Republic of the Philippines
PROVINCE OF CAGAYAN
Tuguegarao City
Office of the Governor

August 7, 2014

ENGR. CESAR S. SIADOR, JR.
Regional Director
DENR-Environmental Management Bureau
Carig, Tuguegarao, City

DENR-EMB-REGION 02 TUG. CITY RECEIVED DATE: 8-12-14 RECORDS SECTION

Sir:

May we respectfully submit our application for an **Environmental Compliance Certificate (ECC)** for the proposed **Construction/Rehabilitation of Namabbalan Norte-Baliuag-Bical-Cabbo Farm to Market Road** located at barangays Namabbalan Norte, Tuguegarao City and Baliuag,Bical and Cabbo, Penablanca, Cagayan, respectively.

Attached is the **Environmental Examination (IEE) Report** for your reference, evaluation and approval.

Thank you very much.

Very truly yours,

ALVARO T. ANTONIO
Governor

PROVINCIAL NATURAL RESOURCES & ENVIRONMENT OFFICE
Capitol Hills, Tuguegarao City
Tel. No.: (078) 304-5161

1. EXECUTIVE SUMMARY

The Cagayan Dairy Enterprise through the Integrated Farmers Cooperative has long been engaged in the production and processing of raw milk thru the assistance of the Philippine Carabao Center, National Government Agencies and the Local Government Units. However, the production is still limited due to limited funds, poor facilities, insufficient supply of raw milk due to poor road conditions and inaccessibility.

To give solution to the problem on poor road conditions, a construction/rehabilitation of farm to market road is proposed. These are located at Barangays namely Namabbalan Norte , Namabbalan Sur in Tuguegarao city and Baliuag, Bical and Cabbo, Penablanca, Cagayan.

It is a 17.8304 kilometer that interconnects the five barangays where the source of raw milk, proposed forage production area, existing processing center and the communal dairy barn is located thus making the industry sustainable and profitable. The existing road to be rehabilitated is 13.870 km while the road to be opened is 3.960 kms. Each have a 4 linear meters width and a 1.5 meters shoulder on both sides.

Considering the proximity of the proponent barangays to that of the processing center and market centers, the subproject will have a direct impact on the diary industry like job generations and increase agricultural activities for development.

This report was prepared in accordance with the policies and guidelines set forth under PD 1586 and pursuant to the Revised Procedural Manual 30-03 before the issuance of an ECC to the project.

The Initial Environmental Examination (IEE) report and the Environmental Management plan of the project represents the environmental setting and the mitigating measures relative to the preservation of the environment.

1. Brief Description of the Project

The proposed construction/rehabilitation of the 17.8304 farm to market road will be a great help to the locality particularly among the influence barangays of Tuguegarao city and Penablanca and to the province as a whole thus providing their accessibility the year round that will enhance in the upliftment of their economic activities.

Portion of the proposed project is an existing graveled road with spot concreting but deteriorating as cracks are found along the stretch of the concrete segment. It is a 13.870 kms long that starts from Barangay Namabbalan Norte, along the national highway (start of Section 1) up to Barangay Baliuag (end of Section 1) with approximate length of 6.870 kms then from barangay Cabasan (start of Section 2) traversing Barangay Bical, Namabbalan Norte up to

Barangay Namabbalan Sur with a total length of 7 kilometers. The width of the road is 4 linear meters with 1.5 meters shoulders on both sides. It is not passable during wet season because it is slippery and with deep holes. Along both side of the road particularly at Barangay Baliuag are Integrated Social Forestry Areas planted with corn and other agricultural crops.

Section 3 is a road to be opened that starts from a portion of barangay Baliuag, Penablanca that connects to the forage area at Namabbalan Sur. Portion of it is an existing trail only passable through hiking and by farm animals. The length is **3.960** kilometers, 4 linear meters wide and with 1.5 meters shoulder on both sides. It passes a grazing land covered by Bracharia grass with patches of shrubs. Climbing vines to include some rattan wildlings, shrubs and miscellaneous species such as, samak, bignai pugo, tibig, etc. of less commercial value are found to be affected by the opening of the road. Trees such as rain tree, hauili, alim,antipolo, malapapaya, etc. are also found but not to be affected. No live creek is found to exist in the area.

2. BRIEF DESCRIPTION OF PROJECT'S IEE PROCESS

This report was based on the requirements set forth on PD 1586. The study area is the entire project influence area of the project which was conducted during the first quarter of the year .

Data Gathering was undertaken by the team with the following methodologies:

Ocular inspection of the proposed project and the influence areas to determine the existing land uses, bodies of water, geographical features, etc.

Physical assessment was conducted in terms of general use classification topography vegetative cover and socio-cultural aspects;

Secondary data like soil and suitability, population off farm/non farm economic activities was gathered from CPDCO- Tuguegarao and MPDO & MA-Penablanca.

Maps like NAMRIA maps, geo-hazard maps from Mines and Geo Sciences Bureau were also used as reference.

3. Summary of Baseline Characterization

3.1 Physical Environment

Geographical Boundaries :

Tuguegarao city is a component city situated at 17.61 North Latitude, 121.73 East longitude and 58 meters elevation above the sea level. It is bounded on the north by the municipalities of Iguig and Solana; on the south by the province of Isabela; on the west by the municipalities of Enrile and Solana; and on the east is the municipality of Penablanca.

Penablanca is also a first class municipality situated at 17 37 40 North, 121 47 16 East. It is bounded on the north by the municipality of Baggao, on the south by the province of Isabela; on the west by the municipality of Iguig and Tugeugarao city band on the east by the Philippine Sea.

Topography:

City of Tuguegarao

More than half of Tuguegarao city are plain, i.e. flat to nearly level land. These plains are about 65.5% of the towns total land area, majority of which are fertile alluvial plains, being contiguous to the rivers. The lowest elevation range 10-16 meters a.s.l and these are the flood plains of 0-1% slope all along the rivers. The Poblacion is located in the highest elevation, 23-24 meters a.s.l. of flat land (0-1% slope)

The rest are hills and hill rocks, which line the eastern portion of the town, with elevations ranging 40 to 146 meters above sea level (asl)

The town is generally drained by the Cagayan River and by the Pinacanauan River. The Pinacanauan River flowing from the Sierra Madre mountains of Penablanca in the east traverses the mid-eastern portion of the town. Branching from the rivers are tributaries like creeks which are dried up during summer months.

Municipality of Penablanca

Occupying about 85% of the total area of the municipality of Penablanca located on the eastern section is a sundry topography of patches of alluvial plains, valleys, low lying hills and the mountain ranges.
Large settlements are located at the western periphery of the municipality except for Lagum area (comprising barangays Nabbabalayan, Buyun and Mangga) which is located between mountains

in the central part of the municipality. Total released alienable and disposable land low lying areas are 13,381 hectares or 10.74% of the total land area of the municipality. The town site has an elevation from 51-105 meters above sea level.

The city of Tuguegarao and the Municipality of Penablanca soil types are ideal for agricultural and dairy industry uses because it retains nutrients and retains water while still allowing excess water to drain away. A large area is highly suitable for pasture and cattle production.

3.2.Biological Environment

3.2.1.Floral Composition

livestock with patches of shrub species. Cultivated areas in the uplands are planted with corn, fruit trees and other perennial crops while at the lowlands are planted with rice. However, in the forested portion and on gullies of the barangay influence areas are common hardwood and miscellaneous species. Also species of bamboos are also found along creeks.

There will be no plants, crops to be damaged/affected upon implementation of the project since said road is already existing. However, on the road opening leading to the forage production area some miscellaneous species at sapling stage, climbing vines and shrubs shall be removed . Planting with fast growing species along the roads or to any designated portion of the area shall be done as mitigating measures.

List of Species found within the area of influence

Common Name	Scientific Name
Red Lauan	Shorea negroensis
Mayapis	Shorea palosapis
White Lauan	Shorea contorta
Alupag	Euphorio didyso
Antipolo	Artocarpus blancoi
Balete	Kinglodendrum alternifolium
Dao	Dracontumelum dao
Kalumpit	Terminalia microcarpa
Lamio	Dracontumelum edule
Makaasim	Dillenia luzonniensis
Narra	Pterocarpus indicu
Sakat	Terminalia ninata
Malapapaya	Poluscias nodosa
Tangisang Bayawak	Ficus variagata
Acacia	Samania saman
Dita	Alstonia scholaris
Guijo	Shorea guiso
Lanete	Kibatalia gitigensis
Anabiong	Trema orientalis
Alim	Melanolepis multiglandulosa
Kamiring	Semecarpus philippinensis
Dapdap	Erythrina indica
Akleng Parang	Acacia procera

Bikal Baboy	Schizostachyum diffusum
Kawayan killing	Bambusa vulgaris
Kawayan tinik	Bambusa spinosa
Bayog	Dendrocalamus merrillianus
Paco	Diplamlum esculentum
Aribong gubat	Oncosperma horridum
Guijo	Shorea guiso
Bignai pugo	Aleurites pentandrum
Signal grass	Bracharia decumbens

3.2.2. Faunal composition

Birds were observed to be present in the forest portion of the barangays and they often visit kaingin areas to feed on insect found on agricultural crops. Observed species also includes butterflies, mosquitoes, dragonflies, bees, ants, cicada and grasshoppers. Animals like wild boar, monkeys, deer, lizard and Tangisang bayawak are now rarely encountered at the proposed project area since their habitat is already turned into upland agriculture, however, they still can be found within the forest far from the community.

Invertebrates such as several species of insects, arachnids have also suffered a similar fate. Human incursions and clear cutting of the forest have seriously damaged their habitat leading to their migration to less affected portion of the forest. No rare or endangered species shall be affected by the project implementation.

Aquatic plants and animals like fresh water crabs, shells and water plants like hyacinths, talahib, kangkong and other water plants are found along the creeks. Little is known about the microbial population present in the area.

Faunal Species found within the area of influence

Common Name	Scientific Name
A. Avifauna	
Rufous Hornbill	Bucerous hydrocorax
Tarictic	Penelopides panini
Oriol	Icterus galbula
Maya	Lonchora artricapilla
Pirpiruka (local name)	Stumus vulgaris
Owl	Nyctea scandica
B. Mammals	
Phil. Forest rat	Rattus everetti
Fruit bat	Dobsonia chapmani

c. Reptiles	
Monitor lizard	Varanus salvator

Snake	Trimerusurus flavomaculatus
Phytoon	Python regius
Pagong	Heosemys reytensis

3.3. Socio-economic en ironment

There are four (4) ba angays who are beneficiaries of the project. The total number of household is 1,346 with a to al population of 6,249 of which 3,242 are males and 3,047 are females. They derived their i come from their on-farm, off-farm/non- farm activities. Business and employment opportunitie: are remarkably high in the locality.

Lifestyle is simple an typical of rural areas. Traditional social gatherings or events such as fiestas, birthdays or marri ges are mostly observed. As Christians, church celebrations are faithfully celebrated.

Health and safety con litions may be described as tolerable in the area since there is the presence of facilities and med al care.

4. SUMMARY OF MPACT ASSESSESMENT AND ENVIRONMENTAL MANAGEMENT PL N

The predicted impacts during the construction/development, operation and abandonment phase of the project on land, water air and the people will be assessed in terms of its magnitude, frequency and extent. This sh ll be taken into consideration by the proponents and implement necessary mitigating measures

Activity	Environme tal aspect	Environmental impacts	Mitigating measures	Responsibility
A1. Site preparation and development	Removal of the vegetative over	Increase sedimentation during construction.	Re-use of removed top soil in other road maintenance and other land leveling activity. Proper disposal and Compaction of soil.	Contractor
		Removal of affected miscellaneous species and shrubs	Roadside tree planting .and at any identified portion of the area.	Contractor

	leveling of	he terrain	Possible soil erosion And siltation of creeks during heavy rains	Provision of drainage canal and enclose hazardous area with barriers.	Contractor
			Disturbance of the faunal species (cows, carabao's, etc)	Temporary transfer meantime to other grazing area.	Owners of animals
A.2. Construction of the road, scraping, shaping, widening shaping and other road components	Increase in sedimentati n		Temporary increase in soil erosion and siltation of waterways during rainy days	Proper planning on earth fiil surface. Proper disposal and compaction of soils.	Contractors
	Generation of equipment used oil/grease		Potential contamination of surface and ground water with oil/grease due to presence of heavy equipment.	Spill of oil/grease be minimized and proper handling and disposal of the waste. A designated motor pool be identified and be well maintained.	Contractor
	Delivery of equipments and materials		Possible traffic in the roads	Provide traffic signs and road directions in the site	Contractor
				Establishment /construction of	Contractor

	influx of construction workers	Potential contamination with human waste	temporary camps with sanitary toilets.	
		Injuries due to unavoidable actions during work.	Issuance of safety gadgets to workers	Contractor
		Increase employment in the proponent barangays	Priority employment of residence within the area of influence.	Contractor
	Generation of solid waste	Prevalence of dust/mud during construction	Regular sprinkling of the ground and filling of potholes during rainy days especially to nearby residence areas.	Contractor
B. road opening	Sedimentation in waterways	Occurrence of erosion on exposed roadsides	Erosion control measures be applied.	Contractor
	Loss of forest cover to nearby forest areas	Easier mobility in forest disturbance due to illegal settlers	Deputation of barangay officials as local ENRO's	PNREO
C. Operation phase	Generation of noise and smokes	Smoke pollution and nuisance to residents	Equipment used shall be properly maintained. Set up speed limit of vehicle passing along residential areas.	

			Subject equipment to smoke belching test	Contractor
	Generation of demolition spoils and solid wastes	Degradation of water quality due to contamination	Segregation of usable materials such as bottles, cans, catoons, plastics, etc. to be sold to MRF. Hauling of residuals by the contractor.	
	Soil erosion on ISF areas found along constructed roads at Baliuag as caused by increase use of herbicides.	Degradation of top soil on ISF areas found along constructed roads at Baliuag.	Application of sloping agricultural land technology. Regulate the use of herbicides.	farmers

5.SUMMARY OF ENVIRONMENTAL MONITORING PLAN

The Environmental Monitoring Plan shows that the proponent is willing to implement and check the environmental performance during the implementation of the project. This shall be done by the assigned Project Engineer who shall monitor, verify and assess the status of the project and make corrective actions on the environmental aspects if such mitigating measures are effective.

The emissions and effluent of equipment used are in accordance with DENR-EMB rules and regulations. The Environmental Monitoring Plan shall also concentrate on the possible inadequacy of the mitigating measures to prevent soil erosion and sedimentation in the nearby creeks.

Environmental Monitoring Plan to be conducted during the conduct of the different phases of the project.

Activities	Parameters	Frequency	Cost	Responsibility
1.Pre-	Vegetation loss	Confine only to the		contractor

operational /site preparation	Dust generation Noise generation of equipment	area that is programmed Regular sprinkling of the ground Proper maintenance of equipments. Set up speed limit of vehicle passing along residential areas. Subject equipment to smoke belching test.	Included in the construction cost.	
b. construction phase	Solid waste generation Increase employment in the area Soil erosion on eroded slopes and upland areas Sedimentation of nearby creeks	Installation of garbage receptacles and practice the 3 R's. Priority hiring of residents within the influence barangays. Intensify the use of the Sloping Agricultural technology on upland areas. Construction of sediment traps to drainage channels leading to creeks.	To be determined	contractor
c. operation phase	Contamination of creeks due to waste being dumped by drivers and local residents Increase local	IEC on solid waste management Proper handling and disposal of oil/grease. Provide financial	To be determined	contractor

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

1. BASIC PROJECT INFORMATION

Project Name:	Construction/Rehabilitation of Farm to Market Road
Location/ Address: Baliuag,Bical & Cabbo,	Namabbalan Norte, Namabbalan Sur, Tuguegarao City & Penablanca, Cagayan
Nature of Project:	Rural Access
Proponent Name	: Province of Cagayan (Integrated Farmers Cooperative)
Address	: Namabbalan Norte, Tuguegarao city

2. DESCRIPTION OF THE PROJECTS IEE PROCESS

2.1 Terms of reference of the IEE study

The study was based from the guidelines set forth in Department Administrative Order (DAO) 2003-30 of the Department of Environment and Natural Resources-Environmental Management Bureau, its Revised Procedural Manual for PD 1586.

References used are : Socio-economic data gathered from CPOCO-Tuguegarao, MPDO & MA- Penablanca and PSA; secondary data gathered from MPDC and proponent barangays, reference maps, etc.

The outcome of the report was used as a planning tool in the formulation of an environmental management plan for the project.

2.2 The IEE team

The Social and the Environment Safeguards (SES) in support to the Intensified Building-Up of Infrastructure and Logistics for Development (I-BUILD) component of the Provincial Program Management Implementing Unit (PPMIU) under the Philippine Rural Development Program with members from the Provincial Natural Resources and Environment (PNREO), Provincial Social Welfare & Development Office (PSWDO), Provincial Engineers Office (PEO), Office of the Provincial Agriculturist (OPA) and Provincial Planning & Development Office (PPDO) were tasked to prepare an Initial Environmental Examination (IEE) Report of the

proposed Farm to Market Road project as a requirement for the issuance of an ECC by the EMB-DENR.

2.3 **IEE Study Schedule**

The activity was done through consultation, site visit of the area to determine the actual situation, secondary data gathering of the area as to its land use, its environmental conditions and other relevant physical features.

An Initial Environmental Examination (IEE) Report was drafted and finalized

The IEE report was submitted to the DENR- EMB as endorsed by the Governor

2.4 **IEE Study Area**

The study area had focused on the foreseen impact that may happen especially during the different phases of the project such as pre- construction, construction and to its operational phase relative to its environmental conditions like air, water, land and the people. Based from observations in the area, less mitigating measures be formulated to prevent the adverse impact to the environment considering that it is already an existing road that needs only to be rehabilitated . The road to be opened has also less impact to the environment since only shrub and miscellaneous species of less economic value be affected.

2.5 **The IEE Methodology**

The project to be conducted with IEE is an existing road hence no great disturbance on the environment is expected to occur, however, environmental assessment was still made in order to avoid further problems as the different phases of the project will be under implementation.

3. Project Description

3.1Project location and area

The project is located at Nanabbalan Norte, Tuguegarao city and at Baliuag, Bical and Cabbo, Penablanca, Cagayan. It is a 17.8304 kilometers construction/rehabilitation of Farm to Market Road. The activities involved are road opening, construction of line drainage canal and construction of retaining walls.

3.2 **Project Rationale**

The project is a Rural Access Road designed to provide an all weather road network accessible all year round. This connects the different proponent barangays where the source of raw milk, proposed forage production area, the existing processing center and the communal dairy barn are established.

The road to be rehabilitated has a total length of 13.870 kilometers. It is an existing graveled road with spot concreting but deteriorating as cracks are found along the stretch of the concrete segment. It is programmed into two sections.

The first (1) section starts from Barangay Namabbalan Norte, Tuguegarao city along the national highway) and ends up to Barangay Baliuag, Penablanca with approximate length of 6.870 kilometers. The width of the road is 4 linear meters with 1.5 meters shoulders on width of the road is 4 linear meters with 1.5 meters shoulders on both sides. Both side of the road are Integrated Social Forestry project areas planted with corn and other agricultural crops.

The second (2) section of the road for rehabilitation also starts from Barangay Cabasan,Penablanca traversing Barangay Bical, Penablanca, eastern portions of Namabbalan Norte and Barangay Namabbalan Sur of Tuguegarao city with a total length of 7 kilometers. It is not passable during wet season because it is slippery and with deep holes.

The road to be opened is programmed as the third (3) section which begins from a portion of barangay Baliuag, Penablanca that connects to the forage area at Namabbalan Sur. The length is 3.960 kilometers, also 4 linear meters wide and with 1.5 linear meters shoulder on both sides. Also, along the road are ISF projects planted with corn and other agricultural crops. A portion of about 0.500 kilometer is an existing trail only passable through hiking and by farm animals while the remaining 3.460 kilometers is the portion to be opened. It pass a grazing land covered by Bracharia grass. Climbing vines, some rattan wildlings, shrubs and miscellaneous species at sapling stage such as samak, bignai pugo, tibig, etc. of less commercial value are found to be removed in the road opening with a length span of ten (10) meters . Trees such as rain tree, hauili, alim,antipolo, malapapaya and patches of shrubs are also found but not to be affected. No live creek is found to exist in the area.

With the construction of the farm to market road, will be a big help to the proponent barangays to provide accessibility to other neighboring barangays thus enhance the flow of economic activities.

3.3. Project Development Plan, Process/Technology and project components

3.3.1 PPMIU Organizational Structure to manage the project

The implementation of the farm to market road sub project will be contract under the supervision of the Provincial Government of Cagayan through its Provincial Project Management Implementing Unit which was organized for the implementation and monitoring of infrastructure sub projects of the Philippine Rural Development Program (PRDP).

The city of Tuguegarao and Municipal Government of Penablanca, the concerned barangays will be jointly responsible for the operation and maintenance of the road sections within their respective jurisdiction.

3.3.2 Plan for management during construction

The implementing office is the Provincial Engineering Office of Cagayan (PEO). It will be implemented through bidding. During the implementation, there will be an assigned Project Engineer to monitor the rehabilitation of proposed project and a member of PPMU. Regular report on the status of the project will be done by the Project Engineer who will be in the site throughout the project implementation. The private contractor's private Engineer will report the status of the project to the resident project engineer of the PEO. The PEO's project engineer will do site validation and submit reports of his findings. Regular meetings will be scheduled to assess the status of the project and come up with solutions if problem exist.

3.3.3 Sustainability plan

3.3.3.1 Organizational Development Plan for the operation and maintenance

Project monitoring and supervision will be through the regular practice of the PEO in similar projects that is a project resident engineer who will be assigned to monitor and supervise the implementation of the project, if needed, additional technical staff will be assigned.

3.3.3.2 Operation and maintenance plan for the operation

The Provincial Government of Cagayan together with the city of Tuguegarao and Municipality of Penablanca will allocate necessary funds and manpower requirement for the maintenance work to ensure the project sustainability.

As the road operation and maintenance scheme requires routine and periodic activities, the provincial, city and municipal will work hand in- hand. The periodic maintenance which will be done every five years will be the responsibility of the provincial, city and municipal. Routine maintenance includes vegetation control, cleaning and repair of culverts/box culverts, cleaning of side ditches and lined canals, filling of ruts and potholes, etc.

3.4. **Description of Project Phase**

3.4.1. **Pre-construction/Pre-operational Phase**

The activities conducted in this phase are the following:

- Information dissemination and consultations to the different barangay proponents about the proposed farm to market road project.
- Gathering of secondary data
- Survey of the proposed area
- Mapping
- Preparation of lay out and detailed plans
- Consultations with other stake holders
- Secure clearances, certifications, permits to concerned national government agencies and LGUs
- Inspection of existing pavement

3.4.2. **Construction/Development Phase**

As part of the work is ground staking/marking before construction. It involves the actual development of the road and establishment of formal structure. The laid out route line will be scraped. Likewise, existing vegetation along both side of the existing road shall be maintain as carbon sink.

The material requirements for the construction consist of hard durable particles or fragments of crushed stones, slugs or crushed or natural gravel and filler of natural or crushed sand and other finely divided mineral matter. The composite material shall be free from vegetable matter and lumps or balls of clay and shall be of such nature that it can be compacted readily to form a firm, stable sub base. This is in consonance to the standard specification for highways, bridges and airports.

The construction is composed of three (3) sections and are described as follows:
Section 1- This is a existing road which starts from the national highway at Barangay Namabbalan Norte, Tuguegarao city traversing Barangay Baliuag, Penabalanca, Cagayan with a total length of 6.8704 kms. and a width of **4 linear meters with 1.5 meters shoulders on both sides**. Concrete line drainage with a total length of 400 linear meters with a width of 0.8 m and 1.0 m depth. The construction of RCCP with head wall with a total length of 40 linear meters to be located on the sloping areas to control erosion. There are five lines proposed reinforced concrete culvert pipes 910 mm diameter with headwalls wing walls and for road crossing drainage.

Section 2- Also, an existing road traversing Barangay Cabbo, Bical and Baliwag with a total length of 7.0 kms and a width of 4 linear meters with 1.5 meters shoulders on both sides proposed to be concrete paved with removed and replaced of the existing dilapidated concrete

3.4. **Description of Project Phase**

3.4.1. **Pre-construction/Pre-operational Phase**

The activities conducted in this phase are the following:

- Information dissemination and consultations to the different barangay proponents about the proposed farm to market road project.
- Gathering of secondary data
- Survey of the proposed area
- Mapping
- Preparation of lay out and detailed plans
- Consultations with other stake holders
- Secure clearances, certifications, permits to concerned national government agencies and LGUs
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Section 2- Also, an existing road traversing Barangay Cabbo, Bical and Baliwag with a total length of 7.0 kms and a width of 4 linear meters with 1.5 meters shoulders on both sides proposed to be concrete paved with removed and replaced of the existing dilapidated concrete

pavement on various stations as recommended by the DPWH based on the assessment and test result conducted. Concrete line drainage with an effective width of 0.80 m and 1.0 m depth will be placed on various stations with a total length of 250 linear meters. There are also five lines proposed reinforced concrete pipes 910 mm diameter with headwalls wing walls and for road crossing drainage.

Section 3- Road opening a circumferential road linking road 1 & 2 with a total length of 3.960 kilometers. This includes the construction of line drainage with a total length of 230 linear meters are proposed on various stations which has an effective width of 0.80 m and 1 m depth, and installation of 24 linear meters reinforced concrete pipe culverts with 910 mm diameter includes headwalls, wing wall on road crossing drainage. Proposed retaining wall to be located at sloping areas that measures 260 meters length with effective height of 5 meters.

3.4.3. **Operational phase** –.

Upon completion of all the project construction and curing, the road shall be put into operation. Degraded areas shall be rehabilitated through the planting of fast growing species, grasses and creepers along critical slopes. Sustainable Upland Agriculture Technology (SALT) shall be adopted and the use of herbicides to kill weeds be limited on ISF areas located along the constructed road particularly at Barangay Baliuag, Penablanca to mitigate possible surface run-off . Kaingin activity within the remaining forest areas of the area of influence shall also be prohibited to maintain ecological balance.

3.4.4 **Abandonment phase** -

The farm to market road will be maintained by the proponent barangays. The Provincial Government of Cagayan shall allocate an annual maintenance budget and a periodic maintenance budget every 6 years for 20 years. The equipment used during the construction shall be pulled out after the project had been finished. All construction spoils will be disposed off properly while temporary structures like bunkhouse of construction workers will also be dismantled. Solid waste management will be enforced to preserve the aesthetic value of the area.

5 **Manpower requirements** -

The project is expected to employ fifty five (55) unskilled laborer/workers and 115 skilled workers from the proponent barangays throughout the duration of 485 calendar days.

3.6. **Project cost** -

The project cost is estimated at Php 151,816,920.19 of which 80% (Php 92,653,536.15) will be taken from the loan Proceeds, or Php 11,581,692.02 from GOP and the remaining 10% (Php11,581,692.02) will be the LGU's Equity.

3.7. **Project Duration and Schedule** -

The project is expected to start once the World Bank shall have released the budget for the project.

4. BASELINE ENVIRONMENTAL CONDITIONS, IMPACT ASSESSMENT AND MITIGATION

4.1 The Land Environment

4.1.1 Land Use

The general land use of the area is classified under open grassland and agricultural land areas. The proposed17.8304 kilometer project traverses a tract of agricultural and grazing lands starting from Barangay Nanabbalan Norte and Sur, Tuguegarao city to Bical, Baliuag and Cabbo, Penablanca. The 3.960 road opening does not pass thru any declared or proposed protected area. The widths of existing road has enough area for expansion on both sides as required by DPWH Standards.

4.1.2 Pedology

-Reconnaissance conducted, soil type on top ridge is rocky to sandy while at the lower elevation is clay loam and sandy loam. Terrain along the farm to market road project is identified in the NAMRIA topographic map with the highest elevation reading at one hundred three (103) meters above sea level. Basing from the soil survey and the soil map of the city/municipality prepared by the Bureau of Soils and Water Management the soil types are ideal for agricultural and dairy industry uses because it retains nutrients and retains water while still allowing excess water to drain away. A large area is highly suitable for pasture and cattle production.

4.1.3 Geology and Geomorphology

Drainage situation and flooding potential. Geo-hazard map from the Mines and Geo-sciences Bureau shows that barangay Namabbalan Norte falls outside the flood prune areas in the city of Tuguegarao. Likewise, Bical, Baliuag and Cabbo, Penablanca Cagayan falls also outside the flood prune areas as per Geo hazard map provided. These four (4) barangays covering the projects falls outside the flood prune areas of both the municipality as per geo hazard map of the locality are well drained thru the Cagayan River and Pinacanauan River.

4.1.4 Terrestrial biology

4.1.4.1 Floral composition

Vegetative cover of the area is categorized into grasslands, cultivated areas and secondary forest. The pasture area is generally covered by Bracharia grasses suitable for grazing

Vegetative cover near the proposed area is categorized into grasslands, cultivated areas and secondary forest. The pasture area is generally covered by Bracharia grasses suitable for grazing livestock with patches of shrub species, herbs like cogon, talahib and hagonoy. The upper areas are cultivated areas under the Integrated Social Forestry Project planted with corn, fruit trees and forest tree species while at the lowland areas are planted with rice. However, in the distant forest areas of the influence barangays are common hardwood and miscellaneous species. Species of bamboos are found along creeks.

There will be no plants, crops to be damaged/affected upon implementation of the project since the road is already existing. However, on the road opening leading to the forage production areas, some miscellaneous species, climbing vines and shrubs shall be removed.

Some List of Species found within the area of influence

Common Name	Scientific Name
Red Lauan	Shorea negrosensis
Mayapis	Shorea palosapis
White Lauan	Shorea contorta
Alupag	Euphorio didyso
Antipolo	Artocarpus blancoi
Balete	Kinglodendrum alternifolium
Dao	Dracontumelum dao
Kalumpit	Terminalia microcarpa
Makaasim	Dillenia luzunniensis
Narra	Ptericapus indicus
Sakat	Terminalia ninata
Anabiong	Trema orientalis
Alim	Melandepis multiglandulosa
Kamiring	Semicarpus philippinensis
Dapdap	Erythrina indica
Tamarind	Tamarindus indica
Guava	Psidium guajava
Binai Pugo	Aleurites pentandrum
Hauili	Ficus septica
Bangkal	Nauclea orientalis
Gmelina	Gmelina arborea
Akleng Parang	Acacia procera
Binuang	Octomeles sumatrana
Malaikmo	Celtis Philipinensis
Bolong-eta	Diospyrus pilosanthera
Balinghasai	Buchania arborescens
Balobo	Diplodiscus paniculatus
Puas	Schizostachys fenexii
Anonas	Annona reticulata
Rain tree	Samana saman

Guava	Psidium guajava
Bignai pugo	Aleurites pentandrum
Hawili	Ficus septica
Bangkal	Nauclea orientalis
Gmelina	Gmelina arboria
Binuang	Octomeles sumatrana
Malaikmo	Celtis philippinensis
Bolong eta	Diospyrus pilasonthera
Pagsahingin	Canarium sperium
Balobo	Diplodiscus paniculatus
Anonas	Anona reticulata
Bikal baboi	Schizostachyum diffusum
Boho	Schizostachyum lumampao
Kawayan Kiling	Bambusa vulgaris
Kawayan tinik	Bambusa spinosa
Bayog	Dendrocalamus merrillianus
Fern	Diplamium esculentum

4.4.2 Faunal Composition

Birds were observed to be present in the forest portion of the barangay influence area and they often visit kaingin areas to eat insects found on agricultural crops. Observed species also includes butterflies, mosquitoes, dragonflies, bees, ants, cicada and grasshoppers. Animals like wild boar, monkeys, deer, monitor lizard and Tangisang bayawak are now rarely encountered at the proposed project area since their habitat is already deforested with the introduction of upland farming in the areas, however, they can still be found within the forest areas far from the barangays.

Invertebrates such as several species of insects, arachnids have also suffered a similar fate. Human incursions and converting the forest areas to upland areas have seriously damaged their habitat leading to their migration to less affected portion of the forest far from the ommunity. No rare or endangered species shall be affected by the project implementation.

Aquatic plants and animals like fresh water crabs, shells and natural plants like hyacinths, talahib, kangkong and other water plants are found along the creeks. Little is known of the microbial population present in the area.

Faunal species found the project influence areas

Common name	Scientific Name
A. Avifauna	
Rufous Hornbill	Bucerous hydrocorax
Tarictic Hornbill	Penelopides panini
Spotted Wood Kingfisher	Actenoides lindsayi

Oriol	Icterus galbula
Maya	Lonchora artricapilla
Pirpiruka	Sturnus vulgaris
Owl	Nyctea scandiaca
B. Mammals	
Phil Forest rat	Rattus everetti
Fruit bat	Dobsonia chapmani
c. Reptiles	
Monitor lizard	Varanus salvator
Snake	Trimerusus flavomaculatus
Phytoon	Python regius
Pagong	Heosemys reytensis

4.2 Water Environment

4.2.1 Water Resources

Rivers, springs and creeks are the water resources of the proponent barangays. The Cagayan river and Pinacanauan river traverses both the municipality and city that provides suitable source of water for irrigation to farmlands. Springs are also tap as water system for the community particularly at Barangay Bical, Penablanca.

Creeks are also found particularly at barangays Baliuag, Bical and Cabbo, Penablanca and are use by local residents for their domestic use.

4.2.2. Water Supply Facilities

The sources of water supply for potable use in the area are the local water works system, communal water system, barangay water systems which are tap from springs. Installed artesian wells also are source of potable water of residents within the proponent barangays. The depth of water in the elevated settlements or built-up areas ranges from 6 to 24 meters.

4.2.3. Water Quality

The area has no identified industries at present and no water quality study can be found.

4.2.4. Hydrology

The construction/rehabilitation project would not likely affect the ground water flow since the activities shall be confined above the ground level of the area.

A deep well which might be installed by the proponent shall only have a minimal extraction rate. The water consumption rate is relatively small to cause significant on the water table and ground water characteristics in the area. Water is naturally re-charge by precipitation (rainfall).

During the construction phase of the project, the nearby surface water body such as the creek will unavoidable be affected if not properly mitigated. Soil erosion may occur and be transported into the nearby creeks which may result in increased turbidity and suspended solid concentration. The erosion potential is specially magnified during the rainy season when there will be increased run-off from the area. This negative impact could be minimized through the implementation of a proper mitigation measures.

4.3. The Air Environment

4.3.1 Climate

The climate in the locality is classified under Type III. Seasons are not very pronounced. Relatively dry from November to April and wet during the rest of the year. In the uphill, the climate is commonly moderate for most part of the year.

4.3.2. Air Quality and Noise

The air quality in the area is generally considered good except in some portions of the existing road which are not cemented and are very dusty especially during summer caused by jeeps, dump trucks and other moving vehicle passing by. Loud noise of dump trucks loaded with commodity are also creating some noise especially during rainy days when the road is very hard for transportation. Ground watering of the dusty road shall be done to avoid dust during construction and proper check up of motor engines and smoke belching test shall be required so as to mitigate noise in the area particularly along residential areas. However, the presence of trees along the road serves as carbon sink in the area.

4.4. People

There are four (4) barangays who are beneficiaries of the project. The total number of households is 1,346 with a total population of 6,249 of which 3,242 are males and 3,047 are females. They derived their income from their on-farm, off-farm/non –farm activities. Business and employment opportunities are remarkably high in the locality.

Lifestyle is simple and typical of rural areas. Traditional social gatherings or events such as fiestas, birthdays or marriages are mostly observed. As Christians, church celebrations are faithfully celebrated.

Health and safety conditions may be described as tolerable in the area since there is the presence of facilities and medical care.

5. ENVIRONMENTAL MANAGEMENT PLAN

5.1 Impacts Management Plan

Predicted impacts during the construction/development, operation and abandonment phase of the project on land, water, air and the people will be assessed in terms of its magnitude, frequency and extent. The proponent shall take into consideration seriously and implement necessary mitigating measures.

Activity	Environmental aspect	Environmental impacts	Mitigating measures	Responsibility
A1. Site preparation and development	Removal of the vegetative cover	Increase sedimentation during construction.	Re-use of removed top soil in other road maintenance and other land leveling activity. Proper disposal and Compaction of soil.	Contractor
		Removal of affected miscellaneous species and shrubs	Roadside tree planting .and at any identified portion of the area.	Contractor
	leveling of the terrain	Possible soil erosion And siltation of creeks during heavy rains	Provision of drainage canal and enclose hazardous area with barriers.	Contractor
		Disturbance of the faunal species (cows, carabao's, etc)	Temporary transfer meantime to other grazing area.	Owners of animals
A.2. Construction of the road, scraping, shaping, widening shaping and other road components	Increase in sedimentation	Temporary increase in soil erosion and siltation of waterways during rainy days	Proper planning on earth fill surface. Proper disposal and compaction of soils.	Contractors
	Generation of	Potential	Spill of oil/grease	Contractor

	equipment used oil/grease	contamination of surface and ground water with oil/grease due to presence of heavy equipment.	be minimized and proper handling and disposal of the waste. A designated motor pool be identified and be well maintained.	
	Delivery of equipments and materials	Possible traffic in the roads	Provide traffic signs and road directions in the site	Contractor
	influx of construction workers	Potential contamination with human waste	Establishment /construction of temporary camps with sanitary toilets.	Contractor
		Injuries due to unavoidable actions during work.	Issuance of safety gadgets to workers	Contractor
		Increase employment in the proponent barangays	Priority employment of residence within the area of influence.	Contractor
	Generation of solid waste	Prevalence of dust/mud during construction	Regular sprinkling of the ground and filling of potholes during rainy days especiaily to nearby residence areas.	Contractor

b. road opening	Sedimentation in waterways	Occurrence of erosion on exposed roadsides	Erosion control measures be applied.	Contractor
	Loss of forest cover to nearby forest areas	Easier mobility in forest disturbance due to illegal settlers	Deputation of barangay officials as local ENRO's	PNREO
c. operation phase	Generation of noise and smokes	Smoke pollution and nuisance to residents	Equipment used shall be properly maintained. Set up speed limit of vehicle passing along residential areas. Subject equipment to smoke belching test	Contractor
	Generation of demolition spoils and solid wastes	Degradation of soil and water quality due to contamination	Segregation of usable materials such as bottles, cans, plastics, cartoons, cement bags to be sold to MRF within the locality. Hauling of residuals by the contractor.	contractor
	Soil erosion on ISF areas along the constructed road.	Degradation of top soil on ISF areas found along constructed roads at Barangay Baliuag.	Application of sloping agricultural land technology and regulate the use of herbicides on ISF areas.	Contractor/ farmers

5.2.Emergency Response Policy and Generic Guidelines

Emergencies are events that are cause by natural forces or force majeure like typhoon that may result to negative effects to people and the environment. Accidents during the project activities implementation are unavoidable. In this case, the proponent shall formulate and implement emergency response plan to avoid the accidents from its possible occurrence. This is also to provide the proponent the appropriate strategy on responding to situations which minimize destruction of properties and loss of life among its workers.

5.3. Environmental Monitoring Plan

The Environmental Monitoring Plan shows that the proponent is willing to implement and undertake and check the environmental performance of the implemented project. This shall be done by the assigned Project Engineer who shall monitor, verify and assess the status of the project and make corrective actions on the environmental impacts if such mitigating measures are effective .

That the emissions and effluents of equipment used as are in accordance with DENR –EMB rules and regulations.. The EMP shall also concentrate on the possible inadequacy of the mitigating measures to prevent soil erosion and sedimentation in the nearby creeks.

Environmental Monitoring Plan to be conducted by the proponent during the conduct of the different phase of the project.

Activities	Parameters	Frequency	Cost	Responsibility
1.Pre –operational Site preparation	Vegetation loss Dust generation Noise and smoke generation of equipment	Confine only to the area that is programmed. Regular sprinkling of the ground. Proper maintenance of equipments. Set up speed limit of vehicle passing along residential areas. Subject equipment to smoke belching test.	Included in the construction cost	contractor

	ISF areas found along road constructed.	technology (SALT) and regulate the used of herbicides to kill weeds on ISF areas found along constructed road.		contractor PNREO/ Farmer beneficiaries

5.4.Institutional Plan for EMP Implementation

In order that a good relationship shall exist between the proponent and the community relative to to the promotion of a sound environmental protection in the area of operation, an institutional partnership shall be establish by the proponent among government agencies and different stakeholders. This includes the following plan as follows:

- Observe proper waste management practices in the area like disposal of waste at an approved disposal areas;
- Conduct IEC on solid waste management particularly on the 3 Rs such as re use, reduce and recycle practice ;
- Participate in the proper monitoring of the different phases of activity to be undertaken; and
- Comply with the mitigating and enhancement measures identified.
- Intensify the sloping agricultural land technology (SALT) and limit the use of herbicide on ISF areas .

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