.6	16.8	
	1:00 - 2:00	30.6		51.3	20.5		29.3		48.1	16.6	
	2:00 - 3:00	29.1		52.8	20.7		30.2		47.8	16.5	
	3:00 - 4:00	29.4		49.9	19.9		29.6		50.1	16.7	
	4:00 - 5:00	30.6		51.1	20.8		30.7		51.1	17.8	
	5:00 - 6:00	31.9		49.2	20.8		31.6		53.3	19.9	
24 hours Average		33.21		52.44	21.43		32.91		52.80	19.48	

Cross Section 3

Dambouk Khpos village, Ou Dambang Pir commune, Sangkae district,
Battambang province (KP 282+78)

Time	Survey Period	Vibration Level dB 19 .July 2013 (Rainy Season)					Vibration Level dB 6 December. 2013 (Dry Season)				
		L eq	Standard L eq	L max	L min	Mean	L eq	Standard L eq	L max	L min	Mean
Day	6:00 - 7:00	43.7	65	39.8	39.8	40.8	40.3	65	58.6	18.9	40.52
	7:00 - 8:00	39		37.3	37.3		37.8		58.1	16.6	
	8:00 - 9:00	40.3		39.4	39.4		42.5		59.1	16.7	
	9:00 - 10:00	40.9		37.9	37.9		41.2		59.1	16.2	
	10:00 - 11:00	39.6		36.8	36.8		40.7		58	16.8	
	11:00 - 12:00	42.4		34.3	34.3		41.2		57.6	17.9	
	12:00 - 13:00	40.8		34.7	34.7		41.3		58.9	17	
	13:00 - 14:00	40		34.6	34.6		39.3		60.5	16.8	
	14:00 - 15:00	40.9		33.8	33.8		41.2		60.5	16.1	
	15:00 - 16:00	41.1		33.4	33.4		40.4		56.6	15.7	
	16:00 - 17:00	42		38.6	38.6		38.7		59	15.8	
	17:00 - 18:00	38.4		35.7	35.7		41.6		58.4	16	
Night	18:00 - 19:00	39.8	60	58.7	20.9	36.4	41.5	60	58.7	17.1	36.85
	19:00 - 20:00	37.3		54.6	19.8		40.3		56.6	18	
	20:00 - 21:00	39.4		51.1	19.6		37.7		55.6	16.9	
	21:00 - 22:00	37.9		56.6	18.6		36.3		54.3	16.6	
	22:00 - 23:00	36.8		55.9	17.9		36.1		56.6	16.1	
	23:00 - 00:00	34.3		53.8	17.5		36.2		58.4	16.2	
	00:00 - 1:00	34.7		54.6	17.3		35.8		56.9	16.1	
	1:00 - 2:00	34.6		54.8	18.6		34.6		57.7	16.3	
	2:00 - 3:00	33.8		55.2	20.1		35.6		58.8	16.4	
	3:00 - 4:00	33.4		52.7	19.6		35.4		59.6	16.1	
	4:00 - 5:00	38.6		59.4	18.1		35.7		57.7	16.4	
	5:00 - 6:00	35.7		59.1	20.5		37		54.9	16.4	
24 hours Average		38.56		57.77	20.89		38.68		57.93	16.63	

Cross Section 4

Kbal Spean village, Poipet Sangkat, Poipet City, Banteay Meanchey province (KP 407)

Time	Survey Period	Vibration Level dB Roadside Point, 19 .Aug 2013					Vibration Level dB Background Point, 20 .Aug 2013				
		L eq	Standard L eq	L max	L min	Mean	L eq	Standard L eq	L max	L min	Mean
Day	6:00 - 7:00	30.9	65	41.8	21.9	22.7	27.3	65	39.9	18.7	25.0
	7:00 - 8:00	30.6		47.8	22.2		28.8		46.3	18.6	
	8:00 - 9:00	29.7		40.3	23.5		29.6		40.4	19.5	
	9:00 - 10:00	28.6		46.0	23.6		25.3		42.9	20.2	
	10:00 - 11:00	29.6		45.3	24.1		25.6		41.6	21.0	
	11:00 - 12:00	32.6		50.8	24.7		25.2		40.4	19.8	
	12:00 - 13:00	30.7		46.4	23.8		23.9		39.0	20.3	
	13:00 - 14:00	30.5		47.6	23.2		23.2		35.1	20.3	
	14:00 - 15:00	30.2		38.7	22.6		22.8		42.0	18.9	
	15:00 - 16:00	24.6		37.8	19.5		21.9		44.0	17.4	
	16:00 - 17:00	24.8		37.7	19.6		25.3		39.9	17.1	
	17:00 - 18:00	25.5		43.3	19.4		25.0		43.0	17.3	
Night	18:00 - 19:00	24.1	60	34.8	19.7	20.6	21.6	60	43.7	17.6	19.8
	19:00 - 20:00	24.0		35.6	19.4		19.7		40.1	17.0	
	20:00 - 21:00	24.2		35.7	19.1		19.3		35.9	15.8	
	21:00 - 22:00	21.2		33.4	18.2		20.4		32.7	15.1	
	22:00 - 23:00	21.3		34.5	17.9		19.7		40.2	15.6	
	23:00 - 00:00	20.2		31.6	17.4		20.8		36.4	14.3	
	00:00 - 1:00	20.3		27.4	17.6		18.6		35.6	14.3	
	1:00 - 2:00	19.8		31.7	17.4		18.8		29.9	15.4	
	2:00 - 3:00	19.6		30.8	17.6		19.1		30.1	16.7	
	3:00 - 4:00	19.9		31.0	17.5		19.3		33.3	16.8	
	4:00 - 5:00	19.8		33.4	17.9		21.6		30.4	17.2	
	5:00 - 6:00	20.1		34.4	18.7		20.4		34.7	18.1	
24 hours Average		25.12		38.24	20.27		22.63		38.23	17.63	

APPENDIX 15-4

PREDICTION METHOD AND MODEL

1 Calculation Method of Emission Factor

The approximation formulas are as follows:

$FE=A/V+B \times V+C \times V^2+D$

where:

FE : Emission factor

V : Average vehicle travel speed (km/h)

	A	B	C	D
Light Vehicle				
NOx	-0.1874248100	-0.0039820000	0.0000312900	0.1827117200
SPM	0.0204858053	-0.0001713205	0.0000015448	0.0058884575
CO_2	1501.20185	-2.40935	0.02115	174.47635
Heavy Vehicle				
NOx	5.3968052000	-0.0782455300	0.0006706800	3.2657883600
SPM	0.5264308649	-0.0017836421	0.0000140949	0.0846006568
CO_2	908.52069	-23.49899	0.18396	1364.81344

Source : "Grounds for the Calculation of Motor Vehicle Emission Factors using Environment Impact Assessment of Road Project etc. (Revision of FY 2010, National Institute for Land and Infrastructure Management, Japan"

The emission factors for motorcycles are adopted 30 percent of the light Vehicle values.

2 Ambient Air Pollution Dispersion Model (Plume Model)

$$C(x,y,z)=\frac{Q}{2\pi \cdot u \cdot \sigma_y \cdot \sigma_z}\exp\left(-\frac{y^2}{2\sigma_{y^2}}\right)\left[\exp\left\{-\frac{(z+H)^2}{2\sigma_{z^2}}\right\}+\exp\left\{-\frac{(z-H)^2}{2\sigma_{z^2}}\right\}\right]$$

where:

C (x,y,z) : Air pollutant concentration at survey point (x,y,z) (ppm or mg/m^3)

Q : Air pollutant emission rate of point source (ml/s or mg/s)

u : Wind velocity (m/s)

H : Height of emission source (m)

σ_y, σ_z : Horizontal (y) and vertical (z) dispersion coefficient (m)

x : Downwind distance from emission point source to survey point along wind (m)

y : Horizontal distance at right angle to x axis

z : Vertical distance at right angle to x axis

Q is calculated by the following formulations:

$$Q_t = V_w \times \frac{1}{3600} \times \frac{1}{1000} \times \sum_{i=i}^{2} (N_{it} \times E_i)$$

where:

Q_t : Average air pollutant emission rate by time (ml/(m*s) or mg/(m*s))

E_i : Emission factor by vehicle type i (g/ (number*km))

N_{it} : Traffic volume by vehicle type and time (number/hr)

V_w : Conversion factor NOx : 532 ml/g SPM : 1000 mg/g

σ_y and σ_z are calculated by the following formulations:

$\sigma_y = W/2 + 0.46\, L^{0.81}$

$\sigma_z = 1.5 + 0.31\, L^{0.83}$

where:

L : Distance from survey point to roadside (L = x – W/2) (m)

W : Road width (m)

Source : "Environmental Impact Assessment Technique for Road Project No.383-400, June 2007, National Institute for Land and Infrastructure Management, Japan"

Conversion from NOx to NO_2 is calculated by the following formulations:

$[NO_2] = 0.54*[NOx]$

Source : Total Nitrogen Oxide Emission Control Manual, 2000, Japan

The input data are base on the conceptual road design and traffic forecast result in this survey, and collected relevant information. These input data to predict air pollution level are setting as follows:

H :	1 m
x :	11.5 m
z :	1.5 m
Ei :	see Table 16.4-3 "With Project"
Nit :	Motorcycle 334 (Number/hr) (Daily Volume x 0.08)
	Light Vehicle 508 (Number/hr) (Daily Volume x 0.08)

	Heavy Vehicle 167 (Number/hr) (Daily Volume x 0.08)
Wind Direction :	West (Along road direction) or South (Right angle to road direction)
Wind velocity :	2 m/s Source (Annual average wind velocity in Cambodia): Ministry of Water Resources and Metrology
Alignment of Point Sources	0 ~ 20 m on both sides : 2 m interval 20 ~ 180 m on both sides : 10 m interval

3 Brief Calculation Method of LAeq under Simple Condition (Noise Prediction Model)

$$L_{Aeq,T} = 82.3 + 10\log_{10}(1+3.47\,q) - 10\log_{10} l + 20\log_{10} V + 10\log_{10} N_T + 10\log_{10} 3.6/2T$$

where:

$L_{Aeq,T}$: Equivalent continuous A-weighted sound pressure Level of time T (dB)

V : Vehicle speed (km/h)

T : Time (s)

N_T : Traffic volume in time T (number)

l : Distance from carriageway to survey point (l)

q : Heavy vehicle ratio (< 1)

Source : "ASJ RTN-Model 2008 by The Acoustical Society of Japan"

The input data are base on the conceptual road design and traffic forecast result in this survey. These input data to predict noise level are setting as follows:

V :	59 km/hr
T :	From 6:00 to 18:00 43,200 s
	From 18:00 to 22:00 14,400 s
	From 22:00 to 6:00 28,800 s
N_T	From 6:00 to 18:00 842 (Number/hr) x 12 hr (Daily Volume x 0.824)
	From 18:00 to 22:00 261 (Number/hr) x 4 hr (Daily Volume x 0.102)
	From 22:00 to 6:00 313 (Number/hr) x 8 hr (Daily Volume x 0.074)
l	6.5 m and 16.5 m (End Point of Road)
	10.0 m and 20.0 m (15 m line from road center)
	25.0 m and 35.0 m (Borderline between ROW and private land)
q	0.17

APPENDIX 16-1

PROJECT INFORMATION BOOKLET

(ENGLISH DRAFT VERSION)

PROJECT INFORMATION BOOKLET
for
THE RESETTLEMENT ACTION PLAN
NATIONAL ROAD No.5 IMPROVEMENT PROJECT (MIDDLE SECTION)

1. **QUESTION:** What is the National Road No.5 Improvement Project?

   ANSWER: National Road No.5 (NR-5) is the trunk road reaching Bangkok through the border between Cambodia and Thailand. It is also designated as Asian Highway (AH-1) or Southern Economic Corridor of GMS. The Survey Road was damaged by the flood in 2000, and the section between Prek Kdam and Thlea ma'Am and the section between Battambang and Sri Sophon have been temporarily repaired. Therefore, Royal Government of Cambodia firstly requested Japanese loan for rehabilitating 2 sections of NR-5, Prek Kdam – Thlea ma'Am and Battambang – Sri Sophon, and construction of 4 bypasses around Banteay Mean Chey, Battambang, kampong Chhnang and Udong. Then, the middle section from Thlea M'am to Battambang and construction of Pursat bypass also will rehabilitate.

2. **QUESTION:** Who is responsible for the Project?

   ANSWER: The Royal Government of Cambodia represented by IRC (Inter-ministerial Resettlement Committee) will supervise the resettlement action plan implementation. MPWT (Ministry of Public Works and Transport) implements and monitors Resettlement Plan for affected houses, land and other properties on the roads.

3. **QUESTION:** Is the improvement of the road intended to benefit us?

   ANSWER: Yes. The improved road will allow the transportation of goods and people to be quicker, more efficient and cheaper between towns and villages and also from Thailand to all parts of Cambodia. It will help everybody to market their products, get supplies, reduces poverty and to reach public services.

4. **QUESTION:** If there will be road improvements along our road, will we be affected?

   ANSWER: The design and improvement of the highway will affect the use of land, trees and some houses, trading stalls and gardens and entrances in the government owned right of way. During detailed design, these potential effects may be avoided or minimized since actual alignments of the improved road will be determined through consultation with you and the rest of the local communities.

   In case negative impact on land, trees, house and structures cannot be avoided, the owners of affected properties will be properly compensated in cash or in kind for their land use, houses, structures, crops, trees and communal properties in order for them to restore their lost assets, resource or income. Rehabilitation assistance will also be provided to Affected Persons who will be required to relocate in another location.

5. **QUESTION:** What if my private land will be affected by the Project?

   ANSWER: For affected land, compensation can be in the form of replacement land or cash at current market value. If land replacement has been agreed by AHs, the replacement land should be of equal or better productive capacity of the lost land and satisfactory to AHs.

6. **QUESTION:** Does compensation apply to my affected houses or structures?

   ANSWER: Yes. Houses and structures that will be affected by the Project shall be compensated at replacement cost without deduction for depreciation or salvageable materials.

7. **QUESTION:** What about my crops and trees?

   ANSWER: For annual crops, AHs will be given 3 month notice that the land on which their crops are planted will be used by the Project and that they must harvest their crops in time. If standing crops are ripening and cannot be harvested, eligible AHs can be compensated for the loss of the un-harvested crops at the current market value.

   For perennial crops, AHs will be compensated for the loss of fruit and timber trees located within the project area at replacement cost.

8. **QUESTION:** What about our common property resources like school building, pagoda, fence of pagoda and school, irrigation, well and ponds?

   ANSWER: For common property resources, the affected land will be replaced in areas identified in consultation with affected communities and relevant organizations. Affected building and structures will be restored to original and better condition.

9. **QUESTION:** If in case there will be relocation of houses or businesses involved, how can the Project help me rebuild my house during relocation?

   ANSWER: Houses or other properties will be compensated at replacement cost, which includes labor cost to build the houses and the properties. Apart from the compensation for loss of private land and other assets at replacement costs, the Project will ensure that the standard of living of AHs are maintained or better improved after the Project.

<<Entitlement Matrix will be inserted here>>

10. QUESTION: When will the detailed measurement survey be conducted?

ANSWER: The activity will be carried out after the actual alignment has been identified. The DMS survey team will be composed of:

- Representative of IRC;
- Team of Working Group MPWT;
- Provincial Sub-Committee, also Involved representative District, Commune and Village authority; and
- External Monitoring Organization.

The activity will only be carried out in the presence of the AHs. The AHs and the local authorities will be informed a few days prior to the activity.

11. QUESTION: If there will be disagreements or problems that arise during project implementation such as compensation, technical and general project-related disputes, do I have the right to voice my complaint?

ANSWER: Yes. If the AH is not satisfied with the compensation package offered or, if for any reason, the compensation does not materialize according to the agreed schedule, the AH has the right to lodge a complaint based on the Grievance Redress Mechanism as provided below.

- First Stage, Commune Level: An aggrieved AH may bring his/her complaint to the commune leader. The commune leader will call for a meeting of the group to decide the course of action to resolve the complaint within 15 days, following the lodging of complaint by the aggrieved AH. The meeting of the group consists of the commune leader, representative/s from PRSC-WG of the district offices, and the aggrieved AH. The commune leader is responsible for documenting and keeping file of all complaints that are coursed through him/her. If after 15 days the aggrieved AH does not hear from Village or Commune, or if the AH is not satisfied with the decision taken by in the first stage, the complaint may be brought to the District Office either in writing or verbally.
- Second Stage, District Office: The District office has 15 days within which to resolve the complaint to the satisfaction of all concerned. If the complaints cannot be solved in this stage, the district office will bring the case to the Provincial Grievance Redress Committee.
- Third Stage, Provincial Grievance Redress Committee: The Provincial Grievance Redress Committee, which consists of Provincial Governor or Deputy Governor as a committee chairman and Directors of relevant Provincial Departments as members will be established in each province prior to DMS, meets with the aggrieved party and tries to resolve the complaint. The Committee may ask to PRSC-WG for a review of the DMS by the EMA. Within 30 days of the submission of the grievance the Committee must make a written decision and submit a copy of the same to MPWT, the EMA, IRC and the AH.
- Final Stage, the Court Procedures: If the aggrieved AH is not satisfied with the solution made by the Provincial Grievance Redress Committee based on the agreed policy in the RAP, the committee shall file administrative procedures against the AHs with the participation of provincial prosecutors. The case will be brought to the Provincial Court and the same will be litigated under the rules of the court. At the same time, the AH can bring the case to the Provincial court. During the litigation of the case, RGC will request to the court that the project proceed without disruption while the case is being heard. If any party is unsatisfied with the ruling of the provincial court, that party can bring the case to a higher court. The RGC shall implement the decision of the court.

The complaint issues will be solved under the agreed policy in the approved RAP.

The concerned Grievance committees will properly document all complaints and resolutions. AHs will be exempted from all taxes, administrative and legal fees.

12. **QUESTION:** How will you know if these undertakings are kept and the objectives of this Project are met?

ANSWER: All project activities will be monitored by IRC, Provincial Sub-Committee, Ministry of Public Works and Transport, and an external monitoring agency. Quarterly reports will be prepared and submitted to IRC and then IRC will forward it to JICA. A post- resettlement impact evaluation will also be undertaken to assess whether impacts of the Project have been mitigated adequately and the pre-project standard of living of AHs have been restored as a result of the resettlement and project. The JICA will also monitor these activities in its regular supervision missions during the period of project implementation.

If you have further queries and suggestions, please contact us at:

Pursat, Battambang and Banteay Mean Chey Province, also Provincial Department of Public Works: Pursat, Battambang and Banteay Mean Chey

APPENDIX 16-2

TERMS OF REFERENCE FOR

EXTERNAL MONITORING AGENCY

Terms of Reference
for External Monitoring Agency (EMA)
Resettlement Action Plan (RAP) Implementation
for the National Road No.5 Improvement Project

I. Background

1. In the Kingdom of Cambodia ("Cambodia"), road transport accounts for around 65% of passenger transport, and 70% of freight transport, and plays the most important role in domestic transport. During the civil war in the 70's and 80's, most of the roads were deteriorated due to poor (practically non-existent) maintenance. Since 1993, the rehabilitation has progressed with the assistance from multilateral and bilateral development partners.

2. National Road No.5 (NR-5) is the trunk national road connecting the capital city of Phnom Penh to major city of Battambang and then to Bangkok through Thai border city of Poipet. It is also designated as Asian Highway No. 1 (AH-1) or the Southern Economic Corridor of Greater Mekong Sub-region (GMS). However, all the road surface type is double-layered bituminous surface treatment (DBST) and the surface condition is being deteriorated due to rapidly increasing heavy vehicles, as well as inundation/flood except the surface of the sections of 12.6 km from Phnom Penh and between Serei Sophorn and Poipet where asphalt concrete (AC) is adopted to their surfaces.

3. Under such situation, Japan International Cooperation Agency (JICA) dispatched a survey team to Cambodia in November 2010 and reached agreement to conduct the Preparatory Survey on improvement of North Section (between Battambang and Serei Sophorn) and South Section (between Prek Kdam Bridge and Thlea Ma'am) of NR5. The survey named as "Preparatory Survey for National Road No.5 Rehabilitation Project" started in February 2011. As the result of this survey the North Section (Approx. 68 km) was selected as the high priority section.

4. Following the RGC's request to ensure sustainable transportation of the NR5, the South Section (Approximately 139Km) has been also surveyed by the consultant team since January 2013. The survey named as "Preparatory Survey for National Road No.5 (South Section) Improvement Project". From a viewpoint of consistency in road improvement, RGC requested that remaining section of NR5 (between Thlea Ma'am and Battamabng including the bypass around Pursat and between Serei Sophorn and Poipet Section) be surveyed and this survey started in September 2013.

5. The RAP contains the measures to be carried out by the Inter-ministerial Resettlement Committee (IRC) of which the Ministry of Public Works & Transport (MPWT) is a member to avoid and/or minimize impacts on the affected households (AHs), particularly on their sources of livelihood, and for the purpose of improving or at least restoring their standards of living to pre-project level consistent with the JICA Guidelines for Environmental and Social Considerations (April 2010).

6. The purpose of the RAP is to identify the impact on the local population of upgrading and improvement of the road; and to provide measures for compensation where the population is negatively affected by the work, primarily through the acquisition of farmland and encroachment on to residential and commercial sites.

7. AHs are grouped into three broad categories, viz. Individual, Household and Communities, and other sub-groups are defined within each group. In particular within the household category, there are vulnerable groups defined as those that are socially or economically disadvantaged and who will suffer more economically and socially from relocation and improvement than the general population.

8. AHs falling into one or more of the following categories are defined as vulnerable groups;

(i) households headed by women with dependents,

(ii) disabled household heads with no other means of support,

(iii) households falling under the generally accepted indicator for poverty, and

(iv) children (younger than 18 years old) and the elderly (older than 60 years old) households who are landless and with no other means of support.

9. From September 2013 - January 2014, a RAP has been prepared based on census and Inventory of Loss (IOL), baseline socio-economic survey (SES) and Stakeholder Meeting. The RAP has been prepared based on i) census and inventory of all affected households; ii) baseline SES; and iii) replacement cost study for affected land, structure and trees.

10. Centre of the resettlement policy is that the affected people will be compensated for their lost assets at replacement cost and provided with rehabilitation assistance to ensure improvement, or at least maintaining their living standards and income to the level they would have without the Project. The cut-off date for the existing NR-5 from Thlea Ma'am/PST (PK: 171+000) to Battambang (PK: 282+200) and from Serey Sophorn (PK: 366+250) to Poipet (PK: 402+000) is on **2nd September 2013**, and for Pursat Bypass is on **30th December 2013**.

11. Refer to the IOL results, 2,377 households to be affected by the Project. Among them, 247 AHs will lose their private land. A total of 296,069.07 m² of private land along Pursat bypasses will be acquired for the Project. Of these, 90.87% (269,026.84 m²) is used for growing rice.

12. A total of 817 AHs along NR-5 and the Pursat bypass, whose main structures (house, house-shop and/or shop/restaurant) will be affected by the Project. With regard to fruit and timber trees, a total of 3,783 trees of various species and age in NR-5 and the bypass have been counted during the IOL. The affected fruit and timber trees are not commercially grown, meaning they are sporadically planted.

II. Management and Monitoring

13. The RAP requires that the external agency is contracted to provide external monitoring on the Implementation of the approved RAP. The external monitor will indicate any corrective measures necessary to the approved RAP during its implementation.

14. A particular responsibility of the EMA will be to monitor and evaluate, based on the approved RAP, the effectiveness of measures to replace any loss and livelihoods of AHs and of measures to utilize resettlement planning and implementation to maximize the benefits to the immediately adjacent and wider populations of the road improvement and of its integration with social, economic and infrastructural development in the road corridor and the wider region.

III. Requirement for external monitoring

3.1 Monitoring and Evaluation

15. The monitoring and evaluation agency will address specific issues as the following:

(i) Field check/site visits coordinated with the resettlement activities that are taking place based on the approved RAP:
   a) Compensation payments, participatory design of relocation and rehabilitation options, and relocation;
   b) Random review of DMS forms, if complaints exist, compared to the inventory of assets and entitlements; and

c) Random review of entitlement and compensation documents to ensure that the assessment of compensation is based on the agreed compensation matrix and that all entitlements have been accurately applied;

(ii) Payment of compensation and allowances as per approved Update RAP (URAP). Identify whether all AHs are covered under the URAP and confirm that they are all eligible for compensation, resettlement and rehabilitation assistance, irrespective of tenure status, social or economic standing, and any such factors that may discriminate against achieving the project objectives.

(iii) Timing of disbursement of payment and documentation Detailed Measurement Survey (DMS) and payments;

(iv) Public consultation and awareness of resettlement entitlements;

(v) Coordination of resettlement activities with the construction schedule;

(vi) Land acquisition and transfer produces;

(vii) Progress of construction/rebuilding of structures on residual land or to new relocation sites;

(viii) Level of satisfaction of AHs with the provisions of each kind of compensation and implementation of the URAP;

(ix) Grievance redress mechanism (documentation, process, and resolution);

(x) Capacity of AHs to restore/re-establish livelihoods and living standard. Special attention will be given to relocating AHs and vulnerable AHs;

(xi) Trends in living standards. Throughout the RAP implementation process, the EMA will observe and conduct surveys to monitor the progress AHs are making to restore living standards. Special attention will be paid to any differences based on gender. Any potential problems in the restoration of living standards will be reported;

(xii) Effectiveness, impact and sustainability of entitlements and rehabilitation measures and the needs for further improvement, as required under the approved RAP;

(xiii) Gender impacts and strategy;

(xiv) Capacity of AHs to restore/reestablish their livelihood and living standards. Special attention provided or to be provided to severely affected and/or vulnerable households;

(xv) Resettlement impacts caused during construction activities; and

(xvi) Receive complaints from AHs if any and explain to the aggrieved AHs the eligibility for compensation and livelihood restoration set out in the approved URAP.

(xvii) Participation of AHs in RAP updating and implementation;

(xviii) Institutional capacity, internal monitoring and reporting.

3.2 Post evaluation

16. Post-evaluation activities will also be carried out one (1) year after the completion of all relocation activities.

IV. Specific Purpose of External Monitoring

17. The Project requires the services of a domestic monitoring and evaluation team to conduct an independent assessment of the extent to which resettlement and rehabilitation objectives are being met.

18. Specifically, the objectives of the monitoring program are:

(i) to ensure that the standard of living of AHs are restored or improved;

(ii) to monitor whether the overall project and resettlement objectives are being met in accordance with the approved RAP, and if not to suggest corrective measures;

(iii) to assess if rehabilitation measures and compensation are sufficient and comply with JICA Guidelines;
(iv) to identify problems or potential problems; and
(v) to identify methods of responding immediately to mitigate and resolve problems.

V. Methodology of Monitoring and Evaluation

19. The methods for external monitoring and evaluation include:

(i) Review of RAP approved by RGC.
(ii) Check on a random basis the DMS process with AHs from identification to agreement on DMS results.
(iii) Review of SES baseline prepared during RAP preparation (Feasibility Study) and SES conducted at the detailed design stage. If land acquisition (i.e., RAP implementation) does not occur for at least two (2) years, EMA will carry out another SES.
(iv) A post resettlement survey will be carried out one (1) year following completion of resettlement activities. Sampling will include 20% of relocating AHs as well as at least 10% of all other AHs. The same AHs interviewed during RAP updating will be interviewed.
(v) Participatory rapid appraisals (PRA): Consultation with AHs and various stakeholders such as resettlement committee, the Project Management Unit, community leaders; key informant interviews; community public meetings; focus group discussions; direct field observations; and in-depth case studies of good practices and problems identified by internal or external monitoring and required special efforts to resolve.
(vi) Random checks of payments disbursed to AHs during monitoring. The EMA will submit a post evaluation report per project one (1) year following completion of resettlement activities.

VI. Team Composition, Timing, and Submission of Reports

20. The domestic EMA will be composed of one team leader with extensive experience in monitoring and evaluation of resettlement activities in Cambodia and with strong ability in preparing resettlement compliance/monitoring reports. He/she should demonstrate good communication skill and have at least a bachelor degree in a relevant field. The team leader will be assisted by two (2) social enumerators. All reports will be submitted to IRC and MPWT.

21. The monitoring work will be consisted in period of two (2) years and post evaluation will be conducted one (1) year after completion of all resettlement activities.

22. The monitoring reports will include one inception report, 8 quarterly monitoring reports, one base line survey report (six months after signing the contract) and one post evaluation report.

23. Duration of Field visits and report preparation will be as follows:

No.	Position	Working Day	Number	Total Input
	Monitoring Work			
1	Team Leader	178	1	178
2	Social Enumerator	119	2	238
	Base Line Survey			
1	Team Leader	50	1	50
2	Social Enumerator	30	2	60

No.	Position	Working Day	Number	Total Input
	Post Evaluation			
1	Team Leader	50	1	50
2	Social Enumerator	30	2	60
			Total	636

24. Submission of inception and quarterly report will be within two weeks (14 days) after monitoring activities while submission of post-evaluation report will be within one (1) month after post-evaluation activities.

25. The quarterly report will summarize the findings of the EMA, including (a) progress of RAP implementation, including any deviations from the provisions of the RAP; (b) identification of problem issues and recommended solutions to inform implementing agencies and resolve issues in a timely manner; (c) identification of specific gender issues, as relevant; and (d) report on progress of the follow-up of issues and problems identified in the previous reports.

VII. Expression of Interest

26. Please prepare an estimation of the time and finances required to undertake this work. Should you be awarded the contract, a price would be negotiated to undertake and initial consultation and investigation with the community, after which a fixed amount contract would be set and agreed.

Expressions of interest should be addressed to:

27. [Mr. XXX, Resettlement Department, Ministry of Economy and Finance, St 92, Sngkat Wat Phnom, Khan Daunpenh, Phnom Penh]

28. Expressions of interest should be received no later than [time, date]

29. Inquiries may be directed to: [INSERT name, position, phone number]

APPENDIX 16-3

TERMS OF REFERENCE FOR

INCOME RESTORATION PROGRAMS

Terms of Reference for Training and Income Restoration

I. Background Information

1. A Training and Income Restoration Program (IRP) is part of the compensation package provided to all severely affected households and vulnerable affected households by works and land acquisition for the National Road No.5 Improvement Project (Middle Section). Severely affected households include but not limited to the affected households who will (i) lose 20% or more of their total productive land (income generating) and/or assets, and (ii) have to relocate due to the Project.

2. A Consulting firm/Non-Government Organization (NGO) will undertake overall management of the Training and IRP, and will be appointed for that purpose by Inter-ministerial Resettlement Committee (IRC) in the Ministry of Economy and Finance (MEF). The Program will be supervised by the Resettlement Department of the Ministry of Economic and Finance (RD/MEF).

3. The Consulting firm/NGO will directly administer the off-farm training and IRP and will, for that purpose, manage a Training Fund and Income Restoration Training including an Apprenticeship Program[1] (i.e. vocational training) and agricultural extension and training for the entitled AHs. It will provide management support for the Agricultural Relocation and Extension Program and will provide a training of trainers program for the Provincial and District agencies taking part.

4. From September 2013 - January 2014, a RAP has been prepared based on census and Inventory of Loss (IOL), baseline socio-economic survey (SES) and Stakeholder Meeting. The RAP has been prepared based on i) census and inventory of all affected households; ii) baseline SES; and iii) replacement cost study for affected land, structure and trees. Refer to the IOL results, 2,377 households to be affected by the Project. Among them, 247 AHs will lose their private land. A total of 296,069.07 m² of private land along Pursat bypass will be acquired for the Project. Of these, 90.87% (269,026.84 m²) is used for growing rice. A total of 817 AHs along NR-5 and the Pursat bypass, their main structures (house, house-shop and/or shop/restaurant) will be affected by the Project. With regard to fruit and timber trees, a total of 3,783 trees of various species and age in NR-5 and the bypass have been counted during the IOL.

II. Appointment of NGO/Consulting firm

5. For that purpose IRC proposes to enlist the services of suitably qualified Consulting Firm or NGO to develop and implement the IRP which is required for the severely affected households and vulnerable affected households.

6. The Consulting firm/NGO should have the following qualifications:

   (i) Must have good track records in designing and implementing IRP and Gender Development Program within Cambodia;
   (ii) Must have the necessary community development and gender orientation and experience to appropriately deal with the poor and vulnerable affected households;
   (iii) Must be familiar with the use of Participatory Rapid Appraisal tools; and
   (iv) An inclusion of Gender Specialist in the Team.

[1] The apprenticeship program is available for one member of the severely and/or vulnerable affected households, although all the working adults who belong to severely and/or vulnerable affected households are eligible to agricultural extension and training.

III. Objectives of Training and Income Restoration Program

7. The Consulting firm/NGO shall undertake overall management of the Training and IRP, and will be appointed for that purpose by the IRC. The Program will be supervised by RD/MEF.

3.1 General objective

8. The general objective or goal of the program is to minimize the impact of the project on the livelihoods of affected households, to restore their income and to reduce poverty and social exclusion in the project area.

3.2 Specific project purposes

9. The specific project purposes are:

   (i) to improve the vocational skills of severely and/or vulnerable affected households by other means to restore and improve their livelihoods and incomes from off-farm (non-agricultural) employment; and
   (ii) to provide opportunities for production and marketing of crops for households severely affected by losses of land, by means of the provision of appropriate and sustainable IRPs.

IV. Activities

10. To prepare the training and IRP, the Consulting firm/NGO will carry out the following tasks:

   (i) Carry out Situational and Needs Assessment Analysis
      - Analyze existing sources of income of severely and/or vulnerable affected households and existing sources of income in the relocated area to establish a baseline to gauge the success of IRP and estimate current actual income of the affected households;
      - Conduct consultations, needs, aptitude, and preference surveys among the affected households;
      - Determine whether poor/vulnerable affected households have special needs different to other households;
      - Identify the major socio-economic situations and problems of the affected households and it must be understood in the context of the basic profile and culture of the affected communities and the concrete descriptions of their way of life and livelihoods.
   (ii) Identify existing or planned programs of the Government, NGOs, and other agencies within the project area to design appropriate strategies to link up with or expand such programs.
   (iii) Prepare a gender strategy to include enhancement of opportunities for women's participation, and to provide women increased opportunities to learn new skills and participate in the decision-making process, and take advantage of new employment and income-generating opportunities.

11. Based on the results of the activities above, the Consulting firm/NGO will design the appropriate training and sustainable IRPs based on the number of severely and/or vulnerable AHs.

4.1 Off farm training

12. The Consulting firm/NGO will conduct a training needs survey during the first month of the program, making use of data from existing socio-economic surveys of the Project. On this basis the Consulting firm/NGO will provide 6 months vocational or pre-vocational training

to a member of each severely affected household either household head, spouse, son or daughter.

13. Training will be mainly in skills for which there is an established employment demand, but may include basic literacy and numeracy. Skills for which training has provisionally been proposed include crafts production, building trades, motor repair, languages, computer, hairdressing and tailoring.

4.2 Job creation

14. Job creation will be undertaken by the Consulting firm/NGO as 6 month apprenticeships with established enterprises, if available in the area, primarily in Pursat, Battambang and Banteay Mean Chey province aimed at providing on-the-job training and employment for a member in the severely and/or vulnerable affected households.

15. The Consulting firm/NGO will also facilitate hiring of affected households on a priority basis on ongoing project construction activities in order for affected households to benefit directly from the Project.

4.3 Small agricultural and agro-industrial credit

16. The Consulting firm/NGO will facilitate access to existing credit program such as small agricultural production or agro-industrial loans. Loans will be for plant materials, livestock, on-farm irrigation, agricultural tools and equipment, and for small agricultural, depending on the outcome of training capability of the trainees.

4.4 Agricultural extension and training

17. The Consulting firm/NGO will provide training of trainers (concerned Provincial Departments in each of the two provinces) and management support for an agricultural extension program. Agricultural extension and farmer training will be specifically for land use and production development such as livestock, cash crop, home garden and etc. The Consulting firm/NGO will also provide training for women in agricultural and food processing and marketing. All the working adults who belong to severely and/or vulnerable affected households are eligible to this program.

4.5 Access to small enterprise credit

18. The Consulting firm/NGO will facilitate access to existing credit programs to enable affected households to obtain small enterprise loans. Loans will be for crafts production equipment, tools for construction or repair work, and for shop and stall equipment and stock.

V. Staffing and Other inputs

19. The Consulting firm/NGO will provide training personnel in accordance with the following requirements. Durations given below are indicative and subject to variation, during the currency of the services, by agreement with MEF, and estimated on the following basis.

    (i) It is assumed that the training and income restoration will be completed within 24 months;
    (ii) Person -month of personnel has been considered only the period stayed on the site or relevant institution, organizations or factories for training purpose. Time spent in other place such as Home office of Phnom Penh shall not be included in the person-month.

Personnel Inputs of Consulting Services

Position	Number	Person-month[2]
Team Leader	1	12
Vocational Trainer	4	24
Credit Coordinator	2	8
Apprenticeship Trainer 1	2	12
Agricultural Trainer 1	2	14
Agricultural Trainer 2	2	12
Total	13	82

VI. Requirement for report and Reporting

6.1 Requirement for report

20. The Training and IRP must include concrete actions for income restoration, including budget, timetables, responsibility for implementation, economic assumptions and risks and contingency arrangements. The Reports will include, but not limited, to the following:

21. Inception report

- A review of current socioeconomic conditions of the affected household including income baseline. If the existing baseline data is not sufficient, the Consulting firm/NGO is required to carry out supplementary socio-economic survey;
- A summary of Affected households' preferences for training and income restoration (indicating description of methods used to elicit Affected households' views);
- A summary of potential training and IRPs (based on identified economic activities and opportunities prevalent in the area) and options available to affected households and of the process of matching affected households to particular programs or activities;
- A gender strategy.

22. Training and IRP plan

- Detailed feasibility studies of the technical, economic, financial and institutional viability of the proposed IRP[3], including realistic estimation of incomes to be received by participating affected households and the number of affected households that can participate in each activity;
- A time-bound plan on specific programs for affected households who have lost their productivity means;
- A time-bound plan for development of human capital (appropriate trainings which have an established employment demand);
- A time-bound plan on job creation and provision of access to capital for small enterprise, small agricultural, and agro-industrial credit;
- Arrangements and indicators for monitoring the effectiveness of training and IRPs and for modifying plans found to be ineffective;
- Budget and Implementation Schedule.

[2] The amount of person-month will be revised during the RAP updating.

[3] Can be existing or planned programs of the Government, NGOs, and other agencies within the project area with appropriate strategies to link up with or expand such programs.

23. Progress reports (Quarterly)

- The content will include progress based on arrangements and monitoring indicators as set out in the income restoration plan report. It will also include satisfaction of affected households, problems encountered and strategies or resolutions agreed on.

24. Completion report

- It will include concise history of the program, evaluation of the implementation, including financial audit statements.

6.2 Reporting

25. The selected Consulting firm/NGO will submit the following to IRC-MEF:

- Inception Report, one month after mobilization
- Training and Income Restoration Plan, within two months after submission of Inception report (contents as indicated in section VI above),
- Quarterly progress reports
- Completion Report

VII. Schedule

7.1 Schedule

26. The selected consulting firm/NGO for the IRP program will be hired for two and a half years. The consulting firm/NGO will be engaged full-time for the first two years while in the third last year, the consulting firm/NGO will provide back-stop support to the participating affected households, as needed. Post-IRP evaluation will be carried at the end of year 3 or completion of the program.

APPENDIX 16-4

INVENTORY OF LOSS AND

SOCIO-ECONOMIC SURVEY

QUESTIONNAIRE FORM

INVENTORY OF LOSS AND SOCIO-ECONOMIC QUESTIONNAIRE

QID: ☐

Date of interview:...../...../..... Starting time:.....……..

Interviewer's name:..... Ending time:……

Supervisor's name:.....…… Village Headman: ……

I. LOCATION

☐ 1=NR#5 (Thlea Ma'am - Battambang)
2= NR#5 (Serei Sophorn - Poipet) 3= Pursat Bypass

PK: ..... 1= Left 2= Right ☐ (Direction is from Phnom Penh to Poipet).

House No: ……. Village: ...……..

Commune: ..... District: ……..... Province: .....

1.1 Do you know, what is size of the ROW (NR-5)? Left: .....m Right: .....m

1.2 Distance from road centreline to people's house .....m (first column or wall).

1.3 Which option do you prefer for the Pursat city?

1= Flyover 2=NR-5 widening 3=Bypass ☐

1.4 Are there herd animals traverse in this area? 1=Yes 2=No ☐
If yes, what support do you need from the project: .....

1.5 Do you think the bypass construction will disturb to people fishing? ☐ Yes ☐ No
If yes, what is the reason? .....

1.6 Tick the option that will be affected the HH properties:

- ☐ in interval 0 – 12.5m
- ☐ in interval 12.5 – 20.0m
- ☐ in interval 0 – 20.0m

II. PROFILE OF HOUSEHOLD HEAD

Ask for head of household (if not present ask spouse or other adult, but over 18 years old)

2.1 H/H Name: …… Call Name: ……

2.2 Age: ……. Sex: Male ☐ Female ☐

2.3 Occupation: .....

2.4 Language and Ethnic group: ☐

Code: 1=Khmer 2=Chinese 3=Cham 4= Vietnamese
5=Other (specify).....

2.5 Religion: ☐

Code: 1=Buddhism 2=Muslim 3=Christianity
4=Other (specify).....

2.6 The respondent is the household head? ☐ Yes (If yes go to 2.9) ☐ No

2.7 If no, what is the relationship with the household head? .....

Name of the respondent: ……..

2.8 Age: ……. Sex: Male☐ Female ☐

2.9 Fill H\H head status in the box below **(multi answers)** ☐

1= Aged (From 60 years old and older) 2=Widow 3=Disabled 4=Landless
5= Income<20$/month/person (National Poverty Line for Urban Area-2007)
6= Loss agricultural land from 20% of productive land (bypass)
7= Affected on main house from 40% 8= Loss of business or selling place

III. SOCIOECONOMIC PROFILE OF AFFECTED HOUSEHOLD

3.1 How many members are in the household? .....

3.2 How many couple are there in the household? .....

3.3 If there is more than one family, who are living in this house, give all.

No.	Relationship to H/H **(code)**	Age	Sex **1=M 2=F**	Marital status **(code)**	Literate **1=No 2=Yes**	School attending **1=No 2=Yes**	# Years of graded completed education	Working Activities **(code)**		
								1st	2nd	3rd
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										

Code B: 1=Self, 2=Spouse, 3=Son/Daughter, 4=Parent, 5=Brother/Sister, 6=Relative, 7=Other (specify).....

Code E: 1=Single, 2=Married, 3=Divorced/separate 4= Widowed 5 = Other.....

Code I, J and K:

00	None or Unable to work	09	Batery charging	18	Government officer
01	Small business	10	Construction Worker	19	Manufacturer/Craftsman
02	Food processing for sale*	11	Garment factory worker	20	Farmer (on own farm)
03	Hotel/tourism/restaurant	12	Company staff	21	Fishman
04	Hair cut/dresser/Beauty shop	13	Credit provider/ Money exchange	22	Livestock Raising
05	Wedding host	14	Motor transporter	23	NGO staff
06	Merchant/Market trader	15	Taxi driver	24	Migration out for job
07	Machinery/Vehicle mechanic	16	Agricultural laborer/Worker	25	Pupil/Student
08	Electrician	17	Non agricultural laborer/Worker	26	Other (specify) ……..

3.4 Household Assets

3.4.1 Agricultural equipments:

Equipment types	**Number**	**Total Cost (USD)**	**Equipment types**	**Number**	**Total Cost (USD)**
Oxcart			Tractor		
Plow			Hand tractor		
Harrow			Rice mill machine		
Water pump			Other.....		

3.4.2 Other Assets:

Equipment types	Number	Total Cost (USD)	Equipment types	Number	Total Cost (USD)
Bicycle			TV/VCR/VCP		
Motorbike			Sewing machine		
Bamboo rail			Air conditioner		
Car/ Pickup/Minivan			Washing machine		
Truck			Refrigerator		
Boat without engine			Telephone		
Boat with engine			Generator		
Radio/Cassette Player			Other (specify) …….		

3.4.3 Livestock:

Type of livestock	Total Number		Sales of livestock in last year	
	Quantity	Value in USD	Quantity	Value in USD
Oxen				
Buffalo				
Pigs				
Horses				
Chickens				
Ducks				
Other (spec.).....				

3.4.4 Main Trees:

Code of Trees

1=Bamboo	2=Banana	3=Coconut	4=Tamarind
5=Chan Kiri	6=Sapodilla	7=Deum Chan	8=Kamping Reach
9=Kantuot	10=Khvet	11=Jack Fruit	12=Korki
13=Kor	14=Krasang	15=Mkak	16=Longan
17=Pring	18=Jujube	19=Sdau	20= Orange
21=Soda	22=Grapefruit	23=Custard apple	24=Sour sop
25=Guava	26=Teuk Dos Kou	27=Acacia/Eucalyptus	28=Lemon
29=Mango	30=Papaya	31= Sugar Palm	32=Cashew
33=Other.....			

No.	Tree types	Unit	Total Quantity	Income in last year (Riel)	Number of affected trees	
					0 – 12.5 (m)	12.5 – 20.0 (m)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Total Income (Riel)						

3.4.5 Land and Agricultural products:

A. What is your affected land in ROW? (The question "A" is not for bypass)

Land Category	Total of using (m^2)	Affected Area		
		Length (m)	Width (m)	Size (m^2)
Rice field (Sre)				
Orchard (Chamkar)				
Flooded Area				
Commercial				
House Plot / Home Garden				
Other (specify).....				

B. What is your affected land outside ROW?

Land Category	Total Owning (m^2)	Affected Area		
		Length (m)	Width (m)	Size (m^2)
Rice field (Sre)				
Orchard (Chamkar)				
Flooded Area				
Commercial				
House Plot / Home Garden				
Other (specify).....				

C. Agricultural production (all land):

Crop	Area grown (m^2)	Harvested Amount (Kg)	Unit price (Riel/Kg)	Production cost (Riel)	Farming Expend (Riel)	Gross Return (Riel)
Dry rice						
Wet rice						
Vegetable						
Other crop …..						
Other crop …..						
Other crop …..						
Total (Riel)						

3.4.6 House and other Structures

Structure Type Code:

1=House 2=House/Shop 3=Kitchen 4=Bathroom
5= Grange/Storage 6=Shop/Restaurant 7=Craft / Workshop
8= Stall / Market stall 9= Animal table/pigsty 10=Other (specify) .....

Floor Code:

1st=One floor 2nd=Two floors 3=Khmer Style 4= Other .....

Construction Material Code:

1- Temporary Material	2- Thatch	3- Tin / Fibro/ Plastic Sheet	4- Wood
5- Bamboo	6- Roofing Tile	7- Floor Tile	8- Mortar
9- Concrete	10- Earth	11-Metal	12- Brick

13-Others (spec.): ……..…

A. Interval: 0 – 12.5 (m):

Material	Structure: …	Structure: …	Structure: …	Structure: …
Roof				
Wall				
Floor				
Column				
Story				
Total floor area, m^2				
Affected area, m^2				

B. Interval: 12.5 – 20.0 (m):

Material	Structure: …	Structure: …	Structure: …	Structure: …
Roof				
Wall				
Floor				
Column				
Story				
Total floor area, m^2				
Affected area, m^2				

- How many years have you been living here? ..... year(s)
- If you rent the affected structure, how much do you pay per month? .....……Riels
- Where will you relocate to resettle? Shifting back, to same village, other village

3.4.7 Other fixed assets:

No.	TYPE OF ASSETS	UNIT	Affected Quantity	
			0 – 12.5 (m)	12.5 – 20.0 (m)
1.	Concrete Well	set		
2.	Pump Well	set		
3.	Timber post with wire	Meter long		
4.	Concrete post with wire	Meter long		
5.	Brick Wall, 100mm	Meter long		
6.	Brick Wall, 200mm	Meter long		
7.	Water supply system	m		
8.	Mortar	m^2		
9.	Vehicle washing place			
10.	Toilet			
11.	Other (spec.): …….			

3.5 Incomes

3.5.1 What are the main sources of total income in your household?

1st ☐ 2nd ☐ 3rd ☐ 4th ☐

1. Wages or salary 2. Farming hired labor 3. Business or trade 4. Agricultural production
5. Livestock 6. Fishing 7. Equipment making 8. Equipment renting
9. Transportation 10. House/land renting 11. Remittance 12. Fish culture
13. Fish production 14. Other (spec.)……

3.5.2 How much the total income (cash and kind) from these activities in ***Last Year***:

1st ..... Riels
2nd ..... Riels
3rd ..... Riels
4th (others)..... Riels

Total in ……..……. Riels (convert to USD ……)

3.6 Amount of income getting from the ROW using (0-20m): .....Riel
Income source: .....

3.7 Expenses

Annual expense ……Riel converts to USD: ……

3.7.1 Daily expense (recently expense):

Item	Unit	Price per unit/Riel	Total price (Riel)
Rice			
Food (fish, meat, vegetable, and spices)			
Snack			
Wood/charcoal/fuel/gas			
Other (spec.)….....			
Total:			
Annual total (365 days)			

3.7.2 Monthly expense:

Item	Unit	Price per unit/Riel	Total price (Riel)
Cosmetics (perfume, powder, and soap)			
Health (drug, treatment fee).			
Water			
Electricity power			
Other service			
Gasoline			
Other (spec.).....			
Total:			
Annual total (12 months)			

3.7.3 Yearly expense:

Item	Unit	Price per unit/Riel	Total price (Riel)
Clothes			
Education (material, tutoring, and meals at school)			
Furniture			
House repairing			
Ceremonies/marriages			
Entertainment/travel			
Other (spec.).....			
Annual total:			

3.8 Health

3.8.1 Where do you and your household members often go for? (Please tick)

Facility	Health Treatment	Serious Illness	Birth Delivery	How far? (Km)

Traditional Midwife				
Traditional Healer				
Drug shop				
Private Pharmacy				
Health Centre				
Provincial Hospital				
Private Clinic				
Private Hospital				
Other:				

3.8.2 What are the three most important problems with the public health services for the people in this village?

1 = Lack of beds/Equipment 2 = Not enough medicine
3 = No physician medical 4 = Poor quality of service
5 = No midwife 6 = High price
7= Long distance 8 = Unsanitary
9 = Unhelpful staff 10 = Other (Describe).....

1. Most important ☐
2. Second important ☐
3. Third important ☐

3.9 Education

3.9.1 How many children in household is primary school age (6-11)? ☐

3.9.2 How many children in household attend primary school? ☐

3.9.3 If children of primary school age, not attending school, main reason for non-attendance? ☐

1 = Cannot afford school costs 2 = Have to help in business
3 = Takes too long to get to school 4 = other (describe).....

3.9.4 How many children in household is lower secondary school age (12-14)? ☐

3.9.5 How many children in household attend lower secondary school? ☐

3.9.6 If children of lower secondary school age, not attending school, main reason for non-attendance? ☐

1 = Cannot afford school costs 2 = Have to help in business
3 = Takes too long to get to school 4 = other (describe).....

3.10 Credit:

3.10.1 Have you taken any loan? ☐ No **(skip to Q. 3.11)** ☐ Yes

3.10.2 If yes, please fill the table below:

When did you borrow money? **Month/year**	Credit Amount **(Riel)**	From Whom **(Code)**	Interest rate **%**

Code: 1 = Govt. /Bank 2 = NGOs / Society 3 = Landlord / traders
4 = Credit provider 5 = Relative 6 = other (specify).....

3.10.3 What did you use this money for **(multi answers)**? ☐

1 = Food consumption 2 = Health care 3 = Schooling costs
4 = Building/Repairing house 5 = Ceremony/Wedding 6 = Farming
7 = Business improving 8 = Supporting to family members
9 = To meet cost caused by the Project 10 = other (specify).....

3.11 Living condition

A. Water source:

3.11.1 Drinking/cooking: ……. Washing/bathing…….

1= Stream/river 2= Lake/pond 3= Protected well 4 = Unprotected wel
5= Rain water 6= Buying 7= Waterworks 8 = other (specify).....

3.11.2 If buying from vendor, how much it cost per day? ..... Riels

3.11.3 If you collect by yourself, how much time you spend to do so? ..... minutes

3.11.4 Is the drinking water filter? ☐ Yes ☐ No

3.11.5 Is the drinking water boiled? ☐ Yes, always ☐ Yes, sometimes ☐ No

3.11.6 Is the drinking water filtered? ☐ Yes ☐ No

B. Sanitation:

3.11.7 Do you have a pit latrine? ☐ Yes ☐ No

3.11.8 Is there any drainage system near your house? ☐ Yes ☐ No

3.11.9 If yes, please tick in box as follow:

- Proper rain water drainage ☐
- Waste water drainage ☐
- An open drain ☐

C. Energy source:

3.11.10 Lighting: ……. Cooking: …….

1 = None 2 = Fire wood 3 = Private generator
4 = State Electricity 5= Battery 6 = Charcoal
7 = Gas / Kerosene 8 = Torch/Rubber 9 = Other (specify)…….

3.12 Accessibility to other facility service

Please indicate the distance of following facility service:

Facilities	Average Distance (Km)
Nearest School	
Market	
Religious centre (Pagoda)	
Drug shop	
Health Centre/ Referral(or District) hospital	
Provincial/Municipality hospital	
Police Administrative Post	
Commune Centre	
District Centre	
Other Urban	

IV. PERCEPTION ON THE PROJECT

4.1 What do you think about the project? ☐

0 = No answer 1 = Bad 2 = Good & Bad 3 = Good 4 = Very good

4.2 If good/very good, rank the 3 following statements in the boxes:

☐ Improve cargo transportation
☐ Decrease of congestion/accident
☐ Improve travel of tourist
☐ Attract more investment
☐ Increase land price
☐ Improve environment
☐ Create more direct/indirect job
☐ Reduced daily expenditures
☐ Flood prevent
☐ Big push to outskirts area (Bypass)

☐ Improve access other facilities ☐ Improve local product marketing

☐ Others (spec.) ……..

4.3 If you think there are some bad things about the project, rank 3 following statement in the boxes:

☐ Increase daily expenditures
☐ Loss of good trading site
☐ Increase accident
☐ Disturbs families and community
☐ Loss house / shop
☐ Loss of land use in ROW
☐ Worsen access to school
☐ Worsen environmental impact
☐ Decrease household income
☐ Affected on public facilities
☐ Loss occupation
☐ Worsen people health condition
☐ Makes people migrate away
☐ other (spec.) …….

4.4 Will you agree to move your affected properties from PRW? ☐

0 = No answer 1 = Not agree 2 = Agree with assistant 3=Voluntary to move

SIGNATURE

Household Head **Village Headman** **Interviewer**

Sketch map of the affected house