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USAID'S Growth with Equity in Mindanao (GEM-3) Program

Regional Impact Projects (RIP)
R-04 Tawi-Tawi Bridge/Road Partnership

Environmental Assessment Report

Submitted to:

United States Agency for International Development/Philippines
Office of the Economic Development and Governance
Manila, Philippines

Submitted by:

THE Louis Berger Group, INC.

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September 2008

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DRAFT

Request for Environmental Assessment Approval for the Tawi-Tawi Bridge-Road Partnership Project

PROGRAM/ACTIVITY DATA

Country Code: 492-012
Country or Region: Philippines
Activity Name: **Environmental Assessment (EA)Tawi-Tawi Bridge-Road Partnership Project**

Funding Begin: FY 2008 **Funding End:** FY 2009 **LOP Amount**: $2,500,000
Approval Issue: **Environmental Assessment**

OVERVIEW

The project is located in the Province of Tawi-Tawi, a group of islands located at the southernmost tip of the Philippines. The Department of Public Works and Highways (DPWH) of the Government of the Republic of the Philippines and the USAID/Growth with Equity in Mindanao (GEM) Program will jointly fund and undertake the proposed project. The agree-upon project scope includes (i) construction of 3 steel bridges and 2 link roads, and (ii) the upgrading of two earth roads linking the bridges to the existing road network on Sanga-Sanga Island and Tawi-Tawi Island. The construction work is expected to be completed within 12 months at an estimated total cost of $8.10 million for all components. USIAD-GEM Program will cover only the upgrading of the Sanga-Sanga road section at an estimated cost of $2.5 million.

The construction of the bridges that will connect the island of Tawi-Tawi to the Sanga-Sanga island will enable more people from the municipalities of Panglima Sugala, Tandubas, Sapa-Sapa and Languyan (on Tawi-Tawi Island) to take advantage of the superior education, health and social services available only in Bongao, the capital city of Tawi-Tawi, which is located on Bongao Island. The roads and bridges will allow and encourage greater movement of local products and goods throughout the province, create business opportunities and enhance the peace process.

On March 3-4, 2008, USAID/ANE Environmental Protection Specialist Barney Popkin and GEM Environmental Staff conducted a site inspection of the project. Based on the visit and consultations in the field, a resulting Environmental Threshold Decision (ETD) concluded that the bridge construction and road upgrading qualifies for **Positive Determination** per 22 CFR 216.3 (a)(2)(iii) because project components may have potential significant adverse impacts on the environment. The environmental determination for the proposed Category 3 project is indicated in the GEM-3 Revised Environmental Plan (Reference: AID 492-C-00-08-00001-00) approved by USAID/Philippines on May 12, 2008.

Per the Initial Environmental Examination (IEE) for all SO12 activities approved by ANE's Bureau Environmental Officer (ANE/BEO) on September 9, 2005 that includes the GEM Program, infrastructure activities such as those under the GEM Program qualify for a "Negative Determination with Conditions" under 22 CFR 216. Conditions include that construction activities shall be subject to further review using

an established Environmental Screening Review Process (ESR) provided for in the S)12 IEE. Using the ESR, USAID determined that an Environmental Assessment (EA) is needed given the potential environmental impacts of the Tawi-Tawi Bridge Road Partnership Project. It is determined that construction of the roads and bridges in Tawi-Tawi Province, require a **Positive Determination** per 22 CFR 216.3 (a)(2)(iii) because project components may have potential significant adverse impacts on the environment. A scoping process was required to inform the Environmental Assessment process.

On May 20, 2008, DPWH, with support from the GEM Program, conducted a Public Scoping in Bongao, Tawi-Tawi involving 84 participants form national and regional government agencies, local government units, non-governmental organizations and representatives from public and private sectors. The priority issues and concerns identified by the participants included: right-of-way (ROW) land acquisition and compensation, mangrove cutting, tree replacement, quarrying, construction safety, impacts on indigenous flora and fauna, and displacement of people from livelihood and income sources. A Scoping Statement was submitted to and concurred by USAID/Philippines and was reviewed and approved by the ANE/BEO on September 15, 2008.

The Environmental Assessment (EA) addressed the identified priority issues and concerns raised during the Public Scoping and the potential environmental impacts of the Tawi-Tawi Bridge Road Partnership Project. The environmental analysis and evaluation determined that the potential adverse impacts of the project component activities are amenable to mitigation measures that are recommended in the Environmental Management Plan (EMP) for implementation during the construction and operation phases of the project development cycle. The EMP incorporates a program for monitoring compliance by the Civil Works Contractor(s) with the recommended impact mitigation measures to be implemented during project construction. GEM will undertake Beneficial Use Monitoring (BUM) to ensure that the completed facility is maintained and operated properly and that the intended use is enjoyed by the target beneficiaries. An EA Report was prepared according to the content outline and reporting format prescribed in CFR 216.6 (c). This Report is being submitted for review and approval by the ANE/BEO.

RECOMMENDATION

The USAID/Philippines Environmental Assessment for the Tawi-Tawi Bridge Road Partnership Project dated September 19, 2008 (prepared with assistance from the Louis Berger Group, Incorporated, the principal technical assistance contractor for the GEM-3 Program) is recommended for approval by the USAID/ANE Bureau Environmental Officer (BEO).

A/Mission Director _____ Date: _____
Elaida Washington

A/Mission Environmental Officer
_____ Date: _____
Mary Joy Jochico

GEM Project Cognizant Technical Officer
_____ Date: _____
Robert Barnes

APPROVAL

Bureau Environmental Officer _____ Date: _____
John O. Wilson
Approved: ☐
Disapproved: ☐

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To: **Robert Barnes**
OEDG-USAID

Date: Sept. 19, 2008

Cc: **Daniel Moore**
Chief, Office of Energy & Environment (OEE)

Ref #: ESR-037

Fax: 552-9993

From: **Dr. Charles E. Feibel**
Chief of Party

Subject: Environmental Assessment Report of Regional Infrastructure Project (RIP) for Issuance of USAID Environmental Clearance Certification (RIP No. 4)

We have completed the environmental assessment of one RIP according to the prescribed USAID Environmental Procedures (Regulation 216). The attached Environmental Assessment (EA) Report is being submitted to your office to request environmental clearance for this project:

No.	Project Title	Project Location
4	Tawi-Tawi Bridge – Road Partnership	Bongao-Panglima Sugala, Tawi-Tawi, ARMM

Based on the initial results of the Scoping Report, the project was classified as **Category 3 (High Environmental Risk)** for a Positive Determination.

Based on our environmental assessment, the project is anticipated to pose significant adverse environmental impacts, which will be addressed by the recommended mitigation measures defined in the Environmental Management Plan (EMP) prepared for the project.

We request approval of the attached Summary of Environmental Assessment Report. We are prepared to respond to any questions or provide any additional information you may require to facilitate the review and approval of the attached environmental document.

Thank you,

The GEM Program is funded by the U. S. Agency for International Development (USAID) and implemented in partnership with the Mindanao Economic Development Council (MEDCo)

Makati Office: Unit 3, 12/F, Export Bank Plaza Sen. Gil Puyat cor. Pasong Tamo Makati City 1200 Philippines Tel: (63-02) 812-1647 Fax: (63-02) 818-8990 E-mail: gemakati@mozcom.com
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SUMMARY OF ENVIRONMENTAL REVIEW

Project	**Regional Impact Project (RIP)** **Growth with Equity in Mindanao (GEM) Program**
Project Implementing Partner	**Department of Public Works and Highways (DPWH)** Hon. Secretary Hermogenes Ebdane
Project Name	**TAWI-TAWI BRIDGE ROAD PARTNERSHIP** **(RIP No. 04)**
Project Duration	Ten months construction period
Project Description	**Bridge and Road Construction**. The project involves construction of three bridges and link roads between the bridges, and upgrading of two earth roads linking the bridges to the existing road network. The estimated total cost is Php 335 million. A description of project activities is provided in **Attachment A**.
Project Category, Recommended Determination and Documentation	- Category 3 (High Environmental Risk Activity) - Positive Determination (Activity has significant potential adverse environmental impacts) - Scoping Statement and Environmental Assessment Report

Certification: I, the undersigned, certify that:

1. The information in this form is correct and complete.
2. The following actions have been and will be taken to assure that the project complies with environmental requirements established under the Code of Federal Regulations 22 CFR 216:
   - ☑ Those responsible for implementing this project have received training and/or documents describing essential design elements and best practices for activities of this nature.
   - ☑ These design elements and best practices will be followed in implementing this activity, unless USAID specifically requests a change.
   - ☑ Any specific mitigation and monitoring measures described in the environmental review will be implemented in their entirety.
   - ☑ Compliance with the conditions will be regularly confirmed and documented by on-site inspections during project construction and its completion.

A. Sundermann Andaya 3/19/08

Alejandro Sundermann/ Armando Andaya Date
GEM-3 Infra Program Manager/ Environmental Specialist

	Approved:	Disapproved:	Date:
USAID CTO:			
USAID MEO:			
USAID BEO:			

The GEM Program is funded by the U.S. Agency for International Development (USAID) and implemented in partnership with the Mindanao Economic Development Council (MEDCo)

Attachment A

GROWTH WITH EQUITY IN MINDANAO (GEM) – 3 PROGRAM

ENVIRONMENTAL ASSESSMENT REPORT

TAWI-TAWI BRIDGE ROAD PARTNERSHIP PROJECT

1.0 INTRODUCTION

1.1 Environmental Assessment Process

An Environmental Assessment (EA) was conducted to address the potential environmental impacts of the Tawi-Tawi Bridge Road Partnership Project. The project involves construction of three bridges and link roads between the bridges, and upgrading of two earth roads linking the bridges to the existing road network. The EA was required based on the Environmental Screening Review (ESR) process provided for in the Initial Environmental Examination (IEE) for the Growth with Equity in Mindanao (GEM) Phase 3 Program. The proposed construction of the roads and bridges in Tawi-Tawi Province, Sulu Archipelago, qualifies the project for a Positive Determination per Section 216.3 (a)(2)(iii) of the USAID Environmental Procedures (Title 22 of the U.S. Code of Federal Regulations, Part 216), because project components may have potential significant adverse impacts on the environment.

A Public Scoping was held on May 20, 2008 in Bongao, Tawi-Tawi to inform stakeholders regarding the environmental assessment process, and to obtain their input. A Scoping Statement was prepared to document the Public Scoping process. The Scoping Statement was submitted to and concurred with by USAID/Philippines, and was reviewed and approved by the ANE/Bureau Environmental Officer (BEO) in Washington on August 5, 2008 (Refer to **Annex A**).

This Environmental Assessment (EA) Report documents the detailed study of the possible significant environmental impacts associated with the road and bridge construction activities. The EA Report presents an analysis and evaluation of the priority issues and concerns related to the environmental impacts of the project which were identified by stakeholders during the Public Scoping.

The EA Report was prepared according to the content and form prescribed in Section 216.6 (c) of the USAID Environmental Procedures (22 CFR 216). This Report is being submitted for review, approval and issuance of environmental clearance by the USAID BEO before the start of construction.

1.2 Environmental Issues and Concerns

The priority issues and concerns related to the environmental impacts of the Tawi-Tawi Bridge-Road Partnership Project identified by stakeholders during the public scoping are summarized in **Table 1** below.

Table 1. Identified Priority Issues and Concerns Related to Environmental Impacts of the Tawi-Tawi Bridge Road Partnership Project

Project Development Phases	Related Issues Raised	Identified Concerns
Pre-Construction Phase	Right-of-Way (ROW) land acquisition	Loss of land, change in land use, compensation for affected people
	Sourcing of construction aggregates	Illegal beach sand quarrying and coral extraction
	Mangrove cutting/clearing	Impact on sensitive habitat and associated flora and fauna.
	Mobilization of equipment and materials, construction of temporary facilities, etc.	Pose safety hazard to pedestrian and vehicular passage in the construction area.
		Encroachment onto navigational routes along river channel
		Displacement of agricultural farmers and seaweed farmers, and fishermen from income and livelihood sources
		Vehicle and equipment emissions, noise, dust, oil spills and other toxic discharges.
Construction Phase	Clearing and Grubbing (Road Construction)	Erosion and soil deposition in low-lying areas or water bodies
	Demolition, Excavation and Pile Driving, Stream diversion, etc. (Bridge Construction)	Changes in channel beds and impacts on indigenous flora and fauna in waters within the project-influenced area
	Disposal of excess excavation materials and construction wastes and debris, wash/wastewater	Land and water pollution
	Heavy equipment operation	Nuisance, noise, vibration, dust and gas emission, oil spills, and leaks
	Terrain and surface drainage modification	Erosion and soil deposition in low-lying areas or water bodies, impacts on mangrove ecosystem.
	Local labor for construction	Preferential hiring of residents, including women.
	Road traffic problems	Regulation/ restriction of pedestrian and vehicular traffic.
Operation Phase	Transport of goods, including potentially toxic and hazardous materials	Threat of water and land pollution, other safety hazards.
	Improved pedestrian and vehicular traffic flow	Increase risk of road accidents
		Induce access into mangroves
	Increased economic activities	Influx of migrant workers and settlers
		Increase land values
		Inputs on mangrove ecosystem

1.3 Philippine EIA Requirements

The Tawi-Tawi Bridge Road Partnership Project was submitted to the environmental assessment and environmental clearance process in compliance with the Philippine Environmental Impact Statement (EIS) System which is promulgated by Presidential Decree No. 1586. The environmental assessment process applied the technical and procedural guidelines prescribed in the Revised Procedural Manual for the Department of Environment and Natural Resources (DENR) Administrative Order No, 30 Series of 2003 (DAO 03-30), which define the Implementing Rules and Regulations of the Philippine EIS System.

As the Project Proponent, the Department of Public Works and Highways (DPWH) in the Autonomous Region in Muslim Mindanao (ARMM), through the DPWH Tawi-Tawi District Engineering Office in Bongao, conducted an Initial Environmental Examination (IEE) for the Tawi-Tawi Bridge-Road Partnership Project. The ACLT-DT Consultancy Association, Inc. was commissioned by the ARMM-DPWH to undertake the IEE Study which started from April 25, 2008 to June 30, 2008. The GEM Environment Team provided assistance to DPWH and its Consultant to ensure compliance with the technical and procedural requirements prescribed in the DAO 03-30.

The IEE was the level required by the ARMM-DENR Environmental Management Bureau (EMB) for the environmental review and clearance for the Tawi-Tawi Bridge-Road Partnership Project, since the project meet requirement for an extension of an original Environmental Compliance Certificate (ECC) issued to ARMM-DPWH for the Sanga-Sanga-Lapid-Lapid Road and Bridge Construction Project on January 6, 2005. The original project incorporated the major components of the bridge road construction and upgrading works being proposed under the Tawi-Tawi Bridge Road Partnership Project, with minor changes in the design and construction plans. The original project was never started due to lack of funds. The three-year validity of the original ECC was automatically revoked on January 6, 2008.

As prescribed in DAO 03-30, the IEE Process was initiated with the conduct of a Public Scoping by the DPWH Tawi-Tawi District Engineering Office in Bongao, Tawi-Tawi on May 20, 2008. This was attended by 84 participants from national and provincial government agencies, provincial and municipal government units, local officials and leaders of the project-affected communities, non-governmental organizations and academia, religious and women's groups. A Scoping Report documents the public consultation process and presents the issues and concerns raised by the stakeholders.

The IEE assessed and addressed the identified priority local issues and concerns of the proposed project. Environmental baseline information was established from available secondary data, key stakeholder consultations, and focus group discussions. Additional information to characterize the project-affected population and the project impact areas were generated by the DPWH-GEM Environment Team through the conduct of Socio-Economic Profiling and Perception Survey on May 22-26, 2008, and on June 3, 2006 the Rapid Coastal and Marine Resources Assessment of the Subah Manangkay Channel and the Bakhaw Dakula Islet.

An IEE Report was prepared according to the content and format prescribed in DAO 03-30 and was submitted by ARMM-DPWH to DENR-EMB on July 21, 2008. The DENR approved and issued an ECC to ARMM-DPWH for the Tawi-Tawi Bridge Road Partnership Project on August 7, 2008. The ECC has five-year validity and covers the construction of the three bridges and two link roads on Bakhaw Dakula Islet and the upgrading of the Sanga-Sanga Island Road and Tawi-Tawi Island Road.

A copy of the ECC is provided in **Annex B**.

2.0 PURPOSE

2.1 Purpose of Project

The project proposed to establish a land link between the main island of Tawi-Tawi and the island of Sanga-Sanga which are separated by a water body, the Manalik Channel.

To achieve this objective, the project will undertake (1) the construction of 3 bridges across the two major tributaries of the Manalik Channel (Subah Lambus and Subah Manangkay), and two link roads between the bridges traversing the Bakhaw Dakula islet and the nearby smaller Bakhaw Islet; and (2) the upgrading of the existing earth roads that link the bridges to the roads, on Tawi-Tawi Island to the east and on Sanga-Sanga Island to the west.

Refer to the Project Location/Vicinity Map shown in **Annex C**.

2.2 Need for Project

Presently, access to the provincial capital town of Bongao in Bongao Island, from the main Island of Tawi-Tawi, is only by sea transport. The construction of the proposed bridges and link roads will provide a new direct route between the main island of Tawi-Tawi to Sanga-Sanga Island and Bongao Island. When completed, the roadway will be a component of the Tawi-Tawi Trans-Central National Road.

The new roadway will be the only access by land for the four municipalities of Panglima Sugala, Tandubas, Sapa-Sapa and Languyan in the main island of Tawi-Tawi, to the capital town of Bongao in Bongao Island. It will enable more people from the mainland to take advantage of higher education, health and social services available only in Bongao. The new roadway will allow and encourage greater movement of products, goods and services throughout the province, will create business opportunities and investment in new enterprises in Tawi-Tawi, will promote the local tourism industry and will enhance the peace process for the population of Tawi-Tawi.

2.3 Social Acceptability of Project

The provincial and municipal local government units (LGUs) of Tawi-Tawi certified to have consulted their respective constituents and informed them of the proposed development project, including the potential negative and positive impacts. The concerned LGUs also certified that their constituents have no objection to project implementation. Refer to LGU Certification shown in **Annex D**.

3.0 PROPOSED DEVELOPMENT

3.1 Project Background

In 2002, the construction of the Sanga-Sanga Island Bridge and the Tawi-Tawi Island Bridge started under the "Tulay ng Pangulo (President's Bridge)-Salam Bridge Program", implemented by DPWH-ARMM and the President's Bridge Program (PDP) of the Office of the President. The Tawi-Tawi Island Bridge construction was started with the installation of abutments and the steel H-piles for one pier, but no further work was undertaken or completed due to lack of funds. The Sanga-Sanga Island Bridge was never started. Many of the bridge superstructure components that were delivered to the site were stockpiled adjacent to the east approach of Tawi-Tawi Island Bridge (where 2 bridges and a short link road are now proposed), where they remain to date. All bridging materials are under the custody of DPWH-ARMM.

In 2005, DPWH-ARMM cleared and opened a 7.6 km route from the existing Sanga-Sanga concrete road from Bongao to the west approach of the proposed Sanga-Sanga Bridge. The Tawi-Tawi Island Road that will be upgraded to connect to the bridges at the east end of the project is an existing earth road that is passable by ordinary vehicles during the dry season. A traffic count conducted in June 2006 showed an average of 475 vehicles per day using the Lapid-Lapid road, and 400 vehicles per day using the Sanga-Sanga road.

On August 20, 2007, the Office of the President issued Administrative Order 192 directing the Department of Public Works and Highways (DPWH) to implement the construction of the bridges and link roads in Tawi-Tawi Province as an important priority activity.

On March 25, 2008, DPWH and GEM agreed to jointly undertake the bridge and road construction project. DPWH will be responsible for construction of the bridges, the related bridge link roads and the upgrading of the Tawi-Tawi Island Road. GEM will upgrade the Sanga-Sanga Island Road only.

On April 11, 2008, USAID gave preliminary concurrence for the Tawi-Tawi Bridge-Road Partnership Project for implementation under a DPWH-GEM partnership. The preliminary concurrence includes the start of all necessary field investigations, including the conduct of environmental assessment.

3.2 Project Components

The proposed DPWH-GEM Tawi-Tawi Bridge Road Partnership Project consists of five components:

1. GEM Component. Upgrading the Sanga-Sanga Island Road (9.3 km) from Brgy. Karungdung to Brgy. Luuk Pandan, both in the Municipality of Bongao. (Gravel surfaced road with concrete pouring on steeper sections, including installation of drainage structures);

2. DPWH Component. Construction of the Sanga-Sanga Bridge (155 m) connecting Sanga-Sanga Island to Bakhaw Dakula, an islet in the middle of the Subah Manangkay Channel. (Substructure and installation of modular steel materials);

3. DPWH Component. Construction of two Tawi-Tawi Bridges (39 m & 102 m) connecting Bakhaw Dakula Islet to Brgy. Lapid-Lapid on the Tawi-Tawi Island side of Subah Manangkay Channel, including a 120-m link road between the Bridges. (Substructure and installation of modular steel materials);

4. DPWH Component. Construction of link road (600 m) on Bakhaw Dakula islet between the Tawi-Tawi Bridge and the Sanga-Sanga Bridge. (Embankment filling and gravel surfaced road); and

5. DPWH Component. Upgrading of Tawi-Tawi Road (8.45 km) connecting the Tawi-Tawi Bridge to the existing highway network on Tawi-Tawi Island from Brgy. Lapid-Lapid in the Municipality of Bongao to Brgy. Magsaggao in the Municipality of Panglima Sugala. (Gravel surfaced road).

Refer to the Proposed Site Development Plan shown in **Annex E**.

3.3 Project Implementation

3.3.1 Project Development Phases

The project components will be implemented according to the Department of Public Works and Highways (DPWH) Standard Specifications, Volume II: Highways, Bridges and Airport (the Blue Book) 2004 edition.

3.3.1.1 Pre-Construction Phase

The pre-construction phase involves planning and design, obtaining ROW and necessary permits, pre-qualification of contractors and awarding of contracts, and mobilization for construction.

During the pre-construction phase, the construction contractor(s) will mobilize equipment and supplies to the project site and erect temporary facilities for workers and field office, storage sheds and workshops required for the management and supervision of the project. Construction management staff and workers, including local labor, will include women.

The acquisition of Right-of-Way (ROW) and the compensation process will be completed before the start of construction.

Detours may be required to be constructed prior to the commencement of two road improvements. Road closures or detours will be clearly marked to ensure that there are no safety risks for road users.

During bridge construction, an alternate navigational route will be established, as required, to ensure safe and convenient passage of fishing boats and seacraft in the vicinity of the project area. The design plans will integrate required clearances for unobstructed passage of vessels under the bridges. The alternate navigational route will also avoid damage to or interference with seaweed farming activities along Manangkay Channel upstream and downstream of the bridge construction area. Coordination with the concerned local officials will be implemented.

3.3.1.2 Construction Phase

(a) Road Upgrading

Approximately 18 km of existing roadways will be upgraded, consisting of the 9.3-km Sanga-Sanga Road from Barangay Karungdung to Baranggay Luuk Pandan, both within the Municipality of Bongao, and the 8.45-km Tawi-Tawi Road from Barangay Lapid-Lapid in the Municipality of Bongao, to Barangay Magsaggao in the Municipality of Panglima Sugala.

The road upgrading work will involve clearing and grubbing, removal of any structures and obstructions, roadway and burrow excavation, structure excavation, embankment fill, sub-grade preparation and compaction. Road work will include placing of gravel wearing course and Portland Cement Concrete Pavement on steep grades, as well as construction or improvements of road drainage and slope protection structures. Concept design drawings for the road upgrading work are provided in **Annex F**.

A 230-mm thick Portland Cement Concrete Pavement (PCCP) wearing surface will be placed on a 100-mm thick gravel sub-base on steep grades. On flat or rolling terrain, a 125-mm thick gravel wearing course over a 125-mm thick gravel sub-base will be placed. PCCP will be placed on

those portions of the route where steep gradients (> 7%) are unavoidable, to prevent erosion of the road by rain.

For the route passing through a marshy area bordering the Manalik Channel, a surcharge embankment of over one meter in height will be placed for pre-consolidation and to elevate the road above flood waters. The soils in the marshy area are deep and extensive, and it is not possible to excavate and replace such with suitable soils. The marshy road section is likely to settle over time, thus concrete pavement will not be done on that route portion.

Per DPWH, a design frequency of 2 years will be used for the side ditches along the road; for pipe culverts, a design frequency of 10 years will be used; and for box culverts, a design frequency of 25 years will be used. Concrete lined trapezoidal ditches will be used for side ditches on steeper, longer gradient sections. Multi-barrel box culverts will be used for larger catchment area drains. The sizing of box culverts will be based on an evaluation of the performance of existing drainage structures.

Road traffic signs will be installed and pedestrian crossings will be provided, as required, particularly in populated areas along the roadway.

(b) Bridge Construction

The proposed bridge construction plan includes: (i) erect and construct three Mabey-Johnson Bridges, (ii) construct an elevated road bed joining the 2 bridges across Subah Managkay at the Lapid-Lapid Side of Tawi-Tawi Island, (iii) construct a connecting road link across Bakhaw Dakula Island, and (iv) improve approaches at the Lambus-Lambus side of Sanga-Sanga Island and the Lapid-Lapid side of Tawi-Tawi Island. Concept design drawings for the bridge construction work are provided in **Annex G**.

Bridge construction will involve the following activities:

(i) Structure Excavation

Existing H piles will be removed and dismantled pieces disposed of properly. The foundation of bridges will be excavated and completed structures will be backfilled. Structure excavation will involve removal of about 346 m^3 of materials above normal water level and approximately 1,317 m^3 of materials below normal water level. All excavated materials will be disposed of properly. Structure excavation will include the necessary temporary diverting of live stream flow, bailing, pumping, draining, sheeting, bracing, and/or necessary construction of cribs and cofferdams. Work will also include the furnishing and placing of foundation fill material to replace unsuitable material encountered below the foundations of structures.

(ii) Bridge Approach Construction

The construction work will involve embankment fill and sub-grade preparation before placing the aggregate sub-base material. Embankment fill consisting of selected borrow materials (approximately 38,832 m^3) will be required, which will be sourced from DPWH approved quarry sites. The sub-base materials will be spread and compacted to the required thickness (22 m). Aggregate base course material (approximately 16,421 m^3) will be placed and compacted on the prepared sub-base, and a Portland Cement Concrete Pavement (approximately 1,285 m^3), as required per the design, will be constructed on the prepared base according to specifications. Road shoulders of the bridge approaches will be protected from erosion by installing grouted riprap for slope protection, as required.

(iii) Bridge Structures

The construction of the bridge structures will involve the following activities: (i) installation of mid-piers/piers, (ii) pouring of structural concrete, (iii) pouring of PCCP, (iv) construction of abutments, and (v) installation of bridge railings/pre-fabricated Mabey-Johnson bridge superstructures, and

(iv) Link Road Construction.

The link road construction will involve embankment fill and surface gravelling of the road surface and installation of roadside drainage and slope protection structures, as required. Grouted riprap slope protection will be approximately 4,435 m^2. Concept design drawings for the road upgrading work are provided in **Annex** H.

3.3.1.3 Operation Phase

The bridges and roads are a part of a National Highway system and will be maintained by the DPWH-ARMM in coordination with the DPWH Tawi-Tawi District Engineering Office in Bongao. Road traffic management will be coordinated with the concerned provincial and municipal government units in Tawi-Tawi.

3.3.1.4 Demobilization Phase

The demobilization activities after construction completion will include demobilization of construction barracks and other temporary facilities and structures, and removal of all equipment. Construction areas will be cleared and cleaned of any construction waste or debris. Demobilization and restoration work will comply with the accepted procedures and standards prescribed in the approved civil works contract, per DPWH standards.

3.3.2 Project Cost

The total estimated cost of the project is about PhP 335 million. USAID/GEM will fund approx. 25% of the total cost and DPWH and DPWH-ARMM will provide counterpart contributions amounting to 75% of total cost. Project Cost estimates and counter funding are shown in **Annex I.**

3.3.3 Construction Schedule

The project construction is targeted to commence in October 2008 and will be completed in 10 calendar months. A Gantt Chart of Construction Schedule is shown in **Annex J**.

3.3.4 Manpower Requirement

About 350 skilled and unskilled workers, including local hired labor (including women), will be employed in the road and bridge construction work.

4.0 PROJECT ENVIRONMENTAL SETTING

This section describes the existing environmental conditions of the areas that may be affected by the proposed project during implementation.

4.1 Physical Environment

4.1.1 Topography and Drainage

The project route is characterized by flat to rolling and moderately steep slopes ranging from 0% to 15% slopes. The project area elevations between Barangay Karungdung in the Municipality of Sanga-Sanga to Barangay Magsaggao in the Municipality of Panglima Sugala, generally range from about 12 to 50 meters above sea level.

The roadways traverse areas with a natural drainage system. Occasional flooding of low areas of the roads in Sanga-Sanga and Lapid-Lapid occurs during the more rainy months of June, October and November, lasting only a few hours.

4.1.2 Soil Conditions

The soil types in the bridge project areas are characterized by clay, clay loam, sandy loam. Borehole exploration data conducted by DPWH in the general area of the Lapid-Lapid Bridge location determined the subsurface conditions as follows:

Borehole 1 – located at the eastern end of Bridge No. 1, the soil stratum is sandy clay up to 4.50 meters depth and silty sandstone to sandstone down below 7.07 meters. Ground water table is 3.60 meters.

Borehole 2 - located within the island portion of the mangrove area at Bakhaw Dakula, the soil strata is gravelly sand with silts to silty course sand to a depth of 2.25 meters underlying the sand, basalt stone up to 7.0 meters depth. Ground water table were measured during and after drilling equal to 0.80 meters and 0.20 meters respectively.

Borehole 3 - located at the western end of Bridge No. 2, the soil stratum shows silty clay to clayey sand to a depth of 6.0 meters.

The soil types along the roads, based on the materials test data of selected test pits, include silty gravel, silty clay and gravel, mixtures of gravel, silty clay and gravel, mixtures of gravel sand and silts, and mixtures of stone sand and clayey silt.

The whole island of Tawi-Tawi does not appear to be earthquake prone. There is no historical data on earthquake occurrences in the area. The Islands of Palawan and Tawi-Tawi are not included in any seismic source zones; and the Sulu Ridge where Tawi-Tawi is part of has no seismicity at all. (Thenhaus, P.C. et. al. 1994. Estimates of the Regional Ground-Motion Hazards in the Philippines, National Disaster Mitigation in the Philippiens. DOST-PHIVOLCS). Landslide occurrences have not been reported in the project area and the province as a whole.

4.1.3 Surface and Groundwater

Sanga-Sanga Island has no rivers and existing creeks have no flow, except during rainy periods. Local residents obtain their potable water from deep wells. A portion of Barangay Karungdung and Barangay Lato-Lato is considered the watershed area of Bongao Water District, with their pumping area located in Barangay Tubig Bassag. Almost 65 % of the population of Bongao and Sanga-Sanga are supplied with water from this source. Water becomes salty sometimes, especially during high tides.

Barangay Lapid-Lapid and Barangay Magsaggao have abundant water supply sources. Lapid-Lapid streams drain to the Subah Manangkay Channel while Magsaggao streams drain to Malum River. There is no water supply system in the Municipality of Paglima Sugala. Residents rely on individual springs and wells for drinking water.

The Subah Manangkay Channel, where the Tawi-Tawi Island Bridge will be constructed, has a strong flow, usually during incoming tides and strong winds. The channel serves as a navigational route for boats and motor launches going to and from Languyan Municipality in mainland Tawi-Tawi to Bongao.

Marine water is generally clean and clear, and no water pollution incidents have been reported within the general location of the project route associated with channel crossing by seacraft.

4.1.5 Rainfall and Climate

Tawi-Tawi Province falls under the 4th climatic type characterized by no pronounced dry season with precipitation more or less evenly distributed throughout the year. The rainfall, temperature and humidity data for Saga-Sanga is shown in **Table 2**.

Table 2. Climatic Normals for Sanga-Sanga, Tawi-Tawi

Latitude : 05° 02' N
Longitude : 119° 44' E
Elevation : 4.6 amsl
Period : 1951-1980

Month	Rainfall (mm)	No. of Rainy days	Max. Temp. (°C)	Min. Temp. (°C)	Mean Temp. (°C)	Rel. Hum. %	Wind Dir.	Wind Speed (mps)	Cloud-Iness (okta)	Days With TSTM	Days With LTNG
Jan.	121.9	9	30.0	22.2	26.2	87	N	2	6	2	2
Feb.	104.1	8	30.0	22.2	26.2	87	N	2	6	2	2
Mar.	106.7	7	30.6	22.2	26.4	87	N	2	6	3	3
Apr.	137.2	8	31.1	22.2	26.7	87	N	1	6	7	8
May	190.5	10	31.7	22.2	27.0	87	SE	1	6	10	11
Jun	215.9	10	31.7	22.8	27.3	87	SE	1	6	5	7
Jul	160.0	9	31.1	22.2	26.7	86	S	2	6	4	5
Aug	172.7	9	31.7	22.8	27.3	85	S	2	6	4	5
Sep	180.3	10	31.7	22.8	27.3	86	S	2	6	6	8
Oct	226.1	12	31.1	22.2	26.7	88	W	2	6	8	9
Nov	200.7	11	30.6	22.2	26.4	88	VRBL	2	6	6	8
Dec	170.2	12	30.6	22.8	26.7	88	VRBK	2	6	3	5
Annual	1986.3	115	31.0	22.4	16.7	86	N	2	6	60	73

Ref: Worldwide Airfield Summaries of NOAA's National Climate Data Center in Asville

Climate considerations in project construction are rainfall and tropical cyclones. Sanga-Sanga has an annual rainfall of 1986.3 mm which is less than the Philippines annual average rainfall of 2533.4 mm. The rainy months of June, October and November each receive greater than 200 mm of rain. The average annual total number of rainy days is 115. The frequency of tropical cyclone occurrences in the vicinity of Sanga-Sanga is practically nil.

4.2 Biological Environment

4.2.1 Coastal and Marine Ecosystem

A Rapid Resource Assessment (RRA) was conducted by the DPWH-GEM Environment Team on June 2-4, 2008 at Manangkay Channel in the vicinity of the proposed bridge site locations and at the Bakhaw Dakula Islet where the link road between the bridges will be located. The RRA provided an indication of the conditions of the coral habitat and associated fish and seagrass species and mangrove habitat in the project area.

The survey area covered 900 m downstream and 100 m upstream from the proposed bridge site location on Subah Manangkay Channel. The estimated total area surveyed was 50 hectares encompassing the coastal waters and islet. It has a geographic coordinates of 5°05'53.32" North and 119°48'29.55" East at a distance of 8.6 kilometers northeast from Municipality of Bongao, capital town of Tawi-Tawi Province. The location and coverage of the RRA study area is shown in **Figure 1**.

The survey team used Manta Tow Survey (MTS) and Line Intercept Transect (LIT) method for coral reef areas, Fish Visual Census (FVC) for inventory of fishes, and Transect Quadrant Method (TQM) for seagrasses and mangrove areas.

Figure 1. Location and Coverage of the RRA Survey Area

4.2.1.1 Coral Reef

The data shown in **Table 3** determined the poor condition of the coral reef in the study area. The estimated average live coral cover was 23.25% of the total surveyed area. Based on the criteria rating established in the USAID Coastal Resource Management Project (1997-2002), a coral reef is in poor condition when its live coral cover falls within the range of 0 – 25%.

Table 3. Summary Table of Coral Reef Data: Bridge Site Locations at Manangkay Channel

Geographic Coordinate of Survey Areas	Depth (ft)	Visibility (m)	Slope (degrees)	Reef zone	Percentage Bottom Cover (%)				
					Live Hard Corals	Soft Corals	Dead Corals	Plant and other animals	Abiotics
05°05'50" N 119°48'56"E	20	5	40	Fringing	33	1	8.5	54.5	3
05°05'49" N 119°48'55"E	40	5	20	Fringing/ Flat	2	10.5	1	2	84.5
Average Live Coral Cover : Subtotal					17.50	5.75			
Total					23.25				

Coral Reef Criteria Rating Chart	
Condition	Criteria
Excellent	76% to 100% Live Coral Cover
Good	51% to 75% Live Coral Cover
Fair	26% to 50% Live Coral Cover
Poor	05 to 25% Liver Coral Cover

Data obtained as shown in **Table 4** show a low species composition of corals in the surveyed area. Five coral species were idenfied in the fringing reefs (20 m depth) consisting of the *Montipora sp.* and *Pachyseries sp,* which were most abundant hard coral species, and the *Millepora sp.* and *Acropora sp.* and the soft coral *Sarcophyton sp.* which were less abundant. In the fringing/flat reefs (40 m depth), the soft coral *Sarcophyton sp.* was abundant with a few hard coral Acropora sp. Blue sponges and *Hydra* were also found in deeper reef areas. Refer to **Table 4** on Coral Reef and Benthic Lifeforms Data.

Table 4: Coral Reef and Associated Life Forms: Bridge Site Locations at Manalik Channel

Benthic Lifeform	Coral Species Fringing Reef (20 m depth)	Frequency Count	Coral Species Fringing/Flat Reef (40 m depth)	Frequency Count
Hard corals	*Millepora sp. and Acropora*	22	*Acropora sp.*	4
	Montipora sp. and Pachyseries sp.	44		
Soft corals	*Sarchophyton sp.*	2	*Sarchophyton sp.*	21
Dead corals		17		2
Other animals	Blue sponges	11		
	Hydra	96		
Algae			*Halimeda sp.*	2
Seagrass			*Halophila sp.*	2

Hard corals have an important value ecologically because they have more capacity to harbor plants and animals compared with soft corals. Hard corals provide more crevices for fish to hide in and shelter them against their predators.

Soft corals are more concentrated in deeper waters. High turbidity of the water reduces light penetration. Coral polyps are basically light dependent. Soft corals thrive in murky waters, reducing competition for volume and space with hard corals.
There was no evidence of coral rock extraction or harvesting of coral aggregates within the surveyed area.

4.2.1.2 Fish Abundance

Data obtained shown in **Table 5**, identified 12 families with 26 species of fish sighted during the fish visual census along the Lapid-Lapid side of Manalik Channel. Out of the 26 fish species, 17 were associated with the fringing coral reef (depth of 20 m) and 9 were associated with the fringing/flat coral reef (depth of 40 m).

Table 5. Summary Table of Fish Species Occurring at the Bridge Site Locations in Manangkay Channel

Family	Fringing Coral Reef Depth (20m)	Fringing/Flat Coral Reef Depth (40m)
	Species	Species
Haemulidae	*Plectorinchus lessonni*	
Carangidae	*Caranx papueninsis*	
Nemipteridae	*Scolopsis ciliatus*	
Mullidae	*Parupaneus barberinus*	*Pseudupeaneus maculatus*
Chaetodontidae	*Chaetodon melanotus*	
	Calotomus spirideus	
Labridae	*Choerodon anchorago*	*Halichoeres maculipina*
	Thalassoma hardwicke	*Choeodon anchorago*
	Cheilinus trilobatus	
Scaridae	*Scaruss ghobban*	Princess Parrot fish
Pomacentridae	*Pomacetrus moluccensis*	*Stegastes tuscus*
	Dascyllus trimaculatus	
	Abudefduf sexfaciatus	
	Dischistodus prosotaenia	
Apogonidae	*Meiacanthus germinatus*	*Apogon binotatus*
	Cheilodipterus quiquelineatus	
	Apogon fuscus	
Kyphosidae		Chub
Cerridae		*Eucinostomus gula*
Gobiidie		*Coryphopterus punchpectophorus*

Frequency count data obtained as shown in Table 6, show a total of 180 individual fish sighted during the fish visual survey. A total of 161 fish or approximately 90% were juveniles (fork length 1 – 10 cm.) which were mostly associated with the fringing coral reefs at shallower depth of 20 m. A relatively high percentage of the juveniles are non-commercially important or non-fishery target species. However, the presence of coral associated fish species contribute to the ecological richness of the Manangkay Channel. Refer to **Table 6**.

Table 6. Fish Count by Fork Length Size Classes

Fish Species	Coral Reef Association	Fish count by Fork Length Size Classes			
		1-10 cm	11-20 cm	21-30 cm	< 30 cm
*Plectorinchus lessonni**	Fringing			1	
*Caranx papueninsis**	Fringing	3			
*Scolopsis ciliatus**	Fringing	3			
*Parupaneus barberinus**	Fringing	2			
Pseodopeneus	Fringing/Flat	5	3		

*maculates**					
*Chaetodon melanotus** *Calotomus spirideus**	Fringing Fringing	3			
*Choerodon anchorago** *Thalassoma hardwicke** *Cheilinus trilobatus**	Fringing Fringing Fringing	17	8		
*Halichoires maculipina**	Fringing/Flat	3	4		
*Scaruss ghobban**	Fringing		2	1	
	Fringing/Flat	3			
Chub*	Fringing/Flat	1			
*Stegastes tuscus**	Fringing/Flat	9			
*Pomacetrus moluccensis** *Dascyllus trimaculatus** *Abudefduf sexfaciatus** *Dischistodus prosotaenia**	Fringing Fringing Fringing Fringing	42			
*Meiacanthus germinatus*** *Cheilodipterus quiquelineatus*** *Apogon fuscus***	Fringing Fringing Fringing	60			
*Apogon binotatus*** *Coryphopterus*** *punchpectophorus* *Eucinostomus gula***	Fringing/Flat	10			
Total counts	**180**	**161**	**17**	**2**	**0**

* *Commercially important and Indicator Fishes*

** *Non-Commercially Important Fishes*

The low species composition and abundance of juveniles reflect a poor condition of the coral reef. It is assumed that the juveniles are transient occupants of the reef and migrate and colonize nearby coral reefs in Manalik Channel or in Semanale Bay, which offer suitable sources of food, provide better protection from predators, support reproduction and promote establishment of the species. No spawners were observed during the survey.

Local residents reported that the vicinity of the bridge site locations at Manalik Channel are not traditional fishing grounds, but support sustenance fishing. No seaweed farming or other aquaculture activities are operating in the channel section.

4.2.1.3 Seagrass Beds

A total of 3 transect lines composed of 32 quadrants were laid at a 4 feet depth within the survey area for seagrass assessment. Data shown in **Table 7** revealed a sparse distribution of seagrass indicated by a low percentage cover of about 15% of the total surveyed area. The seagrass beds had low species composition with only four species identified, namely: *Enhalus accoroides* or Eel Grass, *Haludule uninervis* or Needle Grass, *Cymodocea rotundata* or Ribbon Grass, and *Halophila ovalis* or Spoon Grass. The eel grass, *Enhalus accoroides*, was the most abundant seagrass species (78% of total count) found.

Table 7. Seagrass Species at the Bridge Site Locations in Manangkay Channel

Common Name	Scientific Name	Frequency Count	Percent of Total Count	Percent Cover
Eel Grass	*Enhalus accoroides*	14	78	13.33
Eel Grass	*Haludule uninervis*	1	6	0.52
Ribbon Grass	*Cymodocea rotundata*	2	11	0.52
Spoon Grass	*Halophila ovalis*	1	6	0.73
	Total	**18**	**100**	**15.10**

The growth distribution of *Enhalus accoroides* is largely influenced by the mixture of muddy and sandy substrate in which only species of sea grass with long and broader leaves can survive. It was also observed that large seaweed populations of the *Halimeda sp.*, *Padina sp.* and *Caulerpa sp.* are floated in the bottom substratum 4 feet underwater during low tide.

The low species composition and abundance, and sparse distribution of seagrass suggested the poor condition of the coral reef in the surveyed area.

4.2.1.4 Mangrove Forest

Data shown in **Table 8** determined low species composition of mangrove in the southern portion of Bakhau Dakula where the bridge and road construction is proposed to locate. Only 3 species belonging to 2 families of mangroves were noted in the sampling area, namely: *Rhizophora mucronata* (Bakauan babae), *Rhizaohora apiculata* (Bakauan lalaki) and *Bruguiera sexangula* (Pototan).

Frequency counts indicated *Rhizophora mucronata* as the most abundant mangrove species (56%) and *Brugeria sexangula* was least abundant (9%).

Table 8. Summary Data of Mangrove Assessment at Bakhaw Dakula Islet

Transect	Coordinates	Frequency Count by Species			Total count by Transect	Average Tree Height (cm)	Total Crown Cover (m^3)	Percent Crown Cover (%)
		Rhizophora apiculata	*Rhizophora mucronota*	*Bruguiera sexangula*				
1	05°05'48"N 119°48'47"E	35	46	12	93	3.60	102.33	10.23
2	05°05'36"N 119°48'47"E	112	190	27	329	5.36	770.66	29.64
Total Count by Species		**147**	**236**	**39**	**422**			
Average Tree Height by Transect						**4.48**		
Total Crown Cover by Transect							**872.99**	
Average Percent Crown Cover by Transect								**19.94**

Condition	Criteria
Excellent	% Crown cover = 76% and above Regeneration Rate =1 and above per square meter Average Tree Height = 5 meters and above Disturbance level = Undisturbed to negligible
Good	% crown cover = 51% to 75% Regeneration rate = 0.76 to 0.99 per square meter Average tree height = 3 meters to 4.99 meters Disturbance level = Slight and few cuttings
Fair	% crown cover = 26% to 59% Regeneration rate = 0.50 to 0.75 per square meter Average tree height = 2 meters to 2.99 meters Disturbance level = Moderate and Noticeable Cuttings
Poor	% Crown cover = 0% to 25% Regeneration rate = Less than 0.50 per square meter Average tree height = Less than 2 meters Disturbance level = Heavy cuttings, Pollution, Rampant Conversion to other uses, Nearly destroyed

The surveyed area was characterized by a sparse distribution of mangrove. The average mangrove tree cover was estimated at 19.94% or 872.99 m^2 of coverage in the total surveyed area of 3,600 m^2. The sparse distribution suggests a poor condition of the mangrove habitat. This may be due to human intervention since noticeable cuttings was observed along the transect line. Adjacent residents are using mangroves to produce coal. Some of them use mangroves to build stilt houses, and for firewood. Presence of plastic waste and decayed logs also show that the area has a moderate disturbance level.

The survey also showed that the mangroves exhibited a natural capacity to grow and regenerate from environmental stress. The average tree height for the whole survey area was 4.48 m which is a little less than 5 m (the average height for a mature tree) which suggest that the surveyed mangrove trees were growing well. As shown in Table 9, *Rhizophora apiculata* (1.95/m^2) and *Rhizophora mucrunata* (2.17/m^2) exceeded the regeneration rate criterion of 1/m^2 which indicate good to excellent regeneration capacity. Comparatively, *Bruguiera sexangula* showed poor regeneration capacity.

Table 9. Summary Data of Mangrove Regeneration Rates

Transect	Coordinates	Regeneratin Rate (no/m^2) by Species			Total Regeneration Rate (no/m^2)
		Rhizophora apiculata	*Rhizophora mucronota*	*Bruguiera sexangula*	
1	05°05'48"N 119°48'47"E	0.83	1.93	0.23	**3.00**
2	05°05'36"N 119°48'47"E	1.12	2.41	0.15	**3.68**
Average Regeneration Rate (no/m2) per species		**0.97**	**2.17**	**0.19**	**3.34**

It was noted during the survey that other mangrove species that are found outside of the sampling area but will be affected during the construction of the road at Luuk Pandan and Bakhaw Dakula, include: Api-api (*Avicennia officinalis* .), Putat (*Barringtonia racemosa*), Buta-buta (*Excoecaria agaloocha*), Bantigi (*Temphis acidula*), Piagau (*Xylocarpus moluccensis*), Saging-Saging (*Aegiceros corniculatum*), Pototan lalake (*Braguirea cylindrica*), Busain(*Bruguiera gymonorrhiza*), Malatangal(Ceriops *tangal*), Bangkau (*Rhizopora stylosa*), Pagatpat (Sonneratia alba), Dungon-late (*Heritiera littoralis*),

4.3 Terrestrial Ecosystem

Based on ocular inspection, research data and interviews with the residents of the five project-affected barangays, the proposed project route is vegetated with agricultural crops, forest species and wild weeds and grasses which were characteristic of a typically man-disturbed land ecosystem.

4.3.1 Trees and Vegetation Cover

Table 10 shows the different forest trees, fruit trees and grasses noted along the Sanga-Sanga Island Road and the Lapid-Lapid Road in Tawi-Tawi Island.

Table 10. Trees and vegetation cover along the Sanga-Sanga Road and Lapid-Lapid Road, Tawi-Tawi.

Forest Tree		Fruit Tree		Grass species	
Scientific name	**Common name**	**Scientific name**	**Common name**	**Scientific name**	**Common name**
Albizia saman	Rain tree	*Cocos nucifera*	Coconut	*Gigantocloa aspera*	Giant bamboo
Gliricidia sepium	kakawate	*Mangifera indica*	Mango	*Schizoztachyum lumampao*	Boho
Gmelina arborea	*Gmelina*	*Annona muricata*	Guyabano	*Bambusa blumeana*	Kawayan tinik
Leucaena leucocephala	*Ipi-ipil*	*Anacardium occidantale*	Kasui	*Andropagon citrates*	Lemon grass
Ceiba pentandra	Kapok	*Artocarpus altilis*	Rimas	*Imperata siarica*	Cogon grass
Vitex farviflora	Molave	*Artocarpus camansi*	Kamansi	*Andropogon aciculatus*	Amorseco
Swietenia mahogany	Mahogany	*Carica papaya*	Papaya	*Saccharum spontaneum*	Talahib
Intsia bijuga	Ipil	*Persea americana*	Avocado	*Charomolana odorata*	Hagonoy
Gliricidia sepium	Madre cacao	*Sandoricum koetjape*	Santol		
Anthocephalus chinensis	Kaatoan bangkal	*Artocarpus eterophyllus*	Jackfruit		
		Tamarindus indicus	Tamarind		
		Citrus madurensis	Chinese orange		
		Mangifera philippinensis	Paho		
		Caffea arabica	Kafe		
		Averrhoa carambola	Balimbing		
		Litsea perrotteti	Marang		
		Annona squamosa	Atis		
		Psidium demisticum	Guava		
		Durio zibethinus	Durian		

The annual crops in the area include the following : Okra (*Abelmochus esculentus*), Corn (*Zea mays*), Banana (Musa *spp.*), squash (*Cucumita maxima*), Bitter guard (Momordica charantia), Pineapple (*Ananas comosus*), Cassava (*Manihot esculenta*), Bath sponge/Patola (*Luffa acutangula*), Egg plant (*Solanum melongena*) , String beans (*Vigma sesquipedalis*), Chili pepper (*Capsicum frutescens*).

4.3.2 Associated Fauna

Wildlife species, including mammals, birds and insects found along the road routes from Patal, Karungdung to Luuk Pandan in Sanga-Sanga Island and from Barangays Magsaggao and Lapid-Lapid in Tawi-Tawi Island are listed in **Table 11**.

Table 11. Summary List of Associated Fauna Noted along the Routes of Sanga-Sanga Road and Lapid-Lapid Road, Tawi-Tawi.

Mammals: - Monkey (*Macaca fascicularis)* - Wild boar (*Sus sp.)* - Fruirt bats	Aves (bird): - Owl - Cattle egrets (*Bubulus ibis*) - White breasted Water hen (*Amaurornis phoenicurus)* - Spotted doves (*Streptopelia chinensis*) - King fisher (*Halcyon capensis)* - Coletos (*Sarcops calvus)* - Kulasisi (*Loriculus philippinensis)* - Large-billed crows (*Corvus macrorhynchos*) - Tawny grassbird (*Megalurus timoriensis*) - Glossy Swiflet (*Collocalia esculenta*) - Stripped breasted Rhabdornis (*Rhabdornis inornatus*) - Pompadour Green Pigeon (*Treron pompadora*) - Olive-Backed Sunbird (*Nectarinia jugularis)* - Black-Chinned Fruit Doves (*Ptilonopus leclancheri*) - Barn swallows (*Hirundo rustica*) - Savanna Nightjars (*Caprimulgus affinis*) - Asian Koels (*Eudynamus scolopacea*) - Black-Naped Orioles (*Oriolus chinensis*) - Chesnut munias (*Lonchura malacca*) - Blue Breasted Quail (*Caturnix chinensis*) - Scrub fowl (*Megapodius cumingii*) - Maya - Baluds - Woodpeckers - Herons - Sparrows - Sea Eagles
Amphibians: - Frog	
Reptiles: - Saltwater crocodile (*Crocodylus porosus)* - Monitor lizard (*Varanus sp.)* - Turtle	
Insects: - Butterflies - Dragonflies - Bees - Bugs - Grasshoppers - Ants - Beettles	

4.3 Socio-economic Environment

4.3.1 Land Classification/ Use

Both the Sanga-Sanga Road and Lapid-Lapid Road traverse Alienable and Disposable (A&D) lands under PLS 655-D Bongao Public Land Subdivision, and PLS 78 Bato-Bato Balimbing Public Land Subdivision, within the Resettlement Project of the Department of Agrarian Reform, respectively. The lands along the road routes are partly populated and used for agricultural farming and livestock production. Large tracts are grassland areas.

The bridges and link roads on the Bakhaw Dakula islet, is classified as Timberland. The land area in the islet is planted with coconuts and fruit trees, while the surrounding areas of the islet have mangrove vegetation.

Refer to Land Classification/Use Map shown in **Annex K**.

4.3.2 People

Based on 2007 Census Data. the Province of Tawi-Tawi has a total population of 450,346. The impacted municipalities of Bongao and Panglima Sugala have a total population of 95,055 and 50,504, respectively. The total estimated population in the impacted barangays of the project is 11,464. Census data as summarized in **Table 12**.

Table 12. Total Population in the Project Impact Areas (August 2007)

Municipality	Barangay	Total Population
Bongao		(95,055)
	Karungdong	3,020
	Lato-Lato	880
	Luuk Pandan	2,578
	Lapid-Lapid	1,890
Panglima Sugala		(50,504)
	Magsagao	3,096
	Total	11,464

4.7.3 Socio-Economic Conditions in Impacted Barangays

A Perception Survey was conducted on May 22-26, 2008 to characterize the living condition of the people in the impact barangays of the project and their understanding of the project activity and its potential impacts, positive and negative, on their lives and the surrounding environment.

A total of 83 respondents from the project-impacted barangays were involved in the survey. These are residents living within 30 meters along the route of the roadways traversing the impacted barangays. Survey data is summarized in **Annex L**. A brief description of the socio-economic situation and living conditions of the project-affected population is presented below.

4.7.3.1 Project Affected People

Respondents to the survey were between the ages of 15 to 65. A majority, or 63%, of the respondents were male. About 83% of the respondents were married and with an average of 3-8 household members. All respondents were Muslims and the majority, or about 66% of the respondents, were migrants from Sulu Province, while the rest were mostly natives of Tawi-Tawi Province.

About 51% of the respondents have lived in the area for more than 10 years and 31% of the respondents said that they do not have plans to transfer to other areas. For those who have the option to transfer, they identified Sabah in Malaysia, Bongao and Siasi in Sulu as places to transfer to.

4.7.3.2 Education, Employment & Income

In terms of educational attainment, about 38% of the respondents have no formal education, 32% have an elementary education and about 21% have a secondary school education. There are about 10 primary schools, 7 secondary schools and 4 colleges in Sanga-Sanga, Lapid-Lapid and Bongao that students in the local area can opt to attend.

A majority of the respondents (88%) are poor farmers, with monthly incomes as follow: below P1.000 (35%), up to P5,000 (44%), up to P10,000 (16%) and up to P 15,000 (5%) – Php 44=$1.

The biggest portion of monthly incomes is spent on food, followed by utilities and education. A majority of the respondents at the Sanga-Sanga side choose Bongao as their market or trading area while those at Lapid-Lapid choose the Batu-Batu market.

4.7.3.3 Water, Electricity & Fuel

Hand pumps (41%), deep wells (42%) and faucets (17%) are the sources of drinking water of the residents. A majority (96%) have no access to electricity and are using kerosene lamps for lights at night. All households use wood as fuel for cooking.

4.7.3.4 Property Ownership

A majority of the respondents (90%) said that they own the houses they reside in. Houses are made of Nipa (52%) with GI (38%) for roofing, and wood (82%) and bamboo (14%) for the house structures. About 51% are home lot owners, while 49% of the respondents are tenants.

4.7.3.5 Sanitation

About 74% of the respondents said that they do not have a toilet facility, while about 24% said that their toilet facility is the open pit type. In terms of solid waste disposal, most residents resort to burning, burying or dumping garbage anywhere. There is no garbage collection system in the area.

4.7.3.6 Health

Fever, coughs, malaria and colds are the most common sicknesses in the area. The common cause of death by illness is malaria. About 48% of the respondents prefer to consult a doctor for their medical concerns. Hospitals and clinics are preferred for health consultations, while 23% indicated that they go to their local Barangay Health Centers for their health concerns.

4.7.3.7 Environmental Concerns

About 47% of respondents reported improvement in their environment in the past years. These include improvements or developments of new facilities such as roads, schools and other social services or public infrastructures. These changes are seen as beneficial to the community, and 41% of the respondents credited such improvements to the efforts of the Barangay officials.

Lack of access to electricity, poor road conditions, lack of access to water supplies and poor local transportation services were identified as major community/local environmental problems that need to be addressed by local officials and the government.

4.7.3.8 Public Awareness

About 88% of the respondents said that they are aware of the proposed project and that they got the information from their relatives and friends (40%) and from the local government officials (38%). Other sources of information (12%) were from the GEM surveyors and students who conducted surveys and research in the area for DPWH.

4.7.3.9 Social Acceptability

Most of the respondents (96%) are in favor of the project. Almost half (48%) perceived that the project is a good public service facility and 24% said that this could pave the way for progress in the area. All of the respondents said that the project would certainly improve the local transportation services in the area and provide employment to local residents.

About 26% of the respondents said that affected families should be compensated fairly, for ROW acquisition and 28% of the respondents said that the project should not take very long.

Most respondents did not have a negative perception of the proposed project except for 5% who said that the project could result to air pollution of the area.

5.0 ENVIRONMENTAL IMPACT ANALYSIS AND MITIGATION MEASURES

5.1 Identified Project Impacts and Analysis

The potential environmental impacts of the proposed bridge-road construction project are summarized in **Table 13**. An analysis of the nature of impact, probability, time-scale, reversibility, spatial influence and magnitude of impacts is also provided.

Table 13. Summary Matrix of the Impact Evaluation of the Tawi-Tawi Bridge-Road Project

Potential Impacts	Nature: Positive (+) Negative (-)	Probability Low Likelihood (L) High Likelihood (H)	Time -Scale : Long-Term (LT) or Short Term (ST)	Reversibility Reversible (R) or Permanent (P)	Spatial Influence Direct Impact Area (DIA) Secondary Impact Area (SIA)	Magnitude Major (Ma), Moderate (Mo) or Minor (Mi)
PRE-CONSTRUCTION PHASE						
Loss of land and shift in land use due to ROW land acquisition	-	H	LT	P	DIA	Ma
Increased quarrying due to demand for construction aggregates	-	H	LT	P	SIA	Ma
Mangrove cutting and clearing to open route for bridge and road construction	-	H	LT	P	DIA	Ma
Health and safety hazards, job and income displacement, navigational water use conflict arising from mobilization of equipment, constriction of temporary facilities, delivery of materials and supplies, etc.	-	L	ST	R	SIA	Mi
CONSTRUCTION PHASE						
Soil erosion and deposition in low lying areas and nearby water bodies resulting from site clearing and grubbing, and terrain and surface drainage	-	L	ST	R	DIA	Mo

modification						
Changes in channel beds and impacts on fish and aquatic life resulting from demolition, excavation, pile driving and bridge structure construction	-	L	ST	R	DIA	Mi
Land and water pollution problems arising from disposal of excess excavation materials, wastes and debris, wash/wastewater	-	L	ST	R	DIA	Mi
Air pollution and nuisance noise problems arising from operation of heavy equipment	-	L	ST	R	DIA	Mi
Regulation of restriction of pedestrian, vehicular or sea craft passage at or within construction areas	-	L	ST	R	DIA	Mi
Preferential hiring of local labor for construction, some may be women	+	H	ST	R	SIA	Mo
OPERATION PHASE						
Pollution problems and health and safety hazards arising from transport of goods, including potentially toxic and hazardous materials	-	L	ST	R	DIA	Mi
Road traffic safety hazards and risk of mangrove encroachment due to opening of pedestrian and vehicular access	-	L	ST	R	DIA	Mi
Influx of migrant workers and settlers, increased land values, and impacts on mangrove ecosystem due to improved economic activities	+	H	LT	P	SIA	Ma

5.1.1 High Significant Project Impacts

The project is determined to pose potential significant adverse environmental impacts related to the following issues and concerns, namely:

1. Loss of land and shift in land use due to ROW land acquisition
2. Mangrove cutting and clearing to open the route for bridge and link road construction
3. Increased quarrying of construction aggregates
4. Create socio-cultural problems

The identified significant adverse impacts could have long-term effects on the resources and use in the project-influence area and on the affected communities and people, if not properly mitigated.

ROW Land Acquisition

Loss of land and shift in land use are anticipated consequences of road development. The main concern raised by stakeholders was related to the timely and full compensation for any ROW land acquisition and payment for any land improvements on the road by DPWH. before the start of construction.

DPWH determined that the upgrading of the Sanga-Sanga Road would affect 33 individuals owning property to be traversed by the road ROW. It was also determined that portions of the roadway which was cleared in 2005 were being used by individuals for livestock growing and agricultural farming without DPWH permission. The acquisition of the land for the road upgrading will affect this limited pattern of ROW use and result in the displacement of affected farmers and residents from some of their income sources.

The land owners have donated the required ROW, per a "Certification" signed by the owners, dated February 22, 2008. The owners will remove and transfer their farm implements and structures from the ROW before the start of construction, with assistance by DPWH.

Only a few small houses built with light materials and some thatched roof nipa huts existing along the roadway will have to be removed or transferred to other locations, before the start of construction.

Mangrove Cutting and Clearing

The opening of new road that will cut through a mangrove area on Bakhaw Dakula Islet raised serious environmental concern. The new road construction will require cutting and clearing of approximately 1 hectare.

Mangrove is identified as an Environmentally Critical Area (ECA) under DENR Proclamation 2146. Based on site inspection and assessment by the Community Environmental and Natural Resources Office (CENRO) of District 1 Bongao, Tawi-Tawi, on June 3, 2008, it was determined that the proposed mangrove cutting and clearing on Bakhaw Dakula Islet required for the road construction would adversely affect the mangrove ecosystem and its associated wildlife and marine life. It was recommended that appropriate mitigation measures be implemented as part of an Environmental Management Plan (EMP) for the project. Refer to **Annex M**.

The loss of vegetation cover and root system could have significant adverse effects on the mangrove ecosystem. Mangrove stripping could possible reduce the potential nesting and roosting areas for birds, and increase exposure of sensitive species to intense solar radiation, among others. Removal of mangrove root system would eliminate potential breeding, spawning and nursing grounds for associated fish and marine life; and reduce capacity to buffer strong winds and waves, among others. Changes in mangrove structure could alter the nutrient cycling and photosynthetic process which could potentially impair growth and development, and interfere with reproduction and regeneration of an assemblage of mangrove-associated flora and fauna. Mangrove provides vital life support to diverse aquatic species, including many important commercial fish species.

Mangrove stripping could also create potential access to and induce further exploitation of mangrove forest resources. This is demonstrated by current practice of using mangrove wood in charcoal making by the local residents.

Quarrying of Construction Aggregates

The project is perceived to create increased demand for beach sand and coral gravel to be used as aggregates in the road and bridge construction. Local residents and officials expressed concern that the demand for construction aggregates would intensify illegal quarrying of beach sand and further aggravate the beach erosion problem affecting many parts of Bongao Island and nearby Islands in Tawi-Tawi Province.

There are no rivers in Bongao Island to provide alternate sources of construction aggregates. Importation of construction aggregates from sources or suppliers outside Bongao Island, such as Zamboanga or Cotabato, is costly. This shortage creates additional pressures on local coastal mineral resources to meet increasing demand for construction sand and gravel.

Local officials stressed the need to prohibit or ban beach quarrying in Bongao Island and surrounding islets; and to enforce strict regulatory measures to prevent or control illegal quarrying and beach erosion problems.

Social Issues Related to Increased Economic Activities

The project is perceived to create serious social and cultural problems related to the impacts of anticipated increase in economic activities during the construction period and when the road and bridge facilities are completed and operational.

Project mobilization is expected to stimulate an influx of migrant workers and settlers into the construction area and vicinity resulting from the creation of job and employment opportunities and by opening of small enterprises and establishments in the project-influence area. The increased mobility and concentration of people within a short period of time at the construction area and vicinity could impose additional demand on limited local infrastructures (e.g., transport and communication) and basic services (e.g., housing, social welfare, power supply, water and sanitation services, health and education, police and security). Lack of or inadequate financial resources and institutional capability by the host communities and local government units to meet the increasing demand for service infrastructures could result in potential social unrest and cultural conflicts, spread of diseases, police and security problems, among others.

The development associated with the new road transport facilities is anticipated to stimulate land speculation and land value appreciation, and the possible conversion of productive agricultural lands to residential, commercial and industrial land uses. Improved road transport system is an important support infrastructure to land development.

Uncontrolled access to mangrove, as a result of road opening to the forest area, could encourage further encroachment and exploitation of the mangrove resource. Mangrove areas could be subjected to conversion to fishponds, resort development, and other land uses. The use of mangrove for human activities could also result in the generation and disposal of wastes that could cause or result in environmental pollution problems. The use of mangrove in charcoal making by local residents is an important resource management concern.

5.1.2 Minor Significant Project Impacts

The project is determined to pose potential impacts of low to moderate significance related to the following issues and concerns, namely:

1. Site Topography and Drainage Problems
2. Occupational and Public Health and Safety Hazards
3. Construction Waste and Environmental Pollution Problems

The identified project impacts could have short-term effects on environmental resources and use in the project-influence areas and on affected communities and people, if not properly mitigated.

Site Topography and Drainage Problems

Terrain and surface drainage modification are important technical and engineering considerations in the planning and design of the proposed road and bridge construction and upgrading project.

The roadway would traverse steep sloping areas where top soil could be prone to mobilization by surface runoff. Low lying areas along the road route could be susceptible to deposition of soil washed off from high elevation and steep sloping areas. There is also potential for surface runoff and top soil to find their way into nearby inland water bodies, mangrove swamps or the coastal waters. These physical changes on local terrain and surface hydrology could potentially contribute to the deterioration of water quality on the receiving water bodies which could affect the sensitive habitat and species.

If not properly mitigated, soil mobilization and deposition could modify local topographic features along the roadway. Low lying area could be prone to flooding and inundation, particularly during heavy rains.

It is also recognized that site preparation activities for the bridge construction would involve demolition of existing bridge structures, excavation and pile driving, stream diversion, among others. These activities are likely to cause or result in changes on the channel beds of Subah Managkay and Subak Lambus which could have significant adverse impacts on fish and other aquatic life.

Occupational and Public Health and Safety Hazards

Construction works is likely to pose hazards to life and health of workers, nearby residents and people passing through the work area. These hazards may lead to accidents, injuries or death, if proper safeguards are not enforced and implemented.

Construction safety and health hazards could arise from physical stress factors related to mobilization of equipment, transport of materials and supplies, building of structures, removal and disposal of construction wastes or debris, among others.

Human exposure to nuisance noise, dust, vibration and gaseous emissions from operating motor engines or heavy equipment during construction contributes to physiological stress. Poor housing and sanitation facilities increase the risk of spread of communicable diseases at the work place, which could be worsen with lack of or inadequate health and medical services at the work camp or in the host communities.

Social unrest and cultural conflicts are likely to arise among migrant workers and settlers, poor community relations and inadequate security services at the work camp.

Road traffic and navigation passage within the project area could create hazards to life, property and economic activities of the local residents.

Construction Waste and Environmental Pollution Problems

The generation and disposal of construction wastes are important concerns related to the prevention and control of environmental pollution problems at the work place and surrounding areas.

The road construction and upgrading works are expected to generate excess excavation materials, demolition debris and scrap metals, construction wastes and refuse, waste metal, wood and plastics, among others which have the potential to cause or result in land and water pollution problems.

Land or sea disposal of wash and wastewater discharges from work areas, depots, motor pools, among others could potentially cause or result in water pollution problems that may impact upon sensitive habitats and species.

Risk of environmental contamination may be posed by incidents of leaks or spills of any potentially toxic and hazardous substances that are used, stored, discarded or disposed of from the construction area.

5.2 Impact Mitigation Measures

5.2.1 Road ROW Land Acquisition and Compensation

DPWH has cleared the route ROW for the upgrading of the Tawi-Tawi Road and Sanga-Sanga Road. DPWH obtained a Certification of Donation of ROW from the 33 affected land owners to clear the route for the upgrading of the Sanga-Sanga Road by GEM (Refer to **Annex N**). There is no remaining ROW land acquisition issue related to the upgrading of the existing Tawi-Tawi Road by DPWH Tawi-Tawi District Engineering Office.

Bakhaw Dakula Islet is a proclaimed Timberland which is a public domain and placed under the administrative jurisdiction of the DENR. DPWH will obtain the necessary clearance from DENR to authorize the use of Timberland for the proposed bridge and road construction project. The Tawi-Tawi PENRO/CENRO will provide the technical and advisory assistance to DPWH to facilitate the issuance of DENR clearance prior to start of site clearing activities.

5.2.2 Prior Issuance of Permit to Cut Mangrove

DENR requires issuance of a "Permit to Cut" to authorize the cutting and clearing of mangrove trees before the start of construction. Mangrove protection and conservation is promulgated by the Forestry Code of the Philippines (Presidential Decree No 705) and permits to cut are issued by the DENR pursuant to DENR Administrative Order No. 26 Series of 1996. In compliance with the regulations, DPWH will obtain a "Permit to Cut" mangrove trees from the DENR-ARMM. The procedural requirements involve the following:

- LGU to endorse cutting/clearing of mangrove trees for project. DPWH will request the Municipal Government of Bongao and Provincial Government of Tawi-Tawi to pass a Council Resolution recommending/endorsing to the Provincial Environmental Conservation and Protection Council the proposed cutting and clearing of mangrove area (approximately 1 hectare) to open the route for construction of the bridges and link roads.

- Local DENR to verify/certify clearance for mangrove cutting and replacement. DPWH will request DENR to conduct site inspection and verification to determine and assess the present condition of the mangrove area and to certify any environmental concerns related to the proposed mangrove cutting/clearing for road construction project, including recommendation for mangrove replacement and replanting.

- ARMM-DENR Regional Secretary approves issuance of "Permit to Cut". Based on recommendation by the Provincial Environment & Natural Resources Office (PENRO) and the Provincial Environmental Conservation and Protection Council, the ARMM DENR

Regional Secretary will issue an approval of the issuance of a "Permit to Cut" to authorize mangrove clearing operations. Refer to **Annex O**.

- There are no mangrove or tree clearing requirements on the Sanga-Sanga Road, except for moving a very limited number of thatched roof huts where ROW is already acquired.

5.2.3 Mangrove Replacement and Roadside Re-greening

As a mitigating measure, DPWH will implement a 3-year Mangrove Reforestation and Re-greening Plan to replace approximately 1 hectare of mangrove forest in Bakhaw Dakulah Islet that will be cut and cleared for the bridge and link road construction projects. The mangrove replacement will be complemented by roadside planting along the Sanga-Sanga Road and Tawi-Tawi Road. The Mangrove Reforestation and Re-greening Plan is provided in **Annex P**.

The plan will be implemented with the participation of residents in the project affected areas who are willing to work to undertake plantation establishment activities, including propagule collection, site preparation, planting and maintenance and protection of a mangrove plantation farm. Roadside re-greening will encourage the involvement of local governments, civic organizations and private sector. DPWH will coordinate with the local DENR (PENRO/CENRO) regarding the institutional arrangements and financial requirements to implement a community-based reforestation and re-greening plan.

5.2.4 Construction Aggregates from Legitimate Sources

DPWH and GEM subcontractors will use construction aggregates obtained from identified areas or sources operating with required government permits. Borrow materials will be obtained from permitted DPWH or point sources. The use of beach sand and coral stones is prohibited for this project.

Pursuant to the Philippine Mining Act of 1995 and the Revised Implementing Rules and Regulations, DPWH will secure an Exclusive Sand and Gravel Government Gratuitous Permit from the Provincial Mining Regulatory Board or Office of the Provincial Governor of Tawi-Tawi. The Exclusive Government Gratuitous Permit will authorize DPWH to extract and utilize sand and gravel materials from approved quarry sites in identified locations during the effectivity of the Permit.

The extraction and removal of quarry resources under this Permit shall be confined within the area specified, the boundaries of which according to the application, will be well established according to survey rules and regulations.

DPWH will be responsible in identifying, selecting and delineating the boundary of the prospective quarry site(s) in the designated location(s), and shall determine the adequacy and suitability of the quarry resources for the intended construction use. DPWH will closely coordinate the identification and selection of quarry sites with the host LGUs and Barangays and secure acceptance and approval for use of the local quarry resources within their jurisdiction. Also, DPWH shall involve the local DENR offices (PENRO and CENRO) in conducting site inspections and verification of any environmental concerns, and issuance of an environmental approval of the quarry sites/locations and quarrying operations. DPWH shall submit these documents to support requests for approval of the Exclusive Government Gratuitous Permit by the Provincial Mining Regulatory Board or Office of the Provincial Governor of Tawi-Tawi.

The Permit strictly prohibits any extraction or removal of materials in offshore areas within five hundred (500) meters from the coast and two hundred (200) meters from the mean low tide level along the beach.

As Permit Holder, DPWH shall manage its operations in a technically and environmentally responsible manner to achieve safe, non-polluting and self-sustaining post disturbance landforms. It will be the responsibility of DPWH to use the quarry materials for the infrastructure project and in no case shall the same be disposed of commercially, or for other purposes.

5.2.5 Construction Site Safety, Traffic and Environmental Management

The Construction Contractors will formulate and implement a Safety, Traffic and Environmental Plan (STEP) to guide compliance with specific safety and health, traffic and environmental control measures during the pre-construction, construction and post-construction phases of project implementation. The STEP will conform to regulatory standards and procedures which are prescribed in the following:

- Department Order No. 13 Series of 1998. Guidelines Governing Occupational Safety and Health in the Construction Industry. Bureau of Working Standards. Department of Labor and Employment (DOLE)

- Presidential Decree No. 856. Code of Sanitation of the Philippines (Chapter XVII – Sewage Collection and Disposal, Excreta Disposal and Drainage; Chapter XVIII – Refuse Disposal, Chapter XIX – Nuisance Noise; Chapter XX – Pollution of the Environment)

- Road Works Safety Manual (Temporary Signing and Traffic Management for Maintenance and Construction Works on Roads and Bridges). January 2004. Department of Public Works and Highways

GEM will provide assistance to its subcontractor in the preparation and submission of a STEP through the holding of (1) a Pre-Construction Conference, (2) Technical Coordination Meetings, and (3) Follow-on Consultations, including an Information, Education & Communication (IEC) campaign. Prior GEM approval of a STEP is required before start of construction work on the Sanga-Sanga Road.

The STEP incorporates (1) Project Safety Plan, (2) Site Environmental Plan and (3) Traffic Control Plan.

Project Safety Plan. Includes plans for the promotion of site safety and health of workers and nearby residents during the construction period. More specifically, prevention and control of work-related accidents, injuries and illnesses, provision of sanitation facilities and personal protective equipment, and installation of pollution control devices or measures to avoid nuisance noise, dust and vibrations. A site specific Contingency Response/ Emergency Plan will be formulated to address potential accidents or emergencies at the site during the construction phase.

Site Environmental Plan. Includes plan for the promotion of environmental protection and general cleanliness and orderliness at the construction site and surrounding areas. This also includes implementation of good construction waste management practices to properly dispose of cans, bottles, paper, plastics, wood, metals, oils, chemicals, etc. Waste minimization strategies such as recycling, recovery and reuse will be encouraged. Disposal of excess excavation materials to designated dump sites will be promoted to prevent land and water pollution problems. Proper drainage and slope protection structures will be installed to prevent or minimize soil erosion or deposition of sediments in low lying areas along the Sanga-Sanga Road and Tawi-Tawi Road or mobilization of topsoil into mangrove swamps and nearby coastal waters.

Traffic Control Plan. The Plan shall cover the means and methods the subcontractor intends to take for proper and adequate control of traffic during the construction. This Plan shall address requirements under the "Maintenance and Protection of Traffic" Specifications and shall include, but not be limited to, the provision for the traffic control or detours for safe access and

unobstructed flow of vehicular and pedestrian traffic at or near construction area, installation of road safety signs and warning signals, and dissemination of traffic safety information, among others. Alternate navigation route along Manangkay Channel, as may be required, will be established in close coordination with the concerned local government units and the respective seaweed farmers and fishermen associations in the project affected areas.

When construction work begins, the succeeding process of environmental compliance monitoring by GEM commences and will continue through construction completion. The primary purpose of environmental compliance monitoring is to ensure the implementation of sound environmental management throughout the project construction phase as outlined in the approved STEP and the conditions set in the Environmental Compliance Certificate (ECC). It will also provide basis for timely decision-making and effective planning and management of environmental measures through the monitoring of project impacts.

5.2.6 Social Development Measures

The construction and operation of the road facility in Tawi-Tawi will create socio-economic impacts on the affected population and communities.

Compensation for ROW land acquisition. DPWH, in coordination with local government units, had completed the compensation for the 33 affected land owners and made payments for any land improvements by farmer-residents along the Sanga-Sanga Road and Tawi-Tawi Road. The completion of the ROW acquisition made possible the conversion and use of the affected farmlands for the road construction project.

Reduction in income displacement. An estimated 300 residents are engaged in seaweed farming in Manalik Channel about 200-500 m upstream and downstream of the bridge construction area. As early as 2004, DPWH had informed the seaweed farmers about the planned bridge construction project and advised that necessary clearing of the navigational waters be done to avoid and prevent displacement from livelihood and damage to seaweed farming implements along the channel. DPWH will closely coordinate with the local government units and fishing/seaweed farmers associations concerned for delineating an alternate navigational route along Managkay Channel to ensure the safe passage of fishing boats and seacraft at or in the vicinity of the bridge construction area. DPWH will provide assistance in removing, relocating or reconstructing seaweed culture beds and fish enclosures/pens that may be required to clear the navigational route for the barging of construction equipment, materials and supplies, including construction wastes and debris to and from the bridge construction site.

Priority Local Hiring. Qualified skilled and unskilled local residents, which may include women, will be given priority in the hiring of workers for construction work. Local residents will be tapped for the mangrove reforestation and roadside regreening activities.

Regulation of Land Conversion. When completed, the bridge and road facilities are expected to result in increased land speculation and land values in the vicinity of the project area. The local government agencies (DENR) and provincial/municipal government units should enforce necessary regulatory and control measures to prevent indiscriminate conversion of the remaining mangrove forests to fishponds and other commercial activities in the area. Environmental pollution and waste management measures should be enforced to safeguard the quality and use of coastal marine waters. Appropriate measures should be put in place to protect and conserve the biodiversity and productivity of the mangrove ecosystem in the project area. Community involvement in environmental awareness campaign should be promoted and encouraged by DENR, NGOs and other civic organizations in Tawi-Tawi Province.

Managing Migrants and Settlers. Improved road transport will create opportunities for capital investment and business establishment in the Province of Tawi-Tawi. Mobility of people will

encourage migrants and settlers into the province and in municipalities within the influenced area of the road transport facility. The immediate impacts of improved transport services may include corresponding increase in demand for local infrastructures and service facilities/utilities such as health, sanitation, water and power, garbage and sewage disposal, education and institutional services. Increase in population will put more pressure on fragile land resources of the province. Proper land use and zoning ordinances should be enforced to minimize or eliminate further conversion of farm lands or coastal areas, or encroachment into fragile forested areas by human settlement and industries.

5.2.7 Beneficial Use Monitoring (BUM) during Operation

To assess whether the projects are maintained and used in a manner that provides long-term beneficial impacts to the community after construction completion, and to document that the benefits are being achieved, a GEM Beneficial Use Monitoring (BUM) system is established. The system identifies the extent to which projects are providing intended benefits to targeted recipients, including implementation of good site environmental management, such as general cleanliness and orderliness, road safety and security and conditions requiring additional GEM intervention.

6 ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP), shown in **Table 14** is prepared to guide implementation of recommended impact mitigation and monitoring measures by the responsible persons or agency to assure satisfactory compliance during construction and operation of the project.

Table 14. Environmental Management Plan (EMP) for the Tawi-Tawi Bridge-Road Partnership Project

Impact Mitigation and Enhancement Measures	Primary Responsible Parties	Monitoring Indicator(s)	Monitoring Method	Monitoring Frequency	Monitoring Cost	Monitoring Responsibility
1. IMPLEMENT LAND ACQUISITION AND RESETTLEMENT/ RELOCATION PLAN (LARP) PRIOR TO START OF CONSTRUCTION.						
i. Settle ROW land acquisition	DPWH, PGS, LGU	Process documentation of land acquisition (i.e., Deeds of donation, Deeds of sale or Certification of Use executed by the affected land owners/occupants	Record review and visual inspection	Prior to start of construction	Low	DPWH*, PGT**, GEM
ii. Compensate land improvements, livelihood structures or facilities affected by project	DPWH, PGS, LGU	Process documentation of compensation; Priority hiring of affected residents for construction jobs	Record review and visual inspection	Prior to start of construction	Low	DPWH*, PGT**, GEM
2. IMPLEMENT CONSTRUCTION SITE ENVIRONMENTAL BEST MANAGEMENT PRACTICES (BMPs).						
i. Mangrove cutting within the approved clearing area (approximately 1 hectare in Bakhaw Dakula Islet).	GEM-Contractor	Issuance of "Permit to Cut" by DENR-ARMM Implement approved Mangrove Replanting and Re-Greening Plan/Program for replacement of cut mangrove trees	Visual inspection and record review	Middle and end of site clearing task	Low	Contractor SO***, GEM

ii. Adequate measures to maintain natural drainage system, and preserve soil condition and water quality and resource use.	GEM-Contractor	Integrate drainage and slope protection measures in design and construction plan to control or prevent soil erosion, flooding and pollution problems	Visual inspection and record review	Start, mid and end of construction	Low	Contractor SO***, GEM
ii. Enforce legitimate extraction or quarrying of sands and gravel.	GEM-Contractor	Prohibit construction use of beach sand and coral aggregates; Issuance of Gratuitous Sand and Gravel Quarry Permit by DENR-ARMM and Provincial Government List of Quarry Sites operating with necessary government permits	Spot check of delivery receipts with Contractor	Start and during construction	Low	Contractor SO***, GEM
3. IMPLEMENT CONSTRUCTION SITE SAFETY AND TRAFFIC BEST MANAGEMENT PRACTICES (BMPs).						
i. Implement prescribed site safety measures and provide worker's facilities at the worksite	GEM-Contractor	List of PPEs supplied to workers; Provision of worker's bunkhouse, water supply and sanitary facilities.	Visual inspection and record review	Daily to weekly until end of construction	Low	Contractor SO***, GEM
i. Enforce traffic rules and regulations; install Early Warning Devices (EWDs)	GEM-Contractor	Designation of parking area, flagmen and alternate route; Traffic signs, and signals installed as planned.	Visual inspection and record review	Daily to weekly until end of construction	Low	Contractor SO***, GEM
ii. Prevent damage or destruction of properties as a result of the works.	Contractor	Installation of measures such as fencing to protect properties from accidental damages	Visual inspection and record review	Daily to weekly until end of construction	Low	Contractor SO***, GEM
iii. Limit or mitigate impact to water, air quality and noise level at the worksite	GEM-Contractor	Application of measures to protect workers and public from harmful emissions, effluents and nuisance noise.	Visual inspection and record review	Daily to weekly until end of construction	Low	GEM, DOTC-ATO, LGU
4. Local capability strengthening on Environmental Compliance Monitoring (ECM) during construction and operation of project						
i. Help strengthen local capability for enforcement and monitoring of environmental compliance.	DPWH/Tawi-Tawi	Information, Education and Communication (IEC) on Environmental Compliance Monitoring during construction and operation phase	Environmental Compliance Monitoring (ECM) Plan for Contractor	Prior to completion and turnover	Low	GEM USAID
			Beneficial Use Monitoring (BUM) Plan for Project Grantee	After turnover to Project Grantee of completed facility	Low	GEM USAID

* Department of Public Works and Highways
** Provincial Government of Tawi-Tawi
*** Contractor Safety Officer

6.0 EA STUDY TEAM

The Environmental Assessment Study Team was composed of DPWH and GEM personnel.

DPWH EA Study Team

Team Leader and Forestry Specialist	:	Dinah Cabrido Waja	Primarily responsible in the planning and management of the Environmental Assessment (EA) Study and preparation of EA Document; and provided technical inputs regarding the forest resource component of the EA
Socio-Economic Specialists	;	Hasbullah Ajak and Ombra Jauhari	Provided technical inputs regarding sociological component of the EA
Coastal Marine Resources Specialists	;	Waldzman Samimi; Mohd. Riza Murphy and Ramon Tangon	Provided technical inputs regarding marine ecological component of the EA
Land Use and Mapping Specialists	;	Ridwan B. Tanji and Jul-Asri Jerry	Provided technical inputs regarding land use component of the EA
Technical Adviser for DPWH	:	DPWH Tawi-Tawi District Engr. Benzoud Ajihil	Provided oversight, management and inputs throughout the EA process and EA Documentation

GEM EA Study Team

Senior Environmental Specialist	:	Dr. Armando A. Andaya	Provided oversight, management and input throughout the EA process and EA documentation
Environmental Specialist	:	Kent Dequito	Coordinated and supervised DPWH Team in the conduct of the Rapid Resource Assessment (RAA) regarding coastal marine resources, and data analysis and reporting
Environmental Specialists	:	Yevgeny Honrade and Leonila P. Galerio	Coordinated and supervised DPWH Team in the conduct of Socio-economic Profiling and Public Perception Survey, and data analysis and EA report preparation
Environmental Specialists	:	Dewi-Puspa Tingkalan and Genefer Dizon	Coordinated and supervised DPWH Tean regarding the Public Participation and Scoping Process and Documentation/Reporting
Technical Advisers for GEM	:	Alejandro Sundermann, Engr. Lito Buluran, Michael Nyquist	Technical review and inputs regarding project development plan, design and construction plan components of the EA

ANNEXES

Annex	Description
A	USAID BEO Approval of Scoping Statement
B	ECC Issuance
C	Project Location/Vicinity Map
D	LGU Certifications
E	Existing and Proposed Site Development Plans
F	Concept Design for the Road Upgrading Work
G	Concept Design for the Bridge Construction Work
H	Concept Design for the Interlink Road
I	Project Cost Estimates
J	Gantt Chart of Construction Schedule
K	Land Use and Classification Map
L	Perception Survey Data
M	DENR CENRO Site Inspection Report
N	Certification of Land Donation
O	DENR Recommendation for the Issuance of Permit to Cut
P	Mangrove Reforestation and Regreening Plan

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H	Concept Design for the Interlink Road
I	Project Cost Estimates
J	Gantt Chart of Construction Schedule
K	Land Use and Classification Map
L	Perception Survey Data
M	DENR CENRO Site Inspection Report
N	Certification of Land Donation
O	DENR Recommendation for the Issuance of Permit to Cut
P	Mangrove Reforestation and Regreening Plan

Annex A

USAID BEO Approved
Scoping Statement

A/EC 8-123 Philippines S0492-012 RQD for SS for EA Tawi-Tawi Road-Bridge

USAID | PHILIPPINES
FROM THE AMERICAN PEOPLE

Request for Scoping Statement Approval for the Tawi-tawi Bridge-Road Partnership Project

PROGRAM/ACTIVITY DATA

Country Code: 492 -012
Country or Region: Philippines
Activity Name: **Scoping Statement (SS) for Environmental Assessment (EA), Tawi-tawi Bridge-Road Partnership Project**

Funding Begin: FY 2008 **Funding End:** FY 2009 **LOP Amount:** $2,500,000
Approval Issue: **Scoping Statement for Environmental Assessment**

OVERVIEW

The project is located in the Province of Tawi-Tawi, a group of islands located at the southernmost tip of the Philippines. The Department of Public Works and Highways (DPWH) of the Government of the Republic of the Philippines and the USAID/Growth with Equity in Mindanao (GEM) Program will jointly fund and undertake the proposed project. The agreed-upon project scope includes (i) construction of 2 steel bridges, and (ii) the upgrading of three earth roads linking the bridges to the existing road network on Sanga-Sanga Island and Tawi-Tawi Island. The construction work is expected to be completed within 12 months at an estimated total cost of $8.10 million for all components. USAID-GEM Program will cover only the upgrading of the Sanga-Sanga road section at an estimated cost of $2.5 million.

The construction of the bridges that will connect the island of Tawi-Tawi to Sanga-Sanga island will enable more people from the municipalities of Panglima Sugala, Tandubas, Sapa-Sapa and Languyan (on Tawi-Tawi island) to take advantage of the superior education, health and social services available only in Bongao, the capital city of Tawi-Tawi, which is located on Sanga-Sanga island. The roads and bridges will allow and encourage greater movement of local products and goods throughout the province, create business opportunities and enhance the peace process.

Per the Initial Environmental Examination (IEE)* for all S012 activities approved by ANE's Bureau Environmental Officer (ANE/BEO) on September 9, 2005 that includes the GEM Program, infrastructure activities such as those under the GEM Program qualify for a "Negative Determination with Conditions" under 22 CFR 216. Conditions include that construction activities shall be subject to further review using an established Environmental Screening Review process (ESR) provided for in the S012 IEE. Using the ESR, USAID determined that an Environmental Assessment (EA) is needed given the potential environmental impacts of the Tawi-Tawi Bridge-Road Partnership Project. It determined that construction of the roads and bridges in Tawi-Tawi Province, require a **Positive Determination** per 22 CFR 216.3 (a)(2)(iii) because project components may have potential significant adverse impacts on the environment. A scoping process was required to inform the Environmental Assessment process.

On May 20, 2008, DPWH, with support from the GEM Program, conducted a Public Scoping in Bongao, Tawi-Tawi involving 84 participants from national and regional government agencies, local government units, non-governmental organizations and representatives from public and private sectors. The priority

* ANE 05-130

issues and concerns identified by the participants included: right-of-way (ROW) land acquisition and compensation; mangrove cutting; tree replacement; quarrying; construction safety; impact on indigenous flora and fauna; and displacement of people from livelihood and income sources. A Scoping Statement was submitted to and concurred by USAID/Philippines for ANE/BEO's review and approval. The EA will commence upon the approval of the Scoping Statement by ANE/BEO.

RECOMMENDATION

The USAID/Philippines Scoping Statement for the Tawi-Tawi Bridge-Road Partnership Project dated 11 June 2008 (prepared with assistance from the Louis Berger Group, Incorporated, the principal technical assistance contractor for the GEM-3 Program) is recommended for approval by the USAID/ANE Bureau Environmental Officer (BEO).

A/Mission Director _____ Elizaida Washington Date: 3-13-09

A/Mission Environmental Officer _____ Mary Joy A. Jochico Date: 8-14-08

GEM Project Cognizant Technical Officer _____ Robert Barnes Date: 7/25/08

APPROVAL

Bureau Environmental Officer _____ John O. Wilson Date: 9/5/08
Approved: ☑
Disapproved: ☐

Clearances: OEDG:RBarnes
PRM:MEStokes
OEE: AMicko
ODD: EWashington

Drafter: EMiciano-Jul-23-08

File: L:SO2/Activity/Mindanao/GEM-3 Program/Scoping Statement for Tawi-Tawi Bridge-Road Project.doc 07/28/08

Annex B

ECC Issuance

Republic of the Philippines
Autonomous Region in Muslim Mindanao
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
OFFICE OF THE REGIONAL SECRETARY
ARMM Compound, Cotabato City
Tel. No. 421-43-92 • Telefax 421-43-87

August 07, 2008

ECCARMM Ref. Code: 2008-0807-17-208

Honorable Razul S. Abpi
Regional Secretary
Department of Public Works and Highways-ARMM
ORC Compound, Cotabato City

ORSEC
DENR-ARMM
RELEASED
Date: 8-7-08 Time: 3:00
By:

Attention : Engr. Bensoud Ajihil
District Engineer
DPWH-ARMM Tawi-Tawi District

Subject : Environmental Compliance Certificate

Dear Secretary Abpi

This refers to your Environmental Compliance Certificate (ECC) application for the proposed Tawi-Tawi Bridge-Road Partnership Project located in Sanga-Sanga Island Municipality, Tawi-Tawi.

After satisfying the requirements in the said application and upon recommendation of the Environmental Management Bureau, this Department has decided to grant an ECC to the above-mentioned project.

With the issuance of this ECC, you are expected to implement the measures presented in the Initial Environmental Examination (IEE) Report, intended to protect and mitigate the project's adverse impacts on community health, welfare and the environment. Environmental considerations shall be incorporated in all phases and aspects of the project. You may proceed with project implementation after securing all the necessary permits from other pertinent government agencies. This Office will be monitoring the project periodically to ensure your compliance with stipulations cited in the attached ECC.

Please be guided accordingly.

Very truly yours,

KABUNTALAN P. EMBLAWA, AL-HAJ
Regional Secretary

Republic of the Philippines
Autonomous Region in Muslim Mindanao

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

OFFICE OF THE REGIONAL SECRETARY

ARMM Compound, Cotabato City
Tel. No. 421-43-92 • Telefax 421-43-87

ORSEC
DENR-ARMM
RELEASED
Date: 8-7-08 Time: 2:00
By:

ENVIRONMENTAL COMPLIANCE CERTIFICATE
(Issued under Presidential Decree 1586)
ARMM2008- 0807-17-208

THIS IS TO CERTIFY THAT THE PORPONENT DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS-AUTONOMOUS REGION IN MUSLIM MINDANAO (DPWH-ARMM) represented by its Regional Secretary, Rasul S. Abpi is granted this **ENVIRONMENTAL COMPLIANCE CERTIFICATE** (ECC) for the proposed **Tawi-Tawi Bridge-Road Partnership Project** located at Sanga-Sanga Island, Bongao and Panglima Sugala, Tawi-Tawi to implement in partnership with the **USAID/GEM Program**, by the Department of Environment and Natural Resources-Autonomous Region in Muslim Mindanao (DENR-ARMM) through the Environmental Management Bureau (EMB).

This Certificate is being issued subject to the following conditions, to wit:

PROJECT DESCRIPTION

The Certificate covers the construction of two (2) new bridges and upgrading of two (2) existing roads that will provide a road link between the main island of Tawi-Tawi and island of Sanga-Sanga.

That the scope of work of the above-mentioned project shall consist of the following components;

a) Upgrading the Sanga-Sanga Road (a 7.60 km. road connecting the Sanga-Sanga Bridge to the Existing highway network on Sanga-Sanga island) from Brgy. Karungdung to Brgy. Luuk-Pandan, both in the Municipality of Bongao. (USAID/GEM component);

b) Construction of Sanga-Sanga Bridge, a bridge connecting Sanga-Sanga Island to Bakhaw Dakula, an islet in the middle of the Subah Manangkay Channel (DPWH National counterpart);

c) Construction of the Tawi-Tawi Bridge, a bridge connecting to Bakhaw Dakula Islet to Brgy. Lapid-Lapid on the Tawi-Tawi Island side of Subah Managkay Channel. (DPWH National counterpart);

d) Construction of islet connecting road, a short road on Bakhaw Dakula islet that will link the two bridges, (DPWH National counterpart); and

e) Upgrading of Tawi-Tawi Road (a 8.45 km. road connecting the Tawi-Tawi Bridge to the existing highway network on Tawi-Tawi Island from Brgy. Lapid-Lapid in the Municipality of Bongao to Brgy. Magsaggao in the Municipality of Panglima Sugala) –(proposed DPWH-ARMM counterpart);

This ECC is issued in compliance to the requirements of Presidential Decree No. 1586, and its implementing guidelines Department Administrative Order No. 2003-30. The EMB, DENR-ARMM, however, is not precluded from revaluating, adding, removing and correcting any deficiencies or errors that maybe found to be inconsistent with the Revised Procedural Manual of DAO 2003-30 after the issuance of this Certificate.

Republic of the Philippines
Autonomous Region in Muslim Mindanao
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
OFFICE OF THE REGIONAL SECRETARY
ARMM Compound, Cotabato City
Tel. No. 421-43-92 • Telefax 421-43-87

GENERAL CONDITIONS:

1. That the proponent must ensure that any ROW land acquisition and compensation requirements are settled and completed before the start of construction, as recommended in the approved EMP incorporated in the IEE Report;

2. That the cutting of mangrove trees shall be limited within the defined clearing areas required to open the route for the construction of the link road across Bakhaw Dakula Islet based on a Permit to Cut applied for and issued to the proponent by the DENR-ARMM Secretary; and that cut mangrove trees shall be replaced according to the Mangrove Replacement/Replanting Plan recommended in the approved EMP incorporated in the IEE Report;

3. That proponent shall provide for the construction aggregate requirements of the project from quarry sites or sources operating with necessary government permit. As may be required, the proponent shall obtain an Exclusive Sand and Gravel Gratuitous Permit from the Provincial Government/DENR-ARMM to authorize quarrying of aggregates in approved sites/areas;

4. That mobilization and demobilization of heavy equipment and machinery over land and water during construction period shall be undertaken safely and properly to protect the lives and property, income and livelihood activities, access to goods and services, among others, of the project affected people. Similarly, the operation and maintenance of the construction equipment and machine shall not cause public nuisance or inconvenience due to the generation of noise, dust and smoke, vibration, among others.

5. That the proponent and/or its contractor shall employ best practices in the management of construction wastes, debris, excavation materials, toxic and hazardous substances or chemicals, domestic sewage and garbage, among others, to protect the health and safety of workers and general public and to prevent or control environmental pollution problems;

6. That the proponent and/or its contractor(s) shall provide all safety equipment and protective clothing in prescribed quantity, source, standards of manufacture and means of ensuring proper utilization by all workmen and staff employed. Such Personal Protective Equipments (PPEs) shall include, but not be limited to, goggles and other eye protectors, hearing protectors, reflective safety vests, safety harnesses, safety equipment and protective foot wears, fire extinguishers, first air equipment and hard hats

7. That the proponent and/or its contractor(s) shall provide or install temporary fencing, barricades and enclosures to ensure safety of workers. Similarly, install traffic control equipment, signage and warning signals, etc., adequately and in designated locations within the work areas and vicinities.

8. That the proponent and/or its contractor shall provide or install necessary soil and water management structures or implement measures to prevent or reduce the occurrence of soil erosion, flooding and inundation of roads, deposition of sediment in low-lying areas, silt mobilization into receiving bodies of water, among others;

9. That the proponent must ensure that all appropriate mitigation/enhancement measures stated in the submitted IEE Report and the Environmental Management Plan (EMP) are strictly implemented;

10. That the proponent shall ensure that all relevant conditions of this Certificate shall be properly complied with by its commissioned contractor/s.

11. That this Certificate shall be considered automatically revoked if the project will not be implemented within five (5) years from the date of issuance or if the project is suspended or stopped for a period of more than two (2) years such that significant changes in land and resource use have occurred in the project area and immediate vicinities.

Republic of the Philippines
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12. That relevant permits from other concerned government agencies must be secured prior to project implementation;

13. That qualified skilled and unskilled local residents, including women, must be given first priority to job opportunities during construction;

14. That transfer of ownership of this project carries the same conditions set forth in this ECC for which written notification to the EMB-ARMM must be made within fifteen (15) days from such transfer; and

15. That on-the-spot monitoring and inspection of the project can be initiated by the DENR-ARMM to ensure that the above-stated ECC conditions and other applicable environmental laws, rules and regulations are properly complied with. Multi-partite Monitoring Team (MMT) may be created to provide independent monitoring of enforcement and compliance with ECC conditions and other environmental responsibilities by proponent and/or its contractor(s).

Non-compliance with any of the provisions of this Certificate shall be sufficient cause for its suspension or cancellation and/or imposition of a fine in an amount not to exceed Fifty Thousand Pesos (PhP 50,000.00) for every violation thereon or both, at the discretion of this Office pursuant to Section 9 of PD 1586.

Given this 7th day of August, 2008

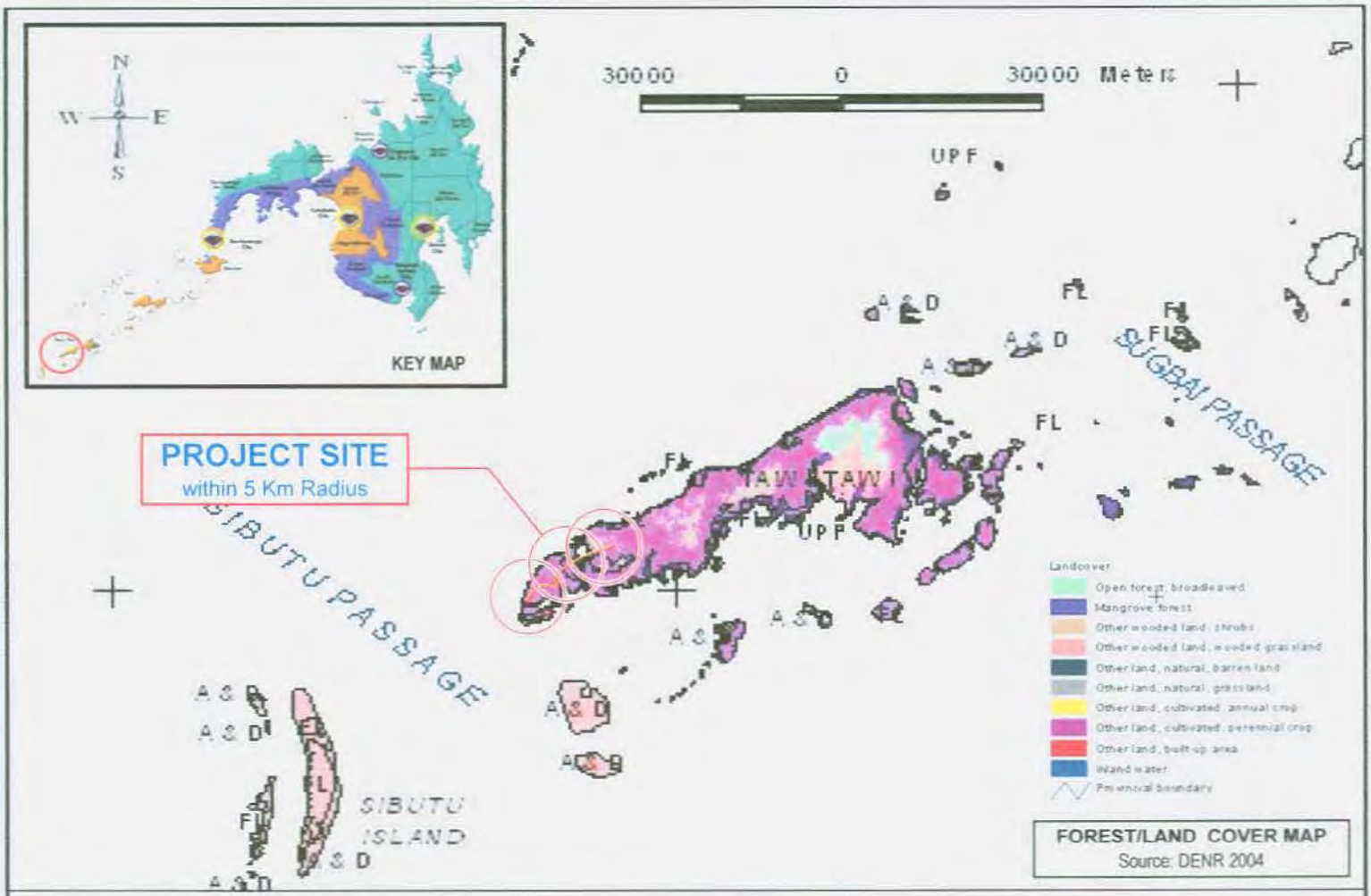
KABUNTALAN P. EMBLAWA, AL-HAJ
Regional Secretary

Recommending Approval:

ABOLAIS B. TENDEGARANAO
Director II, EMB

Annex C

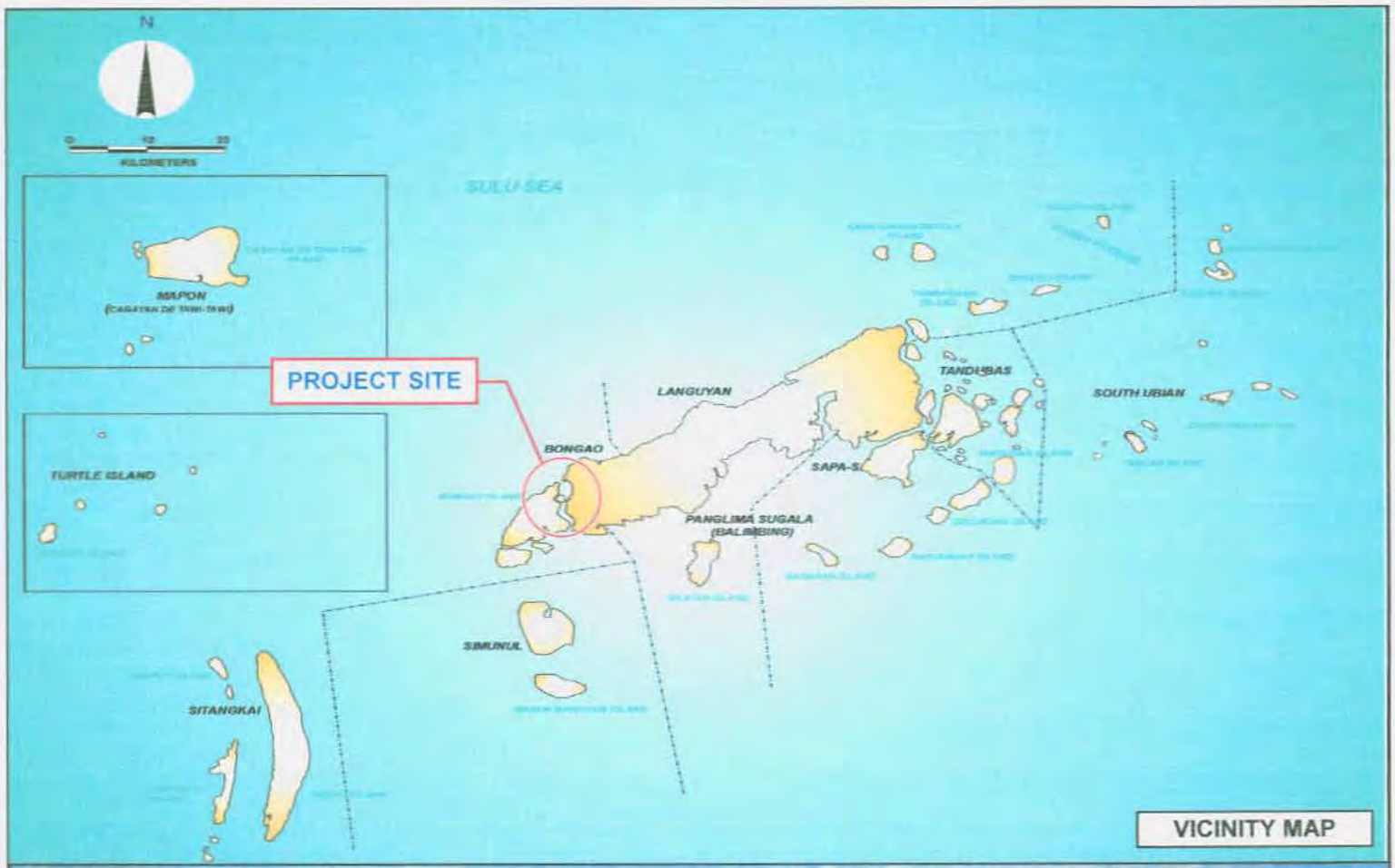
Project Location/
Vicinity Map

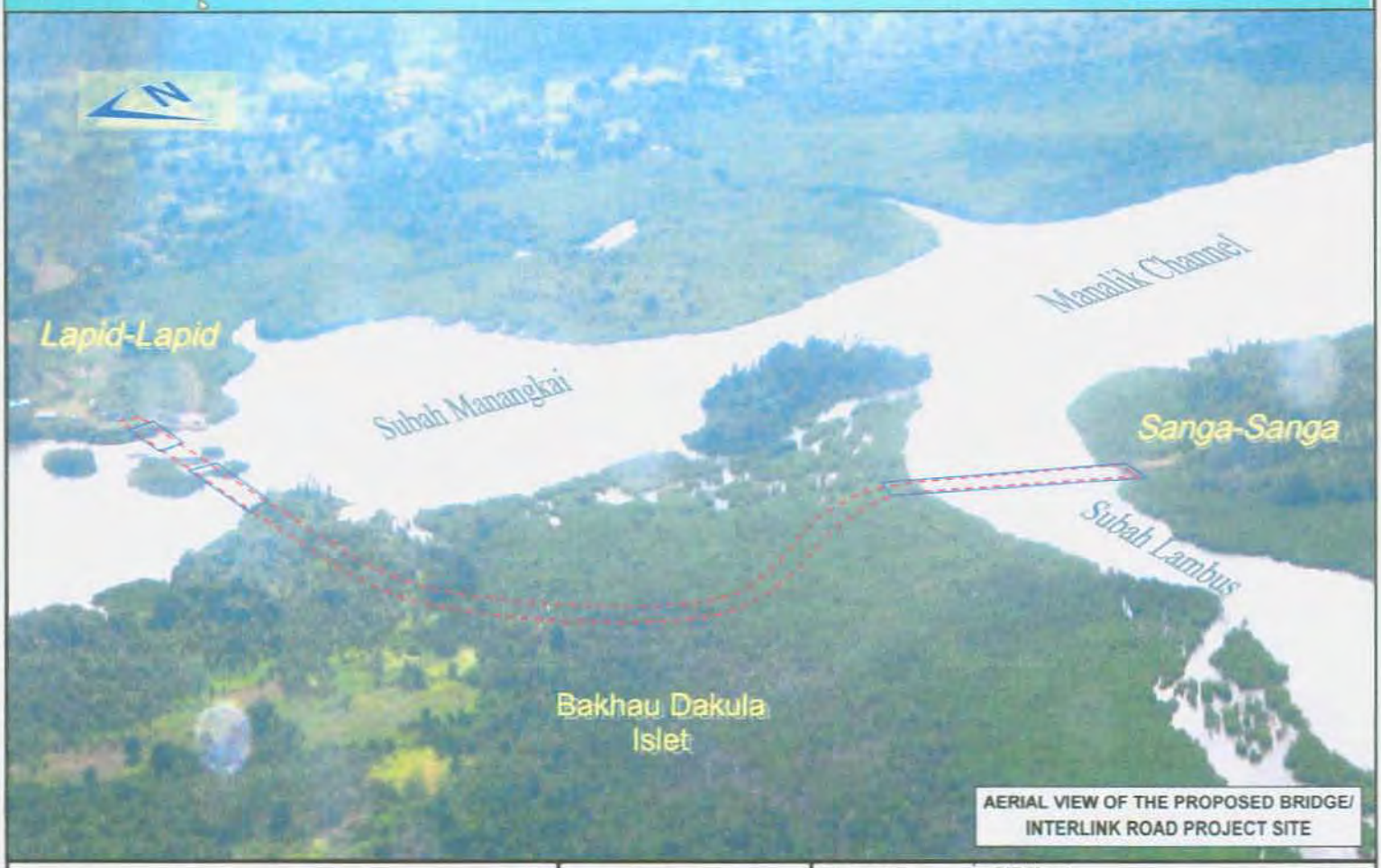


FOREST/LAND COVER MAP
Source: DENR 2004

LOCATION MAP

USAID	GROWTH WITH EQUITY IN MINDANAO 3 (GEM 3) PROGRAM A Project of the United States Agency for International Development THE LOUIS BERGER GROUP, Inc.	ANNEX C-1 LOCATION MAP	PROJECT CODE : RIP No. 4 NAME OF PROJECT : Tawi-Tawi Road/Bridge Partnership LOCATION : Bongao & Panglima Sugala, Tawi-Tawi





USAID GROWTH WITH EQUITY IN MINDANAO 3 (GEM 3) PROGRAM A Project of the United States Agency for International Development THE LOUIS BERGER GROUP, Inc.	ANNEX C-2 VICINITY MAP	PROJECT CODE	: RIP No. 4
		NAME OF PROJECT	: Tawi-Tawi Road/Bridge Partnership
		LOCATION	: Bongao & Panglima Sugala, Tawi-Tawi

Annex D

LGU Certifications

CERTIFICATION FROM THE LOCAL GOVERNMENT UNIT

THIS IS TO CERTIFY that the undersigned has understood the implications of the ***TAWI-TAWI BRIDGE – ROAD PARTNERSHIP PROJECT*** that is being applied by ***DPWH-ARMM, TAWI-TAWI DISTRICT ENGINEERING OFFICE,*** proponent of the project . Further, I certify that I have consulted my respective constituents and they interpose no objections whatsoever against the project, instead we recommend for its operation because it will be the only access by land for the 3 municipalities (Panglima Sugala, Languyan and Sapa-Sapa) in mainland Tawi-Tawi to the capital town of Bongao, which will enable more people from the mainland to take advantage of higher education, health and social services available only in Bongao. The new roadway will allow and encourage greater movement of local products and goods throughout the province, and create business opportunities and investment in new enterprises in Tawi-Tawi, promote local tourism industry and enhance the peace process.

I further certify that the DPWH has already settled all Right Of Way obligations with land owners affected by the project as certified by the barangay. Chairmen concerned.

Done this 27th day of June 2008 at Bongao , Tawi-Tawi, Philippines.

HONORABLE SADIKUL I. SAHALI AL HADZ
Provincial Governor

SUBSCRIBED AND SWORN to before me this 8th day of July 2008, affiant exhibiting to me his Community Tax Certificate No. 05618701 issued on January 7, 2008 at Bongao, Tawi-Tawi, Philippines

ABDUL-AZIZ I. AMILBANGSAR
CLERK OF COURT II
9TH MCTC BONGAO TAWI-TAWI

Doc. No. _____
Page No. _____
Book No. _____
Series of 2008

CERTIFICATION FROM THE LOCAL GOVERNMENT UNIT

THIS IS TO CERTIFY that the undersigned has understood the implications of the ***TAWI-TAWI BRIDGE – ROAD PARTNERSHIP PROJECT*** that is being applied by ***DPWH-ARMM, TAWI-TAWI DISTRICT ENGINEERING OFFICE,*** proponent of the project . Further, I certify that I have consulted my respective constituents and they interpose no objections whatsoever against the project, instead we recommend for its operation because it will be the only access by land for the 3 municipalities (Panglima Sugala, Languyan and Sapa-Sapa) in mainland Tawi-Tawi to the capital town of Bongao, which will enable more people from the mainland to take advantage of higher education, health and social services available only in Bongao. The new roadway will allow and encourage greater movement of local products and goods throughout the province, and create business opportunities and investment in new enterprises in Tawi-Tawi, promote local tourism industry and enhance the peace process.

I further certify that the DPWH has already settled all Right Of Way obligations with land owners affected by the project.

Done this 27th day of June 2008 at Bongao, Tawi-Tawi, Philippines.

HONORABLE NURBERT M. SAHALI
Municipal Mayor
Panglima Sugala Municipality

SUBSCRIBED AND SWORN to before me this 8th day of July 2008, affiant exhibiting to me his Community Tax Certificate No. 05618750 _____ issued on January 22, 2008 at Bongao, Tawi-Tawi, Philippines

ABDUL-AZIZ T. AMILBANGSA
CLERK OF COURT II
9TH MCTC BONGAO TAWI-TAWI

Doc. No. _____
Page No. _____
Book No. _____
Series of 2008

CERTIFICATION FROM THE LOCAL GOVERNMENT UNIT

THIS IS TO CERTIFY that the undersigned has understood the implications of the ***TAWI-TAWI BRIDGE – ROAD PARTNERSHIP PROJECT*** that is being applied by ***DPWH-ARMM, TAWI-TAWI DISTRICT ENGINEERING OFFICE,*** proponent of the project . Further, I certify that I have consulted my respective constituents and they interpose no objections whatsoever against the project, instead we recommend for its operation because it will be the only access by land for the 3 municipalities (Panglima Sugala, Languyan and Sapa-Sapa) in mainland Tawi-Tawi to the capital town of Bongao, which will enable more people from the mainland to take advantage of higher education, health and social services available only in Bongao. The new roadway will allow and encourage greater movement of local products and goods throughout the province, and create business opportunities and investment in new enterprises in Tawi-Tawi, promote local tourism industry and enhance the peace process.

I further certify that the DPWH has already settled all Right Of Way obligations with land owners affected by the project in this barangay.

Done this 27th day of June 2008 at Karungdung, Bongao , Tawi-Tawi, Philippines.

HONORABLE ISMAEL AMARA
Barangay Chairman
Karungdung, Bongao, Tawi-Tawi

SUBSCRIBED AND SWORN to before me this 8th day of July 2008, affiant exhibiting to me his Community Tax Certificate No. 05618830 _____ issued on March 4, 2008 at Bongao, Tawi-Tawi, Philippines

ABDUL AZIZ I. AMILBANGSAR, JR.
CLERK OF COURT-II
9TH MCTC BONGAO TAWI-TAWI

Doc. No. _____
Page No. _____
Book No. _____
Series of 2008

CERTIFICATION FROM THE LOCAL GOVERNMENT UNIT

THIS IS TO CERTIFY that the undersigned has understood the implications of the ***TAWI-TAWI BRIDGE – ROAD PARTNERSHIP PROJECT*** that is being applied by ***DPWH-ARMM, TAWI-TAWI DISTRICT ENGINEERING OFFICE,*** proponent of the project . Further, I certify that I have consulted my respective constituents and they interpose no objections whatsoever against the project, instead we recommend for its operation because it will be the only access by land for the 3 municipalities (Panglima Sugala, Languyan and Sapa-Sapa) in mainland Tawi-Tawi to the capital town of Bongao, which will enable more people from the mainland to take advantage of higher education, health and social services available only in Bongao. The new roadway will allow and encourage greater movement of local products and goods throughout the province, and create business opportunities and investment in new enterprises in Tawi-Tawi, promote local tourism industry and enhance the peace process.

I further certify that the DPWH has already settled all Right Of Way obligations with land owners affected by the project as certified by the barangay. Chairmen concerned.

Done this 27th day of June 2008 at Bongao , Tawi-Tawi, Philippines.

HONORABLE MATARUL JAANI
Barangay Chairman
Luuk Pandan, Bongao, Tawi-Tawi

SUBSCRIBED AND SWORN to before me this 8th day of July 2008, affiant exhibiting to me his Community Tax Certificate No. 05616739 issued on February 27, 2008 at Bongao, Tawi-Tawi, Philippines

ABDUL-AZIZ J. AMILBANGSAMO
CLERK OF COURT II
9TH MCTC BONGAO TAWI-TAWI

Doc. No. _____
Page No. _____
Book No. _____
Series of 2008

CERTIFICATION FROM THE LOCAL GOVERNMENT UNIT

THIS IS TO CERTIFY that the undersigned has understood the implications of the ***TAWI-TAWI BRIDGE – ROAD PARTNERSHIP PROJECT*** that is being applied by ***DPWH-ARMM, TAWI-TAWI DISTRICT ENGINEERING OFFICE***, proponent of the project . Further, I certify that I have consulted my respective constituents and they interpose no objections whatsoever against the project, instead we recommend for its operation because it will be the only access by land for the 3 municipalities (Panglima Sugala, Languyan and Sapa-Sapa) in mainland Tawi-Tawi to the capital town of Bongao, which will enable more people from the mainland to take advantage of higher education, health and social services available only in Bongao. The new roadway will allow and encourage greater movement of local products and goods throughout the province, and create business opportunities and investment in new enterprises in Tawi-Tawi, promote local tourism industry and enhance the peace process.

I further certify that the DPWH has already settled all Right Of Way obligations with land owners affected by the project in this barangay.

Done this 7th day of July 2008 at Lapid-Lapid , Bongao , Tawi-Tawi, Philippines.

MUDDASIL

HONORABLE MUDDASIL IMLAN
Barangay Chairman
Lapid-Lapid, Bongao, Tawi-Tawi

SUBSCRIBED AND SWORN to before me this 07 day of 07 July 2008, affiant exhibiting to me his Community Tax Certificate No. 05615965 issued on 01,24,08 at Bongao, Tawi-Tawi, Philippines

ABDEL-AZIZ I. AMILBANGSA
CLERK OF COURT II
9TH MCTC BONGAO TAWI-TAWI

Doc. No. _____
Page No. _____
Book No. _____
Series of 2008

CERTIFICATION FROM THE LOCAL GOVERNMENT UNIT

THIS IS TO CERTIFY that the undersigned has understood the implications of the ***TAWI-TAWI BRIDGE – ROAD PARTNERSHIP PROJECT*** that is being applied by ***DPWH-ARMM, TAWI-TAWI DISTRICT ENGINEERING OFFICE,*** proponent of the project . Further, I certify that I have consulted my respective constituents and they interpose no objections whatsoever against the project, instead we recommend for its operation because it will be the only access by land for the 3 municipalities (Panglima Sugala, Languyan and Sapa-Sapa) in mainland Tawi-Tawi to the capital town of Bongao, which will enable more people from the mainland to take advantage of higher education, health and social services available only in Bongao. The new roadway will allow and encourage greater movement of local products and goods throughout the province, and create business opportunities and investment in new enterprises in Tawi-Tawi, promote local tourism industry and enhance the peace process.

I further certify that the DPWH has already settled all Right Of Way obligations with land owners affected by the project in this barangay.

Done this _____ day of _____ at Magsaggao, Panglima Sugala , Tawi-Tawi, Philippines.

HONORABLE NASSER DAMMANG
Barangay Chairman
Magsaggao, Panglima Sugala

SUBSCRIBED AND SWORN to before me this 8th day of July 2008, affiant exhibiting to me his Community Tax Certificate No. 05618821 _____ issued on February 12, 2008 at Bongao, Tawi-Tawi, Philippines

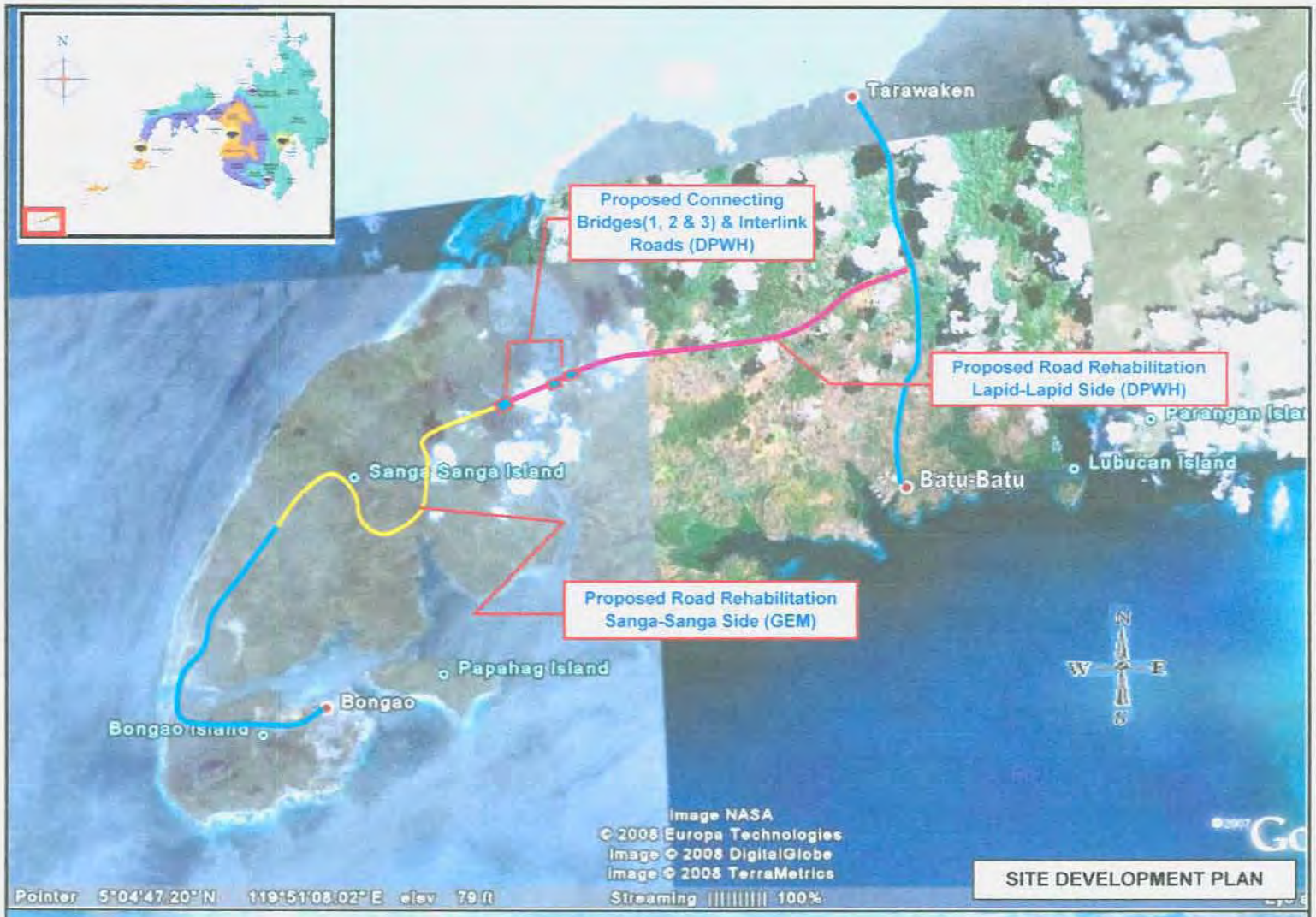
ABDUL-RAZIZ I. KIRIDAYOD
CLERK OF COURT-II
9TH MCTC BONGAO TAWI-TAWI

Doc. No. _____
Page No. _____
Book No. _____
Series of 2008

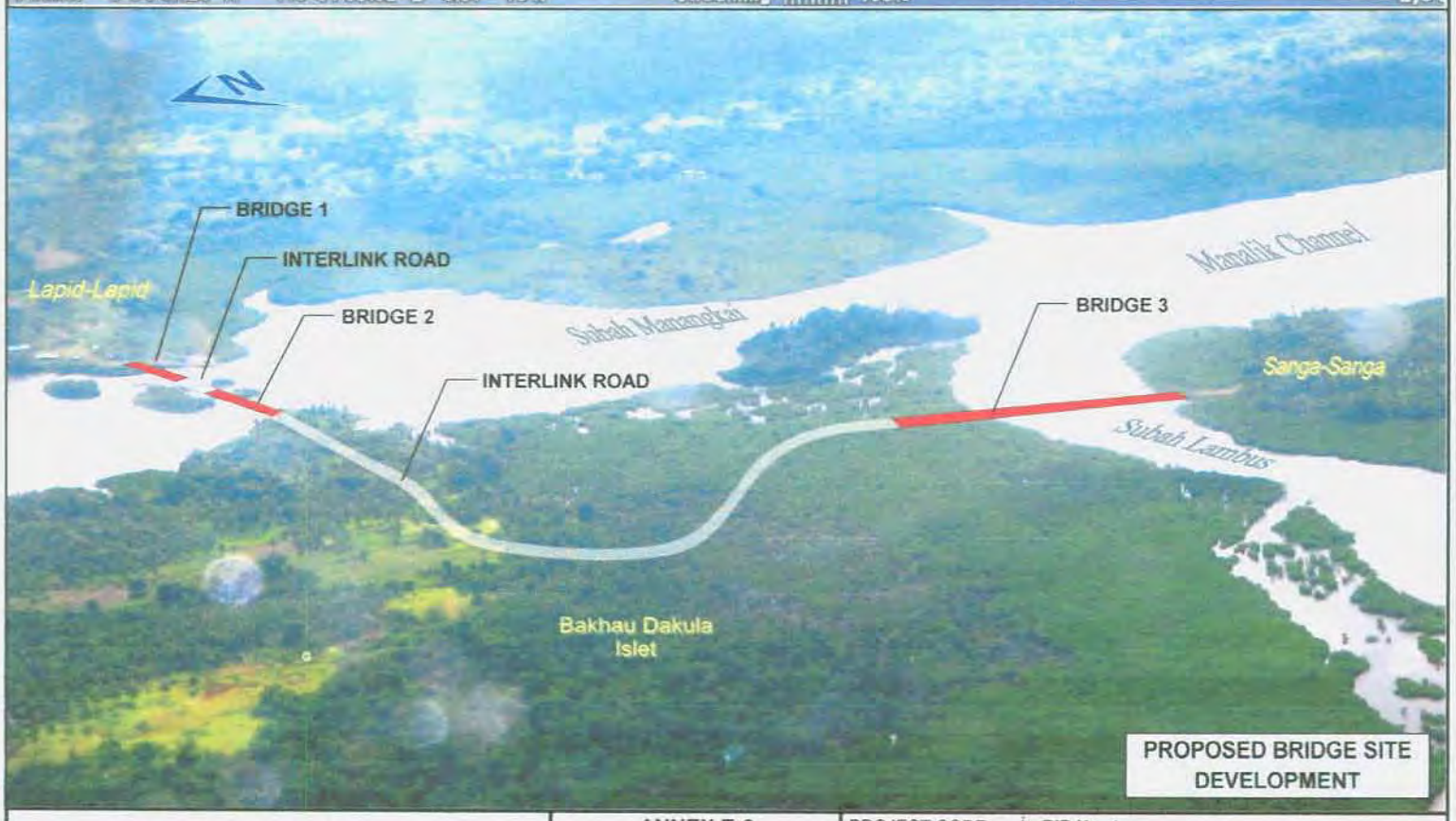
Annex E

Existing and Proposed
Site Development Plan

USAID GROWTH WITH EQUITY IN MINDANAO 3 (GEM 3) PROGRAM A Project of the United States Agency for International Development THE LOUIS BERGER GROUP, Inc.	ANNEX E-1 EXISTING SITE DEVT. AND PHOTOS	PROJECT CODE	: RIP No. 4
		NAME OF PROJECT	: Tawi-Tawi Road/Bridge Partnership
		LOCATION	: Bongao & Panglima Sugala, Tawi-Tawi



SITE DEVELOPMENT PLAN

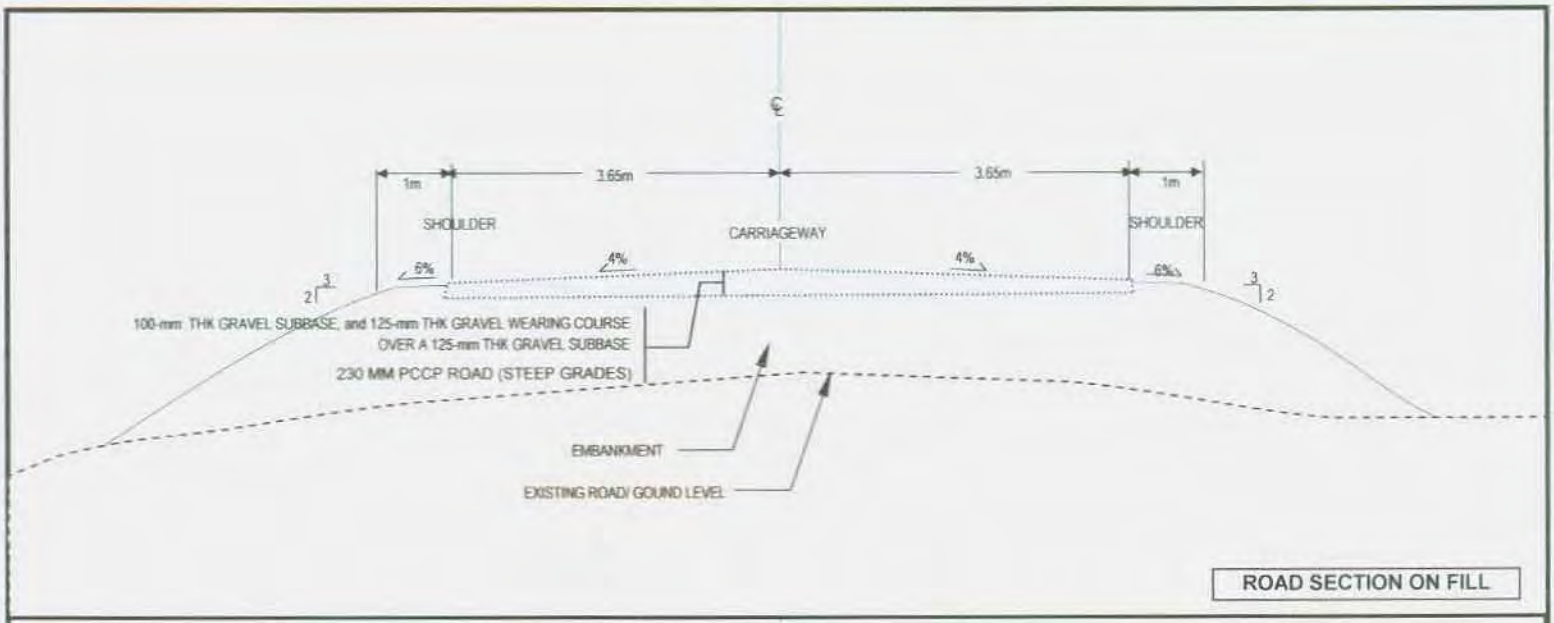


PROPOSED BRIDGE SITE DEVELOPMENT

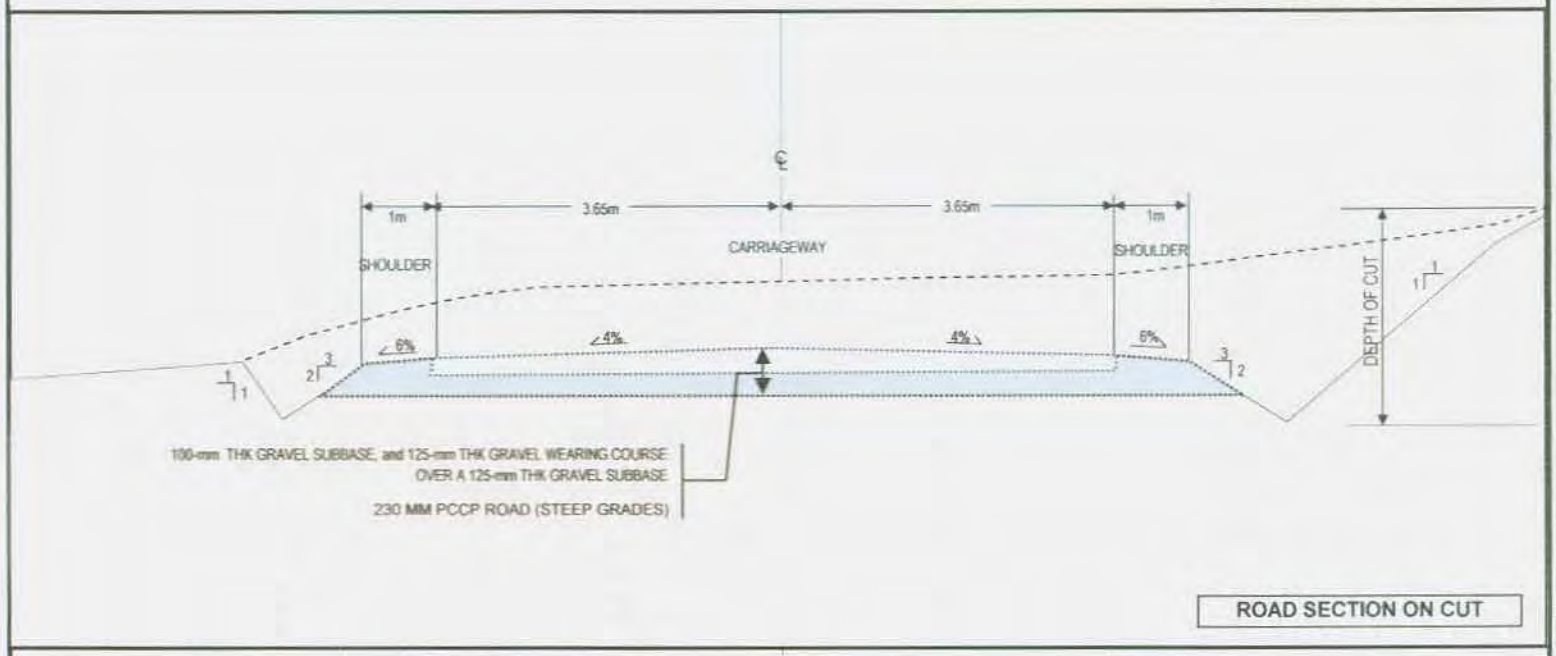
USAID	GROWTH WITH EQUITY IN MINDANAO 3 (GEM 3) PROGRAM A Project of the United States Agency for International Development THE LOUIS BERGER GROUP, Inc.	ANNEX E-2 PROPOSED SITE DEVELOPMENT PLAN	PROJECT CODE : RIP No. 4 NAME OF PROJECT : Tawi-Tawi Road/Bridge Partnership LOCATION : Bongao & Panglima Sugala, Tawi-Tawi

Annex F

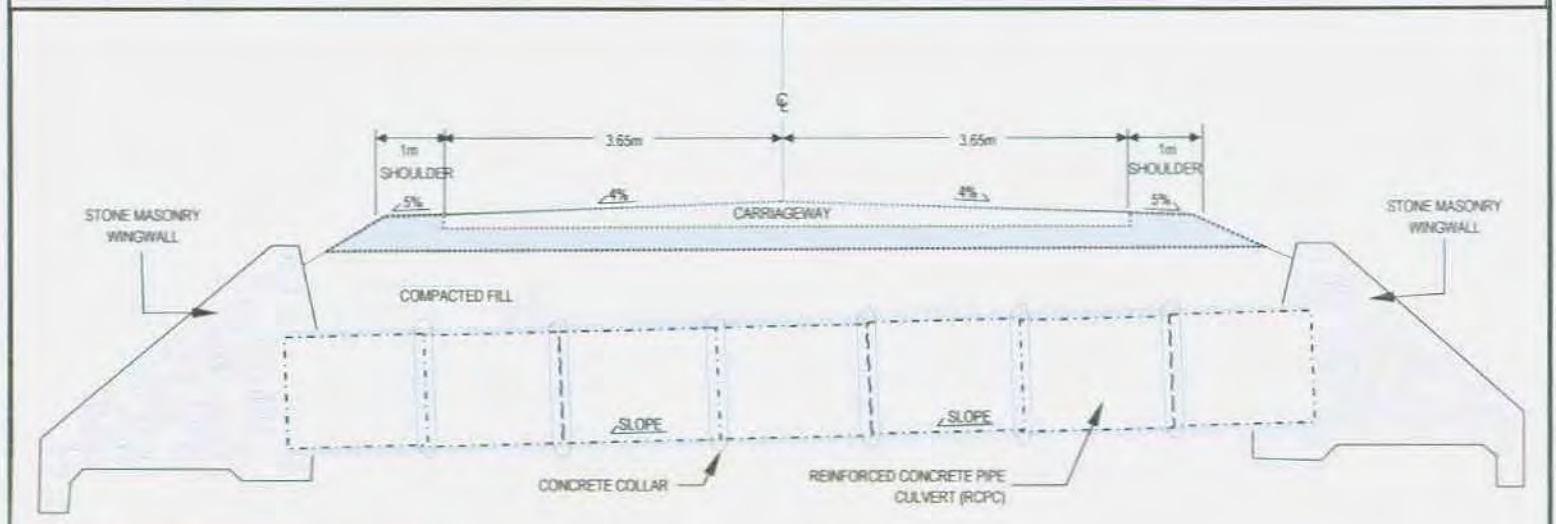
Concept Design for the Road Upgrading Work



ROAD SECTION ON FILL



ROAD SECTION ON CUT



DISCLAIMER:
Concept design only and should not be used for construction and cost estimate. Concept design is subject to detailed final design by GEM design team.

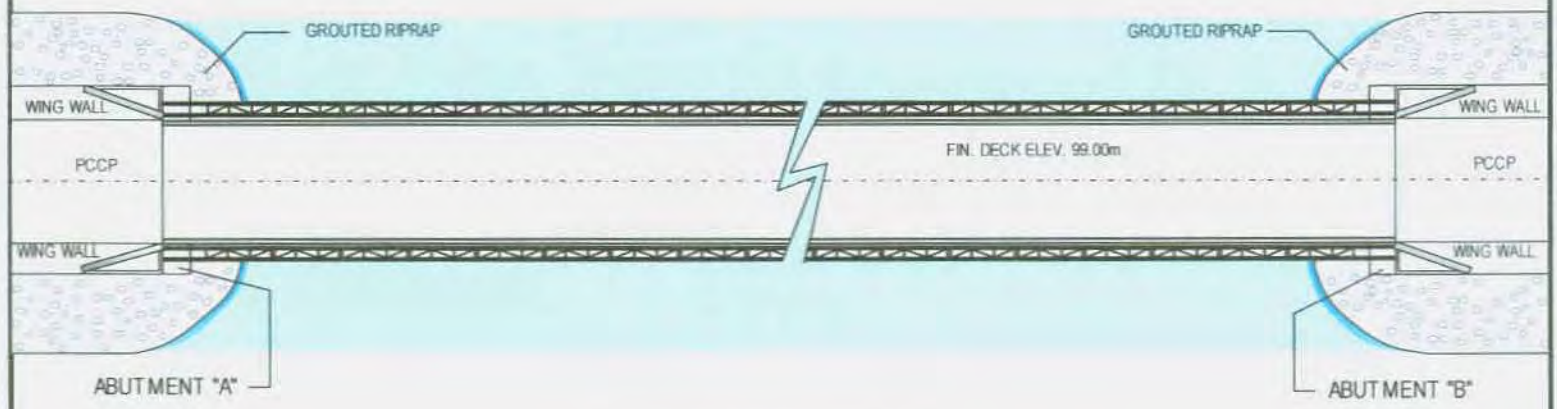
ROAD SECTION WITH RCPC

GROWTH WITH EQUITY IN MINDANAO 3 (GEM 3) PROGRAM A Project of the United States Agency for International Development THE LOUIS BERGER GROUP, Inc.	ANNEX F CONCEPTUAL DESIGN & DRAWING FOR THE ROAD UPGRADING COMPONENT	PROJECT CODE	: RIP No. 4
		NAME OF PROJECT	: Tawi-Tawi Road/Bridge Partnership
		LOCATION	: Bongao & Panglima Sugala, Tawi-Tawi

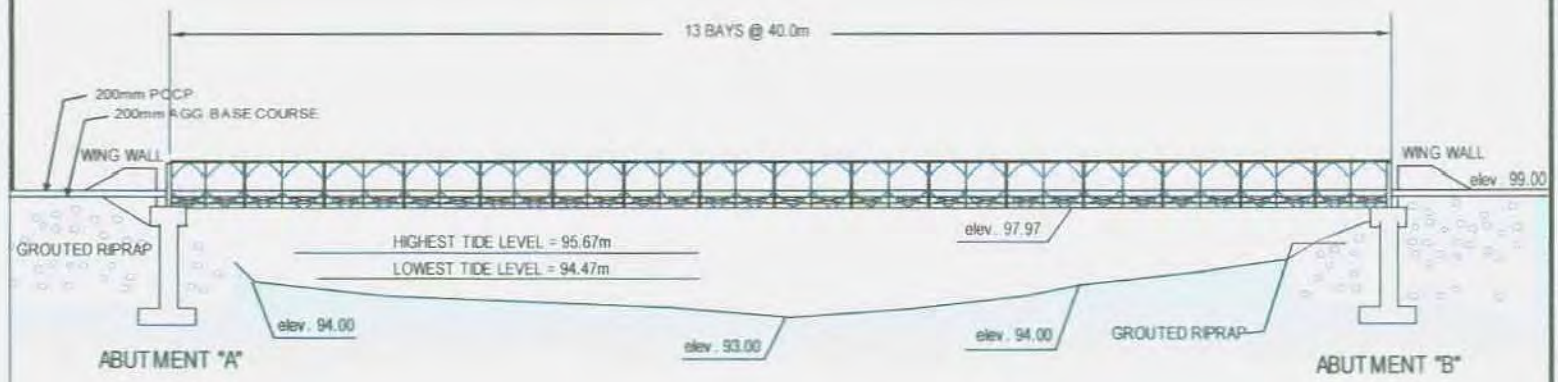
Annex G

Concept Design for the Bridge Construction Work

SITE DEVELOPMENT PLAN



BRIDGE 1 PLAN

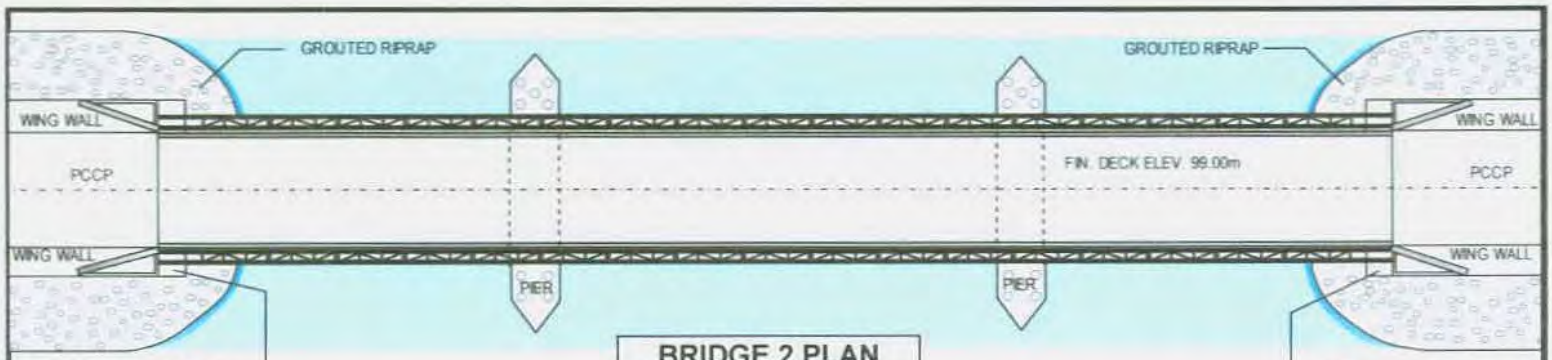


DISCLAIMER:
Concept design only and should not be used for construction and cost estimate. Concept design is subject to detailed final design by GEM design team.

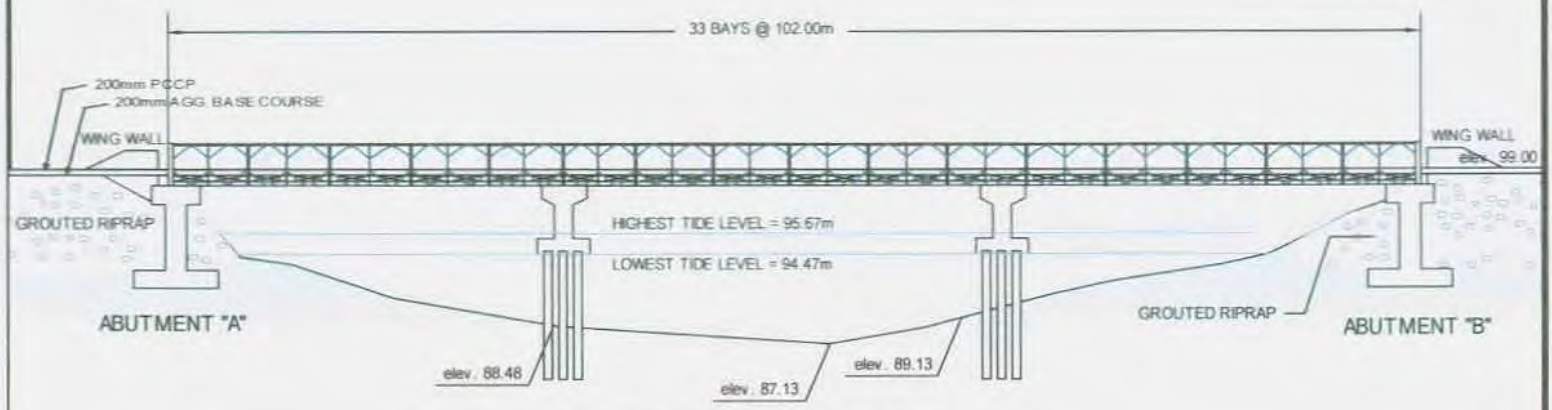
BRIDGE 1 ELEVATION

NOT DRAWN TO SCALE

GROWTH WITH EQUITY IN MINDANAO 3 (GEM 3) PROGRAM A Project of the United States Agency for International Development THE LOUIS BERGER GROUP, Inc.	ANNEX G-1 CONCEPTUAL & TYPICAL DESIGN (BRIDGE)	PROJECT CODE	: RIP No. 4
		NAME OF PROJECT	: Tawi-Tawi Road/Bridge Partnership
		LOCATION	: Bongao & Panglima Sugala, Tawi-Tawi

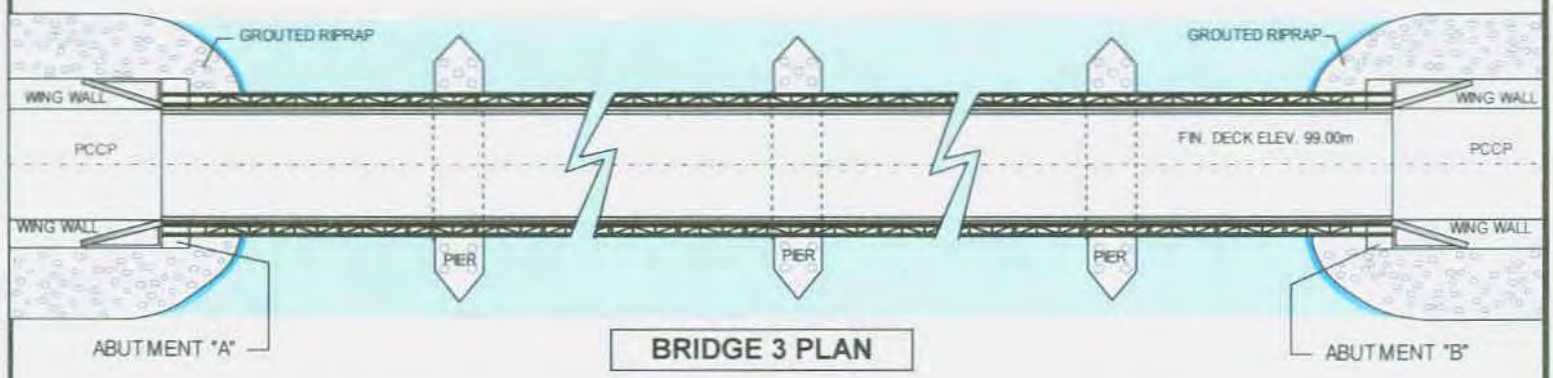


BRIDGE 2 PLAN

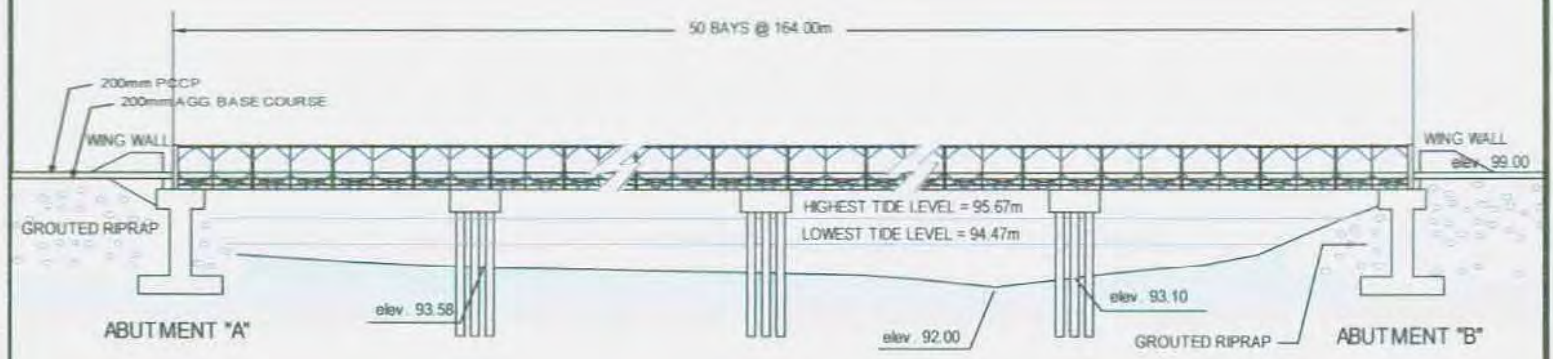


BRIDGE 2 ELEVATION

NOT DRAWN TO SCALE



BRIDGE 3 PLAN



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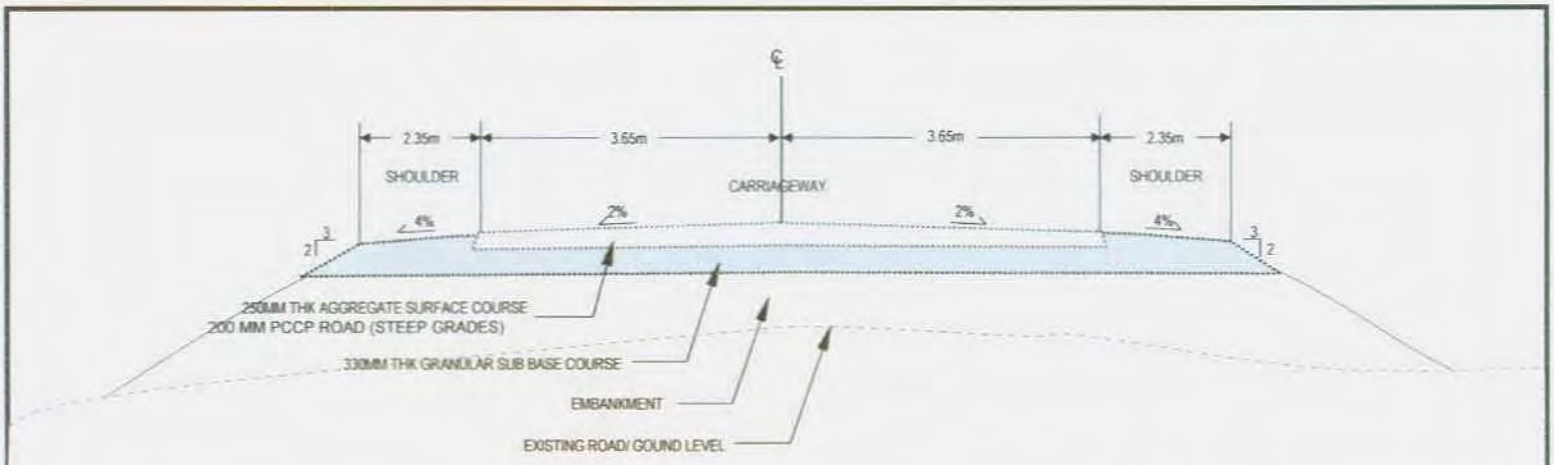
BRIDGE 3 ELEVATION

NOT DRAWN TO SCALE

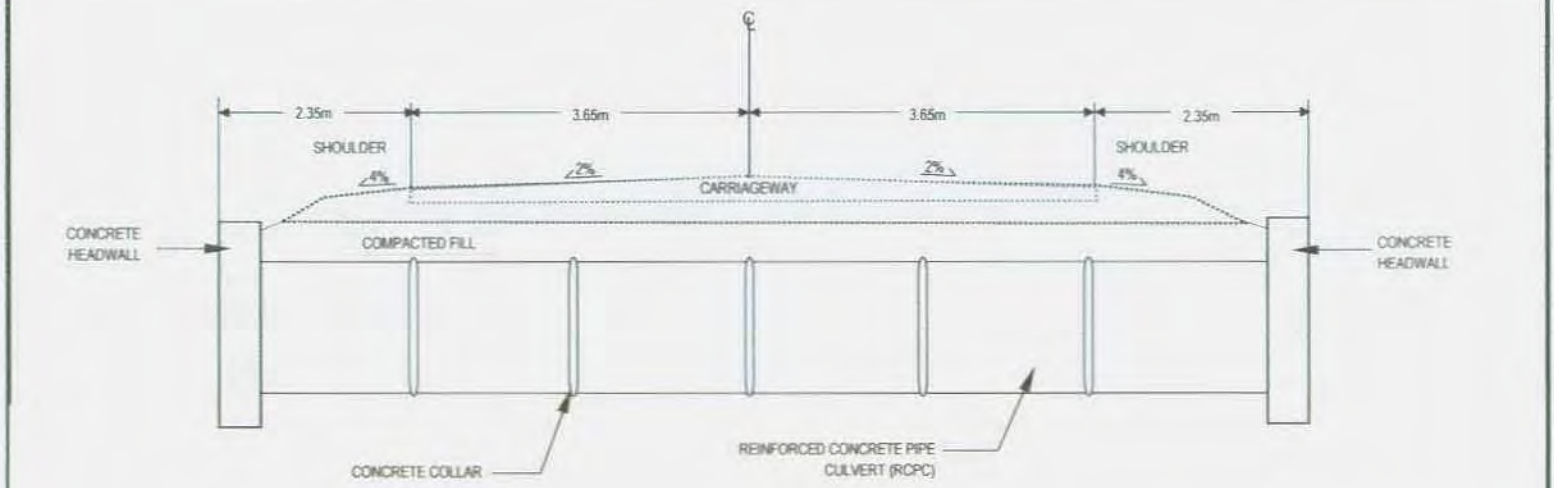
GROWTH WITH EQUITY IN MINDANAO 3 (GEM 3) PROGRAM A Project of the United States Agency for International Development THE LOUIS BERGER GROUP, Inc.	ANNEX G-2 CONCEPTUAL & TYPICAL DESIGN (BRIDGE)	PROJECT CODE	: RIP No. 4
		NAME OF PROJECT	: Tawi-Tawi Road/Bridge Partnership
		LOCATION	: Bongao & Panglima Sugala, Tawi-Tawi

Annex H

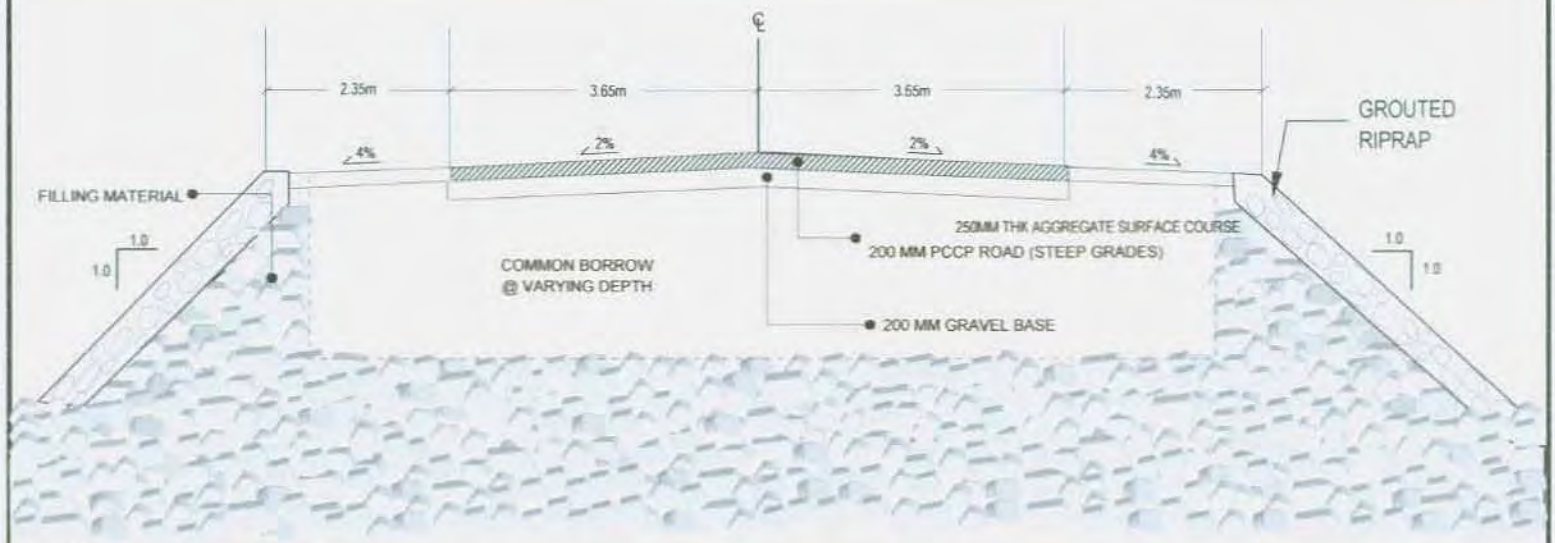
Concept Design for the Interlink Roads



TYPICAL ELEVATED ROAD SECTION



ROAD SECTION WITH RCPC



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TYPICAL FILL SECTION

GROWTH WITH EQUITY IN MINDANAO 3 (GEM 3) PROGRAM A Project of the United States Agency for International Development THE LOUIS BERGER GROUP, Inc.	ANNEX H CONCEPTUAL & TYPICAL DESIGN (INTERLINK ROAD)	PROJECT CODE	: RIP No. 4
		NAME OF PROJECT	: Tawi-Tawi Road/Bridge Partnership
		LOCATION	: Bongao & Panglima Sugala, Tawi-Tawi

Annex I

Project Cost Estimates

PROJECT COST ESTIMATES

The total estimated project cost including counterpart is about Php335 million ($8.10 million (@ PhP 47.00/$1.00) and is distributed as follows:

Description of Item	GEM-USAID	DPWH National	DPWH-ARMM	Estimated Cost
1. Upgrading of 7.6-km Sanga-Sanga Road. (Gravel surfaced road with PCC Pavement in steeper sections).	PhP 90 M ($1.91 M)			PhP 90 M ($1.91 M)
2. Supply and delivery to the site of Steel Modular Bridge materials (superstructure) for Sanga-Sanga Bridge and Tawi-Tawi Island Bridge			PhP 155 M ($3.30 M)	PhP 155 M ($3.30 M)
3. Construction of 285-meter Tawi-Tawi Island Bridge, 155-meter Sanga-Sanga Bridge (substructure and installation of modular steel materials) and construction of 700-meter link road (on the Bakhaw Dakula islet) between the two bridges		PhP 80 M ($ 1.70 M)		PhP 80 M ($1.70 M)
4. Upgrading of of the 8.45 km Tawi-Tawi Island Road			PhP 10 M ($0.21 M)	PhP 10 M* ($0.21 M)
Total	**PhP 90 M ($1.91M)**	**PhP 80 M ($1.70M)**	**PhP 165 M ($3.51 M)**	**PhP 335 M ($7.13 M)**
Percentage Share	**26.86%**	**23.88%**	**49.25%**	**100.00 %**

Annex J

Gantt Chart of
Construction Schedule

Construction Timetable*

Tawi-Tawi Bridge-Road Partnership

ACTIVITY	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10
Sanga-Sanga Road										
1 Mobilization										
2 Facilities for Engineer										
3 Clearing and Grubbing										
4 Subgrade Preparation										
5 Excavation for structures										
6 Laying of R.C. Pipes										
7 Sub-base preparation										
9 Concreting Works										
8 Construction of lined-canal and side ditches										
10 Provision of guardrails, road signs and pavement markings										
11 Demobilization										
Lapid-Lapid Road										
1 Mobilization										
2 Facilities for Engineer										
3 Clearing and Grubbing										
4 Subgrade Preparation										
5 Excavation for structures										
6 Laying of R.C. Pipes										
7 Sub-base preparation										
9 Concreting Works										
8 Construction of lined-canal and side ditches										
10 Provision of guardrails, road signs and pavement markings										
11 Demobilization										
Bridges & Interlink Road										
1 Mobilization										
2 Construction of Temporary Facilities										
3 Clearing of Construction Area										
4 Excavation										
5 Subgrade Preparation										
6 Embankment Works										
7 Base & Subbase Course Preparation										
8 Installation of Mid-piers/ Piles										
9 Pouring of Structural Concrete										
10 Pouring of PCCP										
11 Construction of Abutments										
12 Installation of Bridge Railings, Reinforcing Steel Bars										
13 Drainage & Slope Protection Works										
14 Installation of Road Signs										
15 Demobilization										

*Note * Final construction timetable is pending until final designs are approved*

Annex K

Land Use and Classification Map

LEGEND

Provincial Boundary	
Municipal Boundary	
Barangay Boundary	
A/D,TL,NP,UPF,CR,RP,FR, and other Legal status	
TLA PLA ITP,ISF,AIF TF, and other Regulatory Status	
Shoreline	
Railroad Track	
Main Road	
Secondary Road	
Path and Trails	
Major Waterway/Body	
Minor Waterway	
Mountain Peak	
Contour System	
Other Major Landmark	
Alienable and/or Disposable	A/D
Timberland	TL
National Park	NP
Communal Forest	CnF
Unclassified Public Forest	UPF
Reforestation Project	RP
Forest Reserve	FR
Civil Reservation	CR
Watershed Reservation	WR
Military Reservation	MR
Wilderness Area	WA
Timber Licence Agreement	TLA
Pasture Lease Agreement	PLA
Integrated Social Forestry	ISF
Industrial Tree Plantation	ITP
Agro-Forestry Farm	AIF
Tree Farm	TF

BARANGAY BOUNDARIES, LEGA
& REGULATORY STATUS MAP

Prepared & Machine Copy By:

NASHIR U. LAHIL
Forest Specialist

Checked By:

ERNEST D. SAIL
Forester-I

CERTIFICATION

To Whom It May Concern:

This is to certify that this is the true and correct L.C. Map reproduced from the original copy, as per records on file at DENR-ARMM, District-I, Bongao, Tawi-Tawi, Philippines.

Furnished to Mr. ARMANDO A. ANDAYA, Ph.D., Enviromental Specialist, GEM, Davao City.

This 18th day of August, 2004 at Bongao, Tawi-Tawi, Philippines.

KHOURAN U. MOHAMMAD, A
CENR-OFFICER

ANNEX K-1
LAND CLASSIFICATION MAP

PROJECT CODE	: RIP No. 4
NAME OF PROJECT	: Tawi-Tawi Road/Bridge Project
LOCATION	: Bongao & Panglima Sugala, Tawi-Tawi

Annex L

Perception Survey Data

RESULTS OF PERCEPTION SURVEY

TAWI-TAWI BRIDGE-ROAD PROJECT

Municipalities of Bongao and Panglima Sugala, Tawi-Tawi

Conducted by **ACLT-DT Consultancy Association, Inc** on 22-26 May 2008 for the **Department of Public Works and Highways (DPWH-ARMM) Tawi-Tawi Engineering District** for the Proposed **Tawi-Tawi Bridge-Road Partnership Project**

A. QUESTION ABOUT SELF

Table 1. DISTRIBUTION BY SEX CLASSIFICATION

SEX	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Male	6	25	9	0	11	51	63%
Female	2	15	8	0	5	30	37%
TOTAL	8	40	17	0	16	81	100%

Table 2. DISTRIBUTION BY AGE CLASSIFICATION

AGE CLASSIFICATION	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
15-19 years old	1	0	2	0	1	4	5%
20-24 years old	0	7	0	0	2	9	11%
25-29 years old	1	3	1	0	3	8	10%
30-34 years old	1	7	2	0	1	11	14%
35-39 years old	2	5	4	0	3	14	17%
40-44 years old	1	2	1	0	1	5	6%
45-49 years old	1	2	2	0	2	7	9%
50-54 years old	0	4	1	0	0	5	6%
55-59 years old	1	2	1	0	0	4	5%
60-64 years old	0	2	0	0	1	3	4%
65 years old and above	0	6	3	0	1	10	12%
No answer	0	0	0	0	1	1	1%
TOTAL	8	40	17	0	16	81	100%

Table 3. DISTRIBUTION BY PLACE OF BIRTH

PLACE OF BIRTH	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Siasi, Sulu	1	17	2	0	0	20	25%
Jolo, Sulu	4	10	9	0	10	33	41%
Sitimpa, Luuk Pandan	3	1	0	0	0	4	5%
Patal, Bongao	0	8	0	0	0	8	10%
Karungdung, Bongao	0	2	0	0	0	2	2%
Marang-Marang, Lanuyan		1		0	0	1	1%
Sabah, Malaysia	0	1	0	0	0	1	1%
Batu-Batu, Panglima Sugala	0	0	0	0	2	2	2%
Magasagao Panglima Sugala	0	0	0	0	2	2	2%
Sumangdai, Panglima Sugala	0	0	0	0	1	1	1%
Tarawakan, Panglima Sugala	0	0	1	0	0	1	1%
Lapid-Lapid			4	0	0	4	5%
Zamboanga	0	0	0	0	1	1	1%
Zamboanga del Norte			1	0	0	1	1%
TOTAL	8	40	17	0	16	81	100%

Table 4. DISTRIBUTION BY CIVIL STATUS

STATUS	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Married	7	31	14	0	15	67	83%
Single	1	3	0	0	1	5	6%
Widow	0	4	3	0	0	7	9%
Separated	0	2	0	0	0	2	2%
TOTAL	8	40	17	0	16	81	100%

Table 5. DISTRIBUTION BY NUMBER OF CHILDREN

No. Children	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
0-1	1	10	6	0	1	18	22%
2-3	2	4	4	0	4	14	17%
4-5	3	8	3	0	3	17	21%
6-7	1	3	2	0	2	8	10%
8-9	0	8	2	0	3	13	16%
10-11	0	1	0	0	1	2	2%
12-13	0	3	0	0	0	3	4%
14-15	0	0	0	0	1	1	1%
Above 16	0	3	0	0	1	4	5%
None	1	0	0	0	0	1	1%
TOTAL	8	40	17	0	16	81	100%

Table 6. DISTRIBUTION BY RELIGIOUS AFFILITATION

Religious Affiliation	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Islam	8	40	17	0	16	81	100%
Catholic	0	0	0	0	0	0	0%
Protestant	0	0	0	0	0	0	0%
Aglipayan	0	0	0	0	0	0	0%
Iglesia ni Kristo	0	0	0	0	0	0	0%
Jehova's Witness	0	0	0	0	0	0	0%
Born Again	0	0	0	0	0	0	0%
Others	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

Table 7. DISTRIBUTION BY EDUCATIONAL ATTAINMENT

Level	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Elementary	4	11	6	0	5	26	32%
Elem. Grad	0	0	1	0	0	1	1%
High School	2	12	1	0	2	17	21%
High School grad	0	0	0	0	1	1	1%
College	1	2	0	0	1	4	5%
College grad	0	0	0	0	0	0	0%
Vocational	0	1	0	0	0	1	1%
None	1	14	9	0	7	31	38%
TOTAL	8	40	17	0	16	81	100%

Table 8. DISTRIBUTION BY EMPLOYMENT RATE

Employment Status	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Yes	8	35	17	0	16	76	94%
No	0	5	0	0	0	5	6%
No Answer	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

Table 9 a. DISTRIBUTION BY TYPE OF EMPLOYMENT

Employment Type	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Farmer	8	32	16	0	15	71	88%
Government Employee	0	1	0	0	0	1	1%
Business	0	4	1	0	1	6	7%
Laborer	0	2	0	0	0	2	2%
Housewife	0	1	0	0	0	1	1%
No answer	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

Table 9 b. DISTRIBUTION BY EMPLOYMENT STATUS

Distribution	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Regular	0	0	0	0	0	0	0%
Contractual	0	0	0	0	0	0	0%
Casual	0	0	0	0	0	0	0%
Contract	0	0	0	0	0	0	0%
Lot Owner-farmer	3	23	6	0	7	39	48%
Tenant-farmer	5	13	11	0	9	38	47%
None	0	4	0	0	0	4	5%
TOTAL	8	40	17	0	16	81	100%

Table 10. DISTRIBUTION BY PLACE OF EMPLOYMENT

Distribution	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Inside the Barangay	8	34	17	0	16	75	93%
Outside the Barangay	0	1	0	0	0	1	1%
No Answer		5	0	0	0	5	6%
TOTAL	8	40	17	0	16	81	100%

Table 11. DISTRIBUTION BY YEARS OF EMPLOYMENT

Years	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Less than 1 year	0	3	2	0	2	7	9%
1-2 years	2	4	4	0	1	11	14%
3-4 years	1	8	0	0	1	10	12%
5-6 years	1	5	3	0	0	9	11%
7-8 years	1	3	0	0	1	5	6%
9-10 years	0	0	0	0	0	0	0%
10 years up	3	17	8	0	11	39	48%
No Answer	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

Table 12. DISTRIBUTION BY MONTHLY INCOME

Monthly Income	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Not more than P1,000	5	12	7	0	4	28	35%
P1,001 -5,000	2	19	10	0	5	36	44%
P5,001-10,000	1	7	0	0	5	13	16%
P10,001-15,000	0	2	0	0	2	4	5%
P15,001-20,000	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

B. QUESTION ABOUT FAMILY

Table 13. DISTRIBUTION BY MEMBERS OF THE FAMILY

No. of Family members	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
1 to 2	2	3	1	0	2	8	10%
3 to 4	1	16	5	0	4	26	32%
5 to 6	4	7	6	0	5	22	27%
7 to 8	0	4	3	0	4	11	14%
9 to 10	1	4	2	0	0	7	9%
More than 10	0	5	0	0	1	6	7%
No Answer	0	1	0	0	0	1	1%
TOTAL	8	40	17	0	16	81	100%

Table 14. DISTRIBUTION BY FAMILY INCOME

Family Income	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Not more than P1,000	5	6	6	0	4	21	26%
P1,001 -5,000	2	20	9	0	4	35	43%
P5,001-10,000	1	10	1	0	6	18	22%
P10,001-15,000	0	4	0	0	2	6	7%
P15,001-20,000	0	0	0	0	0	0	0%
No Answer	0	0	1	0	0	1	1%
TOTAL	8	40	17	0	16	81	100%

Table 15 . ALTERNATIVE SOURCE OF INCOME

Family Income	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
No	7	36	9	0	12	64	79%
Yes	1	4	4	0	4	13	16%
No Answer	0	0	4	0	0	4	5%
TOTAL	8	40	17	0	16	81	100%
Fishing	0	0	0	0	0	0	0%
Copra	0	0	0	0	0	0	0%
TOTAL	0	0	0	0	0	0	0%

Table 16. OTHER MEMBER OF THE FAMILY EMPLOYED

Member of Family	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Wife	1	7	0	0	7	15	16%
Husband	2	10	8	0	2	22	24%
Parent	5	15	10	0	7	37	40%
Children	0	2	2	0	5	9	10%
Brother/Sister	0	3	1	0	1	5	5%
Relatives	0	3	1	0	0	4	4%
No Answer	0	0	0	0	0	0	0%
TOTAL	8	40	22	0	22	92	100%

Table 17. MAJOR EXPENSES IN THE FAMILY (MULTIPLE RESPONSES)

Expenses	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Food	8	39	17	0	16	80	99%
Business	0	0	0	0	0	0	0%
Electricity	0	0	0	0	0	0	0%
Water	0	0	0	0	0	0	0%
Tuition Fees	0	1	0	0	0	1	1%
Others	-	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

Table 18. MARKET/ TRADING PLACE

Market	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Bongao	8	40	10	0	0	58	72%
Batu-Batu	0	0	4	0	16	20	25%
Lapid-Lapid	0	0	2	0	0	2	2%
No Answer	0	0	1	0	0	1	1%
TOTAL	8	40	17	0	16	81	100%

C. QUESTION ABOUT THE HOUSE

Table 19. SOURCE OF WATER SUPPLY

Water source	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Pump	5	9	11	0	8	33	41%
Faucet	0	14	0	0	0	14	17%
Spring	0	0	0	0	0	0	0%
River/Creek	0	0	0	0	0	0	0%
Deep well	3	17	6	0	8	34	42%
Rain	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

Table 20. SOURCE OF LIGHT AT NIGHT

Electricity source	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Yes	0	1	2	0	0	3	4%
No	8	39	15	0	16	78	96%
TOTAL	8	40	17	0	16	81	100%
Generator Set	0	0	2	0	0	2	2%
Kerosene lamp	8	40	15	0	16	79	98%
Alcohol Lamp	0	0	0	0	0	0	0%
Candles	0	0	0	0	0	0	0%
Other	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

Table 21. COOKING FUEL (MULTIPLE RESPONSE)

Fuel source	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Wood	8	40	17	0	16	81	100%
Charcoal	0	0	0	0	0	0	0%
LPG	0	0	0	0	0	0	0%
Kerosene	0	0	0	0	0	0	0%
Electricity	0	0	0	0	0	0	0%
Other	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

Table 22. TOILET FACILITIES

	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Yes	2	13	1	0	4	20	25%
No	6	27	15	0	12	60	74%
No Answer	0	0	1	0	0	1	1%
TOTAL	8	40	17	0	16	81	100%
Antipolo Type	0	0	0	0	0	0	0%
Flush Type	0	0	0	0	0	0	0%
Hukay	6	13	5	0	4	28	35%
No Answer	2	27	12	0	12	53	65%
TOTAL	8	40	17	0	16	81	100%

Table 23. SOLID WASTE DISPOSAL (MULTIPLE RESPONSE)

Waste Disposal	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Burning	3	32	10	0	15	60	74%
Bury	0	1	1	0	0	2	2%
Collected	0	0	0	0	0	0	0%
Anywhere	5	7	4	0	1	17	21%
No Answer	0	0	2	0	0	2	2%
TOTAL	8	40	17	0	16	81	100%

Table 24. HOUSEHOLD HOUSE OWNERSHIP

House ownership	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Yes	6	35	16	0	16	73	90%
No	2	5	1	0	0	8	10%
No Answer	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

Table 25. HOUSING MATERIALS

Materials	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Roof:							
GI Sheets	1	17	6	0	7	31	38%
Nipa	7	22	11	0	8	48	59%
Wood	0	1	0	0	0	1	1%
Bamboo	0	0	0	0	1	1	1%
TOTAL	8	40	17	0	16	81	100%
Structure:							
Wood	8	33	15	0	13	69	82%
Nipa	0	2	0	0	1	3	4%
Bamboo	0	5	2	0	5	12	14%
TOTAL	8	40	17	0	19	84	100%

Table 26. HOME LOT OWNERSHIP

Lot Ownership	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
No	6	14	11	0	9	40	49%
Yes	2	26	6	0	7	41	51%
No Answer	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

D. QUESTION ABOUT THE COMMUNITY

TABLE 27. LENGTH OF STAY IN THE COMMUNITY

Length of Stay	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Since birth	0	3	0	0	2	5	6%
Less than 1 year	1	3	4	0	0	8	10%
1-2 years	0	3	0	0	2	5	6%
3-4 years	1	1	2	0	0	4	5%
5-6 years	0	3	1	0	0	4	5%
7-8 years	0	1	1	0	3	5	6%
8-9 years	0	0	9	0	0	9	11%
9-10 years	0	0	0	0	0	0	0%
More than 10 years	6	26	0	0	9	41	51%
TOTAL	8	40	17	0	16	81	100%

TABLE 28. PLACE OF BIRTHS

Place of Birth	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Bongao	0	0	0	0	0	0	0%
Languyan	0	1	0	0	0	1	1%
Sumangdai,	0	1	0	0	0	1	1%
Magsaggao, Panglima Sugala	0	0	0	0	0	0	0%
Jolo	2	3	9	0	4	18	22%
Basilan	0	1	0	0	0	1	1%
Siasi	0	11	0	0	0	11	14%
Karungdung	0	16	0	0	0	16	20%
Luuk Pandan	6	0	0	0	0	6	7%
Lapid Lapid	0	0	0	0	0	0	0%
Zamboanga	0	0	0	0	1	1	1%
Sabah	0	0	0	0	0	0	0%
No Answer	0	7	8	0	11	26	32%
TOTAL	8	40	17	0	16	81	100%

TABLE 29. REASONS FOR MIGRATING (MULTIPLE RESPONSE)

Reasons	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Peace and Order	3	1	0	0	3	7	9%
Family	5	0	1	0	3	9	11%
Farming Area	0	0	5	0	0	5	6%
No Answer	0	39	11	0	10	60	74%
TOTAL	8	40	17	0	16	81	100%

TABLE 30. REASONS FOR PREFERRING TO STAY

Reasons	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Yes	8	38	16	0	16	78	96%
No	0	2	1	0	0	3	4%
TOTAL	8	40	17	0	16	81	100%
REASONS :							
Was born in the place	1	1	0	0	1	3	4%
Place of work	1	12	7	0	4	24	30%
Planted crops	0	0	1	0	1	2	2%
Life is good here	0	5	3	0	1	9	11%
Peaceful area	0	2	0	0	0	2	2%
No Answer	6	20	6	0	9	41	51%
TOTAL	8	40	17	0	16	81	100%

TABLE 31. REASONS FOR NOT STAYING

Reasons	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Yes	0	3	1	0	6	10	12%
No	3	35	15	0	10	63	78%
No Answer	5	2	1	0	0	8	10%
TOTAL	8	40	17	0	16	81	100%
REASONS :							
Place of birth	1	1	0	0	0	2	2%
Financial Problem	0	1	0	0	0	1	1%
Less Income	1	0	0	0	1	2	2%
Don't know	0	1	0	0	0	1	1%
Good life/satisfied	0	6	5	0	3	14	17%
Look for work	0	1	5	0	1	7	9%
Crops planted	1	0	0	0	1	2	2%
Save money	1	0	0	0	0	1	1%
Place of work	1	4	5	0	1	11	14%
Peaceful area	0	5	0	0	1	6	7%
No Answer	3	21	2	0	8	34	42%
TOTAL	8	40	17	0	16	81	100%

TABLE 32. PLACE TO TRANSFER

Place to Transfer	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
No plan to Transfer	0	16	12	0	0	28	35%
Bongao	0	2	1	0	4	7	9%
Sabah	3	6	1	0	0	10	12%
Batu-Batu	0	0	0	0	2	2	2%
Siasi	0	3	2	0	1	6	7%
Jolo	0	0	0	0	1	1	1%
Zamboanga	0	0	0	0	1	1	1%
Don't know	0	8	0	0	1	9	11%
None	1	1	0	0	2	4	5%
No Answer	4	4	1	0	4	13	16%
TOTAL	8	40	17	0	16	81	100%

TABLE 33. ELEMENTARY SCHOOL (ES)

School	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Salip Angkaya Elem. School	4	11	0	0	0	15	19%
Sitimpa Elem. School	1	0	0	0	0	1	1%
Patal Elem. School	2	11	0	0	0	13	16%
Bato-Bato Elem. Sch.	0	0	0	0	7	7	9%
Magsaggao Elem. Sch.	0	0	0	0	2	2	2%
Bongao Central Elem. School	0	1	0	0	0	1	1%
Salamat Elem. School	0	1	0	0	0	1	1%
Pangasinan Elem. School	0	2	0	0	0	2	2%
Lapid-Lapid Elem. Sch.	0	0	11	0	0	11	14%
Tubig Mampallam Elem. Sch.	0	0	1	0	0	1	1%
No Answer	1	14	5	0	7	27	33%
TOTAL	8	40	17	0	16	81	100%

TABLE 34. HIGH SCHOOL (HS)

School	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Sanga-Sanga National HS	0	2	0	0	0	2	2%
MSU –TCTO Prep High	0	2	0	0	0	2	2%
Notre Dame of Bongao	0	0	0	0	0	0	0%
Bato-Bato Nat'l. H.S.	0	0	0	0	3	3	4%
TRAC Lab. High	0	3	0	0	0	3	4%
TTSAT	0	5	0	0	1	6	7%
TTSF	0	1	2	0	0	3	4%
No Answer	8	27	15	0	12	62	77%
TOTAL	8	40	17	0	16	81	100%

TABLE 35. COLLEGE EDUCATIONAL FACILITIES AND SERVICE

School	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
MSU TCTO	1	2	0	0	3	6	7%
ACLCI	0	0	0	0	0	0	0%
TRAC	0	1	1	0	3	5	6%

MIT	0	2	0	0	0	2	2%
Others	0	0	0	0	0	0	0%
No Answer	7	35	16	0	10	68	84%
TOTAL	8	40	17	0	16	81	100%

TABLE 36. MEDICAL CONSULTATION (MULTIPLE RESPONSE)

Health Facility	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Barangay Health Center	0	9	1	0	7	17	21%
HOSPITALS				0			
Datu Halun Sakilan Memorial Hospital	6	19	4	0	1	30	37%
Tawi-Tawi Doctors Hospital	0	0	0	0	0	0	0%
Holy Family Hospital	2	11	3	0	0	16	20%
CLINICS				0			
RHU Bongao	0	1	0	0	0	1	1%
RHU Bato-Bato	0	0	3	0	8	11	14%
Private	0	0	6	0	0	6	7%
No Answer	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

TABLE 37. IDENTIFIED COMMUNITY PROBLEM (MULTIPLE RESPONSE)

Problems	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Road	2	6	14	0	0	22	22%
Electricity	0	28	17	0	0	45	45%
Water Supply	0	9	6	0	0	15	15%
Livelihood project	0	1	1	0	0	2	2%
School	0	1	0	0	1	2	2%
Medicine	0	1	0	0	0	1	1%
Transportation	0	10	2	0	1	13	13%
No Answer	4	1	1	0	14	20	20%
TOTAL	2	57	40	0	16	100	100%

TABLE 38. ACTION TAKEN BY THE COMMUNITY (MULTIPLE RESPONSE)

Problems	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
School	0	4	2	0		6	9%
Don't know	2	10	10	0	4	26	37%
Financial support of project	0	4	0	0	0	4	6%
Do something good	0	1	0	0	5	6	9%
Water Tank	0	0	0	0	0	0	0%
No Answer	4	10	0	0	0	14	20%
None	2	11	1	0	0	14	20%
TOTAL	8	40	13	0	9	70	100%

TABLE 39. SUGGESED PROBLEM-SOLVING MEASURE (MULTIPLE RESPONSE)

Suggestions	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Financial support	1	0	1	0	1	3	4%
Electricity	0	4	1	0	-	5	6%
Fast completion of Project	1	2	6	0	3	12	14%
Comfortable life	0	6	1	0	1	8	10%
Education in Arabic	0	2	0	0	0	2	2%
Water Tank	0	2	3	0	3	8	10%

Livelihood	0	1	3	0	1	5	6%
Don't Know	1	8	0	0	1	10	12%
No Answer	4	13	1	0	6	24	29%
None	1	5	1	0	0	7	8%
TOTAL	8	43	17	0	16	84	100%

E. QUESTION ABOUT HEALTH

TABLE 40. COMMON ILLNESS AND DISEASES (MULTIPLE RESPONSE)

Illnesses/ Diseases	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Cough	4	6	1	0	2	13	15%
Fever	2	19	8	0	10	39	44%
Cold	0	3	1	0	3	7	8%
Diarrhea	0	0	3	0	1	4	4%
Asthma	0	0	1	0	0	1	1%
Heart attack	0	0	0	0	0	0	0%
Stomach ache	0	2	2	0	0	4	4%
Malaria	1	6	1	0	4	12	13%
Measles	1	6	1	0	0	0	0%
Dengue	0	1	0	0	0	1	1%
Head Ache	0	3	0	0	0	3	3%
Stiff Neck	0	2	0	0	0	2	2%
Don't know	0	3	0	0	0	3	3%
TOTAL	8	51	18	0	20	89	100%

TABLE 41. MEDICAL SERVICE PROVIDERS (MULTIPLE RESPONSE)

Provider	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Doctor	4	18	11	0	6	39	48%
Brgy. Health worker	0	10	0	0	9	19	23%
Midwife	0	0	0	0	0	0	0%
Quack Doctor	0	5	2	0	0	7	9%
Self medication	4	7	4	0	1	16	20%
No Answer	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

TABLE 42. COMMON CAUSES OF DEATH

Cause	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Natural Death	3	21	10	0	12	46	55%
Stab Wound	0	0	0	0	0	0	0%
TB	0	0	0	0	0	0	0%
Cancer	0	1	0	0	0	1	1%
Heart attack	0	0	0	0	0	0	0%
Diarrhea	0	0	3	0	3	6	7%
Fever	0	0	0	0	1	1	1%
Malaria	7	10	2	0	0	19	23%
Diabetes	0	3	0	0	0	3	4%
Asthma	0	1	0	0	0	1	1%
Measles	0	2	0	0	0	2	2%
Stiff neck	0	2	0	0	0	2	2%
Don't know	0	2	1	0	0	3	4%
TOTAL	10	42	16	0	16	84	100%

F. QUESTIONS ABOUT THE ENVIRONMENT

TABLE 43. CHANGES IN THE ENVIRONMENT

Response	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Yes	6	15	7	0	10	38	47%
No	2	25	10	0	6	43	53%
TOTAL	8	40	17	0	16	81	100%
What:							
Multi purpose center	0	0	0	0	1	1	1%
Barangay Health center	0	0	6	0	1	7	8%
Day Care Center	0	0	1	0	6	7	8%
Water Tank	0	5	0	0	0	5	6%
Road construction	0	3	0	0	0	3	3%
Barangay Road	0	0	4	0	0	4	5%
School	6	7	12	0	7	32	37%
Don't know	0	3	0	0	1	4	5%
No Answer	2	22	0	0	0	24	28%
TOTAL	8	40	23	0	16	87	100%

TABLE 44. CAUSE OF ENVIRONMENT CHANGES (MULTIPLE RESPONSE)

Response	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Government project	0	7	1	0	6	14	17%
Don't know	0	7	1	0	0	8	10%
Active Barangay Chairman & Officials	5	13	9	0	6	33	41%
None	1	3	1	0	2	7	9%
Others	0	4	3	0	1	8	10%
No Answer	2	6	2	0	1	11	14%
TOTAL	8	40	17	0	16	81	100%

TABLE 45. SATISFACTION OF THE PRESENT ENVIRONMENT

Level	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
CONTENTED:							
Yes	2	13	11	0	11	37	46%
No	3	12	3	0	3	21	26%
Don't know	3	9	2	0		14	17%
No answer	0	6	1	0	2	9	11%
TOTAL	8	40	17	0	16	81	100%
Action from govt. officials	3	0	16	0	15	34	42%
No answer	5	40	1	0	1	47	58%
TOTAL	8	40	17	0	16	81	100%

G. QUESTIONS ABOUT THE PROJECT

TABLE 46. SOURCE/S OF INFORMATION ABOUT THE PROJECT

Sources	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Yes	8	37	13	0	13	71	88%
No	0	3	4	0	3	10	12%
TOTAL	8	40	17	0	16	81	100%
Government/brgy official	1	17	4	0	9	31	38%
News from relatives, friend, etc	3	14	10	0	5	32	40%
Brgy meeting	0	0	0	0	0	0	0%
Survey	4	1	3	0	2	10	12%
No Answer	0	8		0		8	10%
TOTAL	8	40	17	0	16	81	100%

TABLE 47. PERCEIVED POSITIVE EFFECTS

Responses	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Provide work opportunity for local residents	0	4	2	0	1	7	8%
Progress	1	10	6	0	4	21	24%
Good public service	6	17	7	0	12	42	48%
Housing	1	1	0	0	1	3	3%
Increase in population	1	1	3	0	1	6	7%
Don't know	0	7	1	0	0	8	9%
TOTAL	9	40	19	0	19	87	100%

TABLE 48. PERCEIVED NEGATIVE EFFECTS

Responses	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Loss of plants/ crops & other vegetation	0	0	0	0	0	0	0%
Loss of work	0	0	1	0	0	1	1%
Water Pollution	0	0	0	0	0	0	0%
Air pollution	0	4	0	0	0	4	5%
Demolition of houses	0	0	0	0	1	1	1%
Increase of Population	0	1	0	0	0	1	1%
None	2	1	11	0	6	20	24%
Don't Know	7	34	5	0	9	55	67%
TOTAL	9	40	17		16	82	100%

TABLE 49. RECOMMENDED MITIGATING MEASURES (MULTIPLE RESPONSE)

Responses	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Financial assistance	0	1	0	0	0	1	1%
Helping each other	0	1	3	0	1	5	6%
Medical volunteers	0	1	0	0	0	1	1%
No Answer	7	27	9	0	13	56	69%
None	1	2	2	0	2	7	9%
Don't know	0	8	3	0	0	11	14%
Pay the affected private property	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%

TABLE 50. THINGS TO CONSIDER IN PLANNING (MULTIPLE RESPONSE)

Responses	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Compensation to affected families	0	5	2	0	1	8	10%
Don't know	0	3	2	0	5	10	12%
Cooperation/ collaboration	0	0	3	0	0	3	4%
Fast completion of project	3	7	7	0	6	23	28%
Do something about the problem	0	0	1	0	0	1	1%
Work opportunity	1	2	0	0	0	3	4%
Increase in Population	0	0	0	0	0	0	0%
No Answer	4	21	2	0	3	30	36%
Not affected		1	0	0	0	1	1%
Whatever the gov't. wants	0	1	0	0	0	1	1%
Electricity	0	2	0	0	1	3	4%
TOTAL	8	42	17	0	16	83	100%

TABLE 51. SUGGESTED ASSISTANCE (MULTIPLE RESPONSE)

Responses	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Financial assistance to affected lot owners	3	1	0	0	0	4	5%
Livelihood/ work (local hiring)	1	2	2	0	3	8	10%
Pay the right compensation for affected areas	0	11	6	0	4	21	26%
Not affected	0	2	0	0	1	3	4%
Any assistance is acceptable	0	1	5	0	0	6	7%
Electricity	0	1	0	0	0	1	1%
No answer	4	14	4	0	2	24	30%
Don't know	0	5	0	0	2	7	9%
Completion of road	0	3	0	0	4	7	9%
TOTAL	8	40	17	0	16	81	100%

TABLE 52. REASON FOR ACCEPTANCE OF PROJECT

Responses	IMPACT AREAS					TOTAL	%
	Brgy. Luuk Pandan	Brgy. Karungdong	Brgy. Lapid-Lapid	Brgy. Lato-Lato	Brgy. Magsaggao		
Yes	8	37	17	0	16	78	96%
No	0	3	0	0	0	3	4%
Don't know	0	0	0	0	0	0	0%
TOTAL	8	40	17	0	16	81	100%
Improved land transportation	8	40	17	0	16	81	100%
TOTAL	8	40	17	0	16	81	100%

Source: Perception Survey, Tawi-Tawi Bridge-Road Partnership, May 22-26, 2008

Annex M

DENR CENRO Site
Inspection Report

Republic of the Philippines
Autonomous Region in Muslim Mindanao
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Office of the Community Environment and Natural Resources Office
District I, Datu Halun St., Tubig Boh, Bongao, Tawi-Tawi
Tel. No. 268-1155

June 4, 2008

RECEIVED 06-6-08

THE REGIONAL SECRETARY
DENR-ARMM Cotabato City

ATTN:

The EMB Director
DENR-ARMM Cotabato City

SUBJECT : SITE INSPECTION REPORT OF TAWI-TAWI BRIDGE ROAD PARTNERSHIP PROJECT USAID/GEM-3 FOR (ECC) ISSUANCE

Sir,

An ocular inspection report on the proposed project construction of Tawi-Tawi Bridge Partnership USAID/GEM-3 Project which has been conducted/verified by the undersigned DENR-ARMM authorized representatives dated June 3, 2008, together with (NGO) accredited Environmental Preparer / Consultant Mrs. Dinah C. Waja to determine Mangrove Ecosystem Assessment, and by GEM-3 representatives Mr. Yevgeny L. Honrade and Mr. Kent Dequito Gem-3 program Davao City respectively.

Objectively, this is an evaluation in assessing and inspecting the environmental setting of the area for construction of the project Tawi-Tawi Bridge with 700 meters long link road between the (2) Two Bridges 15-20 meters width across Bakau Dakula Islands and Subah Manangkai Channel connecting to Lapid-Lapid mainland of Tawi-Tawi province.

FINDINGS / OBSERVATIONS:

1. Pre construction phase will definitely destroy an area of approximately 1.0 hectare mangrove ecosystem with second growth young pristine of forest land. This will be cleared for the road right of way in the project construction of bridges across Bakau Dakula Island.

2. An Environmental destruction which shall be done by the DPWH and USAID / GEM-3 Project construction is high level significant positive impact considering

dislocation of wildlife resources, mangrove ecosystem, sea grass, corals marine organism in the project site area. Hence, this could be addressed through Environmental Management Plan (EMP) or mitigating enhancement measure in allocating reforestation project scheme for recovery factor lost of damage area by means of reforestation, rehabilitation and as well.

RECOMMENDATIONS:

1. Require the project proponent DPWH to provide and allocate the budgetary requirement for mangrove reforestation, rehabilitation of more than 1.0 hectare area and shall be administered by DENR-ARMM through family approach taking into consideration that several activities will be undertaken.

2. A strong representation of stakeholders to monitor the construction phase and tree planting of mangrove reforestation and be created Multi-Partite Monitoring Team (MMT) on the implementation of (EMP) as required under the provision of P.D. 1586 and DAO # 03-30 series of 2003 implementing rules and regulations (IRR) of Philippine Environmental Impact Assessment (EIS) System.

3. DENR-ARMM Tawi-Tawi is strongly recommending for the speedy issuance of (ECC) upon further evaluation of the project proponent application based on IEE/EIS report be submitted thereto for subsequent approval.

Due prompt attention by the top management authority of DENR-ARMM Cotabato City is highly look forward by this office..

FOR. SALDICK K. SIDDIQUE
Environmental Mgt. Specialist
CENRO EMS – II

ENGR. JAVIER I. MOHD. MONEL
Environmental Mgt. Specialist
PENRO EMS - II

Annex N

Certification of Donation of the 33 Affected Landowners

Republic of the Philippines
Autonomous Region in Muslim Mindanao
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE DISTRICT ENGINEER
Bongao, Tawi-Tawi

CERTIFICATION

TO WHOM IT MAY CONCERNED:

This is to certify that, we Lot owners which lots are affected by the Road opening in Sanga-Sanga Bangalian Road Section , have already donated to the Government thru the Department of Public Works and Highways, the twenty (20) meters road right of way.

We further certify that we welcome the Proposed improvement (road concreting , road gravelling) on the said road section because we believe it will bring economic upliftment in our community.

This certification is issued this 7th day of February , 2008 , in Bongao, Twi-Tawi.

DATU KUSIN	**HADJI ASIBA**	**GANIH DULAHID**
BEN LISAO	**IBRAHIM**	**MURSHID**
ASIL SANUDDIN	**HAMSIRAJI HAJIRANI**	**HADJULA**
KALAM UNONG ANUDDIN	**HATIB UNONG**	**SALASAIN**
HATIB HAJIM	**TOTO SARI**	**SALASATOL**

ABIDIN SAHINOL

OMMAR JALAIDI

MARDI

MAKJAN ALPA

EDWIN EDDI

SAHINOL EDDI

AKOB

JUL SALI

JENDE ILAJI

SABIDA UNNID

BAIN GANA

ABDUL BASARON

SARANA SARIPUDIN

TAMATA I TALAIDU

HARADJI JAUJALI

~~TAHIL (YUNOS) Ammang~~

TAHIL Ammang (deceassed)

~~Amilbangsa Ammang~~

ABDULHAN SARIPUDDIN

Annex O

DENR Recommendation for the Issuance of Permit to Cut

بسم الله الرحمن الرحيم

Republic of the Philippines
Autonomous Region in Muslim Mindanao
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Provincial Environment and Natural Resources Office
Capitol Hill, Bongao, Tawi-Tawi
Tel. No. 268-1307

MEMORANDUM

OFFICE OF ... RELEASED
DATE 06-19-2008
BY
BONGAO, TAWI-TAWI

FOR : The Regional Secretary
DENR-ARMM, Cotabato City

ATTN : The FMB Director
DENR-ARMM, Cotabato City

FROM : The PENR Officer
DENR-ARMM, Bongao, Tawi-Tawi

DATE : June 18, 2008

SUBJECT : RECOMMENDATION FOR THE ISSUANCE OF PERMIT TO CUT.

Attached herewith is the report of the ocular inspection on the proposed construction of Tawi-Tawi Bridge-Road Partnership Project which was conducted last June 3, 2008. Accordingly, the construction passes through mangrove forest of approximately 1.0 hectare that needs to be cleared to pave the way for the road construction.

In as much as the proponent is willing to replenish in other areas those mangroves that have been cut, this office recommends that the proponent per his request be granted an express authority to cut those affected mangroves so that said construction can be started as scheduled.

For information and appropriate action.

JONEL I. MOH. MONEL
PENR Officer

Annex P

Mangrove Reforestation and Regreening Plan

THREE-YEAR DEVELOPMENT PLAN
1-HECTARE MANGROVE REFORESTATION PROJECT

Bakhaw Dakula, Lapid-lapid, Bongao
Tawi-Tawi Province

REGREENING OF THE SANGA-SANGA TO PANGLIMA SUGALA ROAD

Prepared by:

Department of Public Works and Highways
Tawi-Tawi District Engineering Office
Bongao, Tawi-Tawi

THREE YEAR DEVELOPMENT PLAN FOR A 1.0 HECTARE MANGROVE REFORESTATION PROJECT LOCATED AT BAKHAW DACULA, LAPID-LAPID, BONGAO, TAWI-TAWI AND REGREENING OF THE SANGA-SANGA ROAD TO PANGLIMA SUGALA ROAD

1.0 RATIONALE

Tawi-Tawi is composed of island municipalities separated by bodies of water. The present transportation means between Bongao municipality and the neighboring island municipalities is by sea transport through small motorized launches. During months if December to March, when the monsoon wind visit the province, sea transport become hazardous to motorized launches.

The proposed Tawi-Tawi Bridge-Road Partnership project of the DPWH- USAID/GEM-3 program is in line with the need of the Autonomous Region in Muslim Mindanao to speed up the social, economic and political development through the construction of roads and bridges to link the various roads and highways in the region thus, through this project, Bongao, the provincial capital of Tawi-Tawi will be linked to three (3) municipalities in the mainland, namely: Panglima Sugala, Languyan and Sapa-Sapa.

The proposed project will also provide a large contiguous area for expansion of commerce and trade which is currently concentrated in Bongao, and provide additional industrial lands for development . Health and Educational facilities can now be accessed by this three municipalities.

A portion of the mangrove forest located at Bakhaw Dacula will be cut to give way for the construction of a link road between the three bridges that will be constructed. An approximate area of 1.0 hectare mangrove forest will be cut to open for the road. For this damage, the Department of Public Works and Highways has made a mitigating measure to replenish the damaged mangrove forest by identifying a denuded mangrove area adjacent to the road project to be reforested.

2.0 DESCRIPTION OF THE PROJECT AREA

1. Location

The proposed mangrove project is located at Barangay Luuk Pandan, Bongao, Tawi-Tawi. It lies approximately between geographic coordinates latitude 5^0 34' 00" to 5^0 34' 10" North , longitude 119^0 48'44" to 119^0 48'46" East. The re-greening project which is roadside planting covers the Sanga-Sanga road to Panglima Sugala road that will be affected by the proposed project.

2. Climate

The area falls under the fourth climatic type, characterized by no pronounced dry season with precipitation more or less evenly distributed throughout the year. The months of August, September, October and November are the wettest month of the year . The months of February, March, and April are the driest month.

3. Topography

The configuration of the mangrove area is level and exposed to lowest tide and about two (2) feet below at highest tide. While the re-greening of road side area is from 10 % to 50 % slope. It has an elevation ranging from 0 to 50 meters above sea level.

4. Vegetation Cover and Land-Use

The proposed mangrove reforestation area was previously vegetated with stunted mangrove forest. With continuous cutting activities for firewood and charcoal making, the area becomes denuded and open. Adjacent to the area, vegetation observed are species of Bakauan babae, Bakauan Lalake, and Pototan, rattan, ferns, api-api, tangal, tengol-tengol, and other typical mangrove swamp vegetations . For the area for roadside planting , vegetative cover as seen along the road are agricultural crops like coconuts, fruit trees, bananas, grasses, etc. The area for roadside planting is under the alienable and disposal land and mangrove area is timberland.

5. Edaphic Characteristics

The soil is composed of soft black mud of varying depth ranging from shallow (30cm) to more than one (1) meter deep for the mangrove area. For the roadside planting, the soil observed along the road are clay, clay loam, and sandy loam.

6. Socio-Economic Profile

The residents adjacent to the project area are from low to middle income groups. Some are unemployed, farmers, fishermen, sari-sari store owners, students and others are professionals.

7. Peace and Order

The project area is a peaceful area, Their has been no encountered problems during the previous implementations of reforestations projects adjacent to the project site. People are supportive to the project implementation.

8. Community Involvement

Residents in the area who are willing to work will be tapped to undertake plantation establishment activities like propagule collection, site preparation, planting and maintenance and protection.

Roadside re-greening will be undertaken thru the participation of groups like the Philippine Marines, Civic and Religious Organizations, students of the Mindanao State University Tawi-Tawi College of Technology and Oceanography and the Tawi-Tawi Regional Agricultural College., government agencies, Local Government Units and concerned citizens of Bongao and Panglima Sugala municipalities. Seedlings for the tree planting activities will be purchased from the experimental nursery of the BS Forestry Department of the Tawi-Tawi Regional Agricultural College. Fruit trees will be provided by the Department of Agriculture.

III. OBJECTIVES

1. General

1. To use reforestation as a tool for addressing rural equity and development issues.
2. To attain a condition of ecological stability and optimum sustainable productivity of forest resources.
3. To replenish the damaged mangrove areas during the construction and upgrading of the Sanga-Sanga road going to Paglima Sugala municipality.

2. Specific

1. To reforest 1.0 hectare denuded mangrove forest area as one of the mitigating measure to be implemented to replenish the damage to mangrove in the construction of the link road connecting the two bridges.
2. To generate job opportunities for the residents within and adjacent of the project area.
3. To re-green the roadside from Sanga-Sanga to Panglima Sugala affected by the road upgrading thru community participation.

IV. IMPLEMENTATION AND DEVELOPMENT STRATEGIES

1. Site Selection

Areas to be reforested consists mainly of open and denuded mangrove area.. Before establishing a plantation, the site is characterized first as to its physiography, substratum and plant indicators. This is to determine the type of mangrove species that is to be planted and the appropriate technology applicable to a particular area.

The site adjacent to the bridge construction area was selected by the joint DENR PENRO and CENRO Environmental Specialists and IEE Preparer as this area is now being threatened for denudation. Illegal cutting for firewood and charcoal production will be stopped if the project will be implemented. This area was also chosen to preserve the mangrove vegetation of the area. The area is also accessible to any form of transportation and also by hiking and passed the criteria for site selection.

2. Choice of Species

Species like Bacauan lalake and Bacauan babae will be suitable to be planted in the project area as this species can grow well and are found within the residual mangrove forest and propagules can be collected readily in the nearby mangrove stands.

3. Nursery Establishment and Development

The establishment of nursery is not necessary since the propagules of mangrove species will be planted immediately in the field after collection from the mother tree.

Seedlings of Mahogany, Mangium and flowering trees will be purchased from the Tawi-Tawi Regional Agricultural College BS Forestry Experimental nursery and fruit trees will be provided by the Department of Agriculture.

3. Site Preparation

Their will be extensive site preparation for the mangrove reforestation as manifested in the area as the chosen site was previously being disturbed by illegal cutting of mangrove trees for the purpose of making charcoal. All branches and other obstruction will be removed and staking will be made.

4. Planting Scheme

Bacauan propagules will be planted in the field at a spacing of 1 meter by I meter.

For the roadside planting, a spacing of 10 meters on both sides of the road will be applied. Tree guards will be required per group who will participate in the tree planting activities in order to ensure 100% survival. Cost for the road side regreening program will be shouldered by the contractor through the DPWH and will be incorporated in their construction cost upon bidding. Monitoring will be conducted by the DENR and the DPWH.

5. Plantation Maintenance and Protection

Mangrove species is prone to crab and snail infestation, especially in its early stage when the first leaf have not come out yet. To counter this infestation, a number of laborers will be regularly assigned to just collect snails and crabs especially during night time.

6. Silvicultural Treatment

Unlike upland plantation, mangrove doe not require much silvicultural treatments specially on its early years of planting. This is so because mangrove area subject for this plantation are free from undesirable species of shrubs. Silvicultural treatments like thinning , cutting and pruning will be done on the eight and tenth year after establishment as soon as there is an indication of extensive competition for growing space and nutritive aspect.

For the road side plantation, pruning will be done on the third year to ensure that the trees planted will be straight and not branchy . This activity will be financed by either the DPWH or the Local Government Units concerned.

V. PROJECT ADMINISTRATION AND SUPERVISION

The project implementation will be administered and supervised by the CENR Bongao Technical personnel who will then hire the services of the local residents as contractor in the implementation of the various activities of the project.

Technical personnel under the forestry sector of the PENR and the CENR Office of Bongao shall monitor the implementation of the daily activities of the project. The DPWH will also assist in the maintenance and protection by providing labor support to the project.

Funds for the implementation of the reforestation and the roadside regreening will be incorporated in the contractor's cost during bidding.

The budgetary requirement for the reforestation and the purchase of seedling for the re-greening activity is **PhP 216,250.00.**

The Local Government Units of Bongao and Panglima Sugala will assist in the re-greening program of the Sanga-Sanga Road to Panglima Sugala Road thru their tree planting programs conducted yearly.

PREPARED AND SUBMITTED BY :

ENGINEER BENSOUD AJIHIL
OIC, District Engineer

COST ESTIMATES FOR A 1.0 HECTARE MANGROVE REFORESTATION PROJECT

ACTIVITY	GOAL	UNIT OF MEASURE	AVERAGE COST PER UNIT (P)	TOTAL PROJECT COST (P)			
				IST	2ND	3RD	TOTAL
I. SURVEY AND PLANTING							
1. Perimeter Survey, Area computation, Site characterization	1.0	Hectare	2,750.00	2,750.00			**2,750.00**
2. Blocking for monitoring and Evaluation	1.0	Hectare	750.00	750.00			**750.00**
3. Preparation of Project Development Plan	1	Document	2,000.00	2,000.00			**2,000.00**
II. PLANTATION ESTABLISHMENT							
1. Propagule Collection (including 10% mortality)	11,000	Propagules	2.00	22,000.00			**22,000.00**
2. Site Preparation	1.0	Hectare	200.00	200.00			**200.00**
3. Staking	10,000	stakes	.50	5,000.00			**5,000.00**
4. Planting	10,000	Propagules	2.00	20,000.00			**20,000.00**
5. Replanting	1,000	Propagules	2.00	2,000.00			**2,000.00**
III. MAINTENANCE AND PROTECTION							
1. Removal of debris and Patrol Works	1.0	Hectare	3,500.00	3,500.00	3,500.00	3,500.00	**10,500.00**
IV. ADMINISTRATION AND SUPERVISION	1.0	Hectare	860.00	860.00	860.00	860.00	**2,580.00**
TOTAL				**60,860**	**4,360.00**	**4,360.00**	**69,580.00**

COST ESTIMATES FOR ROADSIDE RE-GREENING PROJECT

Cost of purchasing Forest Tree Seedlings @ P 10.00/ Seedling

Number of Seedlings Needed 10,000 seedlings

TOTAL COST OF SEEDLINGS TO BE PURCHASED IS P 100,000.00