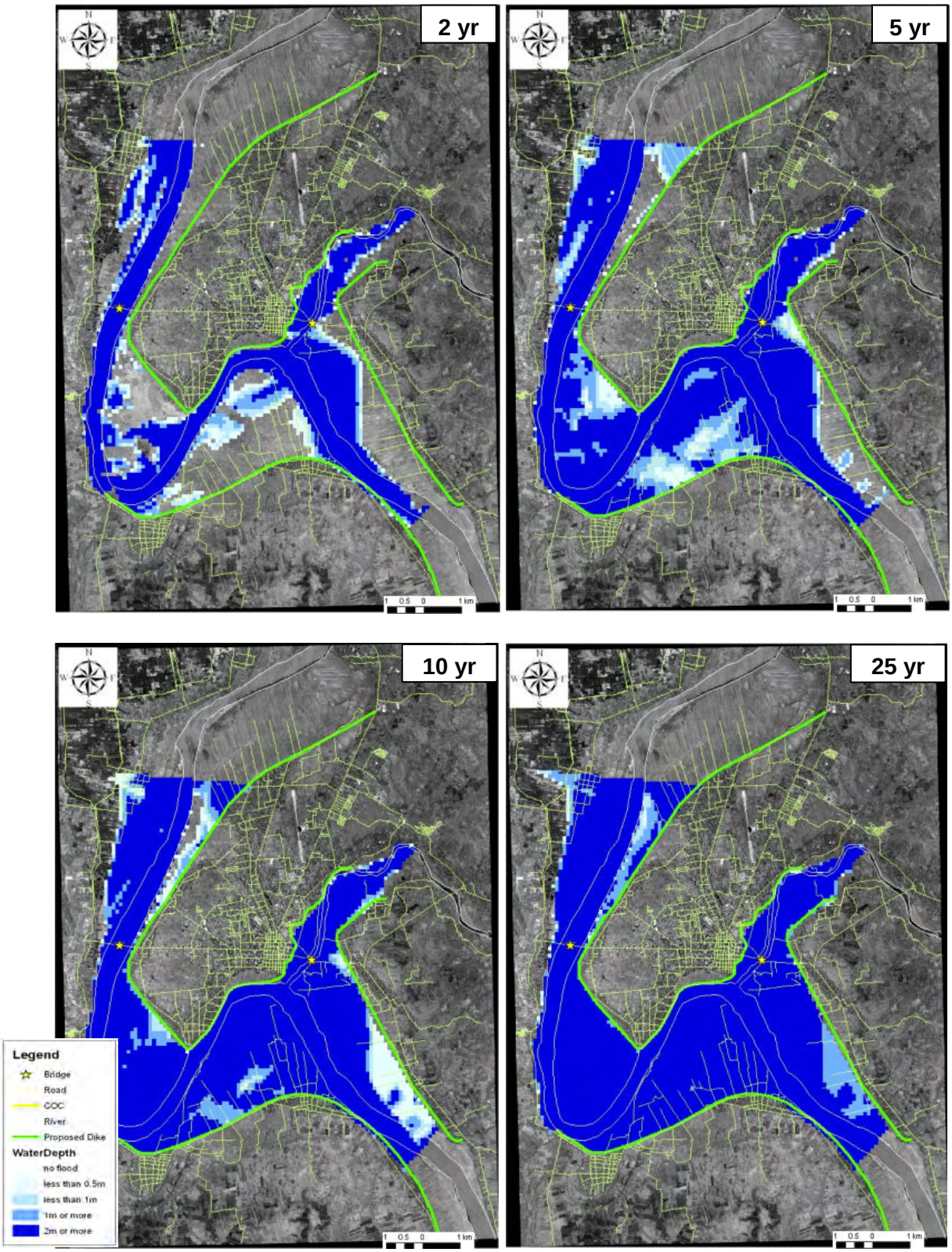
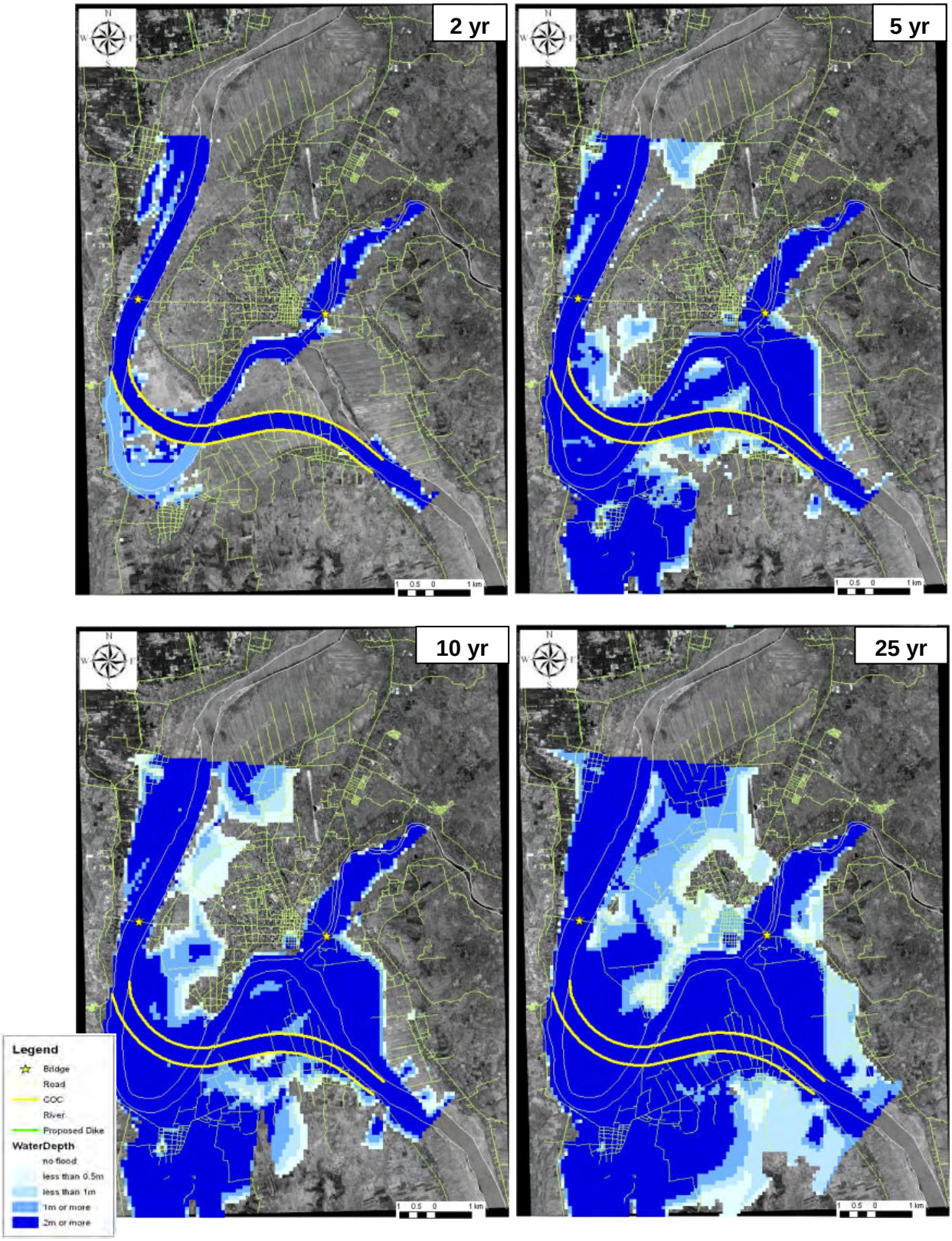
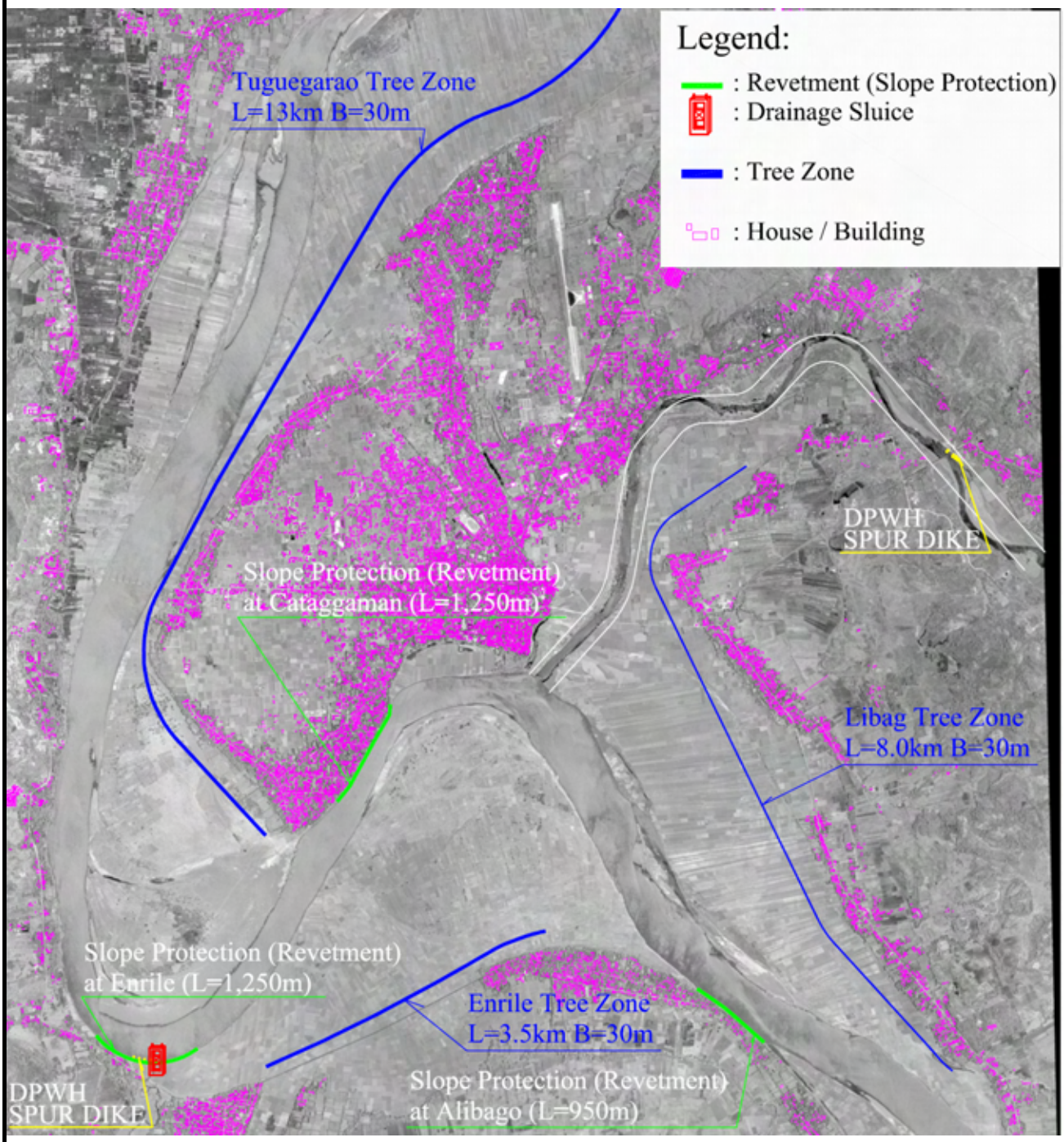


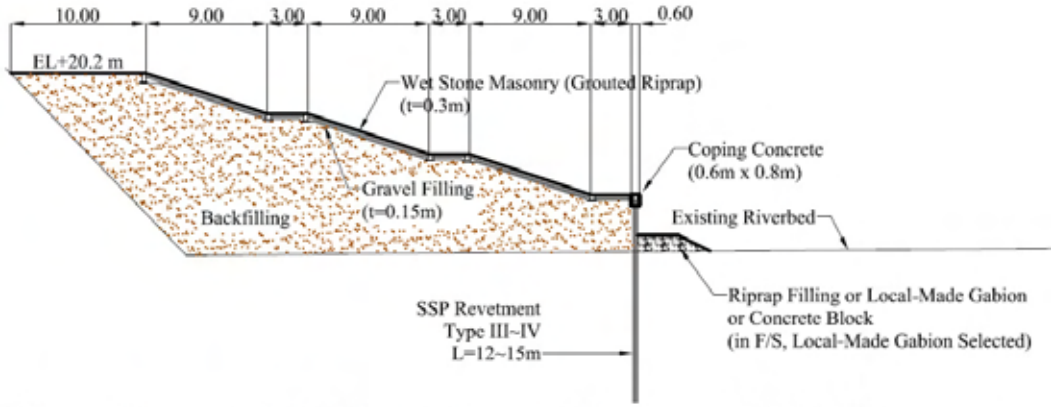
THE PREPARATORY STUDY FOR SECTOR LOAN ON DISASTER RISK MANAGEMENT	図 7.6 洪水氾濫計算結果 (With Alt-C2: Dike & Slope Protection)
CTI Engineering International Co., Ltd. Nippon Koei Co., Ltd	



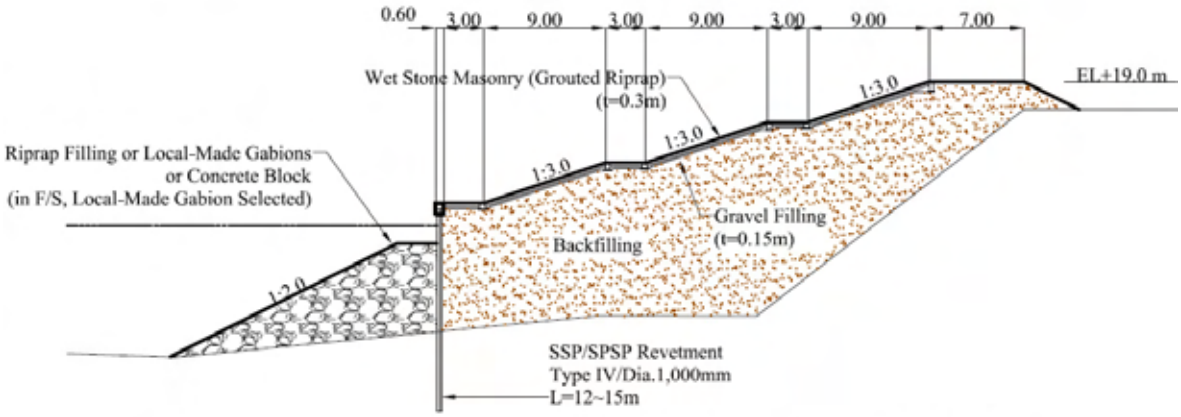
THE PREPARATORY STUDY FOR SECTOR LOAN ON DISASTER RISK MANAGEMENT	図 7.7 洪水氾濫計算結果 (With Alt-C3: Cut-Off Channel)
CTI Engineering International Co., Ltd. Nippon Koei Co., Ltd	



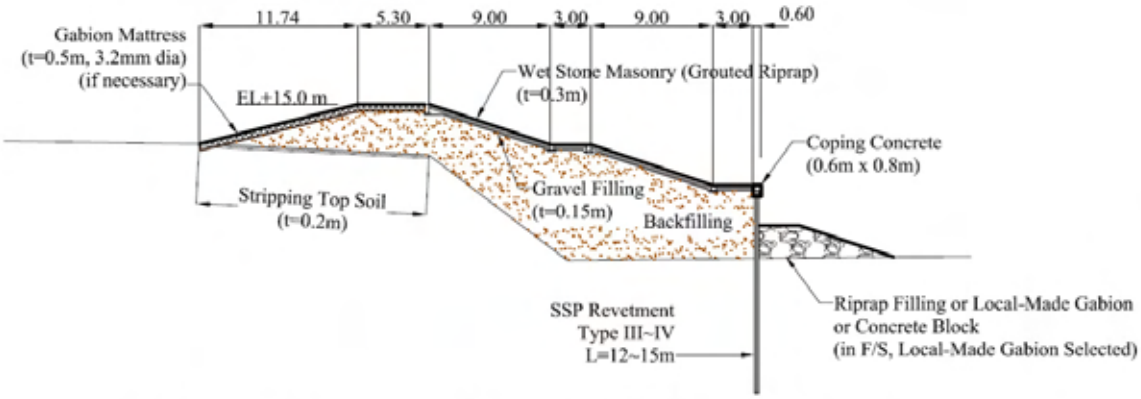
THE PREPARATORY STUDY FOR SECTOR LOAN FOR DISASTER RISK MANAGEMENT	図 7.8 セクターローン事業で実施することを 提案する 3 箇所の護岸位置図
CTI Engineering International Co., Ltd. Nippon Koei Co., Ltd	



STANDARD CROSS SECTION OF REVETMENT-1
(AT ALIBAGO SITE)

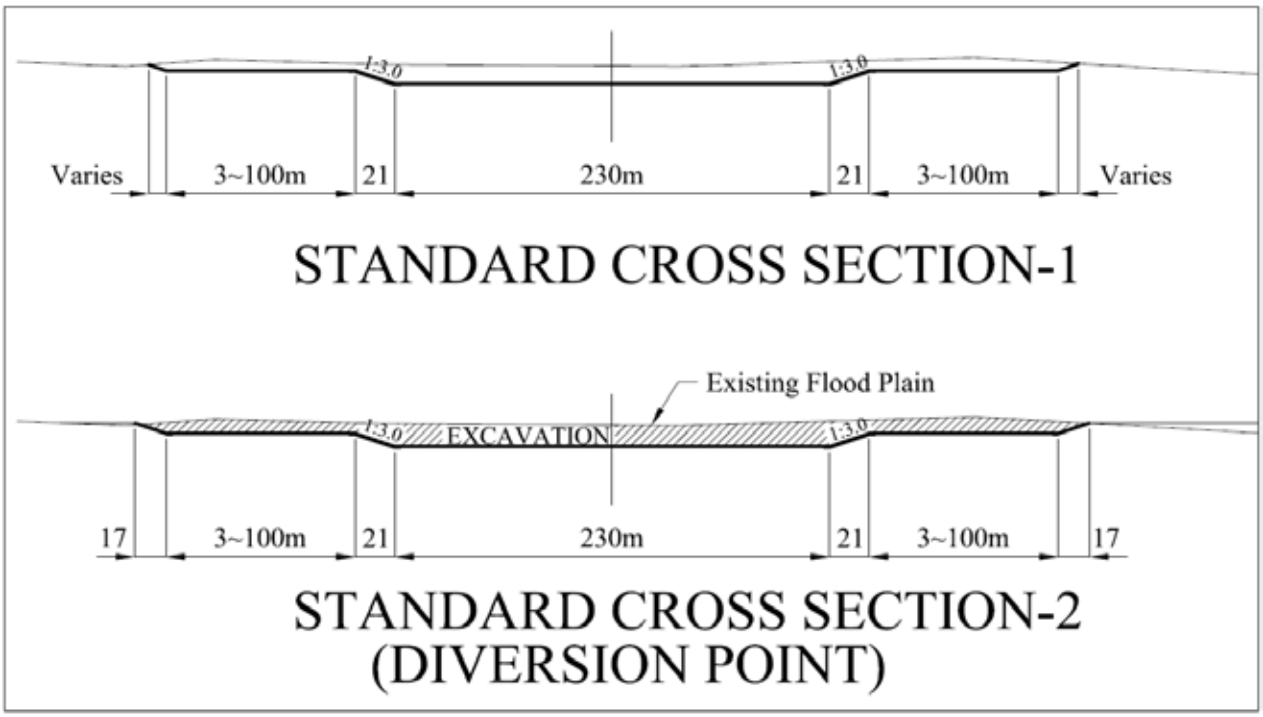


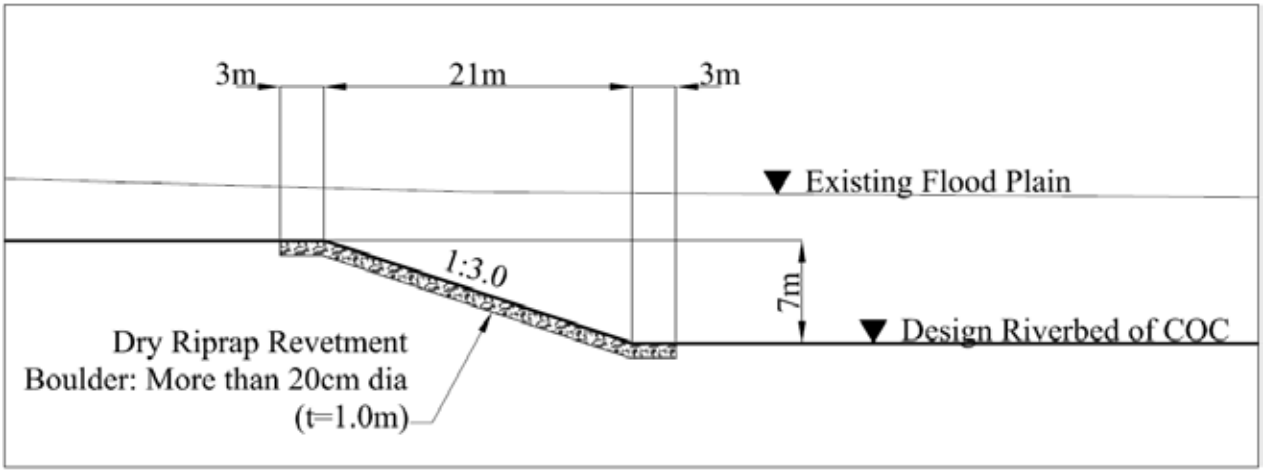
STANDARD CROSS SECTION OF REVETMENT-2
(AT CATAGGAMAN SITE)



STANDARD CROSS SECTION OF REVETMENT-3
(AT ENRILE SITE)

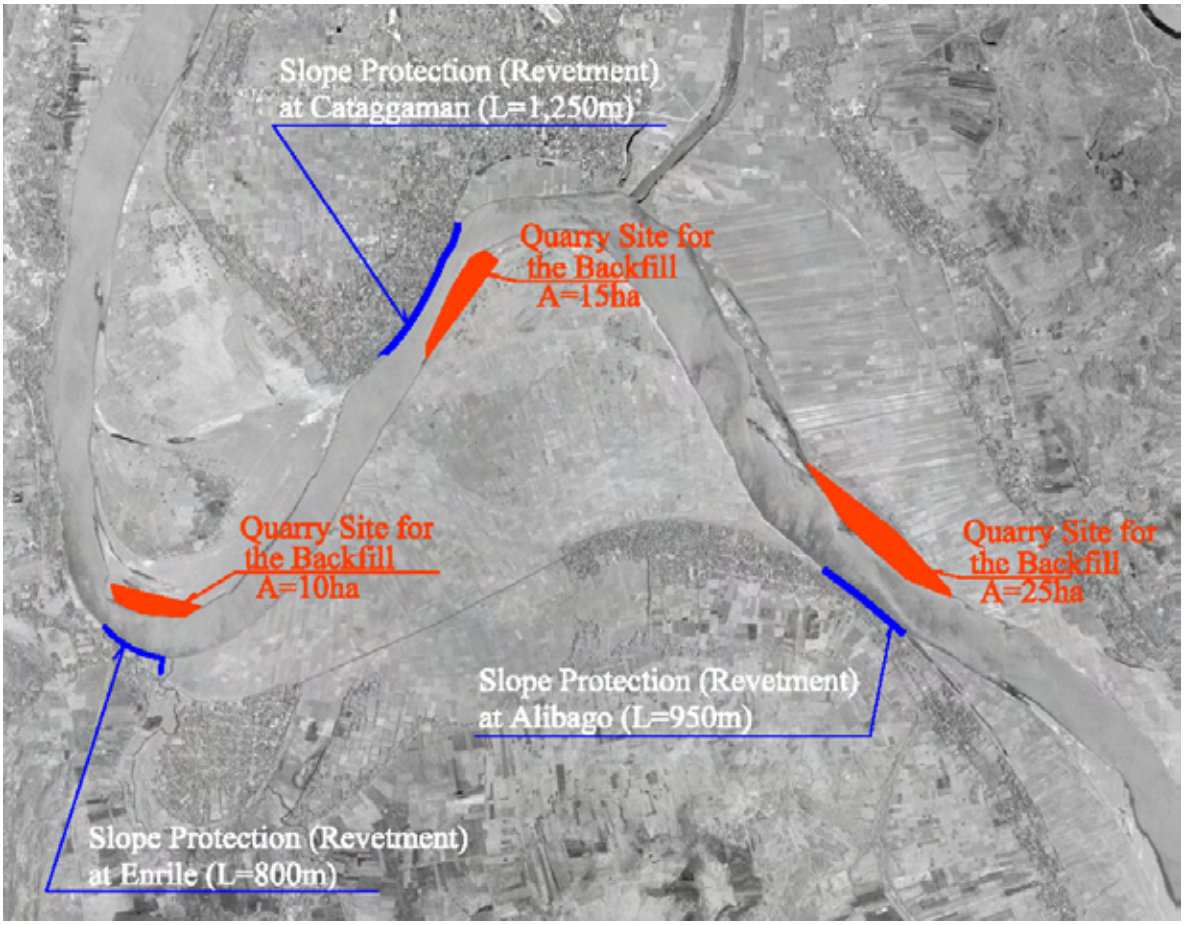
THE PREPARATORY STUDY FOR SECTOR LOAN FOR DISASTER RISK MANAGEMENT	図 7.9
CTI Engineering International Co., Ltd. Nippon Koei Co., Ltd	提案護岸の標準断面図



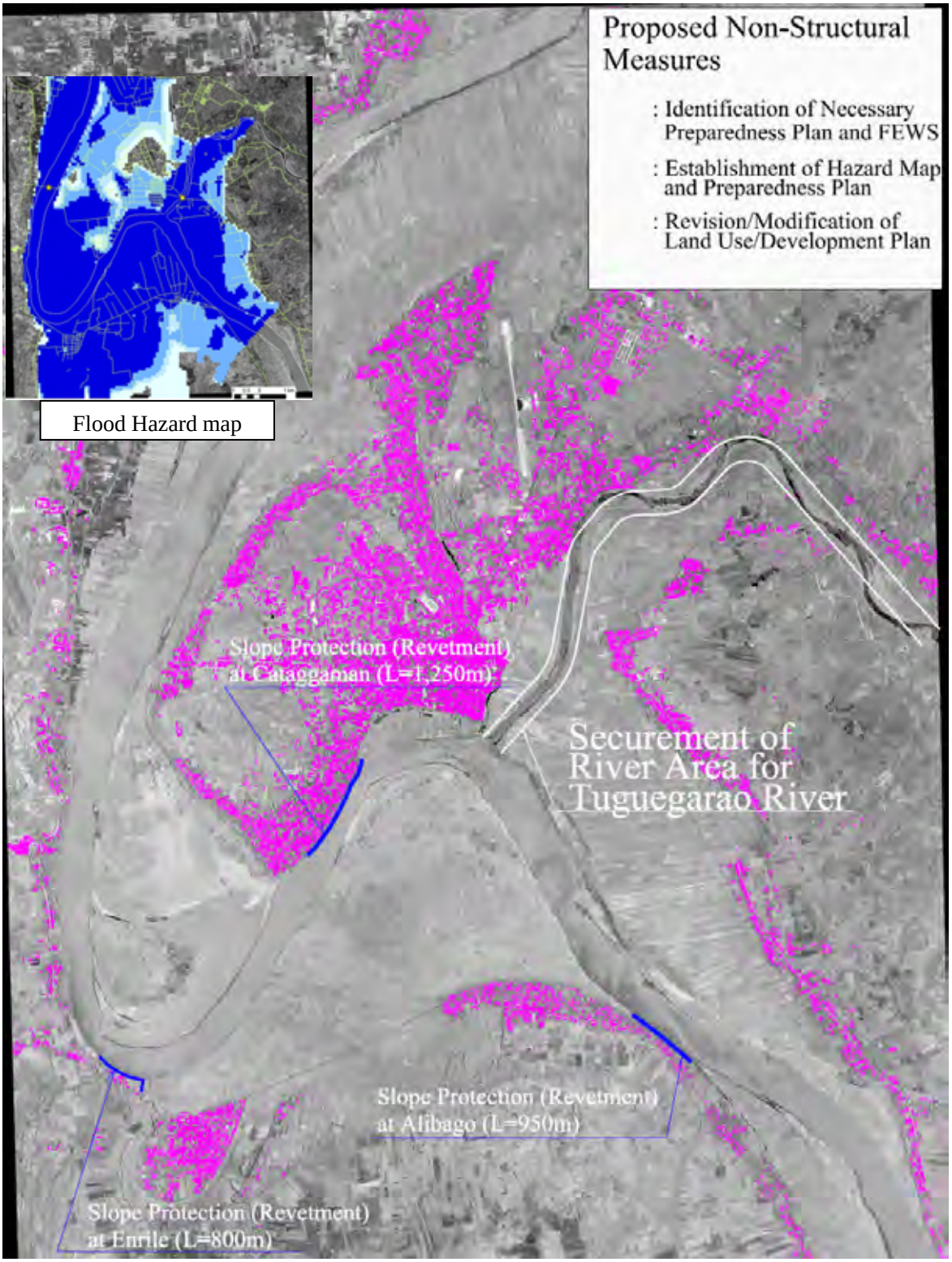


(Source: 2002 F/S)

THE PREPARATORY STUDY FOR SECTOR LOAN FOR DISASTER RISK MANAGEMENT	図 7.10
CTI Engineering International Co., Ltd. Nippon Koei Co., Ltd	2002 年 F/S で提案されて本調査で評価した Cut-Off Channel 標準横断図



THE PREPARATORY STUDY FOR SECTOR LOAN FOR DISASTER RISK MANAGEMENT	図 7.11 護岸建設埋め戻し土提案土取り場
CTI Engineering International Co., Ltd. Nippon Koei Co., Ltd	



THE PREPARATORY STUDY FOR SECTOR LOAN FOR DISASTER RISK MANAGEMENT	図 8.1 Cagayan 川 Tguegarao 地区の提案洪水構造物・非構造物対策
CTI Engineering International Co., Ltd. Nippon Koei Co., Ltd	

ANNEX

ANNEX PIIA 9-1

BIOLOGICAL SURVEY IN CAGAYAN RIVER

(1) Survey methodology

The survey was conducted based on 1) the eye-checking on the habitats/signs and 2) interview to the local residents.

(2) Collected data

(a) Flora

The reconnaissance survey reveals that the proposed project site is largely agricultural and vast tracks of lands are planted with different agricultural crops. Rice and corn are among the most dominant crops and considered to be the leading economically important plant species in the area. The Table below shows the different plant species that makes up the vegetation cover of the proposed project site.

Table 1 Collected Species in the Project Site (Flora)

Family	Scientific Name	Common Name	Ecological Status	Ecological and Economic Importance
Anacardiaceae	*Buchanania aborescens*	Balainghasai	Tree; depleted/endemic	Light construction material
	Semecarpus cunneiformis	Ligas	Tree; depleted/endemic	Fruites edible; medicinal value
	Mangifera indica	Mango	Tree; endemic; common	Cultivated for food; medicinal value; wood craft
Annonaceae	*Cananga odorata*	Ilang ilang	Tree; indigenous	Ornamental
Apocynaceae	*Alstonia scholaris*	Dita; WHITE CHEESE WOOD	Smooth tree growing 6-20 meters; endemic	Medicinal; Pesticidal
Araliaceae	*Scheffera odorata*	Five fingers	Woody vine; endemic	Ornamental
Caricaceae	*Carica papaya*	Papaya	Shrub; endemic; common	Cultivated for food; medicinal value
Combretaceae	*Terminalia foetidissima*	Talisai gubat	Tree; common/ Indigenous	Shade tree, ornamental, edible fruit
Cyatheaceae	*Cyathea sp.*	Fern	Common	Ornamental
Datiscaceae	*Octomeles sumatrans*	Binuang	Tree; common/endemic	Light construction; charcoal making
Euphorbiaceae	*Antidesma bunius*	Bignai	Deciduous tree; distributed in thickets, in towns and settlements, occasional in forests	Medicinal; food
Graminae	*Arundo donax*	Tambo	Grass; common	Handicrafts
	Schizostachyum sp.	Climbing bamboo	Bamboo; depleted	Ornamental purpose, ecological balance
Leeaceae	*Leea philippinensis*	Kaliantan	Shrub; endemic	Biodiversity
Meliaceae	*Azadirachta indica*	Neem tree	Tree; introduced	Pesticide;
Mimosaceae	*Leucaena diversifolia*	Ipil-ipil	Tree; common/ Indigenous	Fuelwood; light construction material
Moraceae	*Ficus septica*	Hauili	Small tree; endemic	Wild crafted; medicinal value
	Ficus stipulosa	Balete	Tree; endemic	Medicinal; Ornamental (bonsai)
	Artocarpus blancoi	Antipolo	Tree; common/ Indigenous	Light construction
Moringaceae	*Moringa oleifera*	Malunggay; Horse raddish tree	Shrub; endemic; common	Cultivated for food; medicinal value

Family	Scientific Name	Common Name	Ecological Status	Ecological and Economic Importance
Musaceae	*Musa sapientum*	Banana	Shrub; endemic; common	Cultivated for food; medicinal value
Myrtaceae	*Psidium guajava*	Guava	Evergreen shrub; small tree; endemic	Medicinal; food
	Syzgium cumini	Duhat; Java plum	Tree; endemic	Medicinal; food
Palmae	*Cocos nucifera*	Coconut	Palm; common/exotic	Multipurpose, medicinal value
	Caryota rumphiana	Takipan	Palm; endemic	Ornamental
Polypodiaceae	*Nephrolepis sp.*	Fern	Fern; common	Ornamental
Rhizoporaceae	*Carallia brachiata*	Bakauan gubat	Tree; depleted	Tanning, dyeing, fuelwood/charcoal
Sapotaceae	*Palaquium philippinense*	Malak-malak	Tree; endemic	Light construction, medicinal value
Sterculiaceae	*Theobroma cacao*	Kakaw; cocoa	Small tree; introduced	Medicinal; food; wood craft
Verbenaceae	*Lantana camara*	Sapinit	Weed; common/exotic	Pesticidal; hedge plant, medicinal
	Vitioipremna philippinensis	Lingo-lingo	Tree; endemic	Heavy construction
Zingeberaceae	*Alpinia elegans*	Tagbak	Tree; indigenous	Ornamental

Small to medium sized trees with a diameter ranging from 10-20cm were found in the proposed project site. Such trees include hauili (*Ficus septica*), bayabas (*Psidium guajava*), ilang-ilang (*Cananga odorata*) and dita (*Alstonia scholaris*). Pioneer species such as antipolo (*Artocarpus blancoi*) were also observed thriving in the area. Some bignai trees (*Antidesma bunius*) were observed to be relatively abundant in this area. Bignai serves as bird feed but local residents reported that the fruits of bignai are edible and are good for wine and jam making. The river banks were planted with papaya, banana and other vegetables.

(b) Fauna

The table below shows the different animals that are still present and inhabits the proposed project site.

Table 2 Collected Species in the Project Site (Fauna)

Scientific Names	Common Names	Local Names	Family
Birds			
Aethopyga pulcherrima decorosa	Mountain sunbird		Nectariniidae
Bubulcus ibis coromandus	Cattle egret		Ardeidae
Centropus viridis viridis	Philippine coucal	Sabukot	Cuculidae
Collocalia brevirosris whiteheadi	Himalayan swiftlet		Apodidae
Collocalia vanikorensis amelis	Gray swiftlet		Apodidae
Corvus macrorhynchus philippinus	Large-billed crow	Uwak	Corvidae
Cypsiurus parvus pallidior	Palm swift		Apodidae
Gallus gallus gallus	Jungle fowl	Labuyo	Phasianidae
Hypsipetes philippinus philippinus	Philippine bulbul		Pycnonotidae
Lonchura malacca jagori	Chestnut mannikin	Mayang pula	Estrildidae
Merops viridis americanus	Chestnut-headed bee-eater		Meropidae

Scientific Names	Common Names	Local Names	Family
Ninox philippensis centralis	Philippine boobook owl		Strigidae
Passer montanus malaccensis	Tree sparrow	Maya	Ploceidae
Phapitreron leucotis brevirostris	White-eared brown fruit dove		Columbidae
Pycnonotus goivier samarensis	Yellow-vented bulbul	Tagulolla	Pycnonotidae
Rallina eurizonides eurizonoides	Phil. Banded crake	Tikling	Rallidae
Rallus torquatus torquatus	Barred rail	Tikling	Rallidae
Rhipidura javanica nigritorquia	Malaysian fantail		Monarchidae
Treron pompadora canescens	Pompadour green pigeon		Columbidae
Turnix sylvatica celestinoi	Striped button-quail	Pugo	Turnidae
Mammals			
Macaca fascicularis	Long-tailed macaque	Datag	Cercopithecidae
Ptenochirus jagorii	Musky fruit bat	Kwaknit	Pteropidae
Cynopterus brachyotis	Short nosed fruit bat		
Rattus tanezumi	Asian black rat	Dagang bukid	Muridae
Rattus exulans	Polynesian rat		Muridae
Reptiles			
Gecko gekko	Tockay gecko	Tuko	Gekkonidae
Hemidactylus frenatus	House gecko		
Mabuya multifasciata	Common brown skink	Bubuli	Scincidae
Ophiophagus hannah	King cobra	Cobra	Elaphidae
Varanus salvator	Common monitor lizard		
Lycodon aulicus	Common wolf snake		
Python reticulatus	Reticulated python	Sawa	Boidae/ Pythonidae
Amphibians			
Bufo marinus	Marine toad	Palaka	Bufonidae
Rana magna	Frog	Palakang bukid	

Two commensal species, the Asian Black Rat (*Rattus tanezumi*), regarded as a serious pest to agricultural crops and the Polynesian Rat (*Rattus exulans*), a medium to large-sized brown rat predominates Tuguegarao and Enrile. This commensal species was typical of any agricultural area, where it helps as a biological control to ground insect pests.

The presence of macaque (*Macaca fascicularis*) was also indicative of the importance of the project area relative to its surrounding communities. This primate requires a relatively large area to forage, but according to some local residents, these macaques were observed to tolerate disturbances since they are already accustomed to depend on agricultural crops for food. However, their number has dwindled these past years due to the rapid loss of their habitat as a direct result of land conversion from forest to into agricultural, residential, and commercial lands. Just the same, these monkeys, as local residents claim, were considered as pests because they feed on their agricultural crops such as corn, rice and other root crops.

The common short-nosed Fruit Bat (*Cynopterus brachyotis*) and the musky fruit bat (*Ptenochirus jagorii*) are still common in the area. These fruit bats are common native species because they can tolerate and survive in a wide range of habitat types that ranges from secondary growth plant cover to agricultural areas. These bats are very tolerant even with very small patches of forest growth, as long as fruit trees are present in the area. They are extremely important in seed dispersal for the regeneration of second growth

forest. Fruit bats are basically important for seed dispersal of fruit-bearing trees and they do not cause substantial damage to any agricultural crops.

Birds are among the many wildlife species that play an important role in the process of seed dispersal and the eventual regeneration of the second growth forests. It was observed that bulbuls and sunbirds and a number of doves and pigeons are quite abundant in both areas. Presence of these bird species suggests that fruit bearing plant species as well as seed-bearing plant species are still abundant in the area. These birds play an important role in the regeneration of second growth forests because of their ability to disperse seeds.

Two species of amphibian , a frog (*Rana magna*) and an introduced species of toad (*Bufo marinus*), were observed in the area. These common species were found in disturbed habitats and in agricultural areas. Some species of reptiles such as the Towkay gecko (*Gekko gecko*), the common house gecko (*Hemidactylus frenatus*), common ground skink (*Mabuya multifasciata*), common monitor lizard (*Varanus salvator*), common wolf snake (*Lycodon aulicus*), and the reticulated python (*Python reticulatus*) are still observed in the area. Most of the lizards and geckoes were found in households and within the vicinity of human settlements.

ANNEX PIIA_9-2

WATER QUALITY ANALYSIS (CAGAYAN)

(1) Sampling points

The sampling points are shown below.

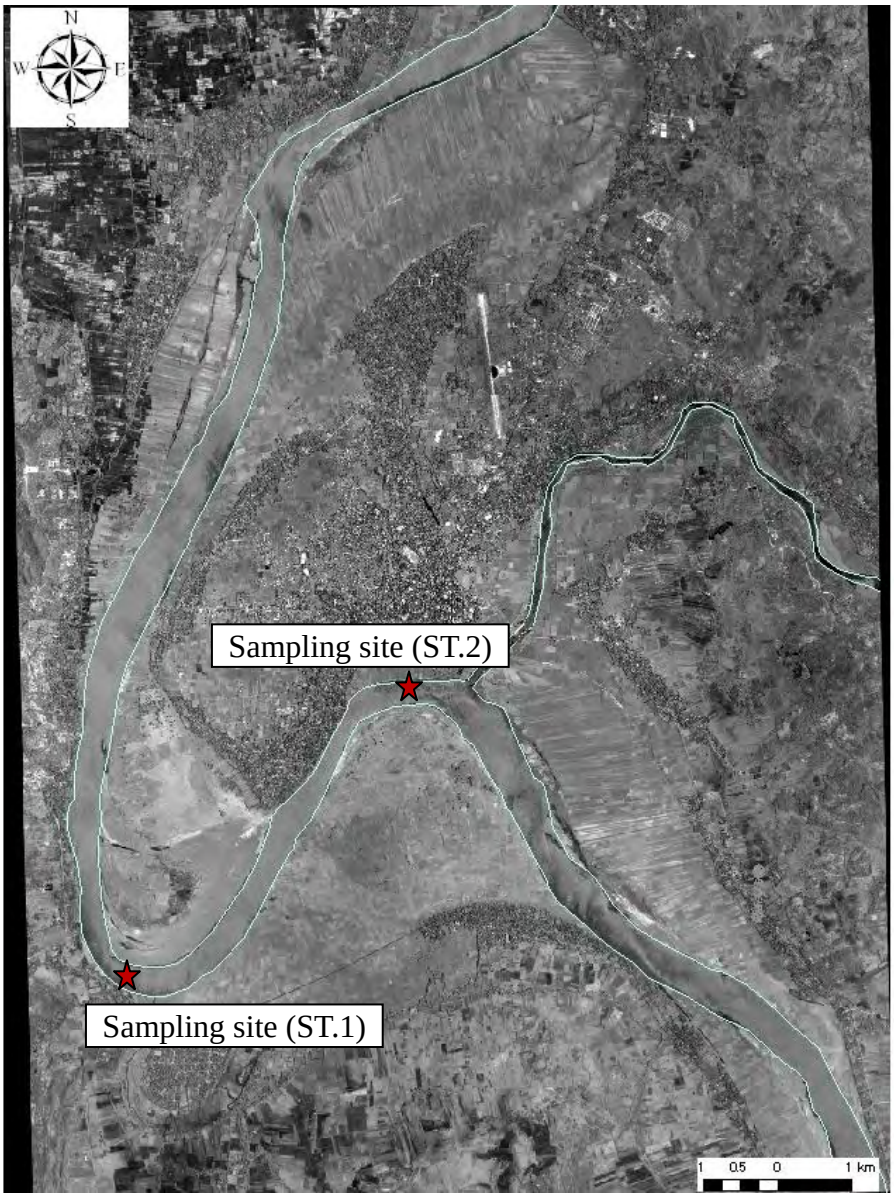


Figure 1 Sampling sites

(2) Collected data

The summary of the data is shown as below.

Table 1 Summary of Sampling Data (heavy metals)

(Unit: ppm)

Analysis	Sample 1	Sample 2	Class C waters	Method detection Limit
Total mercury	<0.0001	<0.0001	0.002	0.0001
Total Arsenic	0.03	<0.02	0.05	0.02
Total Cadmium	<0.002	<0.002	0.01	0.01

Analysis	Sample 1	Sample 2	Class C waters	Method detection Limit
Total Chromium	<0.005	<0.005	0.05 (hexavalent)	0.005
Total Lead	<0.01	<0.01	0.05	0.01
Total Cyanide	<0.01	<0.01	0.05	0.01

The sampling analysis data sheets are shown below.

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Results of Analyses

CRL-SN-09-1990
Page 1 of 6

Customer : Center for Environmental Studies and Management, Inc.
Address : Unit 206, UAG Building, Ortigas Ave., Greenhills, San Juan, Metro Manila
Attn. : Bethela Castro - Del Nero

Customer's Project : Disaster Risk Management

Date Sampled : 26-Jun-09
Date Received : 30-Jun-09
Matrix, Units : Water, mg/L
Analysts : TPS / JBC

Cagayan ST-1 water (1/2)

Lab. No. : 25078-01
Sample I.D. : CAG ST 1 H_2O 62609

Analyses	Dates of Analyses	Results, as received	MDL	DLR
AAS - Cold Vapor (Total Mercury)	07/08/09	< 0.0001	0.0001	0.0001
Colorimetry - SDDC (Total Arsenic)	07/02/09	0.03	0.02	0.02
Flame AAS (Total Cadmium)	07/06/09	< 0.002	0.002	0.002
Flame AAS (Total Chromium)	07/06/09	< 0.005	0.005	0.005
Flame AAS (Total Lead)	07/03/09	< 0.01	0.01	0.01

MDL = Method Detection Limits
DLR = Detection Limits for Reporting (MDL x Dilution Factor)
References: Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 21st Edition.
Test Methods for Evaluating Solid Wastes, Vol 1A, USEPA, Third Edition / 1988 Annual Book of ASTM Standards, Volume 11.01
Varian / Perkin Elmer Analytical Methods, Flame Atomic Absorption Spectrophotometry

Reviewed By: _____ Date: _____
Chas C. Arroyo
Laboratory Manager
PRC License No.: 6701

Approved By: _____ Date: _____
Maria Carmela Q. Capule
Laboratory Director
PRC License No.: 7663

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Jose Abad Santos Ave., Clarkfield CFZ Pampanga, Philippines
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Result of Analysis

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Page 2 of 6

Customer : Center for Environmental Studies and Management, Inc.
Address : Unit 206, UAG Building, Ortigas Ave., Greenhills, San Juan, Metro Manila
Attn. : Bethela Castro - Del Nero

Customer's Project : Disaster Risk Management

Date Sampled : 26-Jun-09
Date Received : 30-Jun-09
Date Analyzed : 15-Jul-09
Matrix, Unit : Water, mg/L
Analyst : NAP

Cagayan ST-1 water (2/2)

Lab. No. : 25078-02
Sample I.D. : CAG ST 1 H_2O 62609 CN

Analysis	Result as received	MDL	DLR
Distillation - ISE (Total Cyanide)	< 0.01	0.01	0.01

MDL = Method Detection Limit
DLR = Detection Limit for Reporting (MDL x Dilution Factor)
Reference: Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 21st Edition.

Reviewed By: _____ Date: 7/24/09
Chas C. Arroyo
Laboratory Manager
PRC License No.: 6701

Approved By: _____ Date: 7/24/09
Maria Carmela Q. Capule
Laboratory Director
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Results of Analyses

CRL-SN-09-1990
Page 4 of 6

Customer : Center for Environmental Studies and Management, Inc.
Address : Unit 206, UAG Building, Ortigas Ave., Greenhills, San Juan, Metro Manila
Attn. : Bethela Castro - Del Nero

Customer's Project : Disaster Risk Management

Date Sampled : 26-Jun-09
Date Received : 30-Jun-09
Matrix, Units : Water, mg/L
Analysts : TPS / JBC

Cagayan ST-2 water (½)

Lab. No. : 25078-04
Sample I.D. : CAG ST 2 H_2O 62609

Analyses	Dates of Analyses	Results, as received	MDL	DLR
AAS - Cold Vapor (Total Mercury)	07/08/09	< 0.0001	0.0001	0.0001
Colorimetry - SDDC (Total Arsenic)	07/02/09	< 0.02	0.02	0.02
Flame AAS (Total Cadmium)	07/06/09	< 0.002	0.002	0.002
Flame AAS (Total Chromium)	07/06/09	< 0.005	0.005	0.005
Flame AAS (Total Lead)	07/03/09	< 0.01	0.01	0.01

MDL = Method Detection Limits
DLR = Detection Limits for Reporting (MDL x Dilution Factor)
References: Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 21st Edition.
Test Methods for Evaluating Solid Wastes, Vol 1A, USEPA, Third Edition
Varian / Perkin Elmer Analytical Methods, Flame Atomic Absorption Spectrophotometry

Reviewed By: _____ Date: 7/14/09
Chas C. Arroyo
Laboratory Manager
PRC License No.: 6701

Approved By: _____ Date: 7/14/09
Maria Carmela Q. Capule
Laboratory Director
PRC License No.: 7663

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Result of Analysis

CRL-SN-09-1990
Page 5 of 6

Customer : Center for Environmental Studies and Management, Inc.
Address : Unit 206, UAG Building, Ortigas Ave., Greenhills, San Juan, Metro Manila
Attn. : Bethela Castro - Del Nero

Customer's Project : Disaster Risk Management

Date Sampled : 26-Jun-09
Date Received : 30-Jun-09
Date Analyzed : 15-Jul-09
Matrix, Unit : Water, mg/L
Analyst : NAP

Cagayan ST-2 water (2/2)

Lab. No. : 25078-05
Sample I.D. : CAG ST 2 H_2O 62609 CN

Analysis	Result, as received	MDL	DLR
Distillation - ISE (Total Cyanide)	< 0.01	0.01	0.01

MDL = Method Detection Limit
DLR = Detection Limit for Reporting (MDL x Dilution Factor)
Reference: Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 21st Edition.

Reviewed By: _____ Date: _____
Chas C. Arroyo
Laboratory Manager
PRC License No.: 6701

Approved By: _____ Date: _____
Maria Carmela Q. Capule
Laboratory Director
PRC License No.: 7663

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Tel.: (6345) 599-3943 * (6345) 599-6529 * (632) 299-5826 * Fax (6345) 599-3963

ANNEX PIIA_9-3

NOISE MEASUREMENT (CAGAYAN)

(1) Sampling date/points

Conducted date: July 16, 2009

Sampling points: (Figure 1 Sampling sites)

(1) At Catagaman in Tugegarao
(2) At Alibago in Enrile
(3) At Palua Norte

The noise sampling stations were positioned at the nearest residential community to determine the possible impact of noise during the construction period.

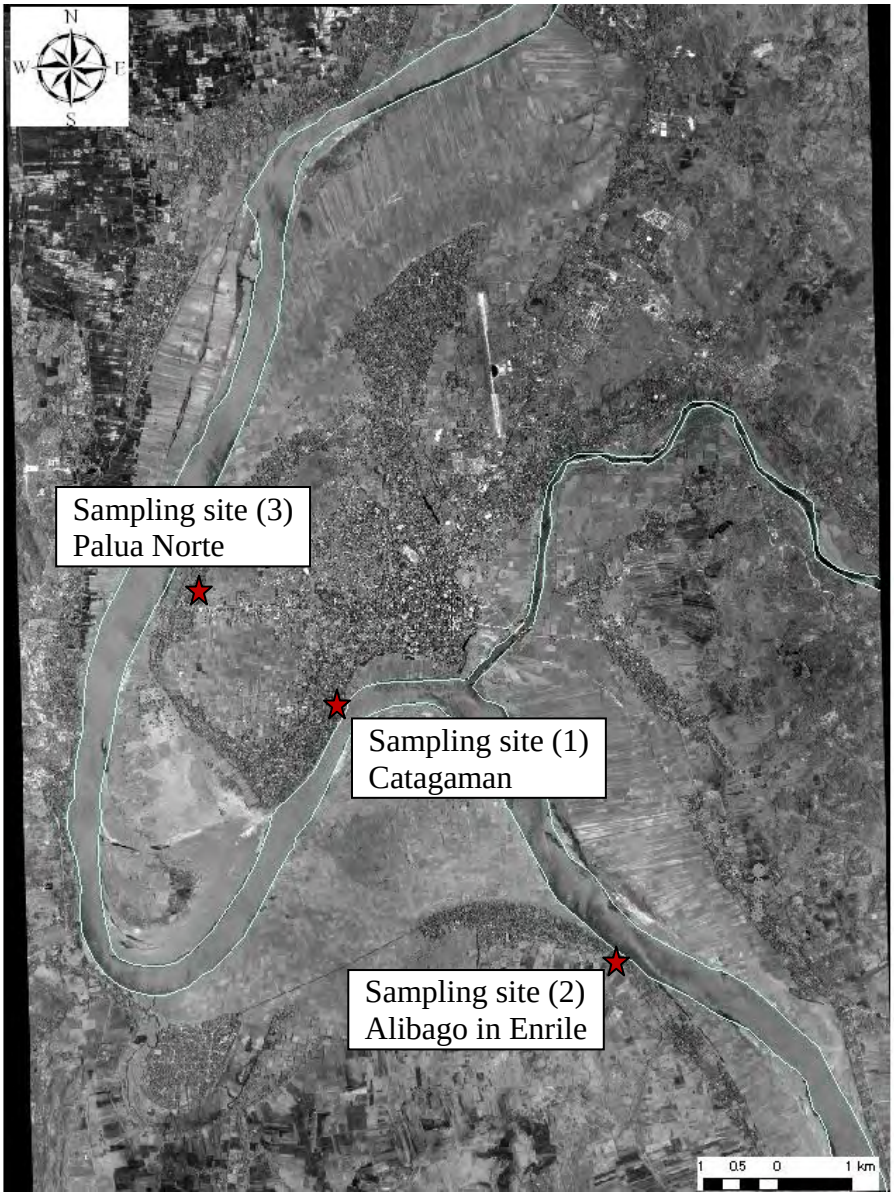


Figure 1 Sampling sites

(2) Measurement instrument

A precision type, digital sound level meter using the method prescribed in the implementing rules and regulations of PD 984. The instrument is also provided with an integral calibrator which is allows the instrument to be calibrated to 94dB. The minimum and maximum of continuous readings were recorded in each station. The median values were then taken and compared with the DENR noise standards based on the 1978 Rules and Regulations of PD 984.

(3) Collected data

The measurement result is shown as below.

Table 1 Results of Noise Sampling

Station	Distance	Time	Min. (dBA)	Max. (dBA)	Median (dBA)	DENR Std. (dbA)	Categogy of Area	Remarks
Catagaman area								
	10 meters from planed revetment	Morning (6:40am)	40.4	71.2	55.8	50	Class AA	Exceeded
		Noon (12:00pm)	56	79	67.5	50	Class AA	Exceeded
		Evening (6:50pm)	51	74.6	62.8	50	Class AA	Exceeded
	15 meters from planed revetment	Morning (7:00am)	45	65	55	55	Class A	within
		Afternoon (11:45am)	56	72	64	55	Class A	Exceeded
		Evening (7:10pm)	40	75.6	57.8	55	Class A	Exceeded
Alibago Enrile								
	10 meters from planed revetment	Morning (8:10am)	43	55	49	55	Class A	within
		Afternoon (1:40pm)	42	63	52.5	55	Class A	within
		Evening (6:10pm)	44	56	50	55	Class A	within
	20 meters from planed revetment	Morning (7:50am)	46	56	51	55	Class A	within
		Afternoon (1:00pm)	43.5	65.5	54.5	55	Class A	within
		Evening (6:20pm)	43	56	49.5	55	Class A	within
Palua Norte								
	15 meters from planed revetment	Morning (8:50am)	43	56	49.5	55	Class A	within
		Afternoon (2:40pm)	45	54	49.5	55	Class A	within
		Evening (6:00pm)	45	55	50	55	Class A	within
	15 meters from planed revetment	Morning (9:20am)	43	71.2	57.1	55	Class A	Exceeded
		Afternoon (3:00pm)	49	71.2	60.1	55	Class A	Exceeded
		Evening (6:20pm)	42.4	67.5	54.95	55	Class A	within

The noise standards may be considered as Class A since the area is primarily used for residential purposes. Thus, the results of the sound level measurement are compared to the daytime standard for Class A area.

The samples were made at Alibago, Enrile, and Catagaman, Tuguegarao because there will be revetments built there at the Palua Norte, since the initial designs called for the inclusion of this area

There were some exceedances in the noise parameters because of the passing through of tricycles and jeepneys in the area which are often noisy and without noise retardants. In Enrile, however, tricyles were far and few and the major sound would be the sound of horse hooves.

(4) Noise Standard

The country implements an Environmental Quality Standard for noise in general areas as outlined in Presidential Decree (PD) 984, or the Pollution Control Law of the Philippines. The noise standards specify the allowable level of noise based on category of area as outlined Table 2.

Table 2 Environmental Quality Standards for Noise in General Areas

Category of Area	Daytime	Morning & Evening	Nighttime
AA	50 dB	45 dB	40 dB
A	55 dB	50 dB	45 dB
B	65 dB	60 dB	55 dB
C	70 dB	65 dB	60 dB
D	75 dB	70 dB	65 dB

Source: Official Gazette, 1978 Implementing Rules and Regulations of P.D. 984.

Legend:

Category of Area is as follows:

AA - a section or contiguous area which require quietness such as area within 100 meters from school sites, nursery schools, hospitals, and special home for the aged.

A - a section or contiguous area primarily used for residential purposes.

B - a section or contiguous area primarily used as commercial area.

C - a section primarily reserved as a light industrial area.

D - a section primarily reserved as a heavy industrial area.

Division of 24-hour period is as follows:

Morning - 5:00 AM to 9:00 AM
Daytime - 9:00 AM to 6:00 PM
Evening - 6:00 PM to 10:00 PM
Nighttime- 10:00 PM to 5:00 AM.

ANNEX PIIA_9-4

LAND-SUE IN TUGEGARAO CITY (CAGAYAN RIVER BASIN)

Table 1 Land-use in Tugegarao City

	Existing (circa 2001)		Proposed / Approved			
	Area (hectares): (1)	% of total	Area (hectares): (2)	% of total	Difference (3): (2) - (1)	Change (3)/(1) (%)
BUILT UP AREA						
Residential	1,313	11.52	2,465	21.63	+1,152	87.74
Commercial	123	1.08	238	2.09	+115	93.50
Institutional	170	1.49	190	1.67	+20	11.76
Industrial	30	0.26	82	0.72	+52	173.33
utilities	157	1.38	273	2.40	+116	73.89
Subtotal	1,793	(15.73)	3,248	(28.50)	+1,455	(81.15)
OTHER LAND CLASSIFICATION						
Agricultural Land	4,520	39.67	5,892	51.71	+1,372	30.35
Open Spaces	3,984	34.96	1,157	10.15	-2,827	-70.96
Creeks	1,098	9.64	1,098	9.64	+0	0.00
Subtotal	9,602	(84.27)	8,147	(71.50)	-1,455	-(15.15)
Total	11,395	(100.00)	11,395	(100.00)	+0	(0.00)

Table 2 Crop-Wise Land use of agriculture Land in Tugegarao City

Crop	1994		1996		1998	
	Area (hectares)	% to total agri land	Area (hectares)	% to total agri land	Area (hectares)	% to total agri land
RICE	871.00	17.67	725.00	18.36	725.00	17.61
CORN	2,810.00	57.01	2,193.50	55.54	2,193.50	53.27
OTHER GRAINS	184.00	3.73	196.30	4.97	208.71	5.07
VEGETABLES						
LEAFY VEGETABLES	51.00	1.03	47.12	1.19	55.00	1.34
OTHER VEGETABLES	188.00	3.81	253.42	6.42	315.00	7.65
FRUITS	94.00	1.91	73.78	1.87	110.00	2.67
ROOT CROPS	278.04	5.64	121.76	3.08	130.50	3.17
OTHER COMMERCIAL CROPS	453.00	9.19	338.51	8.57	379.80	9.22
TOTAL	4,929.04	100.00	3,949.39	100.00	4,117.51	100.00

As one can see from the table, the area for each crop varies per year. This change are due to land conversion and the availability of the river banks for cultivation. The banks of the river are planted mostly to corn and may be available depending on the flooding of the river for that particular year.

About 71.22 % of Enrile's land is agricultural or 13,140 hectares of which 5,678 hectares is planted to crops while the rest is used for grazing land and water impounding projects. The main residential areas in the poblacion area occupies 118 hectares while the Lanna, Magalang East and Alibago residential areas cover 117 hectares. Other residential areas in cover an additional 300 hectares.

Area planted to rice is 3,534 hectares, divided into irrigated areas of 2,048 hectares as irrigated ricefields and 1,,449 hectares rainfed. Areas planted to corn total 1,215.77 hectares. Peanuts are planted to 150 hectares of agricultural land while mungbean is planted in 20.15 hectares. There are likewise 60.78 hectares of tilapia fishponds. Total

land area to vegetables to 92.46 hectares and 457.5 hectares are planted to fruit trees. Most of the other land is used to graze cattle, of which ten farms are found in the area.

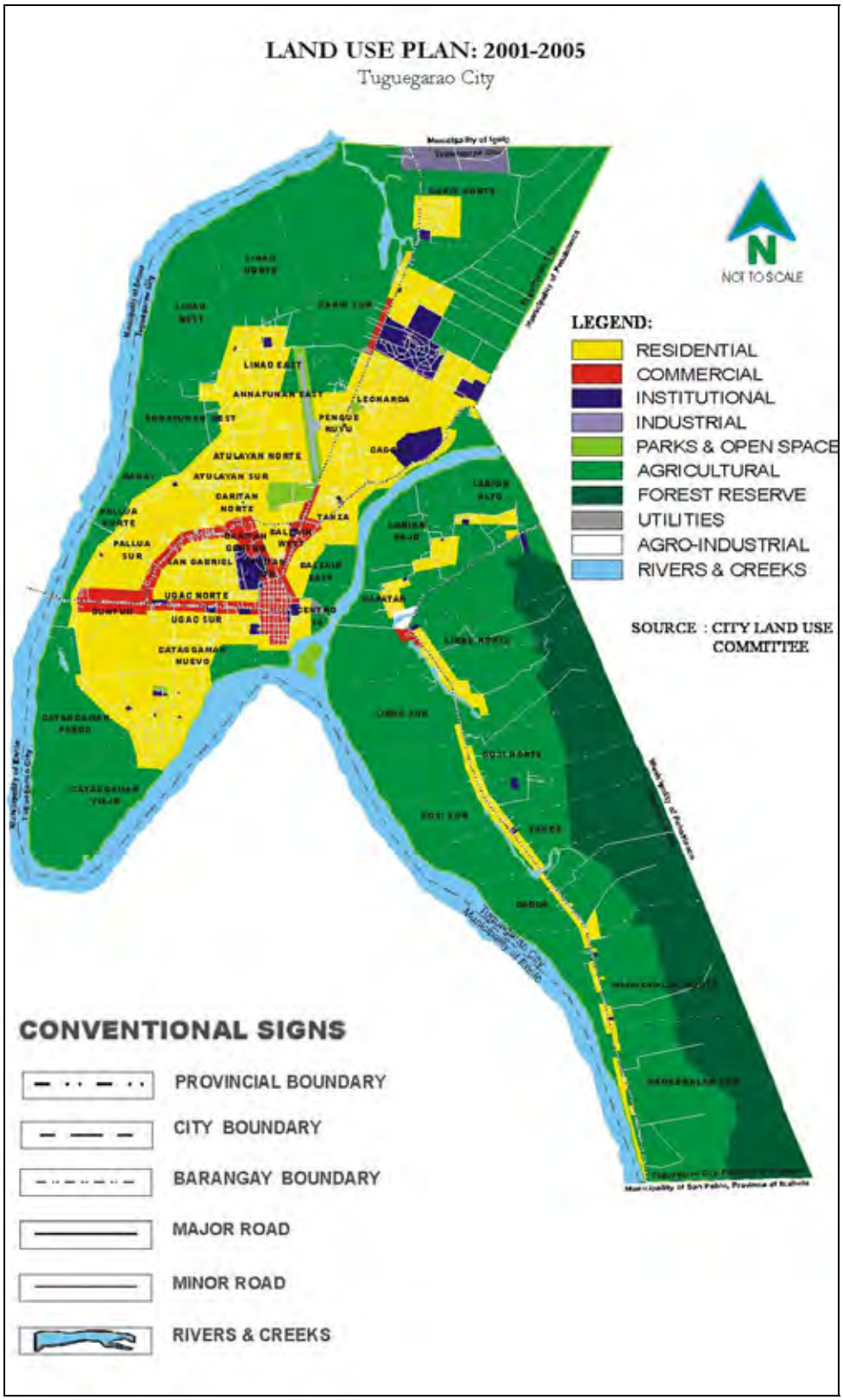


Figure 1 Land use Map in Tugegarao City

ANNEX PIIA_9-5

PROFILE OF PEOPLE IN/AROUND THE PROJECT SITE

IN CAGAYAN

(a) Location of respondents

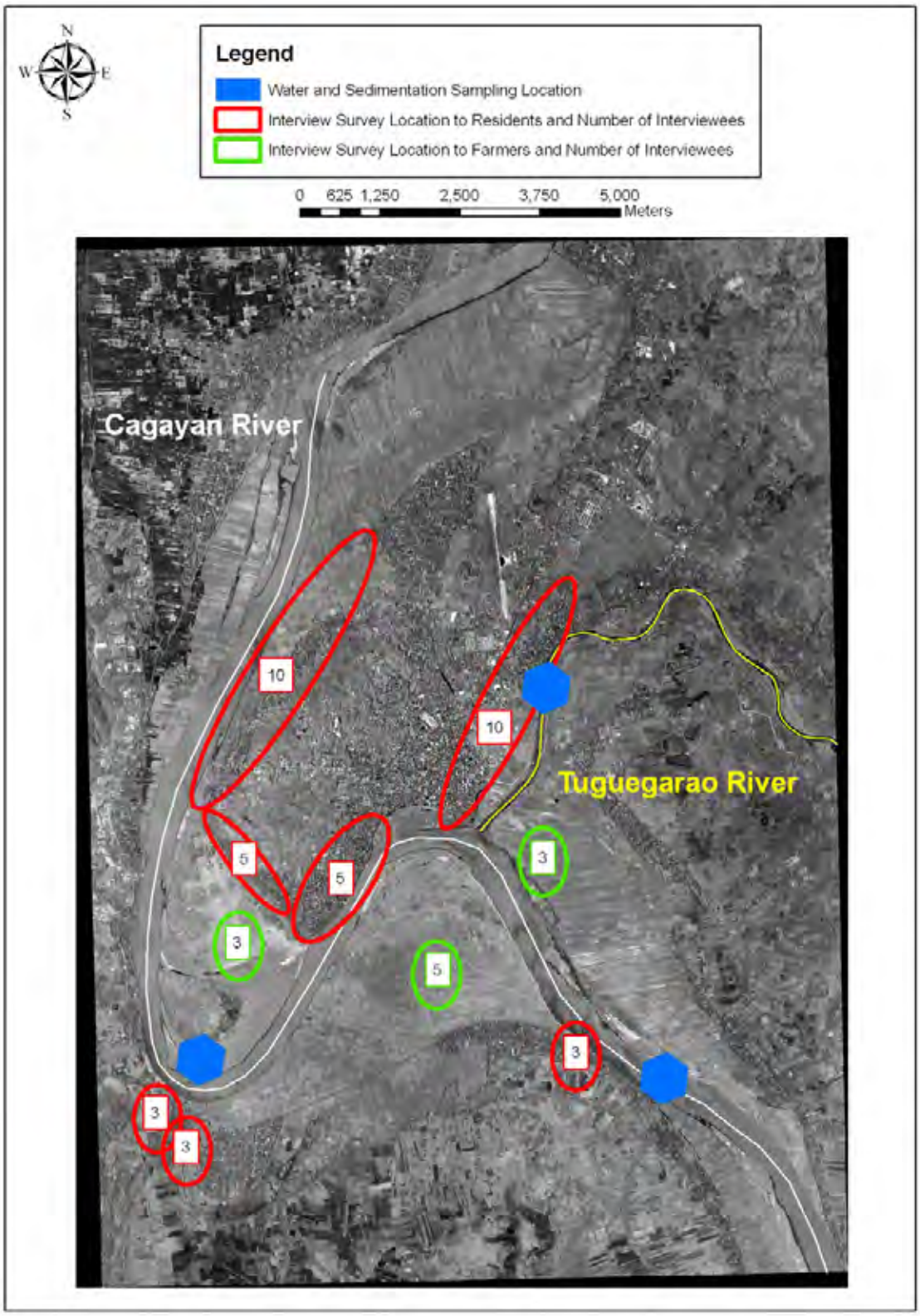
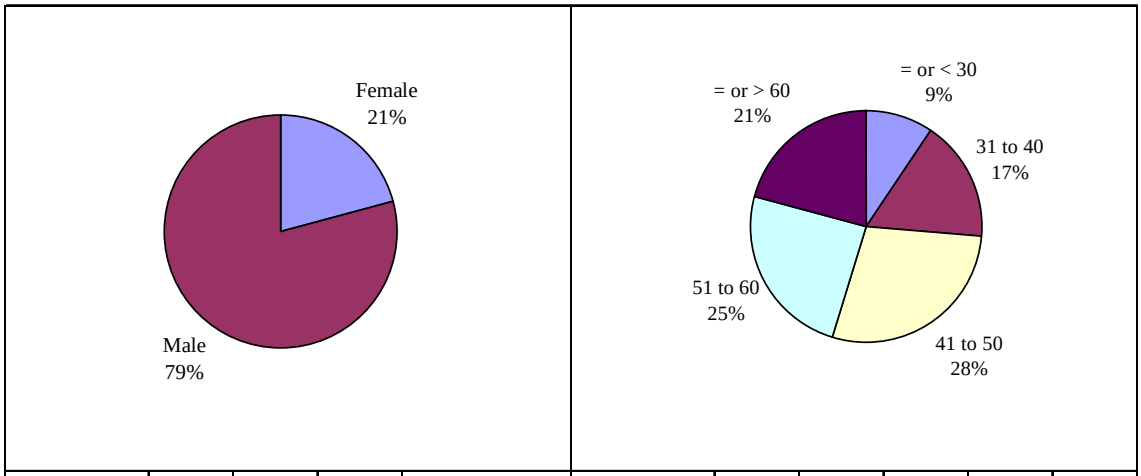


Figure 1 Location of Respondents

(b) Household (HH) heads and family

Gender and age of HH heads

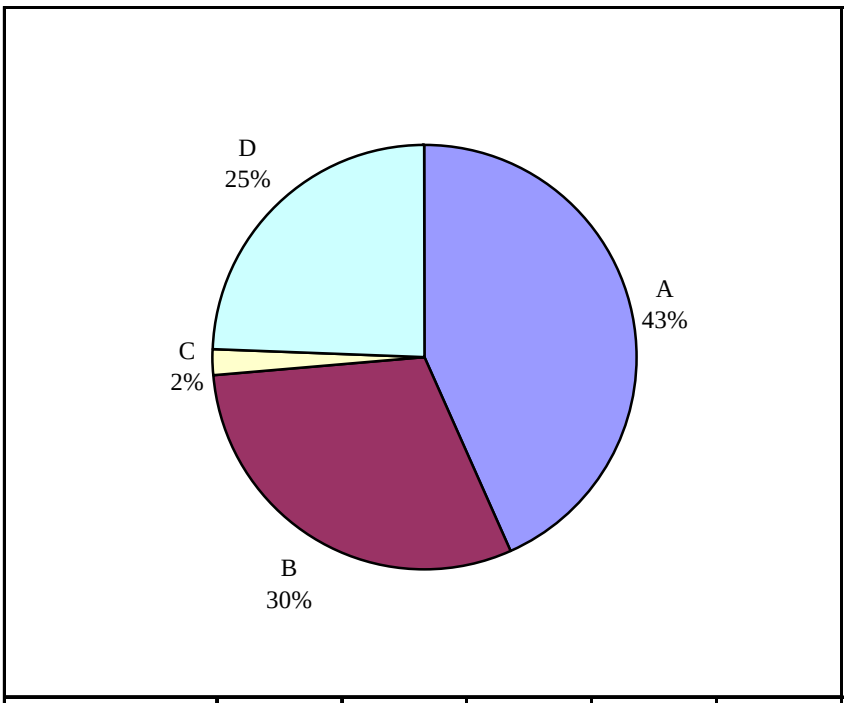


Classification	Female	Male	Total
No. of responds	11	42	53

Classification	= or < 30	31 to 40	41 to 50	51 to 60	= or > 60
No. of responds	5	9	15	13	11

Figure 2 Gender and age of HH Heads

Education of HH heads

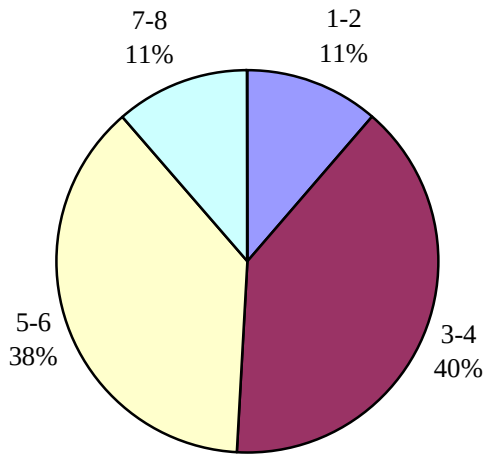


Classification	(A) Elementary level or graduate	(B) High school level or graduate	(C) Vocational/ diploma level or graduate	(D) College level or graduate	Total
No. of responds	23	16	1	13	53

Source: JICA Study Team

Figure 3 HH Heads Education

Family composition



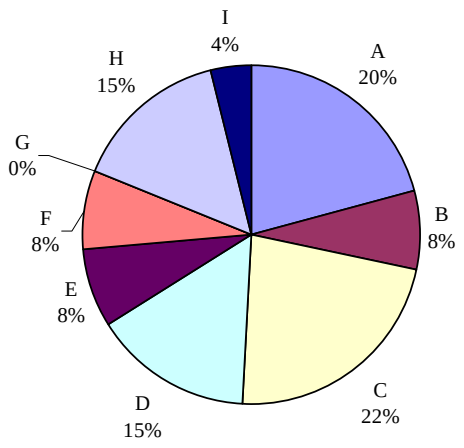
Classification (year)	1-2	3-4	5-6	7-8	> 8	total
No. of responds	6	21	20	6	0	53

Source: JICA Study Team

Figure 4 Total Numbers of family Members

(c) Economic condition

Income source of HH heads



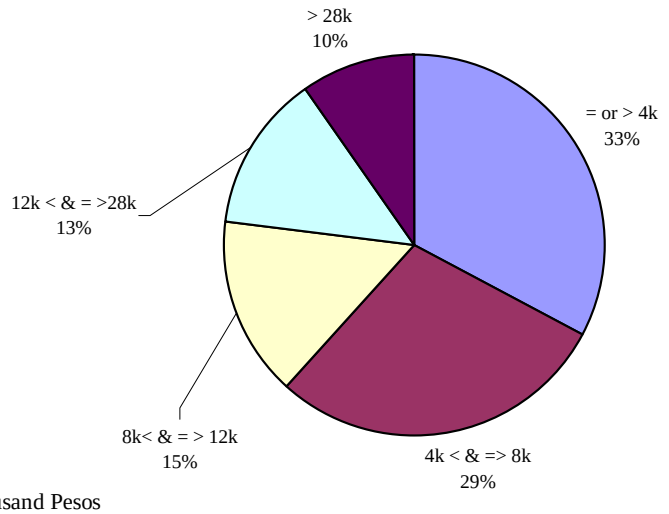
A: Employment *E: Technical/Machine works or Carpentry/Masonry/Construction*
B: Business/Sales *F: Casual workers*
C: Agriculture (farming) *G: Pension*
D: Fishing/Fish related activitie or Driving *H: No Source of Income* *I: Others*

Classification	A	B	C	D	E	F	G	H	I	Total
No. of responds	11	4	12	8	4	4	0	8	2	53

Source: JICA Study Team

Figure 5 Income Source of HH Heads

Family income



k: thousand Pesos

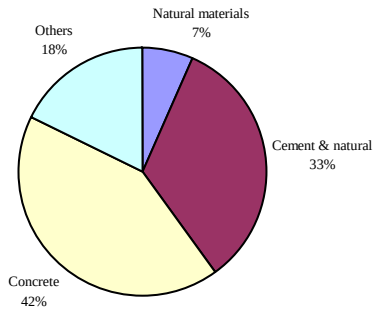
Classification	= or > 4k	4k < & => 8k	8k< & = > 12k	12k < & = >28k	> 28k	Total
No. of responds	18	15	8	7	5	53

Source: JICA Study Team

Figure 6 Family Income per Month of Respondents

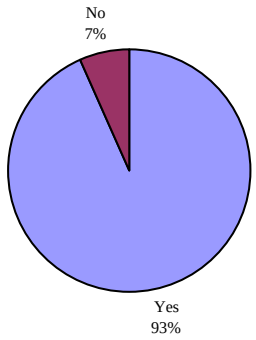
(d) Life condition of HHs

House size and material, Electricity, Water supply and Toilet location



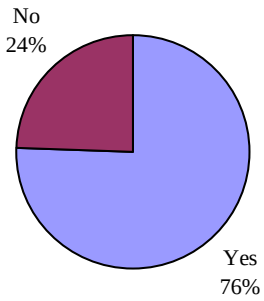
Housing materials

Classification	Natural materials	Cement & natural	Concrete	Others	Total
No. of responds	3	15	19	8	45



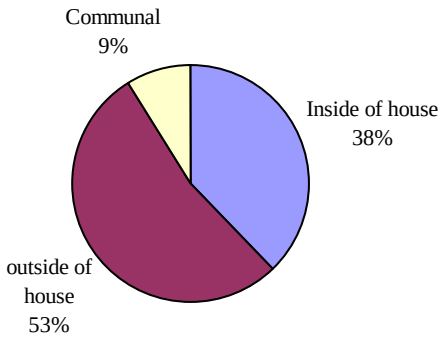
Electricity service connection

Classification	Yes	No	Total
No. of responds	42	3	45



Water service connection

Classification	Yes	No	Total
No. of responds	34	11	45



Location of the toilet used by the family

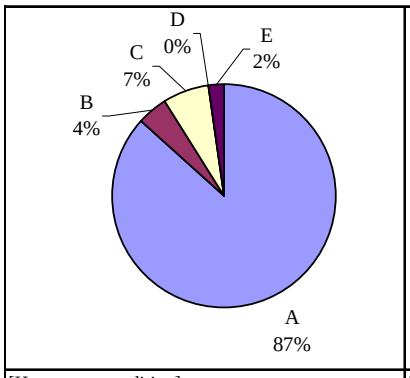
Classification	Inside of house	outside of house	Communal	Others	Total
No. of responds	17	24	4	0	45

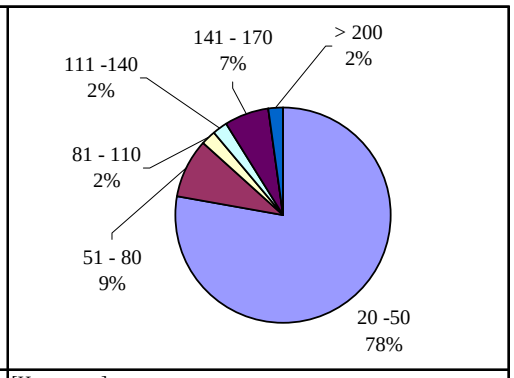
Source: JICA Study Team

Figure 7 Life Conditions of Residents

(e) Property

House ownership and size





[House own condition]
A: Family Owned
B: Owned by the Relative (Renting)
C: Owned by the Relative (Rent-Free)
D: Privately Owned (Renting)
E: Privately Owned (Rent-Free)
F: No response
[House own condition]

[House area]

Classification	A	B	C	D	E	Total
No. of responds	39	2	3	0	1	45

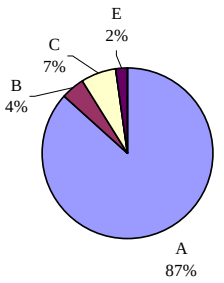
[House area]

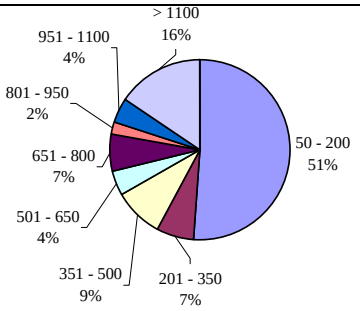
Classification (Unit:m^2)	20 -50	51 - 80	81 - 110	111 -140	141 - 170	171 - 200	> 200	no response	Total
No. of responds	35	4	1	1	3	0	1	0	45

Source: JICA Study Team

Figure 8 House ownership and size of Residents

Land ownership and size





[Lot own condition]
A: Family Owned
B: Owned by the Relative (Renting)
C: Owned by the Relative (Rent-Free)
D: Privately Owned (Renting)
E: Privately Owned (Rent-Free)
F: No Response
[House own condition]

[Lot area]

Classification	A	B	C	D	E	F	Total
No. of responds	39	2	3	0	1	0	45

[House area]

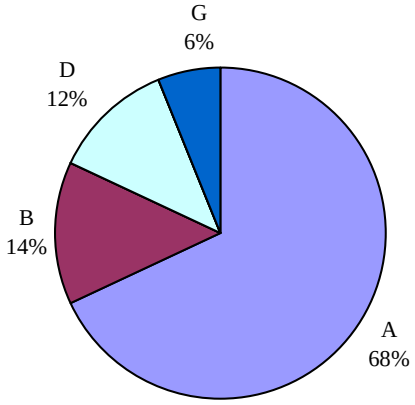
Classification (Unit:m^2)	50 - 200	201 - 350	351 - 500	501 - 650	651 - 800	801 - 950	951 - 1100	> 1100	No response	Total
No. of responds	23	3	4	2	3	1	2	7	0	45

Source: JICA Study Team

Figure 9 House ownership and size of Residents

(f) Opinion on the Project

Opinion on relocation



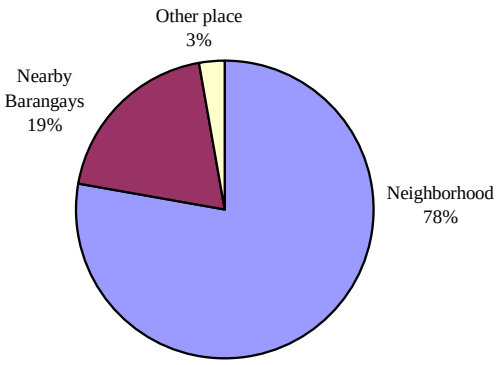
A: Agree
B: Agree, given an acceptable conditions
C: Agree, will follow the decisions of the LGUs
D: Suspending (need time & information)
E: Disagree
F: Other answer
G: No Response

	A	B	C	D	E	F	G	Total
Residents	30	6	0	5	1	2	1	45
Farmers	4	1	0	1	0	0	2	8
total	34	7	0	6	0	0	3	53

Source: JICA Study Team

Figure 10 Opinion on relocation

Relocation site



Classification	Neighborhood	Nearby Barangays	Other place	Total
No. of responds	28	7	1	36

Source: JICA Study Team

Figure 11 Opinion on relocation site

ANNEX PIIA_9-6

QUESTIONNAIRE FOR INTERVIEW SURVEY

ANNEX A
Questionnaire for Affected Households

QUESTIONNAIRE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SURVEY FOR THE PREPARATORY STUDY FOR SECTOR LOAN ON DISASTER RISK MANAGEMENT IN THE REPUBLIC OF THE PHILIPPINES

Magandang araw po sa inyo, ako po ay mula sa Center for Environmental Studies and Management, kasama ng grupo ng Japan International Cooperation Agency at CTI Engineering, International Co., Ltd na gumagawa ng pag-aaral tungkol sa ***Environmental and Social Impact Assessment Survey for the Preparatory Study for Sector Loan on Disaster Risk Management in the Republic of the Philippines****. Nais ko pong malaman ninyo na ang mga impormasyong ibibigay ninyo sa amin sa panayam na ito ay gagamitin po namin sa pag-aaral at ang inyong katauhan gayundin ang inyong mga sagot ay ituturing naming lihim. Sa inyo pong pagsagot, tandaan po nating walang tama o maling sagot, kinakailangan lamang po namin ang inyong matapat na kasagutan.*

Respondent No.

Interviewer: _____ Date of Interview: _____

Address of Interviewee: _____

Contact Number: _____

MGA TANONG PARA SA BAHAY LAMANG ANG APEKTADO NG PROYEKTO

Pangkalahatang Impormasyon (General Information)

1. Pangalan ng Respondent: _____
2. Edad: _____ Araw ng kapanganakan:_____ (mm/dd/year)
3. Kasarian: _____babae _____ lalaki (paki-tsek)
4. Katayuang Sibil: ____ binata/dalaga ____ may-asawa ____balo (paki-tsek)
5. Pinakamataas na antas ng pinag-aralan: _____
6. Pangunahing pinagkakakitaan/hanapbuhay: _____ (tukuyin)
7. Buwanang kita (Php) : _____

8. Iba pang pinagkakakitaan ng respondent:_____ Kita (Php): _____

9. Layo ng pinagtatrabahuhan: _____ Magkano ang pamasahe, ilang sakay? ____(kung angkop)

10. Saang katutubong grupo po kayo kabilang(kung angkop)? _____

Pangalan ng mga Kasama sa bahay	**Edad**	**Kasarian**	**Estado sibil**	**Antas ng pinag-aralan**	**Pangunahing Hanapbuhay /Pinagkakakitaan**	**Buwanang kita**	**Layo ng Trabaho/Lugar /Fare Cost**	**Iba pang pinag-kakakitaan**
(Head)								
Asawa								
Anak								
Anak								
Anak								
Anak								
Nakatatanda								
Mga May Kapansanan								
Kabuuang bilang ng miyembro ng pamilya:						Kabuuang kita ng pamilya:		

(Note to Enumerator: Ask specific level of education, source of income and income per month-then total the income on the space)

11. Anu-ano pa po ang mga uri ng hanapbuhay/pinagkakakitaan ang alam ninyong gawin bukod sa ginagawa ninyo sa kasalukuyan?
_____
_____
_____
_____

12. Anu-ano pong skills/kaalaman ang mayroon kayo ngayon?
_____

13. Anu-ano pa pong skills/kaalaman ang gusto ninyong matutunan?
_____

Struktura ng Bahay at Pamumuhay

14. Ang inyong bahay ay yari sa _____ pinagsama-samang materyales
_____ bahagyang sementado (kahoy at semento)

_____ kabuuang bahay ay sementado

_____ iba pa (pakitukoy) _____

15. Pagmamay-ari ng lote/lupa at bahay:

Item	Kabuuang Sukat (m^2)[1]	Pag-aari ng pamilya[2]	Pag-aari ng Kamag-anak[3]		Pribadong Pag-aari[4]	
			Rental (Php/mon)	Walang Renta/Libre	Rental (Php/mon)	Walang Renta/Libre
Lupa						
Bahay						

1 Sa sukat ng bahay: Kabuuang *floor area*

2 Pag-aari ng kahit sinong miyembro ng pamilya na nakatira sa iisang bahay.

3 Pag-aari ng kamag-anak na hindi kasama sa bahay

4Hindi kaano-ano ang may-ari, pakitukoy ang dahilan kung bakit walang bayad ang pagpapagamit ng lote at bahay

16. Kung pag-aari ang bahay at lote,magkano ang aktuwal na halaga ng mga ito?

Lote (Php) _____ Bahay (Php)_____

Household Utilities

17. Kayo po ay konektado sa suplay ng kuryente? _____ oo _____ hindi, bakit po? _____ _____

18. Maari po bang malaman kung magkano ang huling pinagbayaran ninyo sa kuryente? _____ (Php), kung wala, bakit po? _____ _____

19. Kayo po ba ay konektado sa suplay ng tubig? _____ oo _____ hindi, bakit po? _____ _____

20. Maari po bang malaman kung magkano ang huling pinagbayaran ninyo sa tubig? _____ (Php),

kung wala, bakit po? _____ _____

21. Ang ginagamit na palikuran ng pamilya ay nasa:

_____ loob ng bahay (de-flush) _____ loob ng bahay (de-buhos)

_____ labas ng bahay, pamilya lamang ang gumagamit, ____(de-flush) _____(de-buhos)

_____ komunal; _____ (de-flush) _____ (de-buhos)

_____ iba pa, pakitukoy _____

Opinyon at Pananaw tungkol sa Proyekto

22. Nais po naming malaman kung nitong mga nakaraang taon/buwan ay nakaranas kayo ng pagbaha dito sa inyong lugar? _____ oo hindi_____

23. Kung oo, kailan ninyo po huling naranasan ang pagbaha? Kailan ninyo naman po naranasan ang pinakamalakas?

    Pinakahuling naranasan: Taon ( ), Pangalan ng bagyo ( ), Taas ng baha mula sa lupa ( )cm
    Pinakamalakas: Taon ( ), Pangalan ng bagyo ( ), Taas ng baha mula sa lupa ( )cm

24. Kung tatantiyahin, gaano po kataas ang baha?

    _____ lampas bukong-bukong

    _____ hanggang tuhod

    _____ lampas tuhod

    _____ iba pa, pakitukoy

25. Kinailangan ninyo po bang lumisan (*evacuate*) sa inyong tahanan dahil sa pagbaha?

    _____oo _____hindi

26. Kung oo, saan kayo tumuloy?

    _____ sa kamag-anak, katabing barangay

    _____ sa kamag-anak, sa ibang bayan

    _____ sa mga paaralan o evacuation centers

    _____ iba pa, pakitukoy

27. Kung kakailanganin po na kayo ay lumipat ng lugar na tinutuluyan upang bigyang daan ang proyektong ito, kayo po ba ay:

    _____Sang-ayon

    _____Sang-ayon kung katanggap-tanggap ang mga kondisyon

    _____Sang-ayon, (susundin ang desisyon ng Gobyerno, Pamunuan ng Barangay, Resulta ng Konsultasyon sa Komunidad at iba pa).

    _____Pag-iisipan pa, kukuha ng mga impormasyon na makakatulong sa pag de-desisyon

    _____Hindi sasang-ayon; pakitukoy ang dahilan _____
    _____
    _____
    _____

_____ Iba pa, pakitukoy_____
_____
_____
_____

Para sa mga sumang-ayon:

28. Kung kayo ay bibigyan ng pagkakataon na pumili ng lugar na inyong lilipatan ito ay sa:

_____ kapitbahayan

_____ katabing barangay (na nasa bayan rin),pakitukoy_____

_____ sa ibang bayan, pakitukoy _____

_____ sa ibang lugar, pakitukoy _____

29. Sa inyong palagay, gaano kalayo ang magiging distansya ng relokasyon upang maiwasan ang problema sa trabaho o pagkakakitaan? (mga ilang sakay mula rito)

_____ walking distance

_____ isang sakay

_____ dalawang sakay

_____ tatlong sakay

_____ iba pa, pakitukoy

30. Kung sakaling mawalan kayo ng trabaho dahil sa paglipat, sasang-ayunan po ba ninyo ang pagpapalit ng trabaho?

_____ oo, posible na makahanap ako ng trabaho

_____ oo, kung makakatanggap ako ng sapat na bokasyunal na kaalaman mula sa gobyerno

_____ hindi madaling sabihin sa ngayon

_____ iba pang dahilan, pakitukoy_____

Magandang Araw at Maraming Salamat po!

NOTES:

ANNEX B
Questionnaire for Affected Tenants/Farmers

QUESTIONNAIRE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SURVEY FOR THE PREPARATORY STUDY FOR SECTOR LOAN ON DISASTER RISK MANAGEMENT IN THE REPUBLIC OF THE PHILIPPINES

Magandang araw po sa inyo, ako po ay mula sa Center for Environmental Studies and Management, kasama ng grupo ng Japan International Cooperation Agency at CTI Engineering, International Co., Ltd na gumagawa ng pag-aaral tungkol sa ***Environmental and Social Impact Assessment Survey for the Preparatory Study for Sector Loan on Disaster Risk Management in the Republic of the Philippines****. Nais ko pong malaman ninyo na ang mga impormasyong ibibigay ninyo sa amin sa panayam na ito ay gagamitin po namin sa pag-aaral at ang inyong katauhan gayundin ang inyong mga sagot ay ituturing naming lihim. Sa inyo pong pagsagot, tandaan po nating walang tama o maling sagot, kinakailangan lamang po namin ang inyong matapat na kasagutan.*

Tenant Farmer _____ Fish Cultivator _____ (paki-tsek)

Respondent No.

Interviewer: _____ Date of Interview: _____

Address of Interviewee: _____

Contact Number: _____

TANONG PARA SA TENANT FARMERS/FISH CULTIVATORS (OFF-SITE)

Pangkalahatang Impormasyon (General Information)

31. Pangalan ng Respondent: _____ _____

32. Edad: _____ Araw ng kapanganakan:_____ (mm/dd/year)

33. Kasarian: _____babae _____ lalaki (pakitsek)

34. Katayuang Sibil: ____ binata/dalaga ____ may-asawa ____balo (paki-tsek)

35. Pinakamataas na antas ng pinag-aralan: _____

36. Pangunahing pinagkakakitaan/hanapbuhay: _____ (tukuyin)

37. Buwanang kita (Php) : _____

38. Iba pang pinagkakakitaan ng respondent:_____ Kita (Php): _____

39. Layo ng pinagtatrabahuhan: _____ Magkano ang pamasahe, ilang sakay? ____(kung angkop)

40. Saang katutubong grupo po kayo kabilang (kung angkop)?
_____

Pangalan ng mga Kasama sa bahay	**Edad**	**Kasarian**	**Estado sibil**	**Antas ng pinag-aralan**	**Pangunahing Hanapbuhay /Pinagkakakitaan**	**Buwanang kita**	**Layo ng Trabaho/Lugar /Fare Cost**	**Iba pang pinag-kaka kitaan**
(Head)								
Asawa								
Anak								
Anak								
Anak								
Anak								
Nakatatanda:								
Mga May Kapansanan								
Kabuuang bilang ng miyembro ng pamilya:						Kabuuang kita ng pamilya:		

(Note to Enumerator: Ask specific level of education, source of income and income per month-then total the income on the space)

41. Anu-ano pa po ang mga uri ng hanapbuhay/pinagkakakitaan ang alam ninyong gawin bukod sa ginagawa ninyo sa kasalukuyan?
_____
_____
_____
_____

42. Anu-ano pong skills/kaalaman ang mayroon kayo ngayon?
_____

43. Anu-ano pa pong skills/kaalaman ang gusto ninyong matutunan?
_____

44. ***Lawak ng Sakahan ng Magsasaka/Lawak ng Fishpond ng Fish Cultivator*** *(kabuuang sakahan/fishpond at apektadong parte ng sakahan/fishpond na pag-aari ng apektadong magsasaka/fish cultivator)*

Pakilagay ang mga impormasyong kinakailangan:

Kabuuang Sukat ng Sakahan/Fishpond (ha)			**Sukat ng Apektadong Sakahan/Fishpond (ha)**		
Pag-aari (Own-Operated)	**Inuupahan (Tenant)**	**Kabuuang sukat**	**Pag-aari (Own-Operated)**	**Inuupahan (Tenant)**	**Kabuuang sukat**

45. ***Crop Cultivation of Farmland/Fishpond*** *(apektadong sakahan/fishpond ayon sa uri ng pananim at fishpond species ng apektadong magsasaka/fish cultivator)*

Pakilagay ang mga impormasyong kinakailangan:

Pananim/Fishpond Species	Lawak ng Apektadong Sakahan/Fishpond (ha)	Lawak ng Produktibong Sakahan/Fishpond kada Taon (ha)			Uri ng Pananim/Fishpond species
		Kabuuang Lawak ng pinagkukunan ng Ani/Huli (kada anihan)	Panahon ng pag-ani/Pag-huli kada taon	Kabuuan	
Total					

Opinyon at Pananaw tungkol sa Proyekto

46. Nais po naming malaman kung nitong mga nakaraang taon/buwan ay nakaranas kayo ng pagbaha dito sa inyong lugar? _____ oo hindi_____

47. Kung oo, kailan ninyo po huling naranasan ang pagbaha? Kailan ninyo naman po naranasan ang pinakamalakas?

Pinakahuling naranasan: Taon ( ), Pangalan ng bagyo ( ), Taas ng baha mula sa lupa ( )cm
Pinakamalakas: Taon ( ), Pangalan ng bagyo ( ), Taas ng baha mula sa lupa ( )cm

48. Kung tatantiyahin, gaano po kataas ang baha?

_____ lampas bukong-bukong

_____ hanggang tuhod

_____ lampas tuhod

_____ iba pa, pakitukoy

49. Kinailangan ninyo po bang lumisan (*evacuate*) sa inyong tahanan dahil sa pagbaha?

_____oo _____hindi

50. Kung oo, saan kayo tumuloy?

_____ sa kamag-anak, katabing barangay

_____ sa kamag-anak, sa ibang bayan

_____ sa mga paaralan o evacuation centers

_____ iba pa, pakitukoy

51. Kung sakaling maapektuhan ang inyong lupain upang bigyang daan ang proyektong ito, kayo po ba ay:

_____Sang-ayon

_____Sang-ayon kung katanggap-tanggap ang mga kondisyon

_____Sang-ayon, (susundin ang desisyon ng Gobyerno, Pamunuan ng Barangay, Resulta ng Konsultasyon sa Komunidad at iba pa).

_____Pag-iisipan pa, kukuha ng mga impormasyon na makakatulong sa pag de-desisyon

_____Hindi sasang-ayon; pakitukoy ang dahilan _____

_____

_____

_____

_____

_____ Iba pa, pakitukoy_____

_____

_____

_____

52. Sa inyong pananaw, kinakailangan ba na magbago kayo ng pinagkakakitaan dahil sa nasakop ng proyekto ang inyong sakahan/fishpond area?

_____ oo
_____ hindi

53. Kung oo, paano magiging possible ang pagpapalit ninyo ng trabaho?

_____ posibleng makahanap ng panibagong trabaho

_____ posible kung makakatanggap ako ng sapat na bokasyunal na kaalaman mula sa gobyerno

_____ posible na maipagpatuloy ang pagsasaka kung mayroon ulit magpapasaka ng kanilang lupa

_____ possible na maipagpatuloy ang kasalukuyang pagsasaka/pag-aalaga ng isda sa pamamagitan ng pagpapalit ng sistema na angkop sa magiging gamit ng lupa, ito'y kung sakaling makakatanggap ng tulong pinansyal mula sa gobyerno

_____ iba pang dahilan_____

_____

_____

Magandang Araw at Maraming Salamat po!