

Initial Environmental Examination

Project Number: 41076-048
September 2018

**PHI: Improving Growth Corridors in Mindanao
Road Sector Project**
(PR-06: Alicia-Malangas Road)

Prepared by the Department of Public Works and Highways for the Asian Development Bank

ABBREVIATIONS

AASHTO	-	American Association of State Highways and Officials
ADB	-	Asian Development Bank
A&D	-	alienable and disposable
CENRO	-	Community Environment and Natural Resources Office
CNC	-	certificate of non-coverage
CO ₂	-	carbon dioxide
CR	-	critically endangered
CSC	-	construction supervision consultant
DAO	-	Department Administrative Order
DBH	-	diameter at breast height
DENR	-	Department of Environment and Natural Resources
DED	-	detailed engineering design consultant
DEO	-	District Engineering Office
DOH	-	Department of Health
DPWH	-	Department of Public Works and Highways
ECA	-	environmentally critical area
ECC	-	environmental compliance certificate
ECP	-	environmentally critical project
EHS	-	environmental, health and safety
EIA	-	environmental impact assessment
EIS	-	environmental impact statement
EMB	-	Environmental Management Bureau
EMP	-	environmental management plan
EO	-	executive order
EPRMP	-	environmental performance report and management plan
ESSD	-	Environment and Social Safeguards Department of DPWH
FGD	-	focus group discussion
GHG	-	greenhouse gases
GOP	-	Government of the Philippines
GRC	-	grievance redress committee
GRM	-	grievance redress mechanism
IEC	-	information, education and communication
IFC	-	International Finance Corporation
IEE	-	initial environmental examination
IEER	-	initial environmental examination report
IUCN	-	International Union for Conservation of Nature
LGU	-	local government unit
Ncm	-	normal cubic meter
NO ₂	-	nitrogen dioxide
PAGASA	-	Philippine Atmospheric Geophysical and Astronomical Services Administration
PCCP	-	Portland Cement Concrete Pavement
PCDG	-	prestressed concrete deck girder
PD	-	Presidential Decree
PEISS	-	Philippine Environmental Impact Statement System
PM	-	particulate matter
PPTA	-	project preparatory technical assistance
PR	-	project road
RA	-	Republic Act
RCBC	-	reinforced concrete box culvert
RCDG	-	reinforced concrete deck girder
RCPC	-	reinforced concrete pipe culvert
REA	-	rapid environmental assessment
RF	-	relative frequency
RMC II	-	Roads Management Cluster II

ROW	-	right of way
SPS	-	ADB Safeguard Policy Statement of 2009
TA	-	technical assistance
TSP	-	total suspended particulate
TSS	-	total suspended solids
UPMO	-	Unified Project Management Office
VU	-	vulnerable
WHO	-	World Health Organization

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I. EXECUTIVE SUMMARY

1. The Government of the Philippines has approached the Asian Development Bank (ADB) for financial and technical support for the Improving Growth Corridors in Mindanao Road Sector Project (the project).

2. Transportation is a key sector in the Philippine economy with roads being the dominant subsector. The national road network comprises 29,630 kilometers (km), or 14% of the total road network and includes the main trunk roads, the national primary arterial roads, and national secondary roads. An efficient road subsector is crucial for the Philippines' economic growth and poverty reduction. Despite its importance to the national economy, the road subsector has not received adequate funding. Expansion or improvement of the network has been limited in recent years, and many roads deteriorate prematurely due to inadequate maintenance. Government funding for the road network has been increasing in recent years; however, about 23% of the national road network is in poor condition and in need of rehabilitation. This contributes to the rising number of road accidents in the Philippines. The increasing impact of climate change, particularly flooding, is having a negative effect on the road network. The road network in Mindanao is less developed than the national network. While 82% and 89% of the national roads in Luzon and the Visayas are paved, only 70% of the national roads in Mindanao are paved.

3. The project supports the Government of the Philippines' priorities for improvement of the country's road network and development of Mindanao.¹ It also supports the key objective of ADB's strategy for the Philippines of helping the country achieve high, inclusive, and sustainable growth.² The project is consistent with ADB's Strategy 2020 through its focus on improving the delivery of infrastructure services as well as investing in physical assets.³ The project supports regional cooperation and integration by contributing to the implementation of the ASEAN Highway and BIMP-EAGA Priority Infrastructure Projects. It supports ADB's Sustainable Transport Initiative⁴ by addressing climate change and road safety, and it is included in ADB's Philippines Transport Sector Assessment, Strategy, and Road Map.

4. Use of the sector loan will enable the government to achieve inclusive economic development by concentrating road improvement subprojects in Mindanao and will provide flexibility in determining the most appropriate location for subprojects given changing political and security conditions in Mindanao. The project meets all the requirements for a sector loan:⁵ (i) the government has a sector development plan and the institutional capacity to implement it, (ii) its policies applicable to the sector are appropriate, and (iii) DPWH has demonstrated capacity.

5. The project is considered Category B for environment based on ADB's Safeguard Policy Statement (SPS 2009). The project will improve an estimated 300 km of national primary, secondary, and tertiary roads in Mindanao. The improvements will include paving earth roads, replacing damaged road sections, widening existing roads, adding surface overlays, and replacing and strengthening bridges. The project roads will be designed with features to strengthen resilience to climate change. Among the structural and non-structural features included are elevated pavement levels, enhanced slope protection, and improved maintenance of drainage structures. Road safety on these roads will be improved through road safety community awareness campaigns.

¹ National Economic and Development Authority. 2011. *Philippine Development Plan, 2011–2016*. Manila.

² ADB. 2011. *Country Partnership Strategy: Philippines, 2011–2016*. Manila.

³ ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020*. Manila.

⁴ ADB. 2010. *Sustainable Transport Initiative: Operational Plan*. Manila.

⁵ ADB. 2003. Sector Lending. *Operations Manual*. OM D3/BP. Manila. The project will fund water and sanitation subprojects, applying ADB's safeguards, procurement, and disbursement processes, as per OM D3.f

6. This initial environmental examination (IEE) was prepared in accordance with SPS 2009 for one of the three (3) core subproject roads, the PR-06: Alicia-Malangas Road which is currently a 4-5m wide National Secondary Road made up of gravel. The proposed improvement of the road with a total length of 24.10 km to concrete pavement (PCCP) follows the existing alignment. New PCCP will replace the existing road surface to the required width of 6.70 meters carriageway. Eight (8) bridges will be replaced along this road section, seven (7) existing bridges of which are with steel deck structure and one (1) bridge with concrete deck structure. Majority of the existing culverts are subject for repair whereas others are to be replaced and constructed. The existing road lacks signages at intersections, no directional signs, and absence of signalized pedestrian crossing for students and residents especially on sharp curve. Stalls and residential houses encroach the road right of way and dangerous side ditches are close to the road.

7. The IEE was undertaken to:

- (i) Provide project information and relevant environmental baseline data for the project;
- (ii) Assess potential environmental impacts of the project;
- (iii) Identify mitigation measures to minimize negative impacts;
- (iv) Provide information on the consultations undertaken and the project level grievance redress mechanism (GRM); and
- (v) Develop a robust environmental management plan (EMP) which specifies mitigation and monitoring measures, institutional responsibilities and reporting requirements.

8. An environmental assessment and review framework (EARF) has been prepared to serve as a guide to ensure compliance of subprojects with the environmental assessment requirements under ADB's Safeguards Policy Statement, 2009 (SPS) and the Philippine Environmental Impact Statement System (PEISS).

9. *Project Description.* The improvement of the 24.1-km road will involve the replacement of the gravel road with Portland Cement Concrete Pavement (PCCP) meeting a required carriageway width of 6.70m with shoulder width of 1.5 meters on both sides. Specifically, the major items of work include (i) construction of 24.10 kilometers by 6.70 meters wide PCC pavement with 1.5 meters paved shoulders on both sides (ii) construction of six (6) RCDG and two (2) PCDG bridges with a total length of about 360.0 lineal meters; (iii) construction/improvement of drainage and slope protection structures; and (iv) construction of miscellaneous structures. The road improvement will follow the existing alignment and widening requires a 30m right-of-way traversing the Municipalities of Alicia and Malangas, Zamboanga Sibugay Province.

10. *Existing Environmental Conditions.* Areas along PR 06 are predominantly agricultural. This road does not traverse or is near ecologically sensitive and/or protected areas. The road is characterized as having a rolling terrain and located in the level to gently sloping areas having 0-8% slope gradient to moderately steep slope areas (8%-15%)⁶. Since the project road alignment has rural and agricultural setting, there are no major local sources of anthropogenic emissions. The lack of industrial development suggests that air pollution and noise sources which would normally elevate background levels are not present in the area.

⁶ Environmental Impact Assessment (EIA), TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045), February 2016.

Due to its current unpaved condition however, dust is continually generated and resuspended during the dry season leading to occasional visible level of suspended particulates. During the rainy season, water quality is affected by siltation and mud carried into the ditches and other waterways causing high turbidity levels.

11. *Anticipated Impacts and Environmental Management Plan.* As the project will involve improvement and widening of an existing road with minor realignments, significant adverse environmental impacts are not anticipated. The roadside tree cutting requirements will largely affect fruit trees and other fruit-bearing trees and other common species planted on privately-owned lands; and forest trees of various species (10,867). However, since none of the affected areas are within ecologically protected areas or are in critical habitats/high biodiversity areas which support survival of critically endangered species, ecological impacts are not considered significant. The trees to be cut are found on roadside privately-owned lands that have been largely modified for agricultural and coconut production. Vegetation loss will be compensated through replanting elsewhere of more than 500,000 tree seedlings to be contributed by the project to the country's National Greening Program administered by the Department of Environment and Natural Resources (DENR).

12. Other potential environmental impacts related to construction activities are: (i) soil erosion and sedimentation at and near construction sites, (ii) construction noise, (iii) local air pollution due to construction activities, (iv) oil and other hazardous materials releases, (v) vehicular traffic congestion and public access disruption, (vi) hazards to the public due to construction activities, (vii) pollution and health risks arising from workers camps, (viii) occupational health and safety at work sites. Mitigation measures have been developed for the negative environmental impacts related to construction activities for inclusion in the works specifications to ensure their implementation. To mitigate negative impacts arising from the Project, an environmental management plan detailing mitigation measures, monitoring activities and responsibilities for implementation has been prepared as part of the IEE. DPWH will include the EMP in the bid and tender documents for civil works to ensure that the Project will be carried out consistent with the EMP requirements. Contractors are required to prepare a contractor's environmental management plan (CEMP) aligned with the project EMP to be approved by DPWH and CSC prior to start of construction and ADB will be provided a copy. During construction, DPWH will be assisted by a construction supervision consultant who will also undertake monitoring of the environmental performance and compliance of contractors.

13. *Information Disclosure and Consultation.* Public consultations involving affected people and local officials have been conducted during the project preparation technical assistance phase of this project, and during the preparation of the IEE (and associated consultations during the preparation of the resettlement and indigenous peoples' plan) and in compliance with ADB's information disclosure and consultation requirements. The highlights of the potential subproject environmental and social impacts were communicated to the stakeholders through several public consultations and/or distribution of project information materials.

14. *Grievance Redress Mechanism.* A project-specific grievance redress mechanism (GRM) will be established at the DPWH District Engineering Office (DEO) to receive, evaluate and facilitate the complaints/grievances of affected persons on the sub-project's environmental performance. This mechanism will be disclosed to the host communities prior to commencement of site works. A framework is presented in the IEE with additional details to be provided and documented in the CEMP prior to the commencement of the construction activities.

15. *Conclusion.* Based on the screening and assessment for potential environmental impacts, the project is not anticipated to have significant negative environmental impacts.

Provided that the EMP is enforced, the project can be implemented in an environmentally acceptable manner. There is no need for a further environmental assessment study. Specifically, a full environmental impact assessment (EIA) is not warranted and the subproject's environmental classification as Category B is appropriate.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Environmental Laws, Regulations and Guidelines in the Philippines

16. Major laws regarding the environment in the Philippines are shown in Table 1. These environmental-related laws were formulated under the Presidential Decree (PD) No.1151 as an environmental policy and PD No. 1152 as an environmental regulation in relation.

Table 1. Major Environmental Laws in the Philippines

Title	Contents
Presidential Decree (PD)No.1151	Environmental policy
Presidential Decree (PD)No. 1152	Environmental regulation
Source: Compiled for the PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)	

17. Major environmental laws are set out for natural resources, protection of wildlife and bio-diversity, forest resources, mining, coastal and marine, ambient air, water quality, waste and disposal, land use and resettlement, conservation of historical and cultural assets, environmental assessment, and national integrated protected area system. The laws and decrees applicable to the Project are summarized in Table 2.

Table 2. Environmental Laws and Decrees in the Philippines

Category	Title/Outline	
Natural Resources	Presidential Decree (PD) 1198	Requiring all individuals, partnerships or corporations engaged in the exploration, development and exploitation of natural resources or in the construction of infrastructure projects to restore or rehabilitate areas subject thereof or affected thereby to their original condition
	Republic Act (RA) 3931	An Act creating the National Water and Air Pollution Commission (also includes definitions and penalties related to pollution)
Ambient Air	PD 1181	Providing for the prevention, control and abatement of air pollution from motor vehicles and for other purposes
	PD 1160	Vesting authority in Barangay captains to enforce pollution and environmental control laws and for other purposes
	RA 8749	Philippine Clean Air Act of 1999
Water quality	RA 9275	Philippine Clean Water Act of 2004
	DENR Administrative Order (DAO) 34	Classification of water and use
Waste Disposal	PD 825 (1975)	Providing penalty for improper disposal of garbage and other forms of uncleanness and for other purposes
	PD 1152 (1977)	Philippine Environmental Code (Objective: To achieve and maintain

Category	Title/Outline	
		such levels of air quality as to protect public health and to prevent to the greatest extent practicable, injury and/or damage to plant and animal life and property, and promote the social and economic development of the country)
	RA 6969 (1990)	An Act to Control Toxic Substances and Hazardous and Nuclear Wastes, Providing Penalties for Violations thereof, and for their Purposes
	DAO 36 Series of 2004 (DAO 04-36)	Procedural manual of DAO 92-29, a comprehensive documentation on the legal and technical requirements of hazardous waste management
	RA 9003	Ecological and Solid Waste Management Act of 2000
	DAO 01-34	Implementing Rules and Regulations (IRR) of RA 9003
Forestry/Flora	PD 705	Revised Forestry Code of the Philippines
	DENR Memorandum Order no. 05 of 2012	Uniform Replacement Ratio for Cut or Relocated Trees
	Joint Memorandum Circular No. 2 series of 2014	Guidelines for the Implementation of the DPWH- DENR-DSWD Partnership on the Tree Replacement Project
Environmental Assessment	PD 1586 (1978)	Establishing an environmental impact statement system including other environmental management related measures and for other purposes
	Presidential Proclamation 2146	Proclaiming certain areas and types of projects as environmentally critical and within the scope of the environmental impact statement system established under PD 1586
Source: PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)		

18. The Government of the Philippines (GoP) has ratified international treaties, agreements, and protocols in relation to environmental social considerations which are listed in Table 3.

Table 3. Philippine Environmental Agreements to the International Treaty

Title	Year
Washington Treaty Convention on the international trade in endangered species of wild flora and fauna	(1981)
Convention on biological diversity	(1993)
Framework convention on climate change	(1994)

Source: PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

B. EIA System in the Philippines

19. In the Philippines, all private or public projects or activities which are envisaged to potentially have a negative impact on the environment are subject to an Environmental Impact Assessment (EIA) by the Philippine Environmental Impact Statement System (PEISS). EIA is the preliminary analysis of the potential impacts of the project on the environment. Aware of

the possible negative effects of the implementation of industrial and other activities, the GoP has instituted measures to encourage the use of EIA as a planning and decision-making tool.

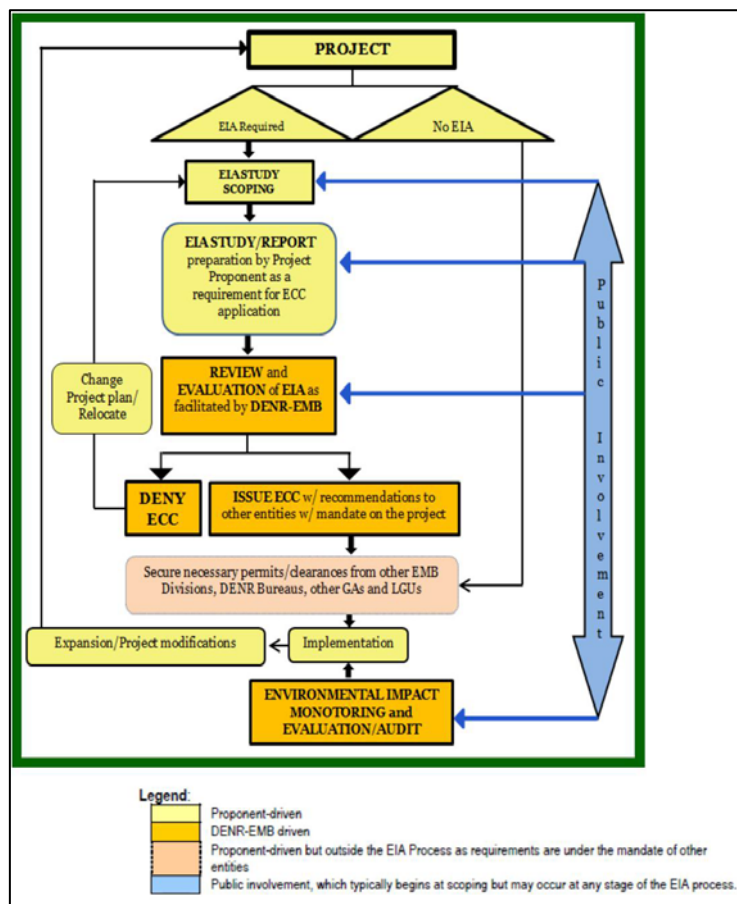
20. PEISS is a set of laws, regulations, administrative orders and guidelines concerned with the EIA. Table 4 shows some of the important laws and guidelines.

Table 4. Laws and Regulations regarding EIA in the Philippines

Title	Outline
Environmental Impact Statement System (EISS), Presidential Decree No. 1586 (1978)	An act establishing and centralizing the Environmental Impact Statement (EIS) System under the National Environmental Protection Council (NEPC), which merged with the National Pollution Control Commission (NPCC) in June 1987 to become the Environmental Management Bureau (EMB).
Presidential Proclamation No. 2146 (1981) and No. 803 (1996)	It proclaims Environmentally Critical Projects (ECPs) to have significant impact on the quality of environment and Environmentally Critical Areas (ECAs) as environmentally fragile areas within the scope of the EIS System.
DAO 96-37 (revised to become DAO 92-21)	Devolved responsibility for EIS to the EMB-Regional Office and further strengthened the Philippine EIS System (PEISS). Placed emphasis on promoting maximum public participation in EIA process to validate the social acceptability of the Project.
DENR Administrative Order No. 30 Series of 2003 (DAO 03-30)	Revised Procedural Manual (2007): Provides for implementation of rules and regulations of Presidential Decree No. 1586, establishing PEISS. Also, provided detailed definition of technical terms and detailed information regarding procedures, related laws and regulations.
DAO 2017-15	Guidelines on public participation under the PEISS

Source: PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045).

21. The procedures of EIA process are shown in Figure 1. The process stages are categorized as: i) pre-study stage (screening and scoping); ii) EIA study stage; and iii) post-study stage (review, decision-making and monitoring).



Source: Revised Procedural Manual for DENR Administrative Order No. 30 Series of 2003 (DAO 03-30) (2007)

Figure 1. Flow of EIA Process

22. According to PD 1586 (1978), the EIA process covers projects which are considered environmentally critical projects (ECPs) or projects in environmentally critical areas (ECAs) presumed to have significant impacts on the environment.

23. A road project with more than 20 km-long new road construction in total is classified as Category A which requires preparation of an environmental impact statement (EIS) in order to obtain an environmental compliance certificates (ECC) from the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR). The criteria of ECPs related to the project are shown in Table 5.

24. A separate EIS document following the scoping process prescribed in DAO 03-30 and its Revised Procedural Manual is being prepared for submission to EMB Region 9 as an application to obtain an Environmental Compliance Certificate (ECC) for the Project. The scoping process was initiated in early August 2016 and the public scoping and technical scoping conducted accordingly between 15 to 18 August 2016. The process is documented in that separate document. These activities supplement the activity during the project preparation phase conducted on August 19, 2015. Several public consultations were likewise conducted during the preparation of the resettlement and indigenous peoples plan (RIPP) to further enhance public awareness of the project as well as participation to communicate impacts that will be addressed during the construction period.

Table 5. EIS and IEE Requirements for Road and Bridge Projects

Project Description	Covered (Required to secure ECC)			Not covered (may secure CNC)
	Category A: ECP	Category B: Non-ECP		Category D
	EIS	EIS	IEE Checklist	PD (Part I only)
3.4.1 Roads, new construction	NATIONAL ROAD: >= 20 km (length with no critical slope) OR >= 10 km (length with critical slope)	PROVINCIAL ROAD and OTHER TYPES OF ROADS: >= 20 km (length with no critical slope) OR >= 10 km (length with critical slope)	ALL TYPES OF ROADS: > 2 km but < 20 km, (length with no critical slope) OR > 2 km but < 10 km (length with critical slope)	<= 2 km
3.4.2 Roads, widening, rehabilitation and/or improvement	None	> 50 % increase in capacity (or in terms of length/width) AND >= 20.0 km, (length with no critical slope) OR >= 10.0 km (length with critical slope)	> 50 % increase in capacity (or in terms of length/width) AND > 2 km but < 20.0 km, (length with no critical slope) OR > 2 km but < 10.0 km (length with critical slope)	> 50 % increase in capacity (or in terms of length/width) but <= 2 km increase in length
3.4.3 Bridges and viaducts (including elevated roads), new construction	>= 10.0 km	>= 5 km but < 10.0 km	> 50 m but < 5.0 km	<= 50 m Regardless of length for footbridges or for pedestrian only
3.4.4 Bridges and viaducts (including elevated roads), rehabilitation and/or improvement	None	> 50 % increase in capacity (or in terms of length/width) OR >= 10.0 km	> 50 % increase in capacity (or in terms of length/width) but < total length of 10.0 km	> 50 % increase in capacity (or in terms of length/width) but < 2 km increase in length
3.4.5 Roads-flyover/ cloverleaf/ interchanges	None	None	Regardless of length and width	None
3.4.6 Pedestrian passages	None	None	All underpass projects	All overpass projects

Project Description	Covered (Required to secure ECC)			Not covered (may secure CNC)
	Category A: ECP		Category B: Non-ECP	Category D
	EIS	EIS	IEE Checklist	PD (<i>Part I only</i>)
3.4.7 Tunnels and sub-grade roads and railways	>= 1.0 km	< 1.0 km	None	None

Source: PPTA, based on "Revised Guidelines for Coverage Screening and Standardized Requirements, EMB Memorandum Circular 005, July 2014"

C. ADB's Safeguard Policy Statement

25. The ADB's process of determining a road project's environment category is through accomplishment of a rapid environmental assessment (REA) checklist taking into account the type, size, and location of the proposed project. Based on SPS 2009, a project could be classified under one of the four environmental categories (A, B, C or FI) as shown in Table 6. PR 09 is considered Category B.

Table 6. Category Classifications on the Environment based on SPS 2009

Category	Application
A	Projects with potential for significant adverse environmental impacts that is irreversible, diverse or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.
B	Projects judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for category A projects. Impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for Category A projects. An initial environmental examination (IEE) is required.
C	Projects likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications are still reviewed.
FI	Projects are classified as category FI if they involve investment of funds to or through a financial intermediary. Where the FI's investment have minimal or no adverse environmental risks. The FI project will be treated as category C. All other FI's must establish and maintain an environmental and social management standard must comply with the environmental safeguards requirements specified in SPS 2009 if the FI's subprojects have the potential for significant adverse environmental impacts.

Source: ADB Safeguard Policy Statement (June 2009)

III. DESCRIPTION OF THE PROJECT

A. Overview

26. The Government of the Republic of the Philippines requested the Asian Development Bank (ADB) to provide Technical Assistance (TA) to prepare the Improving Growth Corridors in Mindanao Road Sector Project. This project supports the Government of the Philippines' priorities for improvement of the country's road network and development of Mindanao, including the government's agenda for Mindanao in the Philippines Development Plan (PDP) 2011-2016. This project extends ADB's long standing assistance in Mindanao with a recent focus on the road sector including institutional development and now improving national roads for inclusive growth.

27. Mindanao is the second largest island in the Philippines, with a population of nearly 25 million people. Despite being rich in natural resources, Mindanao has the highest poverty incidence of the Philippines' three island groups (Luzon, Visayas, and Mindanao), with a rate

of 39%,⁷ due in large part to civil conflict and low economic growth. Although significant development has occurred in recent years, a number of infrastructure targets in the government's Mindanao 2000 plan have not been achieved, due to the lack of coherent plans, inadequate government financial resources, and underinvestment, especially by the private sector.⁸

28. The road network in Mindanao is less developed than the national network. While 82% and 89% of the national roads in Luzon and the Visayas are paved, only 70% of the national roads in Mindanao are paved.⁹ This is compounded by a wider set of issues such as constrained growth of regional economic corridors through Mindanao and reduced support to regional cooperation and integration, as well as the lack of the necessary physical, institutional and governance capacity to support the full delivery of a quality national road network.

29. The impact of the project will be improved mobility, connecting accessibility and safety, and reduced poverty in the project area. The outcome will be reduced transport cost and improved accessibility. Transport on and investment in the national road network will become more efficient. The increased efficiency will be measured by reductions in travel time, vehicle operating costs, and road accident rates; improvements in the road surface condition; and improvements in governance in the transport sector and in DPWH's assessment, communications and administration capabilities. The Project's impact will be an accessible, affordable and safe road network in the project area.

30. This IEE was prepared in accordance with SPS 2009 covering the 24.10-km PR-06 (Malangas-Alicia Road) traversing the Municipalities of Malangas and Alicia in Zamboanga Sibugay Province.

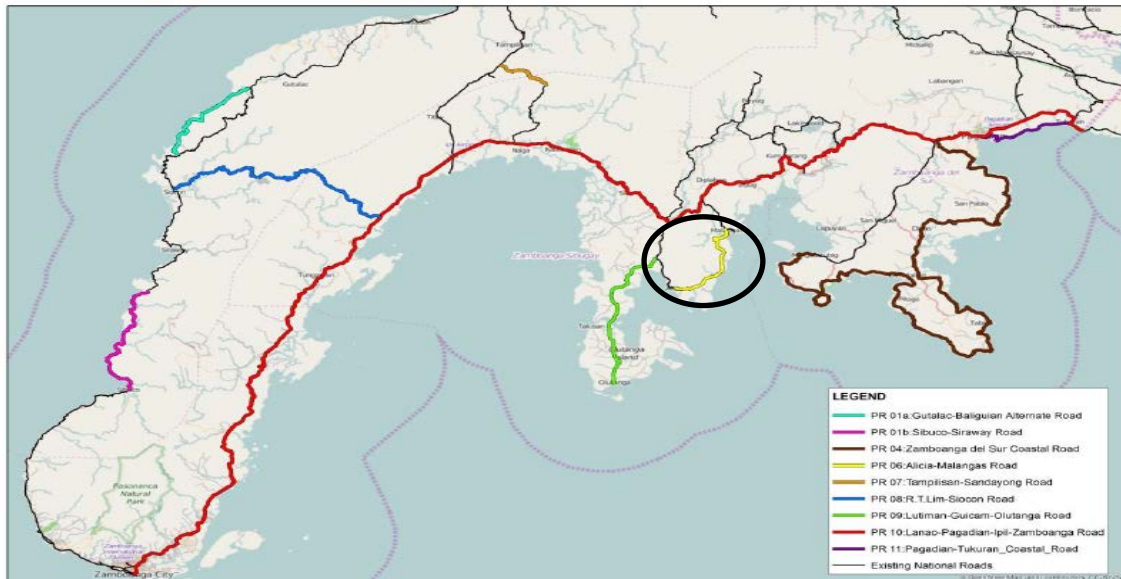
B. Location

31. Road PR 06 is located in Region IX or the Zamboanga Peninsula Region in the western part of Mindanao as shown in Figure 2. Also shown in Figure 2 are other road sections planned for improvement under the proposed sector loan. The existing road is mostly gravel in varying conditions with intermittent PCC pavement sections, with a gross length of 24.10 kilometers. The road has a flat to rolling terrain starting at K1769+648 in the Municipality of Alicia and terminates at K1793+751.43. Following the existing alignment of the project road, the road traverses Barangay Poblacion in the Municipality of Alicia and ends in Barangay Poblacion in the Municipality of Malangas. Altogether, a combined total of 15 barangays of both municipalities are traversed by PR 06.

⁷ ADB. 2010. Making a Difference in Mindanao. Manila.

⁸ MinDA. 2011. Mindanao 2020 Peace and Development Framework Plan 2011-2030.

⁹ By December 2014, 76% of national roads in Mindanao were paved (DPWH).



Source: Environmental Impact Assessment, PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

Figure 2. PR06 in relation to other Sub-projects

C. Proposed Improvement Works

32. PR-06: Alicia-Malangas Road which is currently a 4-5m wide National Secondary Road made up of gravel. The proposed improvement of the road with a total length of 24.10 km to concrete pavement (PCCP) follows the existing alignment. New PCCP will replace the existing road surface to the required width of 6.70 meters carriageway. Eight (8) bridges will be replaced along this road section, seven (7) existing bridges of which are with steel deck structure and one (1) bridge with concrete deck structure. Six (6) of these bridges are proposed to be replaced with RCDG superstructure and two (2) will be replaced with PCDG superstructure. All of these bridges will be of the concrete wall type, and all except one (Tigabon Bridge) will be 2-column concrete pier abutment. Six (6) will be bored pile foundation while two will be driven pile foundation.

Table 7. Subproject Scope and Coverage

Road Project	Province	Municipality (Barangay)	Total Length (km)	Project Scope
PR 06: Alicia-Malangas Road	Zamboanga Sibugay	Alicia (Bella, Ilisan, Alegria, Lapirovan, Poblacion)	24.10	a) Road improvement, upgrading and concreting (gravel to concrete).
		Malangas (Bacao, Camanga, Sinusayan, Logpond, Katituan, Tigabon, Tackling, Payag, Camanga, Lipacan, Poblacion)		b) Construction of eight bridges. c) Construction/improvement of existing drainage and slope protection structures.

33. All the rivers crossed by the proposed bridges and cross-drainage structures need to fulfill requirements for river flood discharge capacity and flood level freeboard.

D. Basic Design of Project Road

a. Selection of Design Elements

34. One of the chief best practice set of design standards practiced worldwide is the “Policy on Geometric Design of Highways and Streets, 2001, AASHTO”. This set of standards is also recommended to adopt as design standards for Philippine national highways by “Highway Safety Design Standards Manual – Part 1: Road Safety Design Manual, 2012, DPWH”.

35. Design speed is used to determine individual design elements, such as stopping sight distance and horizontal curvature. The combination of a design traffic volume and a topography condition, namely flat topography, rolling topography, and mountainous topography, leads to determination of design speeds of roads. A design speed determines corresponding horizontal minimum radius, vertical maximum gradient, super elevation, and sight distances. Topographic conditions will be decided for each section of the project roads.

36. Other elements are less related to design speed, such as pavement and shoulder width and clearances to walls and traffic barriers. Typically, an arterial road warrants a higher design speed than a local road. A road located in flat terrain warrants a higher design speed than one in mountainous terrain.

37. The design elements for PR 06 are summarized below:

1. Design average daily traffic: 400-1000
2. Topographic condition: Rolling
3. Design speed: 60 km/hr
4. Classification of road for design: national secondary
Minimum radius: 130 m
Maximum grade 6%
5. Lanes: 2 x 3.35 m/6.7 m
6. Shoulders: 1.5 m (each side)
7. Right-of-way: 30 m

b. Climate Change Adaptation

38. It is most effective to design and construct a climate resilient road than retrofitting at a later stage when problems appear. Using climate projections based from the results of the PRECIS model run in 2010 by PAGASA¹⁰ to evaluate future requirements instead of basing on historic climate patterns is significantly more cost effective. The DPWH requires incorporation of the following criteria to upgrade design standards as adaptation to climate change. The following adaptation measures have been included in the project design, as appropriate, to make the project road more resilient to climate change impacts:

- Road pavement: improvement of road surface and subsurface drainage systems and raise pavement levels

¹⁰ Source: PPTA, February 2016 from PAGASA, February 2011: Climate Change in the Philippines. Downscaling to a grid resolution of 25km x 25km allowed detailed Regional profiles to be prepared for each region. Climate data over the period 1971-2000 was used as the baseline data and formed the control run to establish the model's bias. Climate change projections Zamboanga Sibugay: **1)** baseline for seasonal temperature increase in degrees C is DJF – 27.1, MAM – 27.9, JJASON – 27.5; seasonal rainfall change in % is DJF – 284.1, MAM – 290.5, JJA – 597.2, SON – 674.1; **2)** Change 2020 (2006-2035) for seasonal temperature increase in degrees C is December to November - 1; seasonal rainfall change in % is DJF – 9.9, MAM – 6.6, JJA – 6.5, SON – 14.8; **3)** Change 2050 (.2036-2065) for seasonal temperature increase in degrees C is DJFMAM – 2, JJA – 1.9; and SON – 2.0; seasonal rainfall change in % is DJF – 4.8, MAM – 10.3, JJA – 22.0, SON – 8.9.

- Road drainage: increase size of side drains, consider alternative drain section, increase water retention capacity of drains, use of water capture and storage retention ponds
- Culverts and cross drainage pipes: increase capacity of hydraulic structures, increase the number of cross drains, use apron rather than catch pit at pipe entrance to avoid clogging by debris, downstream protection of outlets to reduce scouring
- Bridges: review design storm return periods, raise bridge if freeboard is inadequate, reinforce bridge piers and abutments at risk from scouring, provide retention dams upstream to reduce flood flows

39. A 10% increase¹¹ in the design of road structures had been adopted to meet the requirements specified in the Design Guidelines, Criteria and Standards. Other adaptation measures to be implemented for the project are described below:

40. Single-Span Bridge to Replace Multi-section Box Culvert. It is often observed that the debris of broken tree branches and bamboo are clogging river sections and causing flooding in the vicinity. Appropriate cleaning work can remove this kind of problem. However, the basic issue here is placing a wall at the middle of the river obstructing the free flow of river water. Designing a bridge with longer spanning and high vertical clearance makes this road a climate resilient road.

41. Green Planting along Road. Green planting along road sides not only provides a shade shelter for travelers, but also strengthens the ground around the road with roots. They also protect the road from flood water by preventing the water flow from hitting the road directly. Plants also prevent scouring by flood water. Furthermore, plants enhance aesthetic appearance of the road and also have a very valuable function of purifying the air contaminated by exhaust fumes and absorbing CO₂ to reduce the threat of greenhouse effect. However, pursuant to Department Order No. 73 Series of 2014, which Prohibit Uses within the Right-of-way of National Roads; trees, shrubs and plant boxes are considered obstructions that are needed to be removed within the right-of-way of all national roads.

42. If planted correctly on roadsides, trees and other vegetation will not serve as an obstruction but rather create ecological (climatic amelioration, check in air and noise pollution, check in soil erosion and reduce water logging, moderating the effects of wind and incoming radiation) and aesthetical (shade and ornamentation) benefits if proper species of trees are planted. In addition to the benefits of planting trees on roadsides are: it enhances the visual experience of the travelers along the road, it will also define the RoW and highlights the sharp horizontal curves of the road during night time, screen unsightly view from the road as well as the roadside communities from air and noise pollution, prevents the glare from the incoming vehicles, and it will compensate for the trees proposed to be cut during road widening and improvement.

43. In order to avoid the trees being an obstruction, trees to be planted on the roadside should possess the following characteristics: a) mixture of small to medium trees along roadsides to screen the glare from vehicles, b) trees that provide aesthetic benefits such as flowering trees, c) trees should also be evergreen trees that do not have substantial leaf fall so that will avoid the nuisance of falling leaves, d) trees with beautiful leaf color, shape and arrangement and e) should be economic trees that may be harvested on maturity and will generate revenue in the near future. Also, proper planting spaces should be observed. It is recommended that trees should be planted at least 6 meters away from the edge of shoulder or 1 meter away from the toe of embankment whichever is higher. Some of the recommended

¹¹ Information provided by Detailed Engineering Design Consultants, Detailed Engineering Design and Tendering of Asset Preservation (AP) and Road Improvement (RI) Projects of the Road Improvement and Institutional Development Project (RIIDP) and Future Financing, 2018.

species are banaba, katmon, bani, ilang-ilang, alibangbang, banuyo, dita and molave; all are native species in the Philippines.

E. Road Safety

44. During the PPTA, a review was carried out on the project road safety measures for incorporation into the design. These measures were based on a road safety audit in Western Mindanao aimed to identify potential road safety hazards and to incorporate measures in the detailed design to improve safety aspects of the project. The road safety audit followed the key criteria of the ADB Road Safety Audit for Road Projects (2003).

45. The PPTA Road Safety team discussed these findings to determine the potential safety risks and found that most of defects are observed across Western Mindanao. A series of suggested measures were identified for consideration to help avoid or mitigate safety issues. Problems related to geometric design will be solved by following DPWH design standards. Measures considered in the detailed design are shown in Table 8.

Table 8. Summary Road Safety Measures

No.	Problem	Design Measure
1	Road signs and pavement markings	Setting up warning and guide signs, arrow marks and providing delineation lines clearly along every road.
2	No light signal	Providing traffic signals at key intersections
3	Poor pavement without delineation	Improvement of the quality of pavement and provide delineation or pavement markings.
4	Stalls and residential houses beside the road	Removal of stalls to help reduce obstructions and encroachment
5	Small vertical crest with poor sight distance	Improving vertical curves to suit safe design criteria/requirement
6	Sharp curve and insufficient chevron signs	Installation of chevron signs where required and speed limit signs. Improvement of the vertical alignment to provide sight distance requirement
7	Dangerous side ditches close to road	Setting up guardrails between the road and ditches
8	Parking along the carriageway	Prohibiting of the use of carriageway as parking to ensure safe, efficient and smooth vehicular flow
9	No warning sign in construction sites	Installation of advance warning signs on construction sites so the drivers can get advance information beforehand
10	Slope-slide prone zone	Planting of grass and installing the necessary slope protection facilities. Conduct of geotechnical investigation to determine the most appropriate slope protection structures
11	No guard rails at high embankments and steep side slope	Installation of guard rails on all locations with embankment height exceeding 2.0m
12	Block-type guard-walls stones	Changing to guard rails, which function to guide a deviating vehicle back to the lane.
13	Y-type intersection	Changing a crossing angle of 2 roads at merging section to more than 70 degrees. Improve intersection layout; provide proper "channelization"
14	Shortage of sight distance	Moving hazards: trees, fences, poles etc. Improve the horizontal and vertical alignment.
15	No pedestrian crossing	Installation of pedestrian crossing. Sidewalks and bicycle lanes and pedestrian crossings. The roads beside or in the vicinity of schools or markets will be located/designed away from schools and markets as much as possible.

Source: PPTA. NB: In the PPTA workshop held on 29 April 2015, participants of a road safety discussion group suggested to add a few more recommendations in addition to the above: first, road safety education for students

and local residents, and second, widening of shoulder of 1.5m (minimum) for emergency, provision of turn-outs/lay-bys.

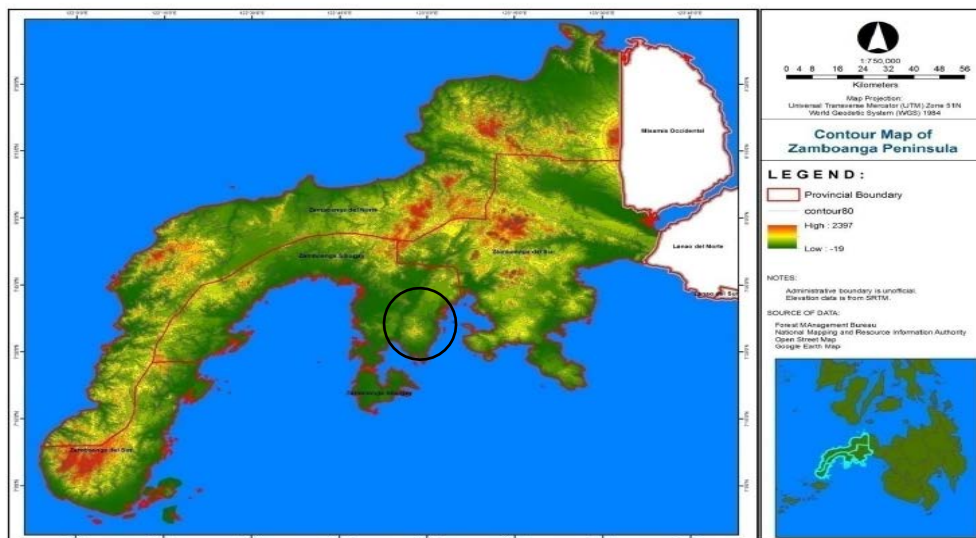
IV. DESCRIPTION OF THE ENVIRONMENT

A. Land Environment

a. Topography and Slope

46. Zamboanga Sibugay (from which PR06 is located) - stretching northward from Zamboanga City in the Southwest and running along the northern boundary of Zamboanga del Norte is a mountainous area except Titay Valley. In the Northeast spreading to Sibuguey valley it is flat and slightly rolling. The coastal plains are narrow strips extending regularly from the Southwest, and then spreading into wide flat lands when reaching the coastal plains of Sibuguey Bay area. On the other hand, about 54% of Zamboanga Sibugay is made up of rugged hills and mountains that stretch northward from the southwest to Salug Valley in the east.

47. PR 06 is characterized by a variable level to rolling terrain having level to gentle slope gradient (0%-8% slope: 11.31 km) gradient) to moderately steep slopes (8%-18%: 7.2 km) and over 18%: 5.1 km).¹²



Source: Environmental Impact Assessment, PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

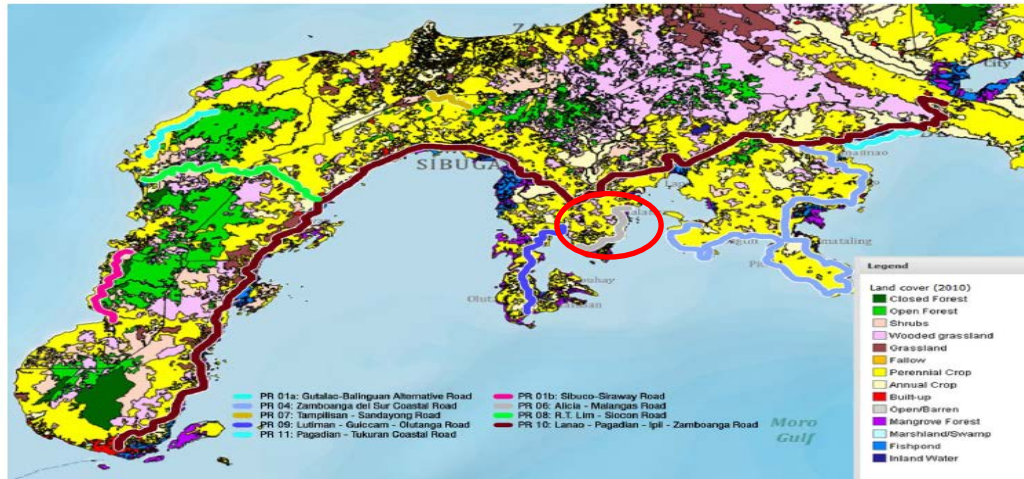
Figure 3. Contour Map of Zamboanga Peninsula

b. Land Use

48. Land uses of the proposed PR-06 alignment are aggregates of agricultural areas primarily perennial crop (52.87%) and annual crops (37.79%) planted with coconut and shrub lands (1.80%). It has also built-up areas (7.52%).¹³ The general land use pattern along the alignment with respect to the peninsula-wide land use is shown in Figure 5.

¹² Source: PPTA.

¹³ Ibid, p. 44.



Source: Environmental Impact Assessment, PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

Figure 4. Land Cover Map of Zamboanga Peninsula

c. Geology

49. The island of Mindanao is characterized by a complex geologic setting manifested by the presence of several arc terrains. As a part of an island arc system, the island consists mainly of two blocks: the island-arc-related eastern-central Mindanao block and the continental Zamboanga Peninsula, which contains several ophiolitic bodies and mélanges (Yumul et. al., 2004). In Zamboanga Peninsula the oldest rocks are likely to be the Upper Jurassic-Cretaceous serpentinitized ultramafics, schists, gneiss and quartzites now exposed in southwest Zamboanga (Santos-Ynigo, 1953; Paderes and Miranda, 1965). Notably the southwest Zamboanga ultramafics correlate with the basement serpentinitized peridotites found in east-central Zamboanga. The hydrothermally-altered strata of the Sindangan Volcanics are considered the oldest volcanics. Overlying the Sindangan Volcanics are shale and sandstone intercalated with thin basaltic flows and limestone lenses formed during Eocene.

50. Three main physiographic-structural units have been recognized in Mindanao Island (Corpuz, 1992). The first unit trends N-NNW and comprises the Pacific Cordillera, Mindanao Central Cordillera and Agusan-Davao Basin. The second unit trends NW and includes the Tiruray-Daguma Range and Cotabato Basin. The third unit encompasses the NE-trending Zamboanga Peninsula and Sulu Islands, where the oldest rocks are probably Upper Jurassic-Cretaceous serpentinitized ultramafics, schists, gneiss and quartzites (Santos-Ynigo, 1953).

d. Soils

51. The Province of Zamboanga Sibugay is largely clay. On slopes over 20%, stone content and its soils have low fertility due to leaching and low organic material content. Perennial crops are extensively grown in many areas.

B. Climate and Meteorology

a. Climate

52. Seasons are not very pronounced but relatively dry from November to April and wet during the rest of the year. The northeast monsoon prevails during November to February while the southwest monsoon occurs during the months of June to October. The rain period starts in June and last up to November while the period from January to May is relatively dry.



Source: Environmental Impact Assessment, PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

Figure 5. Climate Map of Zamboanga Peninsula

b. Rainfall

53. The southwest monsoon is the main rainfall-causing weather system of the area. Tropical cyclones seldom, if not rarely, cross the project area. The rainy season in the area occurs from June to November while the rest of the year is relatively dry. The month of October is the wettest, with a monthly average rainfall of 178.9 mm. The month of February, on the other hand is the driest, with a mean monthly rainfall of 43.7 mm. The average annual rainfall recorded based on years of data is 1266.5 mm. Based on the climatological extremes of PAGASA, the highest rainfall amount, as of 2010, is 199 mm in October 2001 with a minimum rainfall amount of 88.9 mm occurring in May 1990. These rainfall amounts are not that notable compared to the rainfall data gauged by other stations in Mindanao.

c. Temperature

54. For a period of 30 years (1981-2010), the average annual maximum temperature in the region is 36.9oC occurring in April 22, 1987, with the average minimum amt. of 15.6oC computed in Feb. 27, 1995.

d. Relative Humidity

55. Relative humidity is a measure of the amount of moisture in the atmosphere relative to the saturation condition of the air at the same temperature and pressure. The mean annual relative humidity in the area is as high as 83% occurring in the months of July and October. The least humid condition for the area is in summer month of March with an average amount of 78%.

¹⁴ Type III: No very pronounced maximum rain period, with a short dry season lasting only from one to three months, either during the period from December to February or from March to May. This climate type resembles type I since it has a short dry season.

e. Wind

56. The prevailing wind is west southwest with an annual average wind flow of 2 m/s occurring the whole year through.

C. Water Resources

57. According to the PPTA report, the provincial households numbered 98,653 as of 2010. Of these, 1,247 units are Level I¹⁵. Level II¹⁶ has 406 units and Level III¹⁷ has a total of 162 units or functional facilities in 16 municipalities of Zamboanga Sibugay. Likewise, the total population served with adequate water facilities numbered 80,277. This figure was gathered from the Municipal Planning and Development Offices in the Province.

58. There are 19 river channels and nine (9) marine bays or fishing grounds in Zamboanga Sibugay. Of these total number, one (1) river and two (2) bays can be found exclusively in the Municipality of Alicia; and five (5) rivers can be found traversing the Municipality of Malangas. One (1) bay is shared by the Municipality of Alicia and Malangas with the other municipalities. Altogether, the marine waters in the province stretches to about 210 kilometers of shoreline benefitting a total of thirteen (13) municipalities and over a hundred (113) barangays. Little is known of the river (condition in terms of its water quality and use) that will be crossed by the bridge subprojects in eight locations along the alignment. The subproject' detailed engineering design report indicated that drainage in the road corridor is provided by a number of small estuarine channels with limited catchment areas and poorly defined river banks. The only major river is the Lipacan River that drains the eastern slopes of the 595 meters high Mt. Kaladis. This river located south of the Malangas Poblacion flows east and empties into the Dumanguilas Bay. Baseline information about this river as well as the small channels that will be crossed by the bridges shall be collected by the Contractor prior to the start of construction along the alignment. This information will be included in the CEMP.

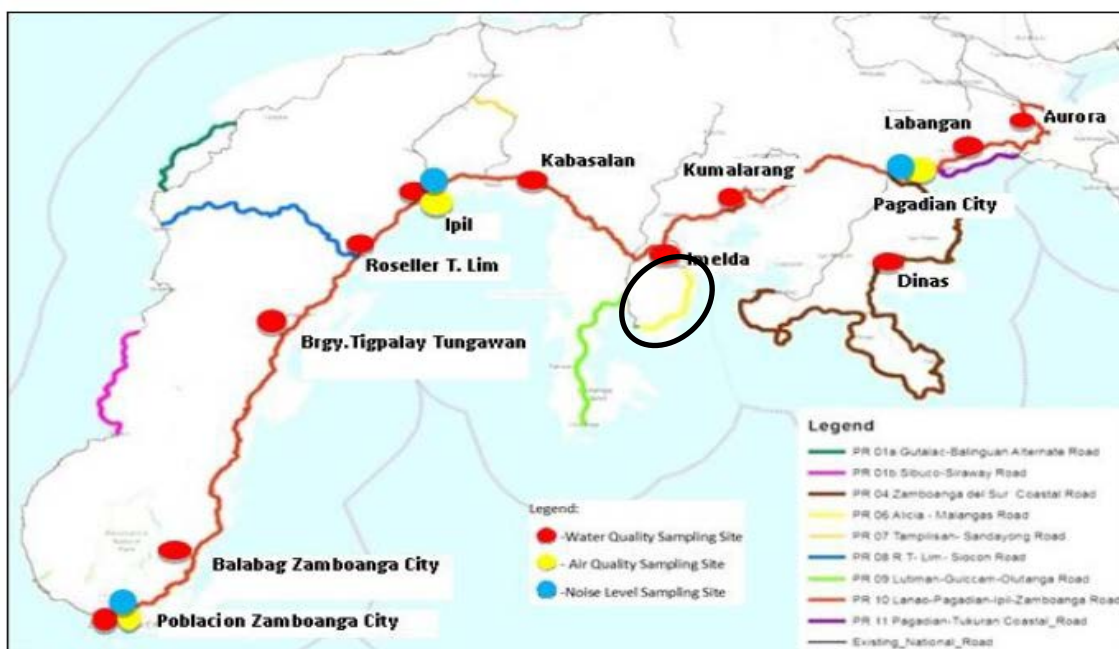
D. Air Quality and Noise

59. There is no available secondary data for air quality and noise in the project area. During the PPTA and during the detailed engineering design owing to severe security risks including resource and logistical constraints not previously agreed in the consultancy agreement between the Government of the Philippines and the consultant, primary data collection/field sampling was not undertaken. Sampling were limited only to a few sampling points during the PPTA as shown in the figure below.

¹⁵ Stand-alone water points which is serving an average of 15 households within a 250-meter distance, e.g. hand pumps, shallow wells, rainwater collectors

¹⁶ Piped water with a communal water point which is serving an average of 4-6 households within a 25-meter distance, e.g. borewell, spring system

¹⁷ Piped water supply with a private water point which is based on a daily water demand of more than 100 liters per person, e.g. house connection



Source: Environmental Impact Assessment, PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

Figure 6. Air Quality and Noise Sampling Locations

60. However, for the same reason as during the PPTA since the project road alignment has rural and agricultural setting, there are no major local sources of anthropogenic emissions. Both sides of the project road are predominantly occupied by croplands mainly of coconut and the remaining areas are made up of settlements and grassland/shrub/open lands. Further, the lack of industrial development suggests that air pollution and noise sources which would normally elevate background levels are not present in the area. As such, it is expected that the average ground level concentrations of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and particulate matter (PM₁₀) will not exceed the values in the International Finance Corporation (IFC) guidelines (EHS Guidelines of April 2007) which are 20 µg/Ncm, 40 µg/Ncm, and 20 µg/Ncm, respectively. TSP measurements were not conducted for the road alignment during the PPTA and also during this phase of the project. It is anticipated that due to the unpaved nature of the road, TSP concentration along the alignment will be over that of the EHS Guidelines during construction. Elsewhere in Zamboanga City, the over-all air ambient level of the City is generally poor. As of September 1997, the Total Suspended Particulate (TSP) concentration equaled an average of 800 ug/Nm³ as measured by the Environmental Management and Protected Area Sector (EMPAS) of the Department of Environment and Natural Resources. Region IX did not pass the National Ambient Air Quality Standards (NAAQS) of 230 micrograms per normal cubic meter (ug/Nm³)¹⁸.

61. Available more recent information for PM 10 and PM 2.5 are added to update the historical figure, albeit limited only to one particulate location but maybe more relevant for the cluster of Sub-projects within the Zamboanga Peninsula. The Environmental Management Bureau Region 9 maintains a 24-hour real time sample collection for Particulate Matter 10 and Particulate Matter 2.5 inside the WMSU San Ramon Campus, Barangay Talisayan,

¹⁸ TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045), prepared by the DPWH for the ADB, February 2016.

Zamboanga City. The area type is general ambient with vegetation and the station type is CAAMS-Particulate Matter System (PMS). The location is located along the Zamboanga West Coast Road at geographical coordinates: North – 7° 0'28.05" East 121° 55'42.94". Results indicate that the criteria pollutants being monitored are within the National Ambient Air Quality Guideline Values (24-hours) for PM₁₀ at 150 ug/Ncm; and for PM_{2.5} at 50 ug/Ncm. The quarterly averages for these criteria pollutants are summarized in the following table below:

Criteria Pollutant	Quarterly Average (CY 2017)		
	1 st Quarter	Second Quarter	Third Quarter
Particulate Matter 10	14.32	7.915	14.46
Particulate Matter 2.5	12.25	9.823	10.60

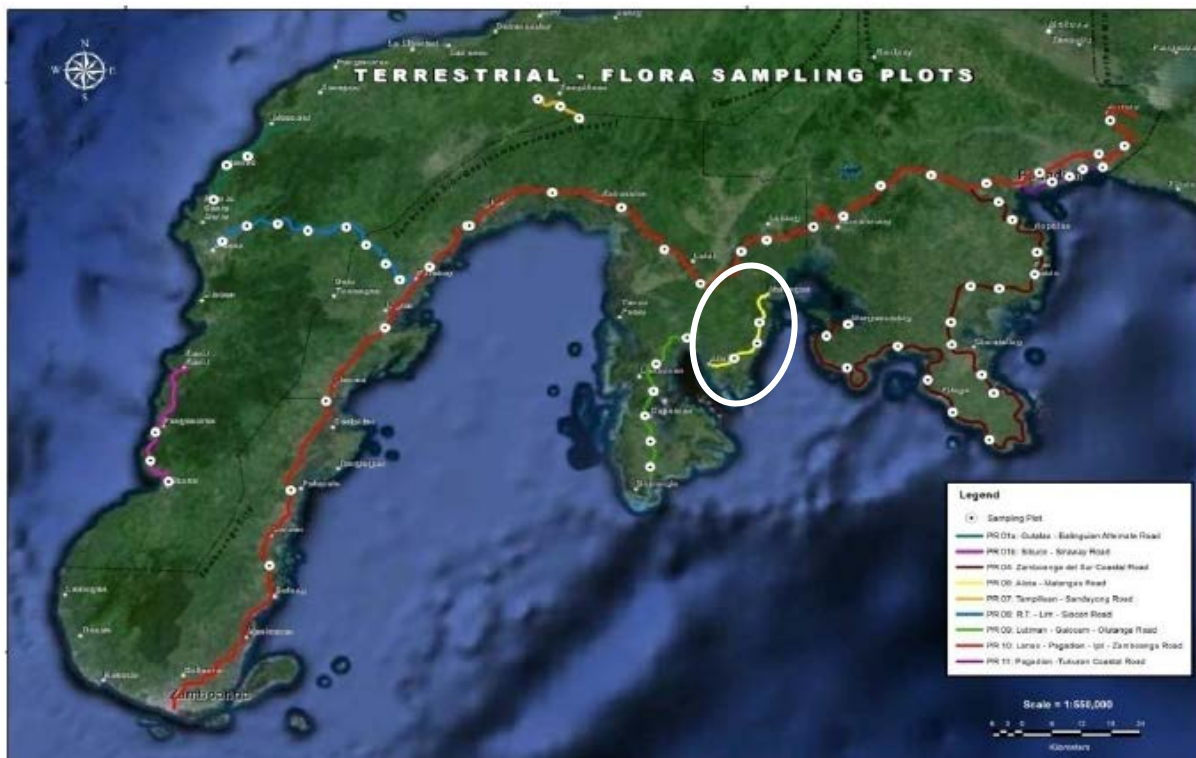
Source: Quarterly Assessment of of Continuous Ambient Air Quality Monitoring Station, Environmental Management Bureau Region 9.

62. To minimize dust generation and resuspension during the construction period, speed limit of up to at least 25 kph in populated areas along the alignment shall be informed to all motorists and contractor vehicle and equipment operators through signages prior to approaching each way of the sensitive receptors. In addition, regular watering at least every 4 hours shall be undertaken by the Contractor during dry construction days in these areas. Baseline measurements for air and noise however is recommended to be collected by the Contractor prior to the start of the construction period and the results will be included in the Contractor's Environmental Management Plan (CEMP).

E. Biological Resources

63. During the PPTA, a terrestrial survey was conducted within the 9 proposed road sections for improvement in Zamboanga Peninsula. The survey was employed to be able to identify the existing flora and fauna species within the project area. It was important that an identification of the existing important flora and faunal species in the area be done to prevent or minimize adverse impact to these species during project implementation.

64. The sampling locations along the road corridors and for PR 06 are shown in the figure below.



Source: Environmental Impact Assessment (EIA), TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045), February 2016.

Figure 7. Terrestrial Flora Sampling Points along PR06

a. Flora Species

65. Three (3) sampling sites were established during the PPTA survey for PR-06. The PPTA report did not provide any criteria for the selection of these sampling sites. It is assumed based on the ecosystem/land use characteristics that the sampling sites generally represented areas that will enable characterization of the flora composition along the road corridor. All of these sampling sites are in agricultural areas with varying associated land uses as shown below:

Table 9. Sampling Sites for Terrestrial Resources Surveys in PR06

Sampling plot	Ecosystem/Land use	Coordinates
24	Aggregates of crops, along settlement area	7°34'44.63"N 123°1'13.08"E
25	Agricultural, aggregates of perennial crops	7°32'34.26"N 123°0'59.01"E
26	Agricultural, coconut areas	7°30'57.93"N 122°58'46.83"E

Source: PPTA

66. The sampling plots above are among the sixty-eight plots established during the terrestrial floral surveys conducted for the PPTA. Details of the terrestrial flora observed from each of the sampling plots for this particular road section is not available.¹⁹ However, based from the PPTA report, existing land cover of the sampling plots is dominated by agricultural

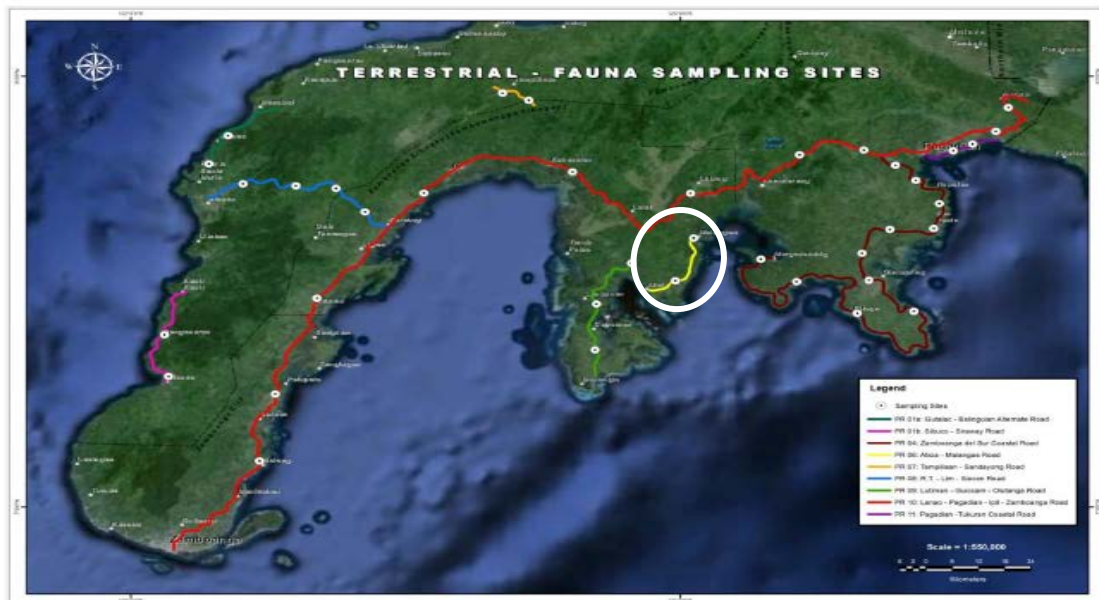
¹⁹ However, aggregated results (not necessarily sampling plot-specific) can be found in Annexes 77 to 86 of the Environmental Impact Assessment (EIA) of the PPTA.

land planted with aggregates of annual and perennial crops and in association with settlement areas.

67. The PPTA reported that based on the result of the survey and with reference to the national list of threatened Philippine plants and International Union for Conservation of Nature (IUCN) that only 6 of the identified species are included in the list. Among these species are Narra (*Pterocarpus indicus*) and Kalantas (*Toona kalantas*) species under the Critically Endangered category, Molave (*Vitex parviflora*) under Endangered category, and Amugis (*Koordersiodendron pinnatum*), Dao (*Dracontamelon dao*) and Lamio (*Dracontamelon edule*) are under vulnerable category and the rest are considered not threatened. Two of these vulnerable species can be found in the subproject road (Narra and Mahogany).²⁰

68. Within the 68 sampling sites, a total 152 species were identified, belonging to 57 families. Family Fabaceae has the highest number of species with 11.84%, followed by Euphorbiaceae with 4.61%. Relative to species category, 83 (54.6%) are tree species including those fruit bearing tree crops, 52 (34.3%) are non-tree species, 12 (7.9%) are agricultural crops and 5 (3.2%) are mangrove species. In terms of species distribution, the majority of these species are native in the Philippines comprising of 129 species (84.7%), and the rest are introduced into the country comprised of 23 species (15.3%). From the 23 introduced species, the majority are tree species consisting of 12 species (69.6%), with the remaining being agricultural crops and ornamental species.

69. This road does not traverse or is near ecologically sensitive and/or protected areas. Results of the tree inventory based on the detailed design show that there are 10,867 roadside trees that will need to be cut inside the 30-m right of way (**Appendix 1**). A total of five (4) species with a combined number of 1,103 trees (Salong – 10; Antipolo – 37; Narra – 44; Molave – 14; and Mahogany – 992) are considered vulnerable species under the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species 2017 and/or The National List of Threatened Philippine Plants (NLTPP) under DENR Administrative Order No. 2007-01. (see **Appendix 1** for details).



Source: Environmental Impact Assessment, PPTA (TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045))

Figure 8. Terrestrial Fauna Sampling Locations along PR06

²⁰ Actual tree inventory conducted during the inventory of loss in connection with the resettlement action planning activities identified three (3) other species that include Salong, Antipolo, and Molave.

b. Fauna Species

70. Two (2) sampling plots were established under this subproject road during the PPTA for the fauna survey as shown in Figure 8 and in Table 10. The PPTA report did not provide any criteria for the selection of these sampling sites. It is assumed based on the ecosystem/land use characteristics that the sampling sites generally represented areas that will enable characterization of the habitats from which faunal species along the road corridor may generally thrive.

Table 10. Sampling Plots for Fauna Survey along PR09

Sampling Plots	Ecosystem/Land use	Coordinates
19	Agricultural area dominated by coconut species)	7°37'28.04"N 123°1'28.03"E
20	Agricultural area aggregates of annual and tree crops	7°31'30.67"N 122°59'28.88"E

Source: PPTA

71. The sampling plots above are among the thirty-eight plots established during the terrestrial faunal survey conducted for the PPTA. Details of the terrestrial fauna observed from each of the sampling plots for this particular road section is not available.²¹ However, based from the PPTA report, a total of 55 species of wildlife belonging to 37 families were recorded during all the surveys along the subproject roads. It was represented by 29 avian species, four reptiles and amphibians and three species of mammals. These information are available in the corresponding annexes of the PPTA report. The succeeding discussions are adopted from that report as follows:

72. Relative to avi-faunal quantity, Chestnut munia is the most abundant species observed during the entire assessment, followed by Eurasian tree sparrow and Cattle egret. In terms of frequency and relative frequency, Eurasian Tree Sparrow is the highest seconded by Asian Glossy starlings, Chestnut Munia, White Collared king fisher and Yellow Vented Bulbul with the same values. These species are noted to be common in lowland, along rivers and marine areas, agricultural, settlements and even on disturb areas.

73. The results of the survey show a low species richness comprising of 47 birds, four reptiles and amphibians, and four mammals. In terms of conservation status only one from aves species are near threatened, one is vulnerable (Aves), 49 species are under least concern (42 aves, four mammals, one reptile and two amphibians), and four species are not evaluated (three Aves and one reptile). Summary of species and their conservation status is shown in the annexes of that PPTA report.

74. Among the mammalian species observed, only the *Rattus everetti* was recorded endemic to the Philippines. However, the said species is under the Least Concern of the IUCN having been characterized as widespread and abundant with large population and stable population trend as well. This species also recorded in wide range of habitats, from forests to disturbed environments. On the other hand, *Bufo marinus* is only among of the species introduced to the Philippines though under Least Concern Category of the IUCN. This species is likewise widely distributed with large population and stable population trend. All the birds noted are common and native that can thrive in relatively disturbed habitats.

²¹ However, aggregated results (not necessarily sampling plot-specific) can be found in Annexes 87 to 91 of the Environmental Impact Assessment (EIA) of the PPTA.

75. The overall result of the survey conducted during the PPTA shows a very low endemism with only one (1) endemic species (*Rattus everetti*) out of the 55 species recorded. This indicates a very disturbed habitat. One (1) species (*Heterocelus brevipes*) is recorded under the threatened categories of the IUCN. Another species, *Python reticulatus*, is listed under the Appendix II of the Convention on International Trade in Endangered Species of Fauna and Flora. The species is not necessarily now threatened with extinction but may become so unless trade is closely controlled. It also includes so-called "look-alike species," i.e. species of which the specimens in trade look like those of species listed for conservation reasons (cites.org). Relatively, DENR Administrative Order no. 2004-15 cited *Python reticulatus* as other threatened wildlife which means the species or subspecies is not critically endangered, endangered nor vulnerable but is under threat from adverse factors, such as over collection, throughout their range and is likely to move to the vulnerable category in the near future.²²

76. For the two (2) sampling plots under this subproject road, the biodiversity composition and evenness using the Shannon-Weiner index (H') and Pielou's index (J') suggest that the road section has a very low biodiversity index with very high species evenness based on the following:

- Shannon-Weiner index (H') - a computed value of 1.951 in Sampling Plot 19 and 1.784 in Sampling Plot 20.
- Pielou's index (J') - a computed value of 0.976 in Sampling Plot 20 and 0.938 in Sampling Plot 19).

F. Socioeconomic Resources

a. Population

77. Information taken from the PPTA indicated that based on the 2010 Census of Population and Housing (CPH), the province of Zamboanga Sibugay posted a total population of 584,685 persons as of May 1, 2010. This is larger by 87,446 persons compared to its total population of 497,239 persons in the 2000 CPH. The increase in the population count from 2000 to 2010 translated to an average annual population growth rate (PGR) of 1.63%. This is lower than the 2.02% annual PGR recorded at 1.63% during the period of 2000 to 2010. The population of Zamboanga Sibugay would double in 43 years. Fifty years ago, the population of Zamboanga Sibugay was only 110,085 persons. This population size is less than one fifth of the population of the province in the 2010 CPH.

78. Densely populated municipalities in the area are Ipil, Titay, and Tungawan with a total population of 64939, 46456, and 40552, respectively. The less densely populated municipalities are Talusan (25,268), Imelda (27,903) and Olutanga (28,717). The Municipalities of Alicia and Malangas has population of 34,895 and 31,243, respectively.

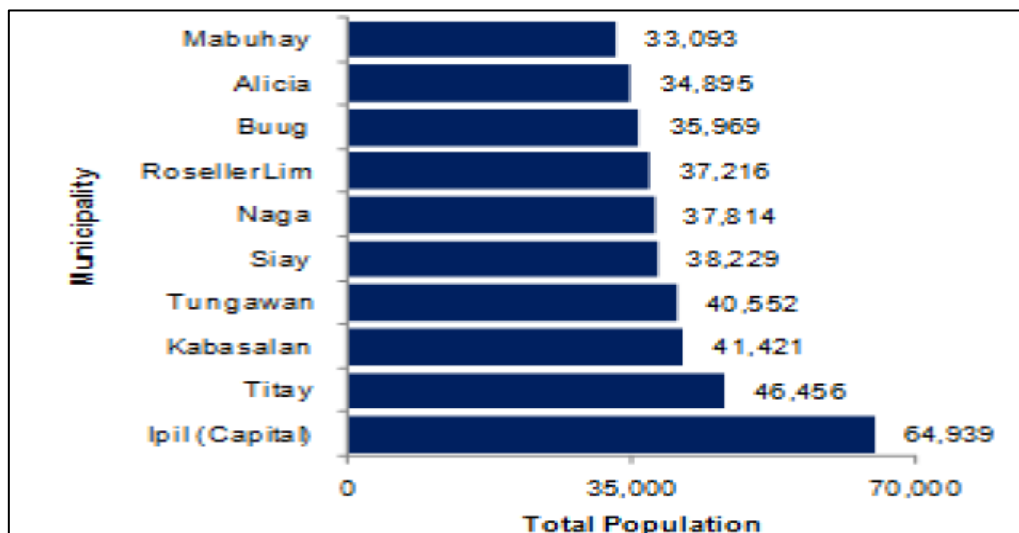
²² TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045), prepared by the DPWH for the ADB, February 2016.

Table 11. Population Characteristic, Zamboanga Sibugay Municipalities

Municipality	Total Population	Household Population	Number of Households	Municipality	Total Population	Household Population	Number of Households
Total	584,685	583,699	122,188				
Alicia	34,895	34,878	7,790	Naga	37,814	37,751	7,666
Buug	35,969	35,956	7,743	Olutunga	28,717	28,672	5,493
Diplahan	31,215	31,084	6,542	Payao	29,755	29,755	6,968
Imelda	27,903	27,880	5,471	Roseller Lim	37,216	37,171	7,963
Ipil (Capital)	64,939	64,507	14,384	Siay	38,229	38,229	7,992
Kabasaran	41,421	41,301	8,412	Talusan	25,268	25,268	4,263
Mabuhay	33,093	33,042	5,816	Titay	46,456	46,456	10,084
Malangas	31,243	31,243	6,852	Tungawan	40,552	40,506	8,749

Source : National Statistics Office, 2010 Census of Population and Housing

79. The ten most populous municipalities of Zamboanga Sibugay are shown in the figure below. The Municipality of Ipil is the most populous and it is the capital of the province that is the gateway to several capital towns and cities of the Zamboanga Peninsula. The Municipality of Alicia ranked ninth (9th) in 2010.



Source: PPTA.

Figure 9. Most populous municipalities of Zamboanga Sibugay

b. Household Size

80. The province average household size in 2010 was 4.80 persons, lower than the average household size of 5.30 persons in 2000.

Table 12. Household Size Characteristics, Zamboanga Sibugay

Indicator	Period	Baseline Data	Source
Total Population	2010	584,685	NSCB, NSO
Projected at 1.63 growth rate (2000 – 2010)	2012	604,381	PPDO
Percentage to the Region's Population	May 1, 2010	17.2	
Population Density (Persons/sq. km.)	May 1, 2010	162	NSCB ,NSO
Annual Population Growth Rate	1990- 2010	1.83%	
Number of Households	2000 2010	93,943 122,188	NSO , NSCB
Average Household Size	2000 2010	5.3 persons 4.8 persons	

Source: PPTA

c. Sex Ratio

81. In terms of sex ratio, there are 106 males for every 100 females showing that the male population slightly outnumbers the female population. Males outnumbered females under the age group 0 to 64 years and more females than males in the older age group (65 years and over).

Table 13. Sex Composition, Zamboanga Sibugay

Indicator	Baseline Data
Sex Ratio:	
Male	51.6 percent
Female	48.4 percent
Median Age	20.6 years
Age Structure	
• under 15 years old	37.2 percent
• 5 to 9 years	12.5 percent
• 0 to 4 years	12.4 percent
• 10 to 14 years	12.2 percent

Source: NSO, Census Year 2010

d. Ethnicity

82. The most generally dialects used in the Province of Zamboanga Sibugay are Cebuano and Hiligaynon (known as Ilonggo). Other dialects, which are common, are Tagalog, Ilocano and other ethnic dialect. On the other hand, the most common ethno-linguistic group to which Sibugaynons belong to is Tausug, Subanen, Maguindanao, Samal, Kalibugan, Maranao and Yakan. Those of Tausug ethnicity account for 32,821 or almost 7% of the household population and are mostly located in the Municipality of Mabuhay. Table 14 presents the most common ethnicities in the province.

Table 14. Ethnicity, Zamboanga Sibugay

Ethnicity	Population	% Share
Tausug	32,821	6.61%
Subanen	28,749	5.79%
Maguindanao	7,831	1.58%
Samal	6,641	1.34%
Kalibugan	5,344	1.08%
Maranao	993	0.20%
Yakan	123	0.02%
Household Population	496,621	100%

Source: National Statistics Office

e. Education

83. The Schools Division of Zamboanga Sibugay is located in the Municipality of Ipil. The Province of Sibugay covers 16 school districts grouped into three (3) Schools Development Center (SDCs) for both elementary and secondary levels. Each SDC has a center, centrally located and are accessible to all its satellite districts especially to the island activities. The Municipalities of Alicia and Malangas belong to SDC III.

Table 15. Schools Division, Zamboanga Sibugay

SDC	Center	Satellite Districts
SDC I	Elementary Level (Ipil Central Elementary School) Secondary Level (Pangi National High School)	Ipil, Titay, Tungawan, Naga, R.T. Lim
SDC II	Elementary Level (Kabasalan Central Elementary School) Secondary Level (Buayan National High School)	Kabasalan, Siay, Payao, Olutanga, Talusan, Mabuhay
SDC III	Elementary Level (Buug Central Elementary School) Secondary Level (Malangas National High School)	Buug, Imelda, Diplahan, Malangas, Alicia

Source: DepEd, Division of Zamboanga Sibugay.

f. Educational Resources

84. The province has no private or public colleges as shown in the table below. It has more public elementary educational institutions and high schools compared with private institutions. Its share of the public pre-schools is almost the same as that of the private pre-schools. The number of public school enrollment is very significant compared with the private schools and therefore is expected to have a high teacher-student ratio.

Table 16. Educational Resources, Zamboanga Sibugay

Educational Institutions	Public	Private
No. of Pre-Schools	16	15
No. of Elementary	418	9
No. of High School	73	9
No. of Colleges	0	0
Current Enrollment	Public	Private
Enrollment		
Pre-School	13,411	1,041
Elementary	88,074	1,096
High School	33,672	3,884
Tertiary		
Teacher-Student Ratio	Public	Private
Elementary	1:33	1:16
High School	1:42	1:19

Source: Environmental Impact Assessment, TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045), February 2016.

g. Health Services

85. Health services were devolved to the LGU's pursuant to the implementation of RA 7160. It has 2 components; the preventive, which is being served by the RHU's in the municipalities, and the curative component, which is being taken, cared of by government and private hospitals. The Crude Birth Rate (CBR) registered at 24.01. The 5-year average vital indicators for the province differed slightly from the total. The Province death and maternal rates are much than the provincial figures.

86. In terms of hospital service capacity, the major public hospitals include Zamboanga Sibugay Provincial Hospital in Ipil, Alicia District Hospital, Olutanga Municipal Hospital and Payao Municipal Hospital. There were 230 hospital beds in the province resulting to a bed: population ratio of 1:2,162. Other public health facilities include 16 health centers and 12 private hospitals.

h. Security Services

87. The Philippine National Police (PNP) to prevent and control crimes maintain peace and order and ensure public safety and internal security with the active support with the community. In spite of the neutralization of the notorious syndicate and wanted individuals, the police have to double their efforts against criminality in the province. The Provincial headquarters of the Philippine National Police indicate that there were 1,489 reported crimes in the province in 2009. There was an increase of 265 crime incidents reported in 2010 and a decrease of crimes in 2011 with total crimes of 700.

V. ANTICIPATED IMPACTS AND MITIGATION MEASURES

88. Since the Project is considered environment category B, significant negative environmental impacts are not anticipated. The impact assessment was conducted for pre-construction, construction and operation phases. Results of the environmental impacts screening are summarized in Table 20. Impact types and magnitudes are indicated for both impacts without the mitigating measures and the resulting situations when mitigating measures will be implemented.

89. The screening table uses the symbols "+" for positive impacts and "-" for negative impacts. Symbols for impact magnitudes are "Δ" for minor and "●" for moderate. The symbol for a minor negative impact is "Δ -", while a moderate negative impact is "● -". The second column of the table indicates the type and magnitudes of the impacts without any mitigating measures being applied. The last column of the table indicates the expected impact magnitude after applying the mitigating measures. Hence, a moderate negative impact (● -) will become minor (Δ) after applying the mitigating measures. The discussions of each identified issue and corresponding mitigation measures are presented in the succeeding sections.

Table 17. Summary of Environmental Impacts Screening for PR 09

Environmental Impacts and Risks	Without Mitigation	With Mitigation
PRE-CONSTRUCTION PHASE (Design)		
- Encroachment on environmentally sensitive areas	n/a	n/a
- Impacts and risks to biodiversity conservation	n/a	n/a
CONSTRUCTION PHASE		
- Impacts to endangered and/or critically endangered species	Δ -	Δ
- Potential damage to archaeological and cultural assets	Δ -	Δ

Environmental Impacts and Risks	Without Mitigation	With Mitigation
Soil erosion and sedimentation within and in the vicinity of construction sites	● -	△
- Noise from construction equipment	● -	△
- Local air pollution due to construction activities	● -	△
- Oil and other hazardous materials releases	● -	△
- Vehicular traffic congestion and public access	● -	△
- Hazards to public due to construction activities	● -	△
- Pollution and health risks due to workers camp	● -	△
- Occupational health and safety risks at work sites	● -	△
- Increased employment opportunity in work sites	● +	● +
OPERATION AND MAINTENANCE PHASE		
Increased risk of road accidents	● -	△
Increased noise levels due to increased vehicular traffic	△ -	△
Increased air pollution due to increased vehicular traffic	△ -	△
Improved accessibility	● +	● +

n/a = not applicable; △ = minor; ● = moderate; + = positive; - = negative

A. Pre-construction

a. Encroachment on Environmentally Sensitive Areas

90. The project alignment is not within or close to environmentally sensitive areas. The existing road is located in a corridor that has been transformed already into its present agricultural landscape, grassland, shrub land, with settlements and roadside trees. The road corridor is not within undisturbed landscapes.

b. Impacts and Risks to Biodiversity Conservation

91. The issue of impacts and risks to biodiversity conservation is not applicable to this project since the road is not located in areas that have concerns on biodiversity conservation. The areas parallel to the road are not undisturbed and over the years the ecological changes due to human activities in those areas have resulted to its present predominantly agricultural landscapes.

B. Construction

a. Inadequate Disclosure of Project Information and GRM

92. To ensure that host communities are aware of the grievance redress mechanism and project implementation schedule and activities, these aspects will be communicated by the DPWH with LGU representatives, directly affected persons, and residents of the host communities. In particular, such communication will be carried out by the Environmental Officer (EO) of the Office of the District Engineer with the support of the CSC through consultations with the municipal and barangay officials in advance of activities, when and where noise, dust and other nuisances may be expected, etc. and how affected persons can access the GRM for environmental concerns related to the project.

93. The consultation for all interested stakeholders, will be conducted by the EO and CSC prior to commencement of site clearing and quarterly thereafter or as agreed with the stakeholders. The EO and CSC should ensure that stakeholders are properly informed and encouraged to attend the consultation.

b. Local Air Pollution

94. Air emissions during construction mainly arise from the operation of construction vehicles and clearing of rubble and demolished bridges, operation of quarry pits and hauling of materials. Emissions from rock crushing operations, aggregate drying, concrete batching plants and hot mix plants which will be required for works in specific roads also degrade air quality. Movement of haul trucks during spoil transport will also generate dust and has the potential to affect communities located along the route towards the spoil disposal area. The problem is present wherever construction is taking place in varying degrees, but is generally not as much as to affect regional air quality; however, impacts are most severe where there are communities, homes, businesses and institutional buildings in the vicinity of construction that causes local ground level air quality to deteriorate. Sensitive receptors located along the alignment of PR 06 are residential houses, schools, churches, barangay halls, hospitals/health center/clinics, daycare centers and markets/commercial establishments among others **(Appendix 2)**.

95. To minimize dust and gaseous emissions during construction phase, the contractor will ensure that:

- a) Regular water spraying/dampening dust emissions from disturbed soil, roadway construction surfaces and haul roads wherever there are sensitive receptors (as mentioned above) nearby is undertaken. Spraying will be done twice daily or at such frequency as is needed to suppress dust emission to acceptable levels.
- b) Regular removal of debris and spoil piles and clean-up after completion of a section.
- c) All vehicles transporting dusty materials will be tightly covered to prevent release of fugitive dust.
- d) Rock crushing, concrete batching plant, aggregate drying and surface treatment preparation operations (whether bituminous asphalt or spray seal mixes) will be located a sufficient distance (at least 500 m) from habitations and community environments including other sensitive receptors (churches, schools, medical facilities, etc.) to assure that there will be no community impacts from such activities. It is due to fine particles or offensive odor which such facilities generate often reach a point within 500m from the source under certain conditions (e.g. wind strength/direction). Establishment and operation of these facilities must be approved by the relevant authorities (e.g., EMB-DENR, LGUs).
- e) All equipment, machinery and vehicles used for the project must be well maintained to ensure proper functioning thereby minimizing contribution to air pollution.
- f) For storage areas of construction materials such as sand, gravel, cement, etc., provisions will be made to prevent materials from being blown away towards sensitive receptors.
- g) Roads will be regularly cleaned to remove tracked mud, cement, etc.
- h) Stockpiling of spoils near sensitive receptors will be prohibited.
- i) Asphalt plants, concrete batching plants and crushing plants will be equipped with dust suppression devices such as water sprays, dust collectors, covered conveyor, etc.
- j) Speed limits (at least 25 kilometers/hour) will be imposed on construction vehicles to minimize dust emission along areas where sensitive receptors are located.
- k) Burning of all types of wastes generated at the construction sites, work camps and other project-related activities will be strictly prohibited.
- l) Stockpiles of sand and aggregate greater than 20 m³ for use in concrete mixing will be enclosed on three sides, with walls extending above the pile and two meters beyond the front of the piles.
- m) Water sprays will be used during the delivery and handling of all raw sand and aggregates, and other similar materials, when dust is likely to be created and to dampen such stored materials during dry and windy weather to avoid impacts to sensitive receptors.

- n) Cement and other such fine-grained materials delivered in bulk will be stored in closed containers.

c. Noise

96. Noise impacts will originate from the operation of construction equipment. The range of typical noise levels in relation to distance from a construction site is shown in Table 18. Sensitive receptors within 100 m from the project road may be adversely affected by construction²³ noise. Noise levels due to construction activities should not exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime based on World Health Organization recommendations.

Table 18. Construction Noise / Distance Relationship

Distance from Construction Site (m)	Range of Typical Noise Levels (dBA)
8	82 – 102
15	75 – 95
30	69 – 89
61	63 – 83
91	59 – 79
122	57 – 77
152	55 – 75
305	49 – 69

Source: Dept. of Transportation (USA)

97. Construction noise levels are expected to exceed WHO guidelines and would temporarily affect sensitive receptors (SRs) close to the construction zone. Along PR 06, SRs found are residential houses, churches, schools, day care centers, hospitals, health centers, public markets/commercial establishments among others (**Appendix 2**). Table 19 indicates noise levels for common construction machinery.

Table 19. Construction Machinery Noise²⁴

Equipment	Noise Emission Level (dBA) at Distances (m) from Equipment										
	5	10	15	20	40	60	80	100	150	200	300
1 Bulldozer	86	80		74	68	64.5	62	60	56.5	54	50.5
2 Excavator	84	78		72	66	62.5	60	58	54.5	52	48.8
3 Loader	90	84		78	72	68.5	66	64	60.5	58	54.5
4 Land scraper	90	84		78	72	68.5	66	64	60.5	58	54.5
5 Mixing Equipment	87	81		75	69	65.5	63	61	57.5	55	51.5
6 Roller	87	81		75	69	65.5	63	61	57.5	55	51.5
7 Vibrator road roller	86	80		74	68	64.5	62	60	56.5	54	50.5
8 Backhoe			81								
9 Compactor			82								
10 Concrete mixer			85								
11 Crane (mobile)			83								
12 Generator			81								
13 Jack hammer			88								
14 Paver			89								
15 Pneumatic tool			85								
16 Pump			76								

²³ For example, when a construction machine with 110 dBA of acoustic power level such as a concrete breaker operates, noise level of 70 dBA is expected to reach at 90 m far from the source, based on an authorized theoretical formulation.

²⁴ Source: PPTA taken from various sources.

Equipment	Noise Emission Level (dBA) at Distances (m) from Equipment										
	5	10	15	20	40	60	80	100	150	200	300
17 Shovel			82								
18 Truck			88								

Source for Equipment 1-7: Initial Environmental Examination (IEE) of the Proposed Logistics development Project. Government of Mongolia. 2011.

Source for Equipment 8-18: Based on Figure 1 – Construction Equipment Noise Ranges. Noise from Construction Equipment and operations, Building Equipment and Home Appliances. US-EPA. 31 December 1971.

A blank field indicates no data available.

98. Noise impacts are an unavoidable consequence of construction that will be mitigated through implementation of the following measures:

- a) Limit the duration of noisy construction activities to daylight hours, whenever possible, in the vicinity of sensitive receptors.
- b) In areas near houses or noise-sensitive sites, noisy equipment will not be operated during nighttime to early morning (19:00H – 06:00H).
- c) Workers exposed to high noise levels will be provided with ear plugs.
- d) The contractors will provide prior notification to the community on the schedule of construction activities.
- e) Whenever possible, noisy equipment will be completely enclosed which can significantly reduce noise levels.
- f) Any stationary equipment that produce high noise levels (e.g., portable diesel generators, compressors, etc.) will be positioned as far as is practical from sensitive receptors.
- g) Construction traffic routes will be defined in cooperation with local communities and traffic police to minimize noise and nuisance.
- h) Vehicle speeds will be reduced around sensitive receptors.
- i) Concrete batching plants will be located at least 500 m away from sensitive receptors.
- j) Temporary noise barriers will be installed along the edge of the road, as necessary, in front of sensitive receptors facing heavy construction activities.
- k) Prior to undertaking noisy activities, the contractor will consult with village leaders and representatives from the religious sites and schools along the project road regarding construction schedule so as to minimize disturbance to important events such as ceremonies, examination period and the like.

d. Impacts due to Spoils Disposal

99. The Project will generate spoils from road widening and replacement of concrete spillways. To ensure proper handling and disposal of such materials, prior to excavation, contractors will submit a spoils disposal plan to concerned authorities such as LGUs and DPWH for approval. A copy of the approved plan will be submitted to ADB. The plan will show the location of proposed excavation sites, cut locations, fill and/or disposal sites for excess cut and, and disposal sites for concrete resulting from spillway/bridge demolition. This plan shall form part of the CEMP.

100. The plan will include photographs of the sites and will also indicate the existing land use and capacity of the disposal site. The contractor will ensure that spoils disposal will not encroach on surface water courses, will not cause sedimentation or obstruction of stream/river flow and not cause damage to agricultural land, irrigation, densely vegetated areas, forests, properties and other productive sites.

e. Impacts from Operation of Borrow Areas and Quarries

101. The Project will require embankment fill and construction materials that will be sourced from borrow pits and quarries. For commercial borrow pits and quarries, the contractor will

ensure that only facilities with necessary environmental permits will be used for the project. For project-specific facilities, i.e., those that will be established and solely operated for the project, the contractor will ensure that these are covered by necessary environmental permits. Copies of the permits shall be provided and included in the CEMP.

102. Prior to operation of these facilities, the contractor will submit to the LGU and DPWH a plan showing the location/s of borrow pits and quarries to be used, as well as timeframe and mitigation measures to be implemented to rehabilitate project-specific borrow pits and quarries. The contractor will also ensure that topsoil will be properly removed, stockpiled and preserved for later use during restoration of the borrow pit. Vegetation cover will also be provided during rehabilitation of the site. Upon completion of extraction activities, quarries and borrow pits will be dewatered, signages and fences installed, as appropriate, to minimize health and safety risks.

f. Erosion and Unstable Slopes

103. Soil erosion and unstable side slopes susceptible to landslides are anticipated along the alignment of PR 06 where raising of embankment maybe required. Impacts due to soil erosion and unstable side slopes may include: i) increased run off and sedimentation causing a increased flood hazard downstream; ii) loss of topsoil that could affect vegetation; (iii) deposition of sediments to water bodies such as rivers and streams thereby adversely water quality and aquatic organisms; iv) damage to vegetation by burying or gulling; and v) development of unsightly cuts and fills that have been riddled by uncontrolled erosion and gulling. The above impacts will be addressed through:

- a) Planting of native species of trees and landscaping along the roads and embankment slopes, as appropriate.
- b) Construction activities in hilly areas will be carried out intensively during dry season. However, as the area is not generally typhoon-prone, construction work during wet season is likely feasible.
- c) Slope protection measures (e.g., sodding) will be implemented to avoid impacts to agricultural land and adjacent properties. Areas to be cleared of vegetation for construction will be restricted to the minimum required for immediate works.

g. Deterioration of Water Quality and Soil Contamination

104. The potential sources of water pollution associated with different construction activities include excavation and filling, bore piling and pier construction for bridge works, concrete mixing, refueling facilities, and equipment maintenance. Water from concrete batching plants and casting yards is expected to be alkaline with high concentration of total suspended solids (TSS). Measures to minimize impacts to soil and water quality are as follows:

- a) Control of siltation during construction will be achieved through limiting the exposure of areas prone to erosion.
- b) Observing proper management of spoils by surrounding the stockpile with bund.
- c) Transporting spoils immediately to final disposal sites.
- d) Sodding the spoils stockpile if prolonged storage is necessary.
- e) Bentonite slurry used during bridge construction will be collected and processed in a closed system and discharge into watercourses will be prohibited.
- f) Spillage of bentonite in agricultural land will be cleaned immediately to prevent caking and hardening.
- g) Prior to establishment and operation of concrete batching plants and casting yards, the contractor will obtain the necessary environmental permits.
- h) Retention ponds with sufficient specifications/capacity will be constructed for treatment of wastewater (e.g., from washing of equipment such as mixer drums, trucks and chute, contact storm water, etc.).

- i) The contractor will operate and maintain the retention ponds to ensure that effluent quality will meet applicable standards.
- j) Equipment service and maintenance yards will be provided with impermeable flooring and collection sump.
- k) Water tight receptacles will be provided in all the equipment maintenance shops for waste oil, oily rags, spent oil filters, solvents and oily containers.
- l) Disposal of wastes contaminated with hydrocarbons will be through authorized waste handlers and recyclers.
- m) Refueling and servicing of equipment will only be carried out in areas adequately equipped to collect leaks and spills.
- n) Fuel and other hydrocarbons will be stored in a roofed area that has an impervious floor and bund around it.
- o) Fuel storage area will be located away from water-courses, flood-prone areas and workers camps.
- p) There will be availability of spill clean-up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored and used.
- q) If spills or leaks of hazardous materials do occur, immediate clean-up will be undertaken.
- r) Relevant construction personnel will be trained in handling of fuels/hazardous substances and spill control procedures.
- s) All storage containers of hazardous materials and wastes will be properly labeled and maintained in good condition.
- t) Restoration of temporary work sites will include removal and treatment or proper disposal of oil contaminated soils.

h. Loss of Vegetation

105. The project will require removal of roadside trees and other vegetation (shrubs, grass, agricultural crops, etc.) to give way to road improvement and widening. The tree inventory carried out based on the detailed design shows that there are 10,867 roadside trees that will need to be cut inside the 30-m right of way (**Appendix 1**). A tree inventory to be conducted by the DENR CENRO is recommended to verify from which among these trees are actually identifiable as endangered, critically endangered or vulnerable species similar to the inventory done for PR 07 that involved DENR CENRO of Zamboanga del Norte. This DENR-CENRO activity shall be conducted prior to the tree-cutting activity during the pre-construction phase of the project as part of the tree-cutting permitting requirement. This is to ensure accurate identification based on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species 2017 and/or The National List of Threatened Philippine Plants (NLTPP) under DENR Administrative Order No. 2007-01.

106. Since none of these areas are within protected areas or are critical habitats/high biodiversity areas which support survival of critically endangered species, ecological impacts are not considered significant.

107. While compensation for all cut trees will be paid to affected persons consistent with the resettlement plan separately prepared for the project, this does not guarantee that the private land owner will replace the trees. To compensate for the loss of trees, the following will be implemented:

- a) DPWH will obtain a tree cutting permit in compliance with PD 705 (Revised Forestry Code of the Philippines). No tree cutting will be undertaken without the necessary permit to be issued by the Community Environmental and Natural Resources Office (CENRO) of the DENR.

- b) The tree cutting program, which will be undertaken by DPWH through a contractor, will be based on the Tree Chart to be prepared by the CENRO. The said chart will be generated through a tree inventory (also to be conducted by the CENRO) detailing the species, diameter at breast height and global positioning system (GPS) reading of each tree. The Tree Chart will also include a site development plan/road alignment plan indicating the location of each tree to be cut.
- c) Marking of each tree will be carried out by the CENRO staff. Tree cutting can only be undertaken under close supervision of CENRO staff who will be present at the site throughout the duration of cutting activities. Cut trees will be turned over to the CENRO.
- d) DPWH will undertake replacement of cut trees in compliance with DENR Memorandum Order no. 05 of 2012: Uniform Replacement Ratio for Cut or Relocated Trees which mandates that *"For planted trees in private and forest lands not covered under item 2.1 (i.e., private lands and forest lands exclusively established for tree plantations/timber production purposes) tree replacement shall be 1:50 while naturally growing trees on the same areas, including those affected by development projects shall have 1:100 ratio in support of the National Greening Program (NGP) and climate change initiatives of the Government"*. Such tree replacement is further mandated in a Joint Memorandum Circular No. 2, series of 2014: Guidelines for the Implementation of the DPWH-DENR-DSWD Partnership on the Tree Replacement Project co-signed by the Secretaries of the DPWH, DENR and Department of Social Welfare and Development (DSWD). Based on the above ratio, it is estimated that DPWH will be required to purchase 1,086,700 tree seedlings to be turned over to the CENRO. The species will be determined by the CENRO. The seedlings will be distributed in various areas for replanting consistent with the NGP. Only the cost of seedlings (estimated at PHP 5.5 M or USD 108,670²⁵) will be shouldered by DPWH since the cost for replanting and maintenance will be covered under the NGP budget.
- e) DPWH will ensure that one of their environment specialists and/or that of the supervision consultant will closely monitor the tree cutting activities to ensure that these will comply with the provisions of the Tree Cutting Permit and corresponding Tree Chart. As part of the semi-annual environmental monitoring report to be submitted to ADB, DPWH will report on the status of tree cutting, any issues/concerns, corresponding actions and other relevant matters.
- f) To avoid unnecessary impacts to vegetation, the contractor will prohibit cutting of trees for firewood and for other uses in the Project and will ensure that tree cutting is limited to areas as approved by the CENRO.

i. Occupational Health and Safety Hazards

108. Workers will be exposed to safety hazards due to operation of heavy equipment, performance of other construction activities, etc. as well as health hazards associated with inadequate sanitation facilities and other accommodation amenities, etc. The following measures will be implemented by the contractor to minimize adverse impacts:

- a) Use of personal protective equipment (PPE) such as safety shoes, safety hat, goggles, safety belt, ear protection or other garments or equipment designed to protect the wearer's body from injury will be strictly observed during construction.
- b) Provision of first aid kits that are readily available to workers as well as access to or availability of a health worker to attend to any immediate health needs of workers and in case of untoward incidents.
- c) Conduct orientation for construction workers regarding health and safety measures, emergency response in case of accidents, fire, etc., and prevention of HIV/AIDS and other related diseases.

²⁵ Exchange rate used: 1 USD is to PHP 50.

- d) Installation of adequate drainage in workers camps to avoid water logging/accumulation of stagnant water and formation of breeding sites for mosquitoes.
- e) Provision of separate clean housing with sufficient ventilation and separate hygienic sanitation facilities for male and female workers
- f) Provision of reliable supply of water for drinking, cooking and washing purposes at the workers' camps.
- g) Proper collection and disposal of solid wastes within the workers'/construction camps consistent with local regulations.
- h) Provision of fire-fighting equipment at the work areas, as appropriate, and at workers camps.
- i) Treatment of wastewater emanating from workers camps, construction camps and other project-related activities and facilities consistent with national regulations.
- j) Use of reversing signals on all construction vehicles.

j. Public Health and Safety Hazards

109. Health and safety hazards may also be experienced by adjoining communities due to activities that will generate elevated noise levels and excessive dust, unsafe construction practices, etc. To protect the health and safety of host communities, the following measures will be implemented by the contractor:

- a) Installation of sturdy fencing or barriers/barricades (such as G.I. sheets, phenolic boards/plywood, wood fences derived from cut trees along the worked areas, filled up used fuel drums with soil or gravel in drainage excavations, concrete jersey barriers or water-filled plastic jersey barriers, bamboo fencing, or barbed wire fencing depending on the extent of excavation works) around excavation areas and construction sites.
- b) Provision of proper signage and lighting at night at the periphery of the construction site to warn and direct traffic and pedestrians.
- c) Deployment of security personnel in hazardous areas to restrict public access.
- d) Imposition of speed limits for construction vehicles along residential areas and where there are other sensitive receptors.
- e) Orientation of drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.
- f) If necessary, provide safe passageways for pedestrians crossing the construction site.
- g) At construction areas, provide safe access to farmland and other properties.

k. Traffic Obstruction

110. The project will affect land access in a number of ways during the construction stage since civil works will be undertaken on an existing road. Hauling of construction materials through the main thoroughfares will also add to the present volume of traffic. Construction activities will require partial road closure which can cause traffic delays and unsafe conditions for vehicles and pedestrians. The contractor will implement the following to minimize impacts:

- a) Provide signs advising road users that construction is in progress, particularly in areas where the project alignment crosses existing roads and where construction related-facilities are located.
- b) Employ flag persons to control traffic when construction equipment is entering or leaving the work area.
- c) Post traffic advisory signs (to minimize traffic build-up) in coordination with local authorities.

I. Accidental Discovery of Artefacts

111. In the event of unanticipated discoveries of cultural or historic artefacts (movable or immovable) in the course of the work, the contractor will take all necessary measures to protect the findings. Procedures to be followed in case of discovery of artefacts are:

- a) Contractor to immediately cease operations at the site of discovery
- b) Contractor to inform the CSC and Environment Officer of the Office of the District Engineer
- c) CSC to relay information to DPWH,
- d) DPWH to notify the National Historical Commission of the Philippines (NHCP) and/or other concerned government agencies for the next steps
- e) Recommence work only after NHCP has provided official notification accordingly

m. Damage to Properties

112. Local roads will be likely used to transport equipment, construction materials and spoils. Since local roads are usually unpaved and has low load bearing capacities, use of these roads by the project may result to deterioration of the roads which can cause inconvenience to the local communities. Damage to properties such as houses, other structures, agricultural land, water supply facilities, etc. may also occur due to operation of vehicles and equipment, and construction-related activities. The contractor will implement the following measures to address such impact:

- a) The contractor will immediately repair and/or compensate for any damage that it causes to properties (houses, farmlands, aquaculture ponds, irrigation canals, etc.), community facilities such as water supply, power supply, communication facilities and the like.
- b) Access roads used for transport of construction materials and other construction-related activities will be maintained by the Contractor in at least in their pre-project condition for the duration of construction.

n. Unanticipated Environmental Impacts

113. If any unanticipated impacts become apparent during project implementation, the DPWH will update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts. The updated or newly prepared documents will be submitted to ADB for review, clearance and public disclosure.

C. Operation Phase

a. Air Quality

114. The impact on air quality during operation stage depends upon traffic volume, traffic fleet including fuel type and prevailing atmospheric conditions. An unstable atmospheric condition disperses pollutants more and results in to low pollutant concentrations while stable atmospheric conditions build-up the pollution level. To assess the likely impacts on the ambient air quality due to the proposed road project, the prediction of nitrogen dioxide (NO₂) and particulate matter (PM) concentrations will have to be carried out using line source dispersion modeling approach, based on Gaussian equation.

115. The model was set up and run to predict 1-hourly increment in NO₂ and PM₁₀ concentrations for the base year 2015 to 2040 quinquennially, using forecasted traffic data on the proposed road. The PPTA report provided the following average daily traffic (cars/day) estimated in 2015 as follows: small – 555; and large – 145. Traffic demand estimation based

on the traffic growth rates established during the PPTA for Region IX expressed in % per annum is as shown below:

Table 20. Traffic Demand Estimation 2015-2040 Region IX (in % pa)

Vehicle type	2015	2020	2025	2030	2035	2040
Small		4.1	3.9	3.5	3.5	3.6
Large		4.6	4.9	5.0	4.8	4.5

Source: TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045), prepared by the DPWH for the ADB, February 2016.

116. Since the impacts of other pollutant concentrations are considered not major in this case, this study focuses on the NO₂ and PM₁₀ dispersion, to be generated from the traffic on the improved PR 06. Input parameters for the pollutant concentration prediction for CALINE-4 include traffic volume, road geometry, emission factors, meteorological conditions (e.g. wind speed/direction, ambient temperature etc.) and receptor location (distance from the edge of the road). The predicted hourly average concentrations of NO₂ and PM₁₀ during peak traffic are shown in Table 21 and Table 22, respectively at six selected receptor locations.

Table 21. NO₂ Predicted Concentrations (ppm) along PR06

Year	Predicted NO ₂ Concentration (ppm)											
	Distance from the edge of the road, m (left side)						Distance from the edge of the road, m (right side)					
	200	100	40	20	10	1	1	10	20	40	100	200
2015	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
2020	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
2025	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
2030	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
2035	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.00	0.00
2040	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.00	0.00

Source: PPTA

Table 22. PM₁₀ Predicted Concentrations (µg/m³) along PR 06

Year	Predicted PM ₁₀ Concentration (µg/m ³)											
	Distance from the edge of the road, m (left side)						Distance from the edge of the road, m (right side)					
	200	100	40	20	10	1	1	10	20	40	100	200
2015	0.2	0.3	0.4	0.5	0.6	0.8	0.8	0.6	0.5	0.4	0.3	0.2
2020	0.2	0.3	0.5	0.6	0.8	1.0	1.0	0.8	0.6	0.5	0.3	0.2
2025	0.3	0.4	0.6	0.7	0.9	1.2	1.2	0.9	0.7	0.6	0.4	0.3
2030	0.3	0.5	0.7	0.9	1.0	1.4	1.4	1.0	0.9	0.7	0.5	0.3
2035	0.4	0.5	0.8	1.0	1.2	1.5	1.5	1.2	1.0	0.8	0.5	0.4
2040	0.4	0.6	0.9	1.1	1.3	1.7	1.7	1.3	1.1	0.9	0.6	0.4

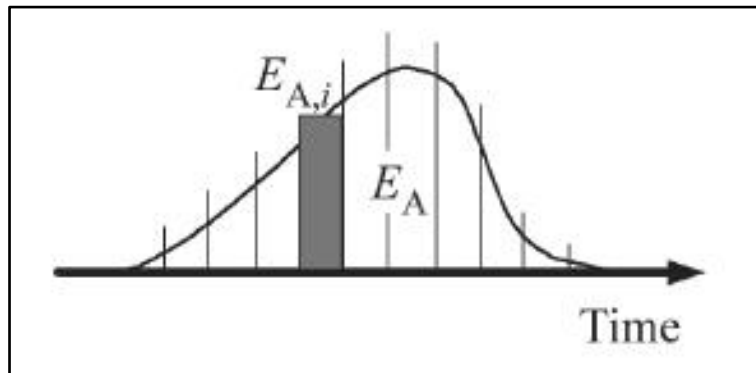
Source: TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045), prepared by the DPWH for the ADB, February 2016.

117. Observation from the model output indicate that when traffic volume increases, the concentration of air pollutants also increases correspondingly. Based from the PPTA report, however, the maximum predicted pollutant concentrations of NO₂ and PM₁₀ which will be generated by the traffic are not considered to worsen the future ambient condition. The national ambient air quality guideline value for NO₂ is 0.2 ppm (24 hours) and 150 µg/m³ for PM₁₀ (24 hours).

b. Noise

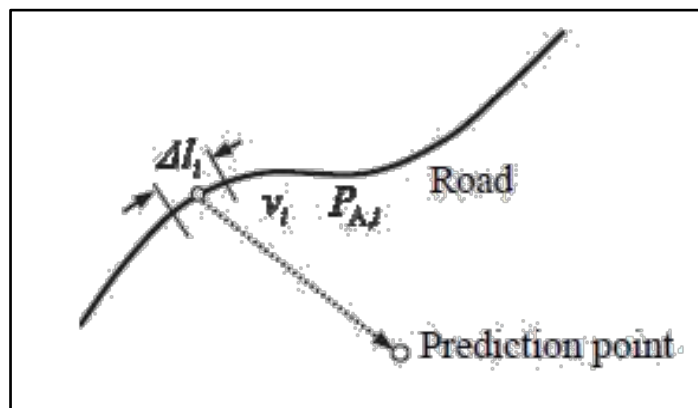
118. During operations, noise emissions from road vehicles may disturb community life and the living environment. Noise impacts from vehicles travelling along these roads are not expected to be significant due to the light traffic loads and the improved road surfaces for smooth driving.

119. The prediction model of road traffic noise, ASJ RTN-Model, computes the equivalent continuous A-weighted sound pressure level, LAeq, as described in the previous section. As the first step to calculate LAeq, the “unit pattern”, a time history of A-weighted sound pressure level at a prediction point is obtained as illustrated in **Figure 10** and **Figure 11**. Next, the unit pattern is integrated in terms of energy over the time of the passage of a vehicle to obtain the single-event sound pressure exposure level, LAeq. By applying the traffic volume NT, which means number of vehicles in T seconds, to the above value, LAeq, T is calculated by the following formula.



Source: The Acoustic Society of Japan

Figure 10. Sound Propagation from a Sound Source to a Prediction Point



Source: The Acoustic Society of Japan

Figure 11. Unit Pattern

120. As the worst case scenario, it was assumed that peak noise will be generated when one of each vehicle type is using a specific section of the road, by using the formula below:

$$L_{Aeq} = 10 \log_{10} \left(\sum_{i=1}^n 10^{(L_i/10)} \frac{N}{3600} \right) = L_{AE} + 10 \log_{10} N - 35.6$$

where:

LAeq = Predicted noise level, in dBA

Li = Rated noise rating, in dBA

N = Traffic volume per hour, in cars/h

LAE = Single-event sound pressure exposure level, in dB

121. The general flow for the calculation of road traffic noise is outlined as follows.

- The first step of the procedure is to set the road structure, the position of the source, the prediction point, the acoustical obstacles and ground surface conditions over the propagation path.
- The lane position for noise calculation is arranged one by one at the center of an each actual center lane. However, it is possible to combine two or more lanes into one hypothetical lane. For instance, a hypothetical lane can be arranged both at the center of an up and a down lane, respectively.
- Discrete source positions are arranged. Generally the range is within $\pm 20l$ (l: the shortest distance from the calculation lane to the prediction point) at an interval of l or less.
- Sound power level of the source, LWA, is set considering the running condition of the vehicle, the running speed of the vehicle and the corrections.
- The unit pattern is calculated separately by lane and by vehicle type, when one vehicle runs on the objective road.
- Time integration value of the unit pattern is calculated. The value corresponds to a single event sound exposure level, LAE. Finally, the equivalent continuous A-weighted sound pressure level, LAeq, T is calculated considering the traffic volume during the time interval as the time energy mean level.
- The calculation procedure from (A) to (F) is done by lane and by vehicle type, and the calculated values are added in energy-base in order to obtain the total noise level from the entire road at the prediction point. If necessary, structure borne noise from viaduct, attenuation due to buildings and influence by meteorological conditions are considered

122. The model was set up and run to predict daily LAeq for the base year (Yr 2015) to Yr 2040 quinquennially, using forecasted traffic data on the improved road.

123. While predicted ambient levels exceed WHO guidelines (Table 22) for residential, institutional and educational areas, the increase by year 2030 at the nearest receptor along the road compared to year 2015 noise levels would be below 3 dBA (Table 23) which is the maximum increase (3 dBA) specified in the WHO guidelines for noise. These guidelines are set out in the International Finance Corp.-World Bank Group's Environment, Health and Safety Guidelines (2007).

Table 3. Noise Standards in General Areas (dBA)

Receptor	Daytime (7am-10pm)	Nighttime (10pm-7am)
A – residential, institutional, educational	55	45
B – industrial, commercial	70	70

Source: Guidelines for Community Noise, World Health Organization (WHO), 1999

Table 4. Predicted Ambient Noise Levels along PR 06

Year	Predicted Ambient Noise Levels (LAeq) in peak hour dB (A)									
	Distance from the edge of the road, m (left side)					Distance from the edge of the road, m (right side)				
	100	40	20	10	1	1	10	20	40	100
2015	51.8	55.6	58.3	60.7	66.8	66.8	60.7	58.3	55.6	51.8
2020	52.6	56.4	59.1	61.6	67.6	67.6	61.6	59.1	56.4	52.6
2025	53.4	57.2	59.9	62.4	68.4	68.4	62.4	59.9	57.2	53.4
2030	54.1	57.9	60.6	63.1	69.1	69.1	63.1	60.6	57.9	54.1
2035	54.7	58.5	61.2	63.7	69.7	69.7	63.7	61.2	58.5	54.7
2040	55.3	59.1	61.8	64.2	70.3	70.3	64.2	61.8	59.1	55.3

Source: TA-8574 PH: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045), prepared by the DPWH for the ADB, February 2016.

124. By 2035 based on the above table, the predicted increase in ambient noise at the nearest receptor along the road compared to year 2015 noise levels would be above 3 dBA (3.4 dBA). This increment exceeds the guideline for noise level increase). The recommendation to address noise impacts during the planned period traffic may include calming measures, e.g., speed bumps, that may be provided in areas where there are sensitive receptors so as to further reduce noise levels from passing vehicles. In addition, regular maintenance of pavement and traffic management especially near receptors would also further contribute to lower ambient noise levels.

c. Induced Impacts

125. The Project will be carried out on an existing road and there is not likely to be any significant or abrupt change to the current pattern of movements caused by road upgrading. The project's induced impacts will be mainly positive. These benefits include improved access to social services and improved economic development opportunities.

VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

126. Public consultations are needed to generate awareness, informed opinions/views, and suggestions/approaches. It is important that misconceptions are clarified and stakeholders are fully aware and informed about the project to eventually stimulate dynamic participation and support in the implementation of the development activities in the locality. It is important that the IEC be produced in local dialect to ensure effective understanding of the target populace. The components of the IEC are the following:

- Dissemination of the outputs of the impact assessment Information on the project design
- Information on project implementation and monitoring

127. The proposed project has been presented to stakeholders through various consultation meetings held during the preparation of the Project and throughout the detailed engineering phase during the preparation of the environmental impact statement (EIS) required by EMB 9 for the application of an Environmental Compliance Certificate (ECC); and the resettlement and indigenous people' plan (RIPP). Likewise, the highlights of the IEE were communicated to the stakeholders during the PPTA through public presentation or distribution of information materials. The information included the following:

- Brief project description showing per road component.
- Potential environmental and socioeconomic issues/impacts per project phase

- Recommended mitigation and enhancement measures addressing both negative and positive impacts of the project
- Commitments/agreements and guarantees made by the proponent to comply with all the proposed measures and recommendations
- Participation of the stakeholders in project implementation

128. In compliance with the requirements of ADB's Safeguard Policy Statement (SPS) (2009 and DAO 2003-30, public consultations were carried out to primarily inform the community about the proposed project and to provide opportunity to the community to participate and make clarifications on pertinent matters related to the project. On August 19, 2015, the PPTA consultants conducted two public consultation for PR 06 (Table 24 and Appendix 3). These were attended by representatives of different sectors and organizations that will be affected by the project implementation. No significant environmental issues were brought up during the consultation besides the issue on resettlement. The issues and concerns raised in the other areas are similar, centering on the issue of resettlement.

Table 235. Summary Matrix of Public Consultation²⁶

DATE	VENUE	GENDER		TOTAL PARTICIPANTS
		Male	Female	
08/19/15 (AM)	Rogelio Roa Sr. Gym, Alicia, ZS	42	58	106
08/19/15 (PM)	Municipal Hall, Malangas, ZS	12	4	

129. During the detailed engineering design, the Design and Supervision Consultant appointed for the assignment conducted another set of public consultation as required by the Environmental Management Bureau Region 9 (EMB Region 9) in connection with the preparation of the environmental impact statement (EIS) for the application of the subproject' Environmental Compliance Certificate (ECC). These were conducted together with EMB Region 9 Staff on August 15, 2016 (in the Municipality of Alicia in the morning); and in the Municipality of Malangas on August 15, 2016 in the afternoon. The major concerns revolved around involuntary resettlement. Issues about dust during the dry construction days, and mud during the rainy season were brought out which should be mitigated during the construction period.

130. Thereafter on various dates in 2017, additional public consultations in connection with the preparation of the resettlement and indigenous peoples' plan were conducted in the fifteen (15) barangays traversed by the road.

131. During the PPTA, a focus group discussion (FGD) was also carried out on June 19, 2015, at Alindahaw Hotel, Pagadian City participated by the Community of Environmental and Natural Resources Officers, Provincial Environmental Officer, and representatives from Regional Office of the Department of Environment and Natural Resources Region IX. Table 25 summarize the output of the FGD.

Table 6. Perceived Impacts of the Proposed Road Projects

Positive Impacts	Negative Impacts
1. Increase of zonal valuation of land along highways	
2. Increase revenue collection	Influx of migrants resulting to environmental threats like solid waste build-up and shortage of

²⁶ Conducted during the PPTA.

	health/sanitary facilities
3. Improve accessibility/transport of goods and services as hastened	Resource use becomes very high (e.g., tree cutting)
4. Facilitate environmental monitoring and supervision	
5. Improve business opportunity/tourism and trade	
6. Increase literacy rate	
7. Neutralize peace and order hotspots	
8. Eliminate "hide out" of lawless elements	
9. Environmental mitigation activity will improve	

Source: TA-8574 PH: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045), prepared by the DPWH for the ADB, February 2016.

VII. GRIEVANCE REDRESS MECHANISM

132. A subproject-specific grievance redress mechanism (GRM) will be established at the DPWH District Engineering Office (DEO) to receive, evaluate and facilitate the complaints/grievances of affected persons on the sub-project's environmental performance. This mechanism will be disclosed to the host communities prior to commencement of site works.

133. The District Engineer will appoint an Environment Officer and will establish the Grievance Redress Committee (GRC) to be chaired by the DPWH District Engineer. Members will include the following: (i) the contractor's highest official at the site such as the Construction Manager or the Construction Superintendent; (ii) barangay chairperson; and (iii) environment specialist of the construction supervision consultant. For the quick filing of complaints, the DGRC will use the attached grievance intake form (**Appendix 4**). The DEO's Environment Officer will be responsible for registration of grievances and communication with the aggrieved party. To facilitate addressing complaints, the contractor will be required to provide contact details of its representative(s) on site in its campsite offices and in project billboards that will be erected at the starting point of the project. The billboard shall likewise include the contact details of DPWH representatives in the event complaints are not readily addressed by the contractor on-site.

134. The steps to be followed in filing complaints and the procedures for redress are the following:

- (i) complainant will provide the background and file the complaint directly either verbally or in writing to the on-site contractor representative(s), and Barangay through its officials for immediate corrective action;
- (ii) the contractor(s) representative is then required to act immediately on valid complaints and record such complaints in a complaints registry that must be maintained on site;
- (iii) complaints that cannot be immediately attended to by the Contractor shall be filed either verbally or writing to the DEO, and or the DEO's Environment Officer who will assist the complainant in filling-up the grievance intake form;
- (iv) within 2 working days, the Environment Officer, contractor's representative, and complainant will discuss if the complaint can be resolved without calling for a GRC meeting;
- (v) within 3 days of lodging the complaint, the DEO's Environment Officer will provide the complainant a written feedback on the process, steps and timeframe for resolving the complaint.
- (vi) if the complaint cannot be resolved, a GRC meeting with the complainant will be called within 5 working days;
- (vii) the GRC will have 15 days to resolve the complaint;
- (viii) the complainant will receive feedback from the DEO's Environment Officer within 5 working days after the various steps of the GRM are completed.

- (ix) if unsatisfied with the decision, the existence of the GRC will not impede the complainant's access to the Government's judicial, administrative remedies or through concerned government agencies (e.g., Community Environment and Natural Resources Office and Provincial Environment and Natural Resources Office of DENR, Regional offices of the Environmental Management Bureau, etc.)

135. The GRC will receive, follow-up and prepare monthly reports regarding all complaints, disputes or questions received about the Project and corresponding actions taken to resolve the issues. These reports will be included in the semi-annual environmental monitoring reports to be submitted by DPWH to ADB.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

136. The Environmental Management Plan (EMP) is the synthesis of all proposed mitigation and monitoring actions, set to a time-frame with specific responsibility assigned and follow-up actions defined. It contains all the information for the proponent, the contractor and the regulatory agencies to implement the project within a specified time-frame

137. This EMP consists of a set of mitigation, monitoring and institutional measures to be taken for the project to avoid, minimize and mitigate adverse environmental impacts and enhance positive impacts. The plan also includes the actions needed for the implementation of these measures. The major components of the EMP are:

- (i) Mitigation of potentially adverse impacts;
- (ii) Monitoring of EMP implementation during project implementation and operation;
and
- (iii) Institutional arrangements to implement the EMP.

138. The main objectives of this EMP are:

- (iv) To ensure compliance with ADB's applicable safeguard policies, and regulatory requirements of the Government of the Philippines;
- (v) To formulate avoidance, mitigation and compensation measures for anticipated adverse environmental impacts during construction and operation, and ensure that environmentally sound, sustainable and good practices are adopted;
- (vi) To stipulate monitoring and institutional requirements for ensuring safeguard compliance; and
- (vii) The project roads and relative facilities should be environmentally sustainable.

139. The identified environmental issues and corresponding mitigation measures and monitoring are provided in Table 26 and Table 27. The responsibilities for implementing the EMP are presented in Table 28.

140. Each contractor will prepare and submit a contractor's environmental management plan (CEMP) consistent with this EMP, prior to start of construction. The CEMP should provide details of activities and location of facilities specific to the contract package such as batching plant and construction camp. It should be cleared by DOH and ADB before any physical activity is started on the site. The CEMP should clearly state that the project will comply with relevant Philippine laws and the ADB Safeguard Policy Statement (SPS) 2009 and the contractor will be responsible for CEMP compliance of the subcontractors.

Table 24. Environmental Management Plan

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
Pre-construction Stage					
1. Inadequate disclosure of project information and grievance redress mechanism	a) Before commencement of site clearing and civil works, the grievance redress mechanism (GRM) as well as project implementation schedule and activities will be communicated with the LGU representatives of the host communities. Such communication will be carried out through consultations with the municipal and barangay officials in advance of activities, when and where noise, dust and other nuisances may be expected, etc. and how affected persons can access the GRM for environmental concerns related to the project. The consultation will continue on a quarterly basis or as agreed with the stakeholders.	Part of Project cost	DPWH/construction supervision consultant (CSC)	Environment and Social Safeguards Division (ESSD) of DPWH/CSC	Mobilization period prior to site clearing and civil works; and quarterly or as agreed with stakeholders
2. Improper implementation of environmental management plan (EMP)	<p>a) Engage qualified Environmental, Health and Safety Officer (EHSO) who will ensure compliance with environmental, health, and safety statutory requirements, contractual obligations and EMP provisions.</p> <p>b) Conduct baseline environmental quality measurements (air-noise, and water) prior to construction following inclusion of this requirement in the tender document and followed through during the review and approval of the CEMP.</p> <p>c) Prepare and submit a contractor's environmental management plan (CEMP), based on the project EMP and with specific</p>	Part of bid cost	<p>Preparation: Contractor</p> <p>Review and approval: DPWH and CSC</p>	ESSD/CSC	During the contractor mobilization period; and as often when the need arise due to the requirements of the construction activities.

²⁷ Contractor should take note of the EMP requirements in the tender documents and provide indicative costs during the tendering process, and preparation of the CEMP based on their experience, best practice, and best judgement to ensure compliance with the EMP requirements.

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	<p>details (location of sensitive receptors, associated facilities, etc.) relevant to the particular contract package or lot, to be approved by DPWH and CSC prior to start of construction.</p> <p>d) Prior to establishment of facilities such as concrete batching plant and asphalt batching plant, the contractor will prepare a CEMP to address impacts due to operation of such facilities. The plans will be reviewed and approved by the CSC and DPWH to ensure that these are consistent with the provisions of the project's environmental management plan (EMP). A copy of the CEMP will be submitted to ADB before establishment of the facilities.</p>				
Construction Stage					
3. Local air pollution	<p>a) Provide signages informing public and contractor staff to observe speed limit of at least 25 kph in populated areas (sensitive receptors) of the community.</p> <p>b) Regular water spraying/dampening dust emissions from disturbed soil, roadway construction surfaces and haul roads wherever there are sensitive receptors (such as houses, churches, businesses, schools, medical facilities) nearby is undertaken. Spraying will be done twice daily or at such frequency as is needed to</p>	<p>Part of bid cost</p> <p>Part of bid cost</p>	<p>Preparation: Contractor</p> <p>Contractor</p>	<p>Compliance monitoring: DPWH, CSC, Community/Barangay Officials</p> <p>ESSD/CSC</p>	<p>During the contractor mobilization period; and as often when the need arise due to the requirements of the construction activities.</p> <p>During dry construction days.</p>

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	suppress dust emission to acceptable levels				
	c) Regular removal of debris and spoil piles and clean-up after completion of a section.	Part of bid cost	Contractor	ESSD/CSC	As often when construction activities require.
	d) All vehicles transporting dusty materials will be tightly covered to prevent release of fugitive dust.	Part of bid cost	Contractor	ESSD/CSC	During each hauling activities.
	e) Rock crushing, concrete batching plant, aggregate drying and surface treatment preparation operations (whether bituminous asphalt or spray seal mixes) will be located a sufficient distance (at least 500 m) from habitations and community environments including other sensitive receptors (churches, schools, medical facilities, etc.) to assure that there will be no community impacts from such activities	Part of bid cost	Contractor	ESSD/CSC	During the contractor mobilization period following locational guidelines; and during facility operation.
	f) Establishment and operation of rock crushing, concrete batching plant, aggregate drying and surface treatment preparation operations (whether bituminous asphalt or spray seal mixes) must be approved by the relevant authorities (e.g., EMB-DENR, LGUs).	Part of bid cost	Contractor	ESSD/CSC	
	g) All equipment, machinery and vehicles used for the project must be well maintained to ensure proper functioning thereby minimizing contribution to air pollution.	Part of bid cost	Contractor	ESSD/CSC	During the contractor mobilization period; and throughout the construction period until complete demobilization.
	h) For storage areas of construction materials such as sand, gravel, cement, etc., provisions will be made to prevent	Part of bid cost	Contractor	ESSD/CSC	

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	materials from being blown away towards sensitive receptors.				
	i) Roads will be regularly cleaned to remove tracked mud, cement, etc.	Part of bid cost	Contractor	ESSD/CSC	During every rainy days; and every after concrete pouring activities in the work site.
	j) Stockpiling of spoils near sensitive receptors will be prohibited.	Part of bid cost	Contractor	ESSD/CSC	During hauling and stockpiling activities; locational guidance provided during the CEMP preparation.
	k) Asphalt plants, concrete batching plants and crushing plants will be equipped with dust suppression devices such as water sprays, dust collectors, covered conveyor.	Part of bid cost	Contractor	ESSD/CSC	During the contractor mobilization period; and throughout the construction period until complete demobilization.
	l) Speed limits will be imposed on construction vehicles to minimize dust emission along areas where sensitive receptors are located.	Part of bid cost	Contractor	ESSD/CSC	Throughout the construction period until complete demobilization.
	m) Burning of all types of wastes generated at the construction sites, work camps and other project-related activities will be strictly prohibited.		Contractor	ESSD/CSC	Throughout the construction period until complete demobilization.

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	n) Stockpiles of sand and aggregate greater than 20 m ³ for use in concrete mixing will be enclosed on three sides, with walls extending above the pile and two meters beyond the front of the piles.	Part of bid cost	Contractor	ESSD/CSC	During hauling and stockpiling activities and throughout the construction period until complete demobilization.
	o) Water sprays will be used during the delivery and handling of all raw sand and aggregates, and other similar materials, when dust is likely to be created and to dampen such stored materials during dry and windy weather to avoid impacts to sensitive receptors.	Part of bid cost	Contractor	ESSD/CSC	During materials delivery activities and throughout the construction period until complete demobilization.
	p) Cement and other such fine-grained materials delivered in bulk will be stored in closed containers.	Part of bid cost	Contractor	ESSD/CSC	During cement delivery activities and throughout the construction period until complete demobilization.
4. Noise	a) Limit the duration of noisy construction activities to daylight hours, whenever possible, in the vicinity of sensitive receptors.		Contractor	ESSD/CSC	Throughout the construction period until complete demobilization.
	b) In areas near houses or noise-sensitive sites, noisy equipment will not be operated during nighttime to early morning (19:00H –06:00H).		Contractor	ESSD/CSC	
	c) Workers exposed to high noise levels will be provided with ear plugs.	Part of bid cost	Contractor	ESSD/CSC	

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	d) The contractors will provide prior notification to the community on the schedule of construction activities.		Contractor	ESSD/CSC	
	e) Whenever possible, noisy equipment will be completely enclosed which can significantly reduce noise levels.	Part of bid cost	Contractor	ESSD/CSC	
	f) Any stationary equipment that produce high noise levels (e.g., portable diesel generators, compressors, etc.) will be positioned as far as is practical from sensitive receptors.		Contractor	ESSD/CSC	During equipment mobilization following locational guidelines.
	g) Construction traffic routes will be defined in cooperation with local communities and traffic police to minimize noise and nuisance.		Contractor	ESSD/CSC	Prior to the commencement of the construction activities anticipated in the locality.
	h) Vehicle speeds will be reduced around sensitive receptors.		Contractor	ESSD/CSC	Throughout the construction period until complete demobilization.
	i) Concrete batching plants will be located at least 500 m away from sensitive receptors.		Contractor	ESSD/CSC	Prior to plant mobilization following locational guidelines.
	j) Temporary noise barriers will be installed along the edge of the road, as necessary, in front of sensitive receptors facing heavy construction activities.	Part of bid cost	Contractor	ESSD/CSC	Prior to the commencement of the activities.
	k) Prior to undertaking noisy activities, the contractor will consult with village leaders and representatives from the religious		Contractor	ESSD/CSC	

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	sites and schools along the project road regarding construction schedule so as to minimize disturbance to important events such as ceremonies, examination period and the like.				
5. Spoils disposal	a) Prior to excavation, contractors will submit a spoils disposal plan to concerned authorities such as LGUs and DPWH for approval. The plan will show the location of proposed excavation sites, cut locations, fill and/or disposal sites for excess cut and, and disposal sites for concrete resulting from spillway demolition. The plan will include photographs of the sites and will also indicate the existing land use and capacity of the disposal site. A copy of the approved plan forming part of the CEMP will be submitted to ADB.	Part of bid cost	Preparation: Contractor Review and approval: DPWH and CSC	ESSD/CSC	Prior to the commencement of the activities; guided by the CEMP.
	b) The contractor will ensure that spoils disposal will not encroach on surface water courses, will not cause sedimentation or obstruction of stream/river flow and will not cause damage to agricultural land, irrigation, densely vegetated areas, forests, properties and other productive sites.	Part of bid cost	Contractor	ESSD/CSC	
	c) Where local residents and villages requests to use spoils as fill materials in their lots and properties, the Contractor shall secure a written request and agreement for proper disposal. The Contractor shall ensure that the filling activities shall not cause pollution or sedimentation and/or waterponding by technically assisting property owners in				

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	the establishment of adequate bunding and drainage.				
6. Impacts from operation of borrow areas and quarries	a) For commercial borrow pits and quarries, the contractor will ensure that only facilities with necessary environmental permits will be used for the project.	Part of bid cost	Contractor	ESSD/CSC	Prior to the commencement of the activities; guided by the CEMP.
	b) For project-specific facilities, i.e., those that will be established and solely operated for the project, the contractor will ensure that these are covered by necessary environmental permits.	Part of bid cost	Contractor	ESSD/CSC	Prior to the commencement of the activities;
	c) Prior to operation of borrow pits and quarries, the contractor will submit to the LGU and DPWH a plan showing the location/s of such facilities to be used, as well as timeframe and mitigation measures to be implemented to rehabilitate project-specific borrow pits and quarries.	Part of bid cost	Preparation: Contractor Review and approval: DPWH and CS	ESSD/CSC	Prior to the commencement of the activities.
	d) The contractor will also ensure that topsoil will be properly removed, stockpiled and preserved for later use during restoration of the borrow pit.	Part of bid cost	Contractor	ESSD/CSC	Throughout the duration of the activities.
	e) Vegetation cover will be provided during rehabilitation of the site.	Part of bid cost	Contractor	ESSD/CSC	Following completion of the civil works activities.
	f) Upon completion of extraction activities, quarries and borrow pits will be dewatered, signages and fences installed, as appropriate, to minimize health and safety risks.	Part of bid cost	Contractor	ESSD/CSC	Upon completion of extraction activities.
7. Erosion and unstable slopes	a) Undertake planting of native species of trees and landscaping along the roads and embankment slopes, as appropriate.	Part of bid cost	Contractor	ESSD/CSC	Following completion of

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
					the civil works activities.
	b) Construction activities in hilly areas will be carried out intensively during dry season. However, as the area is not generally typhoon-prone, construction work during wet season is likely feasible.		Contractor	ESSD/CSC	During the dry season and as weather permits.
	c) Slope protection measures (e.g., sodding) will be implemented to avoid impacts to agricultural land and adjacent properties. Areas to be cleared of vegetation for construction will be restricted to the minimum required for immediate works.	Part of bid cost	Contractor	ESSD/CSC	Prior to the commencement of slope protection works and following completion of the activities.
8. Deterioration of water quality and soil contamination	a) Limit the exposure of areas prone to erosion.		Contractor	ESSD/CSC	During earthworks, and throughout the duration of the activities.
	b) Observe proper management of spoils by surrounding the stockpile with bund.	Part of bid cost	Contractor	ESSD/CSC	
	c) Transport spoils immediately to final disposal sites.	Part of bid cost	Contractor	ESSD/CSC	
	d) Undertake sodding of spoils stockpile if prolonged storage is necessary.	Part of bid cost	Contractor	ESSD/CSC	
	e) Bentonite slurry used during bridge construction will be collected and processed in a closed system and discharge into watercourses will be prohibited.	Part of bid cost	Contractor	ESSD/CSC	During bridgeworks, and throughout the duration of the activities.
	f) Spillage of bentonite in agricultural land will be cleaned immediately to prevent caking and hardening.	Part of bid cost	Contractor	ESSD/CSC	
	g) Prior to establishment and operation of concrete batching plants and casting	Part of bid cost	Contractor	ESSD/CSC	Prior to facility mobilization.

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	yards, the contractor will obtain the necessary environmental permits.				
	h) Retention ponds with sufficient specifications/capacity will be constructed for treatment of wastewater (e.g., from washing of equipment such as mixer drums, trucks and chute, contact storm water, etc.).	Part of bid cost	Contractor	ESSD/CSC	Prior to commencement of pond works; and throughout the construction period until demobilization.
	i) Operate and maintain the retention ponds to ensure that effluent quality will meet applicable standards.	Part of bid cost	Contractor	ESSD/CSC	Throughout the use of the pond until demobilization.
	j) Equipment service and maintenance yards will be provided with impermeable flooring and collection sump.	Part of bid cost	Contractor	ESSD/CSC	During the establishment of the facility.
	k) Water tight receptacles will be provided in all the equipment maintenance shops for waste oil, oily rags, spent oil filters, solvents and oily containers.	Part of bid cost	Contractor	ESSD/CSC	Throughout the operation of the maintenance shops until demobilization.
	l) Disposal of wastes contaminated with hazardous materials will be through authorized waste handlers and recyclers.	Part of bid cost	Contractor	ESSD/CSC	During wastes disposal activities.
	m) Refueling and servicing of equipment will only be carried out in areas adequately equipped to collect leaks and spills.	Part of bid cost	Contractor	ESSD/CSC	Throughout the operation of the maintenance shops until demobilization.
	n) Fuel and other hazardous materials will be stored in a roofed area that has an impervious floor and bund around it.	Part of bid cost	Contractor	ESSD/CSC	Throughout the operation of the campsite until demobilization.

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	o) Fuel storage area will be located at least 100 meters away from water-courses, flood-prone areas and workers camps.	Part of bid cost	Contractor	ESSD/CSC	Prior to the establishment of the fuel storage area.
	p) Availability of spill clean-up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored and used.	Part of bid cost	Contractor	ESSD/CSC	Throughout the operation of the campsite until demobilization.
	q) If spills or leaks of hazardous materials do occur, immediate clean-up will be undertaken.	Part of bid cost	Contractor	ESSD/CSC	Immediately during spills or leaks.
	r) Relevant construction personnel will be trained in handling of fuels/hazardous substances and spill control procedures.	Part of bid cost	Contractor	ESSD/CSC	Prior to demobilization.
	s) All storage containers of hazardous materials and wastes will be properly labeled and maintained in good condition.	Part of bid cost	Contractor	ESSD/CSC	Throughout the operation of the campsite until demobilization.
	t) Restoration of temporary work sites will include removal and treatment or proper disposal of oil contaminated soils.	Part of bid cost	Contractor	ESSD/CSC	Prior to demobilization.
9. Loss of vegetation	a) DPWH will obtain a tree cutting permit in compliance with PD 705 (Revised Forestry Code of the Philippines). No tree cutting will be undertaken without the necessary permit to be issued by the Community Environmental and Natural Resources Office (CENRO) of the DENR	Part of Project cost	DPWH	ESSD/CSC	Prior to tree cutting activities.
	b) Tree cutting can only be undertaken under close supervision of CENRO, DPWH and CSC staff who will be present at the site throughout the duration of cutting activities.	Part of Project cost	Contractor	ESSD/CSC	During tree cutting activities.
	c) Only trees marked based on the Tree Chart prepared by the CENRO will be cut.		Contractor	ESSD/CSC	

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	d) Cut trees will be turned over to the CENRO for disposal		Contractor	ESSD/CSC	During and/or after tree cutting activities.
	e) In compliance with DENR Memorandum Order no. 05 of 2012: Uniform Replacement Ratio for Cut or Relocated Trees, purchase 526,000 tree seedlings (estimate only) and turn over to the CENRO.	Part of project cost (PhP 2.63 M = USD52,000)	DPWH	ESSD/CSC	
	f) Ensure that one of their environment specialists and/or that of the supervision consultant will closely monitor the tree cutting activities to ensure that these will comply with the provisions of the Tree Cutting Permit and corresponding Tree Chart.	Part of Project cost	DPWH/CSC	ESSD/CSC	During tree cutting activities.
	g) As part of the semi-annual environmental monitoring report to be submitted to ADB, DPWH will report on the status of tree cutting, tree relocation or replacement, any issues/concerns, corresponding actions and other relevant matters.		DPWH/CSC	ESSD/CSC	Semi-annual during SEMR preparation and submission to ADB.
	h) To avoid unnecessary impacts to vegetation, the contractor will prohibit cutting of trees for firewood and for other uses in the Project and will ensure that tree cutting is limited to areas as approved by the CENRO.		Contractor	ESSD/CSC	During tree cutting activities.
10. Impacts on fauna	a) Prohibit workers from hunting wild animals.		Contractor	ESSD/CSC	Duration of the construction period.
	b) As much as possible, bridge works will be scheduled in dry season to minimize		Contractor	ESSD/CSC	During the dry season.

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	adverse impacts to fishery, river water quality and other aquatic resources.				
11. Occupational health and safety hazards	a) Use of personal protective equipment (PPE) such as safety shoes, safety hat, goggles, safety belt, ear protection or other garments or equipment designed to protect the wearer's body from injury will be strictly observed during construction.	Part of bid cost	Contractor	ESSD/CSC	Throughout the construction duration.
	b) Provision of first aid kits that are readily available to workers as well as access to or availability of a health worker to attend to any immediate health needs of workers and in case of untoward incidents.	Part of bid cost	Contractor	ESSD/CSC	
	c) Conduct orientation for construction workers regarding health and safety measures, emergency response in case of accidents, fire, etc., and prevention of HIV/AIDS and other related diseases.	Part of bid cost	Contractor	ESSD/CSC	Prior to work deployment; as often as necessary.
	d) Installation of adequate drainage in workers camps to avoid water logging/accumulation of stagnant water and formation of breeding sites for mosquitoes.	Part of bid cost	Contractor	ESSD/CSC	During campsite establishment.
	e) Provision of separate clean housing with sufficient ventilation and separate hygienic sanitation facilities for male and female workers.	Part of bid cost	Contractor	ESSD/CSC	
	f) Provision of reliable supply of water for drinking, cooking and washing purposes at the workers' camps.	Part of bid cost	Contractor	ESSD/CSC	
	g) Proper collection and disposal of solid wastes within the workers'/construction camps consistent with local regulations.	Part of bid cost	Contractor	ESSD/CSC	During campsite operation until demobilization.
	h) Provision of fire-fighting equipment at the work areas, as appropriate, and at workers camps.	Part of bid cost	Contractor	ESSD/CSC	

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	i) Treatment of wastewater emanating from workers camps, construction camps and other project-related activities and facilities consistent with national regulations.	Part of bid cost	Contractor	ESSD/CSC	
	j) Use of reversing signals on all construction vehicles.		Contractor	ESSD/CSC	Throughout the construction period.
	k) Regular coordination with local authorities regarding project activities throughout the construction phase to reduce over-all security risks to the project.		Contractor and DPWH	ESSD/CSC	
12. Public health and safety hazards	a) Installation of sturdy fencing around excavation areas and construction sites.	Part of bid cost	Contractor	ESSD/CSC	During excavation works until completion of the activity.
	b) Provision of proper signage and lighting at night at the periphery of the construction site to warn and direct traffic and pedestrians.	Part of bid cost	Contractor	ESSD/CSC	Throughout the construction period.
	c) Deployment of security personnel in hazardous areas to restrict public access.	Part of bid cost	Contractor	ESSD/CSC	
	d) Imposition of speed limits for construction vehicles along residential areas and where there are other sensitive receptors		Contractor	ESSD/CSC	
	e) Orientation of drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.		Contractor	ESSD/CSC	Prior to work deployment and throughout the construction period.
	f) If necessary, provide safe passageways for pedestrians crossing the construction site.	Part of bid cost	Contractor	ESSD/CSC	Throughout the construction

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	g) At construction areas, provide safe access to farmland and other properties.	Part of bid cost	Contractor	ESSD/CSC	activity until completion.
13. Traffic obstruction	a) Provide signs advising road users that construction is in progress, particularly in areas where the project alignment crosses existing roads and where construction related- facilities are located.	Part of bid cost	Contractor	ESSD/CSC	Throughout the construction activity until completion.
	b) Employ flag persons to control traffic when construction equipment is entering or leaving the work area.	Part of bid cost	Contractor	ESSD/CSC	
	c) Post traffic advisory signs (to minimize traffic build-up) in coordination with local authorities.	Part of bid cost	Contractor	ESSD/CSC	
14. Accidental discovery of artefacts	a) Contractor to immediately cease operations at the site of discovery.		Contractor	ESSD/CSC	Immediately upon discovery of artefacts.
	b) Contractor to inform the CSC and Environment Officer of the Office of the District Engineer.		Contractor	ESSD/CSC	
	c) CSC to relay information to DPWH		CSC	ESSD/CSC	
	d) DPWH to notify the National Historical Commission of the Philippines (NHCP) and/or other concerned government agencies for the next steps.		DPWH	ESSD/CSC	
	e) Recommence work only after NHCP has provided official notification accordingly.		Contractor	ESSD/CSC	Immediately upon NHCP notification.
15. Damage to properties	a) The contractor will immediately repair and/or compensate for any damage that it causes to properties (houses, farmlands, aquaculture ponds, irrigation canals, etc.), community facilities such as water supply, power supply, communication facilities and the like.	Part of bid cost	Contractor	ESSD/CSC	Immediately upon completion of damage assessment.

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	b) Access roads used for transport of construction materials and other construction-related activities will be maintained by the Contractor in at least in their pre-project condition for the duration of construction.	Part of bid cost	Contractor	ESSD/CSC	Throughout the construction period.
16. Unanticipated environmental impacts	a) If any unanticipated impacts become apparent during project implementation, the DPWH will update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts. The updated or newly prepared documents will be submitted to ADB for review, clearance and public disclosure.	Part of Project cost	Contractor, CSC, ESSD	DPWH	Immediately upon occurrence of impact.
	b) Implement measures specified in the new or updated environmental assessment and EMP to address unanticipated environmental impacts.	Part of Project cost	Contractor	ESSD/CSC	Immediately upon completion of impact assessment and agreement on corrective action.
17. Need for additional environmental mitigation measures	a) Implement additional environmental mitigation measures, as necessary, to avoid, minimize and/or compensate for adverse impacts due to construction works and related activities performed by the contractor.	Part of Project cost	Contractor	ESSD/CSC	Immediately upon completion of impact assessment and agreement on corrective action.
Operation Stage					
1. Noise	a) As necessary, install traffic calming measures, e.g., speed bumps in areas where there are sensitive receptors so as	Part of Project cost	District Engineering Office (DEO)	DPWH	Upon completion of roadworks.

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
	to further reduce noise levels from passing vehicles.				
	b) Undertake regular maintenance of pavement and traffic management especially near receptors to contribute to lower ambient noise levels.	Part of Project cost	District Engineering Office (DEO)	DPWH	After the defects liability period of the contractor.
2. Road safety hazards	a) Setting up warning and guide signs, arrow marks and providing delineation lines clearly along the road.	Part of Project cost	DPWH		Upon completion of roadworks and during maintenance operation if necessary.
	b) Provision of traffic signals at key intersections.	Part of Project cost	DPWH		
	c) Improved road will have vertical curves that suit safe design criteria/requirement.	Part of Project cost	DPWH		During detailed design and construction.
	d) Installation of chevron signs where required and speed limit signs.	Part of Project cost	DPWH		Upon completion of roadworks and during maintenance operation if necessary.
	e) Road will have improved vertical alignment to suit sight distance requirement.	Part of Project cost	DPWH		During detailed design and construction.
	f) Installation of guardrails between the road and ditches.	Part of Project cost	DPWH		Upon completion of roadworks and during maintenance operation if necessary.
	g) prohibit the use of carriageway as parking to ensure safe, efficient and smooth vehicular flow; coordinate with LGU(s) concerned to improve enforcement.	Part of Project cost	DPWH		
	h) Provision of pedestrian crossing.	Part of Project cost	DPWH		
	i) Provision of sidewalks and bicycle lanes where appropriate	Part of Project cost	DPWH		During construction

Environmental impacts/Concerns	Proposed Mitigation Measures	Estimated cost ²⁷	Responsible institutions	Responsible for monitoring	Implementation Schedule
					works as specified in the detailed design.
3. Solid waste build-up and shortage of health/sanitary facilities due to influx of migrants	Implementation of related mandates with regard to provision of solid waste management, health and sanitary facilities.		LGU		Upon project completion.
4. Increase in resource use (e.g., tree cutting)	Implementation of related mandates to prevent or minimize illegal tree cutting and other resource extractive activities (e.g., through close monitoring).		DENR		

Table 258. Environmental Monitoring Activities during Construction

Aspect	Means of Monitoring	Frequency of Monitoring	Responsible for Monitoring
1. Close supervision of the contractor's implementation of mitigation measures to minimize or avoid impacts to air quality (particularly dust emission), noise, siltation of surface water and other impacts.	As part of day-to-day project supervision	On-going throughout the construction phase	DPWH/ESSD/CSC
2. Contractor's environmental performance and implementation of construction phase environmental mitigation measures specified in the IEE/EMP	Site visit, ocular inspections, interviews with local residents, coordination with concerned barangay/s	Monthly	DPWH/ESSD/CSC
3. Dust	Visual observation, interviews with local residents, coordination with concerned barangay/s	Monthly	DPWH/ESSD/CSC
4. Noise	Site observation, interviews with local residents, coordination with concerned barangay/s	Monthly	DPWH/ESSD/CSC
5. Surface water quality	Visual observation, interviews with local residents, coordination with concerned barangay/s	Monthly	DPWH/ESSD/CSC
6. Air quality, noise, water quality	Field sampling	To be undertaken to validate complaints and/or during pollution events that are potentially caused by the project	Contractor under supervision of ESSD and CSC

Table 9. Responsibilities for EMP Implementation

Agency	Responsibility
<p>Department of Public Works and Highways (DPWH) *Including Region IX Office and District Engineering Office (DEO)</p>	<ul style="list-style-type: none"> • Executing agency with overall responsibility for project construction and operation • Ensure that sufficient funds are available to properly implement the EMP; • Ensure that Project implementation complies with Government environmental policies and regulations; • Ensure that the Project, regardless of financing source, complies with the provisions of the EMP and ADB Safeguard Policy Statement 2009 (SPS); • Obtain necessary environmental approval(s) from the Environmental Management Bureau and/or other concerned government agencies prior to commencement of civil works; • Ensure that tender and contract documents for design, supervision and civil works include the relevant EMP requirements; • Establish information on an environmental grievance redress mechanism, as described in the IEE, to receive and facilitate resolution of affected peoples' concerns; and • Submit semi-annual monitoring reports on EMP implementation to ADB.
<p>DPWH-Unified Project Management Office (UPMO), Roads Management Cluster II (RMC-II)</p>	<ul style="list-style-type: none"> • Project management office with direct responsibility for the implementation of civil works, engineering designs and project coordination; • Ensure that EMP design measures are incorporated in the detailed design; • Ensure that EMP provisions are strictly implemented and monitored during various project phases (design/pre-construction, construction and operation) to mitigate environmental impacts to acceptable levels; • Ensure compliance with environmental permits; and • Include relevant provisions of the EMP in the bid and contract documents for design, civil works and supervision. • Coordinate with DENR-EMB, Local Government Units (LGU), and other concerned agencies related to environmental aspects for maintaining project's compliance with environmental permits.
<p>Environmental and Social Safeguards Department (ESSD) of DPWH</p>	<ul style="list-style-type: none"> • Assist the UPMO-RMC II and CSC in undertaking their environment-related tasks.
<p>Detailed Engineering Design (DED) Consultant</p>	<ul style="list-style-type: none"> • Incorporate into the project design the environmental protection and mitigation measures identified in the EMP for the design/pre-construction stage; and • Assist PMO to ensure that all relevant mitigation and monitoring measures from the EMP are incorporated in the bidding and contract documents for project supervision and civil works.
<p>Construction Supervision Consultant (CSC)</p>	<ul style="list-style-type: none"> • Prior to establishment of contractor's facilities and commencement of civil works, undertake review of specific

Agency	Responsibility
	<p>environmental management plans (e.g., Consultant (CSC) spoils disposal plan, facilities development plan, etc.) to be prepared by contractors to ensure that such plans are consistent with the provisions of the EMP.</p> <ul style="list-style-type: none"> • Engage environment specialists who will undertake supervision and monitoring of EMP implementation and contractor's environmental performance; • As part of day-to-day project supervision, closely supervise the contractor's implementation of mitigation measures specified in the EMP; • Undertake monthly monitoring of contractor's environmental performance and over-all implementation of the EMP; • Prepare semi-annual environmental monitoring reports (Appendix 3) on status of EMP implementation for submission to ADB; • Based on the results of EMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to ADB
Contractors	<ul style="list-style-type: none"> • Recruit qualified environmental and safety officer to ensure compliance with environmental statutory requirements, contractual obligations and EMP provisions; • Provide sufficient funding and human resources for proper and timely implementation of required mitigation and monitoring measures in the EMP; and • Implement additional environmental mitigation measures, as necessary, to avoid, minimize and/or compensate for adverse impacts due to construction works and related activities performed by the contractor.
Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR)	<ul style="list-style-type: none"> • Review and approve environmental assessment reports required by the Government; and • Undertake monitoring of the project's environmental performance based on their mandate.
Asian Development Bank (ADB)	<ul style="list-style-type: none"> • Conduct periodic site visits to assess status of EMP implementation and over-all environmental performance of the Project; • Review environmental monitoring reports submitted by the executing agency to ensure that adverse impacts and risks are properly addressed; and • Publicly disclose through posting on ADB's website environmental monitoring reports, corrective action plans, prepared by the executing agency during project implementation.

IX. CONCLUSION

141. Results of the initial environmental examination show that the project will not cause significant environmental impacts. Adverse impacts that will be experienced during site works are mainly due to dust and noise emissions as well as potential occupational and community health and safety risks. Road widening within the existing right-of-way will entail tree cutting and this will be compensated through replanting elsewhere of more than 500,000 tree seedlings to be contributed by the project to the country's National Greening Program.

142. As the alignment does not pass through protected areas, critical habitats or high biodiversity sites; significant adverse ecological impacts are not anticipated. To mitigate negative impacts arising from the Project, an environmental management plan detailing mitigation measures, monitoring activities and responsibilities for implementation has been prepared as part of the IEE.

143. Public consultations involving affected people and local officials have been conducted during the preparation of the IEE in compliance with ADB's information disclosure and consultation requirements. DPWH will include the EMP in the bid and tender documents for civil works to ensure that the Project will be carried out consistent with the EMP requirements. During construction, DPWH will be assisted by a construction supervision consultant who will also undertake monitoring of the environmental performance of contractors.

144. Should there be significant changes in the project design or the scope of work, the IEE, environmental assessment and EMP will be updated or a new IEE and EMP will be prepared by the project owners to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts. The updated or newly prepared documents will be submitted to ADB for review, clearance and public disclosure.

Appendix 2. List of Sensitive Receptors by Barangay along PR 06

RECEPTOR	LOCATION (CHAINAGE)	APPROXIMATE DISTANCE (m) FROM EDGE OF ROAD
BRGY. POBLACION, ALICIA		
Municipal Hall	1769+648	50
Public Market		200-300
Fire Station	1769+940	18
District Hospital	1770+060	60
Chapel	1770+280	15
Brgy. Hall	1770+300	30
Session Hall	1770+380	6
Nutrition Hall		6
Day Care Center		10
BRGY. BELLA		
Residential	1771+980-1772+500	
School	1772+400	10
Chapel	1772+640	25
Church	1773+660	20
Residential	1773+700-1774+280	
BRGY. ILISAN		
Residential	1774+860	
School	1774+900	60
Residential	1775+000-200	
Residential	1775+540-700	6
Covered Court	1775+540-701	8
Brgy Hall	1775+540-702	10
Nutrition Center	1775+540-703	5
BRGY. ALEGRIA		
Residential	1776+600-800	
BRGY. LAPIRAWAN		
Residential	1777+340-460	
Detachment	1778+600	30
Chapel	1778+780	60
BRGY. SINUSAYAN		
Mosque	1779+620	2
Health Center	1780+000	10
Brgy. Hall		15
Basket Ball Court		15
Mosque	1780+060	11
Emmam Quarter		9
Arabic School	1780+700	8
Residential	1780+830	5
Mosque	1780+900	7

BRGY. BACAO		
Rice Mill	1781+540	6
Chapel	1781+580	6
Chapel	1781+640	6
Residential	1781+700-1782+000	
BRGY. LOG POND		
Residential/Commercial	1782+540-680	
Health Center		10
Play Ground		7
Market		15
Gym		2
Old Health Center	1782+640	5
Market		5
Church	1782+880	7
BRGY. CATITUAN		
Church	1783+420	20
BRGY. TIGABON		
Residential	1784+620-700	
Mosque	1784+700	2
BRGY. TACKLING		
Residential	1785+420-800	
Church	1785+530	10
Brgy.Hall		5
Day Care Center		30
Covered Court	1785+620	4
Market		7
Health Center		4
Mosque	1785+660	8
BRGY. PAYAG		
Residential	1787+300-600	
BRGY. CAMANGA		
Church	1789+145	13
Brgy.Hall	1789+220	7
Old Brgy.Hall	1789+300	100
Covered Court		100
Residential	1789+260-860	
School	1789+600	100
Residential	1790+200-360	
Detachment	1790+440	8

Appendix 3. Attendance Sheets during the Stakeholder Consultations in PR 06

ANNEX 10
Attendance Sheets during the Stakeholder Consultation in PR 06 (1 of 6)



TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBLIC CONSULTATION

Date : August 19, 2015
Road Section : PR 06, Alicia - Malabang Road
Venue : Rogelio Dela Cruz, Legazpi, Alicia

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
FINLAND CALAMPORAN	Affected	M	[Signature]
ENRIQUE DELA CRUZ	Affected	M	[Signature]
NOEL MONTE	Affected	M	[Signature]
WILSON B. RAMOS	Affected	M	[Signature]
TEDDY NEIL G. BUNY	Affected	M	[Signature]
ANILWAN NASTALT	MAYOR OFFICE	M	[Signature]
FREDRICK A. BIELI	MAYOR OFFICE	M	[Signature]
EDUARDO A. TALA	M. Engrs.	M	[Signature]
Quemir J. Pajonk	MEO-STAFF	F	[Signature]
Lucy Ann C. Peralta	MEO-STAFF	F	[Signature]
ROSE L. DEL ROSARIO	MEO-STAFF	F	[Signature]
Richard T. Pardo	Affected	F	[Signature]
Ramil B. Buenavista	MEO STAFF	M	[Signature]
Yashier S. Muna, Jr.	MUN. MAYOR	M	[Signature]
Rennardo G. Colla, JR., PhD	MUN. V. MAYOR	NA	[Signature]
ETHARLYN A. DAVID	MEO STAFF	M	[Signature]
GABRIEL LEGOIZ JR.	F	M	[Signature]
Estherita Durat	WOMENS	F	[Signature]
Tom [unclear] TERPOLD	TALAYTAP	M	[Signature]
ROLYN A. [unclear]	MAYOR OFFICE	F	[Signature]



ANNEX 11
Attendance Sheets during the Stakeholder Consultation in PR 06 (2 of 6)



TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBLIC CONSULTATION

Date : August 19, 2015
Road Section : PR06 Alicia-Mabayo Road
Venue : Rogelio Ros Sr. Gymnasium, Alicia

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
Louie T. Davila	FARMER	M	[Signature]
DOMINADOR A DELA CRUZ	FARMER	M	[Signature]
Edmundo L. Rodriguez	FARMER	M	[Signature]
RISALIN M. MANTANA	FARMER	F	[Signature]
Aurelia B. Alimadaya	FARMER	F	[Signature]
Felisa E. Manalang	FARMER	F	[Signature]
Adelaida P. Bumbayag	KOMUNIDAD	F	[Signature]
Evelyn X. Yu	KOMUNIDAD	F	[Signature]
Ms. Lucia Nino	HOUSEWIFE	F	[Signature]
Leonora T. Panday	TIYAGAN	F	[Signature]
Romulo B. Rico	ILISAN	M	[Signature]
Silvestre S. Mone	ILISAN	M	[Signature]
Marcelo B. B. B.	ILISAN	F	[Signature]
Foguito R. Daguila	ILISAN	M	J.R. D.
OPP Mantabani	KAPORANGAN	F	OPP
Berita pks	DAPAT	F	[Signature]
Wilma Dariman	DAPAT	F	[Signature]
Jeppie Macaraol	DAPAT	F	Jeppie
Angelo Ples	KAPERAWAN	F	[Signature]
Carl Podiaton	BELLA	F	[Signature]



ANNEX 12
Attendance Sheets during the Stakeholder Consultation in PR 06 (3 of 6)



TA-8574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBLIC CONSULTATION

Date : August 18, 2015
Road Section : PR 06 Alicia - Matangas Road
Venue : Rosalina Riz So. Gymnasium, Alicia

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
Landiepler S. Constantino	Bella	F	<i>[Signature]</i>
Jungco Macaraan	Dapax Alegria	M	<i>[Signature]</i>
Renee Villanueva	Talapat	M	<i>[Signature]</i>
Teodoro G. Sandoval	Talapat	M	<i>[Signature]</i>
Edicita A. Rebotte	CONCEPCION	M	<i>[Signature]</i>
RODRIGO A. ADAPAZ	10 Pags. Bella	M	<i>[Signature]</i>
Vape A. Pulio	Sta. Maria	M	<i>[Signature]</i>
(Mina) J. Rodriguez	Sta. Maria	M	<i>[Signature]</i>
Romelito M. Simbol	STA. MARIA	F	R. Simbol
BERNARDO Y. PAMPIRANG	STA. MARIA	F	B. PAMPIRANG
Maria Magdalena	Sta. Maria	F	<i>[Signature]</i>
Roxanne D. Lindgren	Sta. Maria	F	<i>[Signature]</i>
Marilyn B. Barzon	Sta. Maria	F	M. Barzon
Julia C. Dagandang	Sta. Maria	F	L. Dagandang
Genoveva S. Bonga	Sta. Maria	F	G. Bonga
Bismarville A. Carbon	Sta. Maria	F	<i>[Signature]</i>
Mina G. Juncosa	Sta. Maria	F	<i>[Signature]</i>
Norma C. Dagandang	Sta. Maria	F	<i>[Signature]</i>
Lolita P. Dagandang	Sta. Maria	F	<i>[Signature]</i>
MARIELA S. PUYAT	TALAPAT	F	<i>[Signature]</i>



ANNEX 13
Attendance Sheets during the Stakeholder Consultation in PR 06 (4 of 6)



**TA-B574 PHI: Improving National Roads for Inclusive
 Growth in Mindanao Project (41076-045)**

ENVIRONMENTAL PUBLIC CONSULTATION

Date: August 7, 2018
Road Section: PR 06 Alicia - Malabon Road
Venue: Regalia Lea Sr. Gymnasium, Alicia

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
MARYJANE S. PATAC	TALAPITAP	F	<i>[Signature]</i>
JOSE G. SANEDAN JR	TALAPITAP	M	<i>[Signature]</i>
Dulay T. Sanedana	Talapatap	F	<i>[Signature]</i>
Rosalie S. Escorial	Talapatap	F	<i>[Signature]</i>
Bernardo A. Guinua	Comunidad	M	<i>[Signature]</i>
ERLEN G. ALBERTINO	TALAPITAP	M	<i>[Signature]</i>
Pulfero Capero	Talapatap	M	<i>[Signature]</i>
Eugenia S. Pico	Alitani	F	<i>[Signature]</i>
Fernando Vicente	PARANGANA	M	<i>[Signature]</i>
Marcos Miravides	Davao - Davao	M	<i>[Signature]</i>
Rolando Miravides	Davao - Davao	M	<i>[Signature]</i>
Elizabeth V. Santiago	Davao - Davao	F	<i>[Signature]</i>
Carmelita M. Patayon	Davao - Davao	F	<i>[Signature]</i>
Amelita R. Villagracia	Davao	F	<i>[Signature]</i>
Perla S. Madala	Davao	F	<i>[Signature]</i>
EDUAR V. AGUIRRE	(DPTC) Kabanayan, Alicia Z.	M	<i>[Signature]</i>
Marlon B. Pardo	Kabanayan, Alicia Z.S	F	<i>[Signature]</i>
Nelson D. Pardo	Kabanayan, Alicia Z.S	F	<i>[Signature]</i>
Arnie A. Pardo	(DPTC) Kabanayan, Alicia Z.S	M	<i>[Signature]</i>
MARINO D. URBANO	KANTYKAN	M	<i>[Signature]</i>



ANNEX 14
Attendance Sheets during the Stakeholder Consultation in PR 06 (5 of 6)



TA-B574 PHI: Improving National Roads for Inclusive Growth in Mindanao Project (41076-045)

ENVIRONMENTAL PUBLIC CONSULTATION

Date : August 19, 2015
 Road Section : PR 16 Alicia - Palangas Road
 Venue : Regala Res. Sr. Gymnasium, Alicia

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
Veneranda S. Quintana	CONTRACTOR	F	<i>[Signature]</i>
Rafael C. Tubel	CONTRACTOR	F	<i>[Signature]</i>
Roselyn M. Limkol	STA. MARIA	F	R. Simbol
BERNARDETA Y. PALMUNING	STA. MARIA	F	S. PALMUNING
Maria Magala	Sta. maria	F	C. Magala
Rosealia D. Lelaya	Sta maria	F	Lelaya
Manilyn B. Bonzon	Sta Maria	F	M Bonzon
Itiana C. Dapanglong	Sta. Maria	F	I. Dapanglong
Concepcion S. Borja	Sta. Maria	F	C. Borja
Bernarda A. Carbon	Sta. maria	F	<i>[Signature]</i>
Alvina G. Jansel	Sta. Maria	F	<i>[Signature]</i>
Antonio M. Bando	Sta. maria	M	<i>[Signature]</i>
Norma C. Lapandang	Sta. maria	F	Nal.
Lolita P. Jaganidang	Sta. Maria	F	L.P.
Elpidia Vicencia	Sanctus Bando	F	Elpidia
Joseph G. Guillagor	Home Hold	F	<i>[Signature]</i>
BOBBY B. MUSA	A. B. C	M	<i>[Signature]</i>
RESERVA MUSA	M. O	M	<i>[Signature]</i>
WALTER WAFLE	M. O	M	<i>[Signature]</i>
ASID A. BORO	M. O	M	<i>[Signature]</i>



ANNEX 15
Attendance Sheets during the Stakeholder Consultation in PR 06 (6 of 6)



**TA-8574 PHI: Improving National Roads for Inclusive
 Growth in Mindanao Project (41076-045)**

ENVIRONMENTAL PUBLIC CONSULTATION

Date: August 19, 2015
 Road Section: DROC Alkim - Madangas Road
 Venue: Madangas Municipal Hall, JS

NAME	GROUP REPRESENTED	GENDER	SIGNATURE
1. Claudio Dela Raza	BOBY Kaganad	M	<i>[Signature]</i>
2. Virginia Evaristo	Baya Kaganad	M	<i>[Signature]</i>
3. Cirilo Cortez	Frog Kaganad	M	<i>[Signature]</i>
4. Felipe Calvete	Tachling (Mata)	M	<i>[Signature]</i>
5. MARCO G. SUMANG	PSLACED (SCE)	M	<i>[Signature]</i>
6. JOSEPH T. VARGAS	AIE	M	<i>[Signature]</i>
7. RAUL A. FELICIA	-du-	M	<i>[Signature]</i>
8. CAROLINA SANCHEZ	ADB/PADECO	F	<i>[Signature]</i>
9. DAVID M. ESPINEL	REP. KAGANAD TACHLING	M	<i>[Signature]</i>
10. NORMA M. BAYOLLO	VPWH	M	<i>[Signature]</i>
11. Nurda M. Manubog	Cajituan	F	<i>[Signature]</i>
12. Louisa Dulio	Cadags - oo	F	<i>[Signature]</i>
Wald Kinstoffer Loren	PADECO	M	<i>[Signature]</i>
JIMMY L. CRUZ JR.	LEAD-MANUBOGS	M	<i>[Signature]</i>
Vanessa Cruzada	- du -	F	<i>[Signature]</i>
DR. SEU MARTINO	- du -	M	<i>[Signature]</i>



Appendix 4. Grievance Intake Form

Grievance Intake Form

Name of Project

Project ____ welcomes complaints, suggestions, comments and queries regarding the project implementation and its stakeholders. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing "(CONFIDENTIAL)" above your name.

Thank you.

Contact Information			
Name		Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
Home Address		Age	
City/Province		Phone No.	
		Email	
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below:			
How do you want us to reach you for feedback or update on your comment/grievance?			

Portion to be filled in by the staff:

Date received:	
Received through:	<input type="checkbox"/> In person <input type="checkbox"/> mail <input type="checkbox"/> email <input type="checkbox"/> fax <input type="checkbox"/> phone <input type="checkbox"/> sms
Name of staff who receive comment/ complaint	
Position of staff:	
Type of Grievance:	
Remarks	
Signature of staff	

Update on the case:

Date:	Update

Appendix 5. Project Semi-Annual Environmental Monitoring Report Outline

The borrower/client is required to prepare monitoring reports every six months that describe progress with implementation of the project EMP and compliance issues and corrective actions. A sample outline which can be adapted as necessary is provided below.

- I. Introduction – brief description of project and its components; list each civil work contract package and the scope of work for each, and the starting date of each package
 - a. Report Purpose
 - b. Project Implementation Progress – physical progress of each package
- II. Incorporation of Environmental Requirements into Project Contractual Arrangements - manner by which EMP requirements are incorporated into contractual arrangements, such as with contractors or other parties; includes implementation responsibilities.
- III. Summary of Environmental Mitigations and Compensation Measures Implemented - based on EMP; may include measures related to air quality, water quality, noise quality, pollution prevention, biodiversity and natural resources, health and safety, physical cultural resources, capacity building, and others.
- IV. Summary of Environmental Monitoring – presented per contract package
 - a. Compliance Inspections
 - b. Activities Mitigation Compliance
 - c. Mitigation Effectiveness
- V. Ambient Monitoring Program (if relevant)
 - a. Summary of Monitoring
 - b. Results
 - c. Assessment
- VI. Key Environmental Issues
 - a. Key Issues Identified
 - b. Action Taken
 - c. Additional Action Required with implementation deadline
- VII. GRM update – complaints filed and status
- VIII. Conclusion
 - a. Overall Progress of Implementation of Environmental Management Measures
 - b. Problems Identified and Actions Recommended with implementation deadline

Appendices

- A. Site Inspection / Monitoring Reports/ EMP Monitoring Checklist
- B. Ambient Monitoring Results (if applicable)
- C. Photographs (timestamped)
- D. Others including applicable permits