

EXECUTIVE SUMMARY FOR THE PUBLIC (ESP)-ENGLISH
for the Proposed Pier Uno to Barangay Bunuanan Reclamation Project

EXECUTIVE SUMMARY

ES-A Project Fact Sheet

The Provincial Government of Samar proposes to develop a reclamation project in Barangay Mercedes, Catbalogan City. This project has an area of approximately 35 hectares. The Executive Summary briefly discusses the fundamentals of the proposed project including the Environmental Impact Assessment (EIA) process documentation and its key findings that are essential to the formulation of the Environmental Management Plan.

Table ES - 1. Basic Project Information

Project Name	Pier Uno to Barangay Bunuanan Reclamation Project
Project Location	Along the coastal waters of Barangays Bunuanan, Guinsorongan, Poblacion 6, Poblacion 8, and Poblacion 9, all in the City of Catbalogan, Province of Samar
Project Classification per EMB MC 2014-005	Category A-1 (Reclamation Project)
Scope of the Project	Horizontal development only (Note: separate ECCs will be applied for vertical development and for source of reclamation materials)
Summary of Project components	<ol style="list-style-type: none">1. Land Mass2. Coastal Dike and Drainage Improvement3. Internal Road Network4. Utilities
Project Area	25 hectares
Project/Investment Cost	Approximately 2 Billion Pesos
Project Duration	15 months
Profile of the Proponent	
Name of Proponent	Provincial Government of Samar
Address	Provincial Capitol, Catbalogan City, Samar
Authorized Signatory/Representative	Governor Reynolds Michael Tan
Contact Details	Cellphone number: 0939 990 2021 E-mail: sparkinvestment@yahoo.com
Profile of the Preparer	
EIA Preparer	Engr. John Gilbert Gopez, EnP
Address	27 Unit F, Mayaman St., UP Village, Quezon City, 1101
Contact Details	Landline: (02) 247 3477 E-mail: enviaplanners@gmail.com

EXECUTIVE SUMMARY FOR THE PUBLIC (ESP)-ENGLISH for the Proposed Pier Uno to Barangay Bunuanan Reclamation Project

ES-B Project Description Summary

The City of Catbalogan is the capital of Samar Province. It is located in the western seacoast of the province at coordinates of 11 4636.83" north latitude and 124 5306.63" east latitude. It is approximately 800 kilometers south of Manila, the national capital and 107 kilometers north of Tacloban City – the regional capital at present. It is bounded in the western side by Maqueda Bay, on its north by the municipalities of Tarangnan and San Jorge, and on the east by Jiabong. Coming from the south, the Maharlika Highway traverses the City thru Barangay Lagundi and coming from the north, it enters through Barangay San Vicente.

The total land Area of the City is 274.22 sq. km. Its city proper covers an area of 130 hectares. There are 57 barangays in the entire city. Twenty-one (21) of which are situated in the poblacion, likewise 21 also in the coastal area and 15 barangays in the interior/upland area.

The proposed reclamation project is approximately 25 hectares along the coastal waters of Barangays Bunuanan, Guinsorongan, Poblacion 6, Poblacion 8, and Poblacion 9 in Catbalogan City, Western Samar.

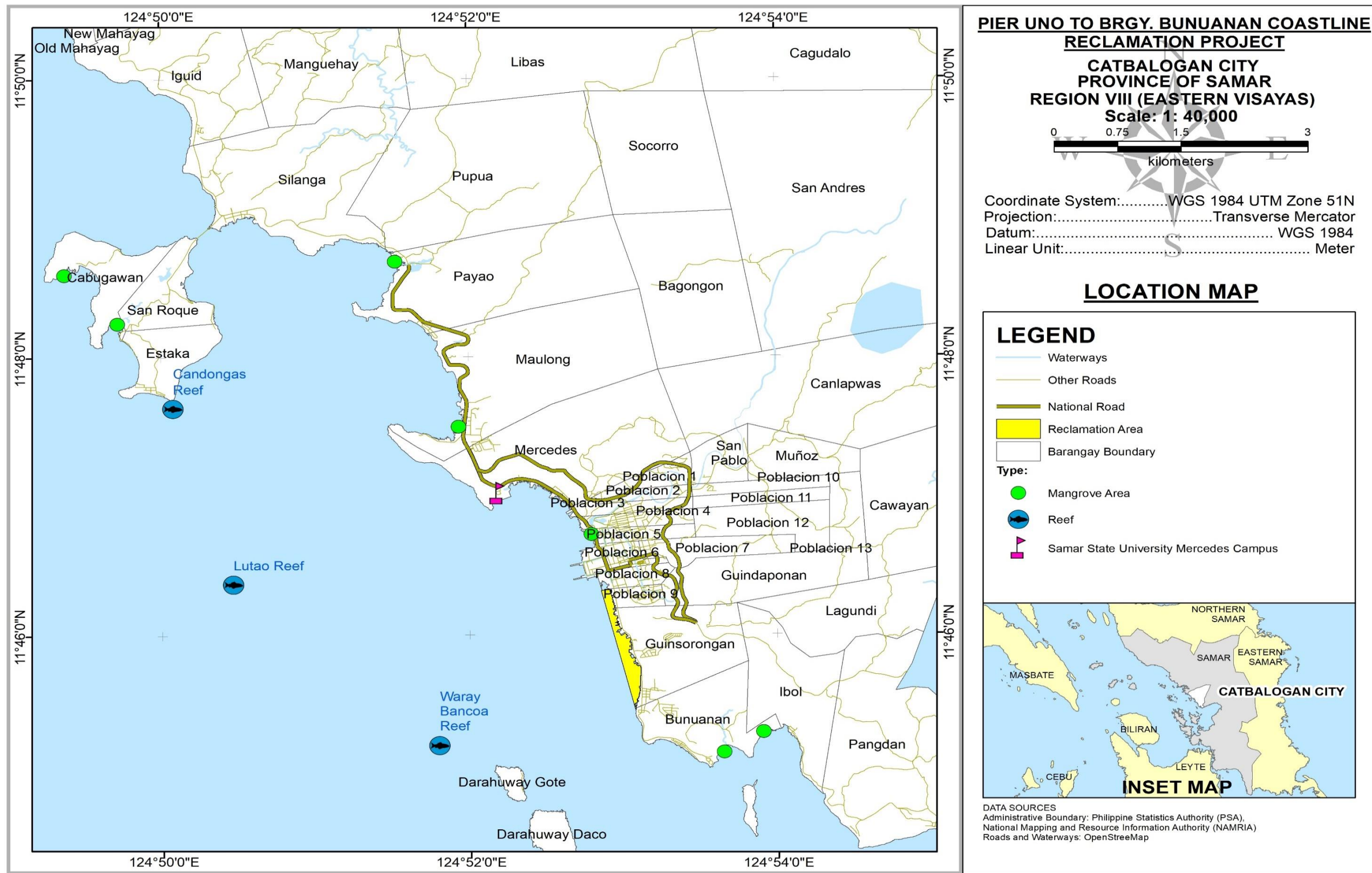


Figure 1. Location Map of the proposed reclamation projects (Barangay Mercedes and Pier Uno to Barangay Bunuanan Reclamation Projects)
Source: City Planning and Development Office of Catbalogan City, Samar

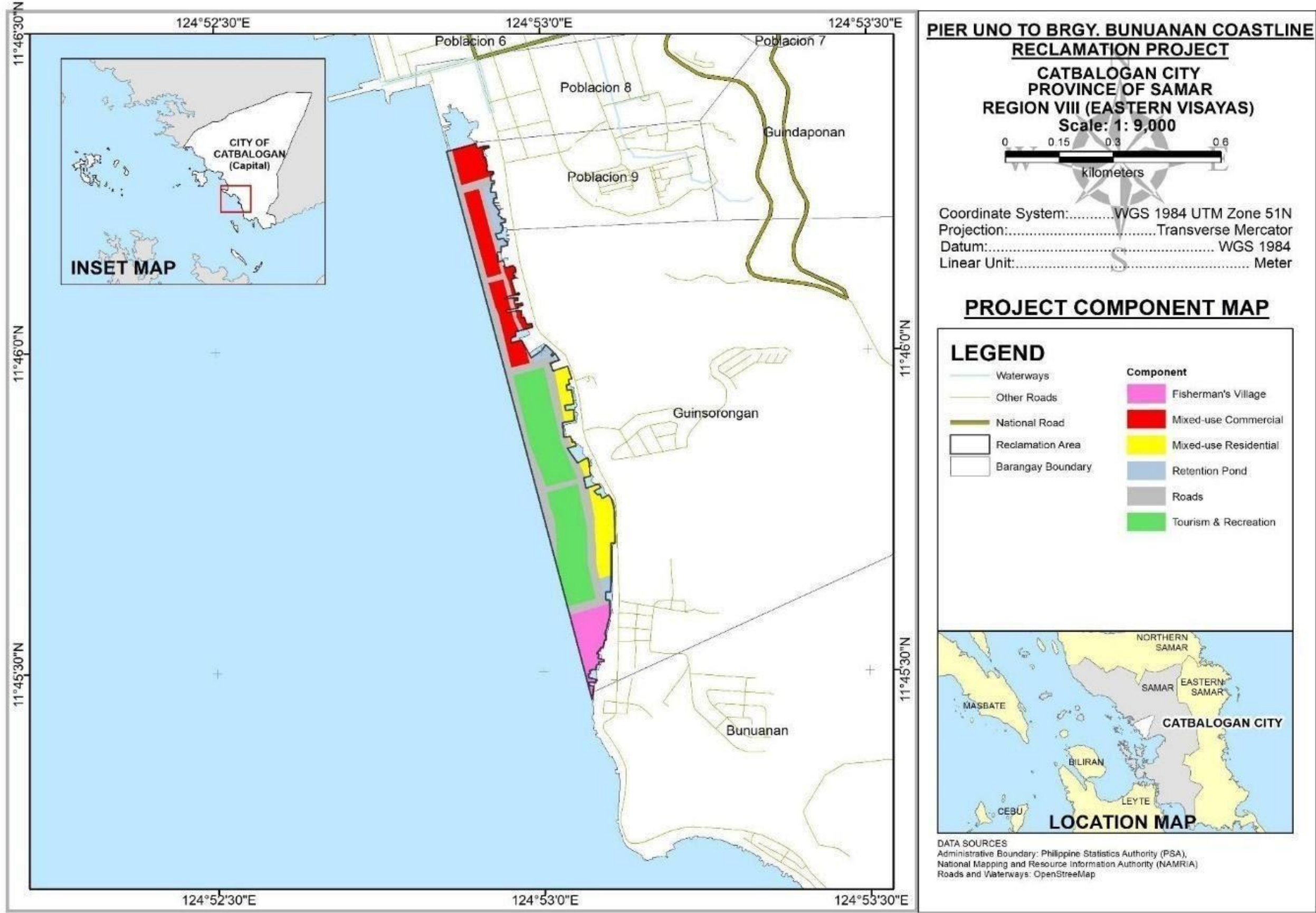


Figure 2. Project Component Map

EXECUTIVE SUMMARY FOR THE PUBLIC (ESP)-ENGLISH for the Proposed Pier Uno to Barangay Bunuanan Reclamation Project

ES-C Process Documentation

C.1. The EIA Team

The Preparer's field of expertise and the EIA module assigned to each member are showed on Table ES - 2.

Table ES - 2. EIA Team Members

Team Member	Field of Expertise/ Module	IPCO No.
John Gilbert W. Gopez	Team Leader / Water Quality Expert	Application with EMB Filed
Jean Ravelo	Geologist / Land	Application with EMB Filed
Emerson Darroles	Oceanography /Water	IPCO-153
Benjamin Francisco	Marine and Freshwater Ecology Expert / Water	IPCO-038
Victor Pantaleon	Coral Reef, Seagrass Expert / Water	Application with EMB Filed
Michael Francisco	Fisheries / Water	IPCO-040
Nazario Sabello	Air Quality Expert / Air	IPCO-240
Nadia Conde	People Module Expert / People	IPCO-102

C.2. EIA Study Schedule

The activities undertaken and completed by the team as part of the preparation of EIS Report are detailed in Table ES - 3.

Table ES - 3. Summary of EIA Study Schedule

Activity	Date
IEC Activities	October 22, 2020
Conduct of Perception Survey	January 2021
Public Scoping	May 10, 2021
Technical Scoping	May 26, 2021
Secondary Data Gathering	May 27 – June 15, 2021
Marine and Freshwater Ecology Survey	June 4-7, 2021
Water Quality and ambient Air and Noise Sampling and Testing	June 10-16, 2021
Oceanographic Survey and Coastal Modeling Study	June 11-13, 2021
Conduct of Geotechnical Investigation	June 16-22, 2021
Preparation of EIS	June 16-29, 2021

EXECUTIVE SUMMARY FOR THE PUBLIC (ESP)-ENGLISH
for the Proposed Pier Uno to Barangay Bunuanan Reclamation Project

C.3. EIA Study Area

The Study Area is where the Reclamation Project is expected to be constructed in Pier Uno to Barangay Bunuanan, Catbalogan City, and neighboring barangays that is expected to have a direct and indirect impact from the project.

C.4. EIA Methodology

The approach and methodology undertaken to prepare this EIS Report is in accordance with the prescribed methods and procedural manual (DAO 2003-30) mandated by the DENR-Environmental Management Bureau. Table ES - 4 provides the methodology used for each module.

Table ES - 4. The EIA Methodology

Environmental Components	Methodology and Approach on Baseline Survey	Methodology and Approach on Impact Assessment
Land		
Land Use and Classification	<ul style="list-style-type: none"> The updated Comprehensive Land Use Plan (CLUP) of Catbalogan City will be the main source of information on land use and land compatibility. The preparers will secure a map showing the project area in relation to existing land use. Identify areas vulnerable/susceptible to natural hazards where the project is located or near the project area (include map/s). Coordinate with relevant government agencies (i.e. NCIP, DAR, DENR, BFAR, MGB) to determine if the project area is under CARP or with CADC / CADT / CALC/ CALT, with IFMA/CBFMA, within COC, within MPSA or other tenurial instruments and identify corresponding existing tenure issues including presence of informal settlers. Discuss the project and secure clearances from the Bureau of Fisheries and Aquatic Resources (BFAR), Department of Public Works and Highways (DPWH), Department of Tourism 	<ul style="list-style-type: none"> Assessment of the compatibility of the proposed project vis-a-vis actual land use and the approved comprehensive land use plan/zoning classification, ECA Classification and/or the coastal resource management plan of the LGU if any. Identify and assess impact in terms of land tenure issues in relation to project implementation Identify and assess impact of the project on these visually significant landforms / landscape / structures Identify and assess impacts of the estimated generation of solid wastes in terms of amount and characteristics (hazardous or domestic).

	<p>(DOT), Philippine Ports Authority (PPA), and Philippine Reclamation Authority (PRA)</p> <ul style="list-style-type: none"> Secure the updated Ecological Solid Waste Management Plan of Catbalogan City to determine existing solid waste management. 	
Geology	<ul style="list-style-type: none"> The consultant will conduct a geotechnical investigation to determine the soil engineering and geotechnical properties of the project site. The slope map will be sourced from the CLUP while a bathymetric map will be generated based on the bathymetry survey. Regional/General Geological Map Natural Hazard Map will be secured from NAMRIA, NDRRMC, MGB, PHIVOLCS, PAGASA. The following maps will also be provided: <ol style="list-style-type: none"> Storm Surge Hazard Map Tsunami Hazard Map Earthquake generators Ground shaking 	<ul style="list-style-type: none"> Identify and assess project impact in terms of the changes in surface landform / topography / terrain / slope / bathymetry including existing hazard as may be aggravated by climate change as projected by PAGASA Identify and assess project impact in terms of the changes in subsurface geology and inducement of subsidence, liquefaction, landslides, mud/debris flow to the environment including the possibility of aggravating existing natural hazards Discuss and assess the impacts of geologic hazards and planned earthworks on the project facilities. Discuss the potential impacts of these hazards and include proposed mitigation measures.
Pedology	<ul style="list-style-type: none"> Summary of Soil Investigation Report on soil type and quality Soil map showing soil types, sampling stations, topography, streams, built-up areas, and planned project features Water and wind erodibility potential Sediment sources, and Riverbank stability Laboratory results on soil sample analysis for N, P, K, pH, organic matter, micronutrients and 	<ul style="list-style-type: none"> Describe capability of the land to accommodate the proposed development with minimal or without soil erosion/loss of topsoil/overburden Describe the physical properties and erodibility potential of the soil, ongoing erosion processes and assess the erosional impacts of the project. The Universal Soil Loss Equation (USLE) and its variants may be used in the modeling. Assess the impact of the project activities including the possibility of spills on soil quality and fertility

	trace metals e. g. Pb, Hg, As, Cd, Cr hexavalent, etc.	
Terrestrial Ecology	<ul style="list-style-type: none"> • Map showing land cover; sampling sites; location of observed important, endangered, and keystone species; ecologically sensitive sites; planned land development works • Flora and fauna species inventory or survey report to cover species listing, abundance, richness, dominance, diversity, evenness, ecological status, and uses 	<ul style="list-style-type: none"> • Loss of species – Of special interest are the keystone, endangered, and endemic species. • Pollution effects on species – The stressors include dust, noise, chemical/ petrochemical spills, eroded sediment, increased temperature, etc. • Relate discussions to estimated GHG emissions and possible carbon sequestration program/s
• Water		
Hydrology & Hydrogeology	<ul style="list-style-type: none"> • Drainage map (also showing local drainage system/infrastructures); • Historical flooding/drought occurrences, stream flow measurements/estimates; • Delineation of watershed /sub watersheds/ floodplain; and identification of aquifers if any • Regional hydrogeological map 	<ul style="list-style-type: none"> • Identify and assess project impact on the change in drainage morphology/local drainage system and resulting effects of flooding pattern in the project area and surrounding. Include climate projections effects on flooding. • Identify and assess project impact in terms of change in stream, lake water depth.
Oceanography	<ul style="list-style-type: none"> • Bathymetric survey and map • Measurement of water currents • Hydrodynamic modeling • Particle dispersion modeling • Storm surge hazard, exposure, • vulnerability, risk maps 	<ul style="list-style-type: none"> • Assess based on cumulative impacts with Pier Uno to Brgy. Bunuanan Reclamation Project • Identify and assess project impact on the degree of change/disruption of circulation pattern and the potential for coastal erosion • Build a hydrodynamic model based on the measured bathymetry and currents and tidal analysis and then validate the model. • Use the hydrodynamic model to assess the impacts of the bathymetric changes. Discuss how the impacts may be affected by climate change. Compare projected new bathymetry as a result of the project with the existing.

Water Quality	<ul style="list-style-type: none"> Water quality sampling and testing will be employed by the EIA preparer through the engagement of an EMB-accredited laboratory. The sampling stations should be outside the area to be reclaimed. The following water quality parameters will be tested: Color, DO, Fecal Coliform, Nitrate, pH, Phosphate, Temperature, TSS, Ammonia, Boron, Fluoride, Selenium, Sulfate, Arsenic, Barium, and Cadmium 	<ul style="list-style-type: none"> Identify and assess project impact in terms of degradation of groundwater, coastal surface water and coastal/marine water quality. Use DENR standard methods and procedures for sampling and analysis. Assess impact on siltation of surface and coastal/marine waters.
Freshwater Biology	<ul style="list-style-type: none"> Summary of endemism / conservation status Abundance of ecologically and economically important species (fishes, benthos, planktons); Presence of pollution indicator species; 	<ul style="list-style-type: none"> Identify and assess project impact in terms of threats to existence/and or loss of species, abundance frequency and distribution species and include discussions on overall impact to freshwater ecology.
Marine Biology	<ul style="list-style-type: none"> Abundance/densities/distribution of ecologically and economically important species (mangroves, fishes, benthos, planktons, coral reefs, algae, seaweeds, sea grasses); Quadrat, transect, line intercept, spot dive, manta tow, marine resource characterization (e.g. municipal and commercial fisheries data) for baseline gathering. Conduct interviews with key stakeholders to validate results of the data gathering and assessment. 	<ul style="list-style-type: none"> Identify and assess project impact in terms of threats to existence, loss of important local species, threat to abundance, frequency and distribution and include discussions on overall impact to marine ecology. Relate discussions to air, water and oceanography Use BMB Technical Bulletin 2017- 05 and 2019-04 as guide for the assessment Map showing the area to be reclaimed and coastal resources (mangroves, seagrasses and coral reef areas) inside and on the areas surrounding the area to be reclaimed.
Air		
Meteorology/Climatology	<ul style="list-style-type: none"> Data from PAGASA like the monthly average rainfall and temperature in Catbalogan will be ; 	<ul style="list-style-type: none"> Identify and assess project impact in terms of change in the local micro- climate change. Also discuss effects of

	<p>Climatological Normal/extremes; Wind rose diagrams;</p> <ul style="list-style-type: none"> • Frequency of Tropical cyclones • Data on Greenhouse gasses (i.e. carbon dioxide, nitrous oxide); 	<p>climate change using PAGASA medium to long term projections</p> <ul style="list-style-type: none"> • Estimate projected greenhouse gases (GHG) (i.e. carbon dioxide, nitrous oxide) using IPCC guidelines; include mitigation and/or sequestration for both construction and operation phases.
Air Quality	<ul style="list-style-type: none"> • Ambient air quality sampling and testing will be employed by the EIA preparer through the engagement of an EMB-accredited laboratory. Two (2) additional sampling stations will be identified to measure the air quality where the trucks will haul the embankment materials from the source of fill going to the reclamation area. The TSP, PM10, SOx, and NOx will be sampled and tested. 	<ul style="list-style-type: none"> • Use DENR standard methods and procedures for sampling and analysis.
Noise	<ul style="list-style-type: none"> • Ambient noise sampling will be employed by the EIA preparer through the engagement of an EMB-accredited laboratory. Two (2) additional sampling stations will be identified to measure the ambient noise level where the trucks will haul the embankment materials from the source of fill going to the reclamation area. 	<ul style="list-style-type: none"> • Use DENR standard methods and procedures for sampling and measurement. • Conduct rapid assessment for noise
• People		
Demography	<ul style="list-style-type: none"> • Latest demographic data on the impact area such as number of households and household size, land area, population, population density /growth, gender and age profile, literacy rate, profile of educational attainment, settlements map will be sourced out from City Planning and Development Office (CPDO) 	<ul style="list-style-type: none"> • Identify and assess project impacts on demography of affected communities. Use assessment in the formulation of Social Development Plan/IEC • Assess availability of alternative public access and housing options for displaced settlers • For project with displacement/ disturbance of properties/settlers, change/conflict in land ownership

	<ul style="list-style-type: none"> • Census of population / property that will be displaced / disturbed • Housing ownership profile / availability of housing/ number of informal settlers 	<ul style="list-style-type: none"> and change/conflict right of way, formulate resettlement framework plan or RAP • Identify and assess project impact due to in-migration patterns including proliferation of informal settlers
Indigenous People	<ul style="list-style-type: none"> • Demographic data on Indigenous People (if any) and existing Culture/Lifestyle that may be significantly affected 	<ul style="list-style-type: none"> • Identify and assess project impact in terms of Culture/Lifestyle that may be affected and/or introduced
Historical and Cultural Heritage	<ul style="list-style-type: none"> • Inventory and description of physical cultural resources and landscapes that have archaeological, palaeontological, historical, religious, aesthetic, or cultural significance. 	<ul style="list-style-type: none"> • Identify all potential project impacts in an integrated manner considering the type, significance, and value/importance of the physical cultural resource/s
Basic Infrastructure and Services	<ul style="list-style-type: none"> • Availability of public services (water supply, power supply, and communications /transportation • Peace and order / crime • Statistical data / information related to public services 	<ul style="list-style-type: none"> • Identify and assess project impact in terms of threats to delivery of basic services including potential for resource competition in the area including effects of in-migration
Environmental Health and Sanitation Profile	<ul style="list-style-type: none"> • Availability of public services in terms of: health resources (Government and Private) • Statistical data / information related to public services - morbidity and mortality rates (infants and adults – 5-year trend) • Common diseases including endemic diseases. 	<ul style="list-style-type: none"> • Identify and assess specific threats to public health and safety due to project impacts. • Analysis of the impact of project implementation on existing disease profile including weather sensitive diseases and impact aggravation as a result of climate change. • Include impacts on health and sanitation
Generation of Local Benefits from the project	<ul style="list-style-type: none"> • Socioeconomic data: 	<ul style="list-style-type: none"> • Identify and assess local benefits of the project in terms of enhancement of employment and livelihood opportunities, increased business opportunities and associated economic activities and increased revenue of LGU

Existing Traffic Condition	<ul style="list-style-type: none"> Road network/ systems Existing Transportation/traffic situation (traffic for land and water) 	<ul style="list-style-type: none"> Identify and assess project impact on the traffic situation in the area including congestion based on existing capacity of road system
Perception Survey	<ul style="list-style-type: none"> Perception survey questionnaires will be prepared by the EIA preparers and conduct primary data gathering. 	<ul style="list-style-type: none"> The result of the perception survey will be used to substantiate the findings and impacts under the People module.

C.5. Public Participation

As per the DENR Administrative Order (DAO) 2017-15, Public Participation is mandatory in preparing the Environmental Impact Statement (EIS) Report to ensure its viability. It should be imposed as early as conducting the Information and Education Campaign (IEC) prior to public scoping. A summary of the public consultation meetings held throughout the formulation of this EIS can be seen on the table below.

Table ES - 5. Summary of Public Consultation Meetings Held

Activity	Date	Venue	Key Participants
Information Education and Communication (IEC) meeting with the Provincial Government of Samar and City Government of Catbalogan	October 22, 2020	Hotel Maqueda Bay, Catbalogan City	Project Technical Working Group & Barangay Officials of the affected Barangays
Public Scoping	May 10, 2021 from (9:00AM to 12:00 PM)	Zoom Application and an on-site venue at Old Tia Anita's	Project Technical Working Group & Barangay Officials of the affected Barangays

Prior to the public consultation meetings held, the participants' comments, issues raised, and their suggestions are summarized on the table below, greatly taken into consideration and integrated for the main report of the EIS.

Table ES - 6. Summary of Issues, Concerns and Suggestions raised during Consultation Meetings

Activity, Date and Location	Aspect	Issues, Concerns, and Suggestions	Participant	Response
Public Scoping, May 10, 2021 via Zoom Application and an on-site venue at Old Tia Anita's	People	How come there is no provision for the fishing village and a designated fish landing port in the master plan?	Gualberto Alcober (BFAR Region 8)	These facilities are placed in the Brgy. Pier Uno to Bunuanan Reclamation Site since it caters for both sites.
		We don't think it's possible to only have one landing center for both sides because it would be too far for those affected in the Pier 1 to Barangay Bunuanan Reclamation Site.	Engr. Arnie (City Planning and Development Office)	Not everyone will be affected thus those in that area do not have to be displaced.
		Both BFAR and the project proponent's plan should complement one another regarding the settlement of the displaced fishermen.	Jerry Malinao (Private Sector)	We'll note it for now.
		Kindly consider where the vendors of dried fish would also be displaced	Representative from Vendors Association	We'll look into this and identify the required size and location of where they would be displaced.
	Water	Is there a proposal for a sewerage treatment plan?	Representative from Provincial Engineering Office	Yes, we do. There is a hired engineer who would be responsible for conceptualizing the infrastructure plan for the
		The BOD content of the rainwater runoff from the cemetery is too		

Activity, Date and Location	Aspect	Issues, Concerns, and Suggestions	Participant	Response
		high. How do you plan on handling this?		reclamation site but we'll take note of this.
	People	For the infrastructure buildings to be constructed, will it be low rise or medium rise buildings?	Rodrigo Estrada (Samar State University)	Low rise buildings, specifically with 4 to 6 floors only.
		Do we have an open space where we can provide parking areas for those who have motor vehicles?		Yes, there is an allocated parking space in the plan.
		Do we have potential investors already in that area?		We need to finalize the master plan first so we can present it to the potential investors.

ES-D EIA SUMMARY

- **Summary of alternatives considered in terms of siting, technology selection/operation processes and design**
- **Concise integrated summary of the main impacts and residual effects after applying mitigation.**

Alternatives

Considering the whole stretch of the Catbalogan City shoreline facing the Samar Sea, there are other possible locations of the project. These possible reclamation sites are the barangays Maulong and Payao which are located north of Mercedes and Barangay Mercedes which is situated in the northern of Bunuanan. But Pier Uno to Barangay Bunuanan site has been found to provide significant economic progress. The following are the reasons why the Provincial Government of Samar decided to reclaim the coastline along Pier Uno to Barangay Bunuanan:

1. Pier Uno to Barangay Bunuanan is near in the central business district of Catbalogan City.
2. Two (2) ports are adjacent to the project site and these are Pier Uno and Pier Dos. This allows to maximize the use of these 2 ports since they are near the proposed reclamation site.
3. The Project Site has a clearance with the Philippine Reclamation Authority (PRA) in a Memorandum of Understanding dated October 3, 2018. PRA is the primary responsible agency for integrating, directing and coordinating all reclamation projects for and on behalf of the National Government and all reclamation projects shall be approved by the President upon the recommendation of the PRA. The Philippine government has given the go signal to the PRA to engage in massive land reclamation all over the country through Public-Private Partnerships (PPP) with the adoption of the Philippine Reclamation Authority Resolution 4161 (Approval of the National Reclamation Plan) on February 25, 2011.
4. Based on the Underwater Rapid Resource Assessment and Ocular Inspection conducted by the Bureau of Fisheries and Aquatic Resources (BFAR), the coral cover was in critical condition while few fish species were observed and mostly are reef fishes. This can be attributed to ineffective conservation and protection management of the local government.
5. The proposed Pier Uno to Barangay Bunuanan Reclamation Project is aligned with the proposed land use plan of the City Government. This means that the project is part of the development goal of Catbalogan.

Impact Assessment and Environmental Management Plan

The summary of impact assessment and environmental management plan the proposed project are presented in **Table 8**. Chapter 2 of this EIA report presents a more detailed discussion.

Table ES - 7. Summary of Impact Assessment and Environmental Management Plan

Environmental Component Likely to be Affected	Potential Impact	Prevention/Mitigation/Enhancement Measures	Residual Effects
The Land			
Terrestrial Ecology	Loss of terrestrial flora due to vegetation removal/ relocation and/or site clearing of source of fill.	Minimize trees for cutting by earth balling/ transplanting trees. Secure tree cutting/ earth balling permit from DENR or PCA. Provide replacement seedlings or any offset agreed with the concerned agency	No residual effects

	Accidental spills and leaks which may eventually lead to a serious impact on surface soil type, chemical composition or fertility	Management control procedures on spills and leaks to be instituted. If necessary, remediation measures should be employed.	No residual effects
Geology/Geomorphology	Inducement of liquefaction	A detailed geotechnical investigation must be undertaken in case a construction of tall buildings (more than 3-storey) is planned to be erected at the site. This is necessary to determine the most suitable foundation scheme and the net bearing capacity as well as to identify any ground stability problem within the area.	No residual effects
Geology/Geomorphology	Earthquake Induced Landslide: Based on the earthquake- induced landslide susceptibility map from PHIVOLCS, the coastal areas where the project site is situated is unlikely to be susceptible to earthquake-induced landslides since it has flat terrain. However, the reclamation project is highly susceptible to lateral spread and flow failure since its offshore perimeter will form a steep slope rising above the seabed.	A properly anchored retaining structure that could hold in-place the reclaimed land should be constructed to mitigate this hazard. The slope of the fill should not be overly steepened to minimize slope failures.	No residual effects
Geology/Geomorphology	Settlement: AMH study indicates that the reclaimed land would not settle uniformly.	To avoid excessive settlement in the reclaimed land, the fill should be engineered to improve its consistency. The fill should be designed to have the characteristic of a vibro compacted sand fill. The soil that should be used for reclamation should not contain a high amount of silty and clayey materials. Preferably, well-graded sand and	No residual effects

		gravel materials should be used. It should be mixed with stabilizing material such as cement.	
Geology/Geomorphology	Ground Subsidence, Collapse, Heave:	Ground subsidence should be monitored continuously from the start of the reclamation, during construction of buildings in the industrial park, and even after all constructions are finished.	No residual effects
Geology/Geomorphology	Other Geo Hazards	Awareness and preparedness raising of construction managers on each of the known hazards to include drills, proper signages and alarm systems	No residual effects
Geology/Geomorphology	Aggravated flooding in nearby coast due to the reclaimed area which at in ease siltation and erosion and impede tidal flushing	Adequate and efficient drainage design is recommended to prevent localized flooding at the site especially during heavy downpours. The drainage lines in the area should regularly be cleaned and maintained of waste materials. Proper waste management should be implemented.	No residual effects
		Sea reclamation is simply filling the area with large amounts of heavy rock and/or cement, then filling with clay and soil until the desired height is reached. The earth filling procedures should conform to engineering application standards that require materials to be properly compacted. Compaction of soil should be 95% of maximum dry density (MDD) and should be done at every lift thickness of 20 centimeters. The same requirement should be applied when compacting disturbed natural soil such as those directly below the foundation and floor slabs where a 10-centimeter thick clean gravel should be placed. Only granular or sandy soils should be used as	No residual effects

		backfill materials. Retaining walls that will hold the earth fill materials in place must be of high integrity (founded on rigid bedrock and can resist impact of waves during tropical cyclones) with good drainage. The ground elevation must be high enough to minimize the effects of coastal flooding.	
Land Use and Classification	Solid waste was littering the terrestrial environment. Reclamation activities do not generate debris and wastes, except domestic garbage from construction crews, which might be disposed at shore. However, there may be accidental spillage.	Littering, accidental spillage of any construction wastes should be avoided by pre- planning ways of their transportation and/or unloading at the temporary storage. Careful planning of the work activities can also reduce the amount of waste generated.	No residual effects
Geology/Geomorphology	Possible flooding due to the limited, narrow and shallow drainages along the road and through the built-up areas along the coastal community	The existing drainage system in the built-up coastal areas should be improved to accommodate floodwaters. There should be a properly designed drainage network that is sufficient to channel the flood to the sea.	No residual effects
	Increase in Ground Water Demand - The influx of workers and their families in the residential area outside the reclamation site will lead to an increase in the consumption of groundwater. If the groundwater provided by the local water district is not sufficient, there would possibly be an increase in groundwater wells in the area. This could lead to over extraction of	The extraction of groundwater in the existing residential and industrial areas should be monitored and regulated to avoid the negative effects of subsidence due to over extraction of groundwater. Regular ground surveys should be conducted to monitor ground subsidence. Rainwater harvesting during the rainy season could be done to augment the water source. The community should also be trained on how to	No residual effects

	groundwater and would contribute to ground subsidence.	conduct rainwater harvesting and on proper water management.	
	Siltation and transport of silt to other areas that may have marine resources	Silt curtains shall be installed in the reclamation area. This shall hold the silt within the area	No residual effects
	Soil erosion	The edge of the reclamation area shall be placed with armor rocks that shall prevent waves to erode the soils being dumped.	No residual effects
The Water			
Marine Ecology	Threat to existence and/or loss of important local species and habitat due to damage to mangroves due to reclamation works	Should there be areas where mangroves are planted, the Proponent shall initiate an enhancement program in collaboration with the local government such mangrove areas are incorporated with the design of the reclamation area as a park or open space.	No residual effects
Marine Ecology	Threat to existence and/or loss of important local species and habitat due to contamination of marine water	Oil /chemical handling and management procedures will be made known to all staff and properly supervised. Take precaution to avoid spillage or leakage of diesel, oils and lubes from construction vehicles. Conduct maintenance of these vehicles only at designated areas and surfaces in the construction yard. Spills / leaks, if any, will be recovered and disposed according to standards. Locate worker camps outside the reclaimed land and away from the beach area.	No residual effects
		Equip camps with necessary facilities / amenities such as water supply, power supply, wastewater collection, solid waste collection and sanitation. Domestic wastes generated from the camps will be disposed at local waste disposal site	

Marine Ecology	Threat to existence and/or loss of important local species and habitat due to potential contamination with substances in fill materials	Fill materials to be prescreened and tested for suitability.	No residual effects
Marine Ecology	Threat to abundance, frequency and distribution due to deposition of Sediments	The channel separating the reclaimed land from the existing shoreline should have sufficient gradient to promote flow of water. It should also be wide enough to promote tidal flushing. The roads should be connected by bridges that will not hinder the flow. The adjustment of the channel width to 15M is intended to promote tidal flushing Dredging could be done to remove the accumulated sediments and maintain the channel depth and gradient.	No residual effects
Marine Ecology	Threat to abundance, frequency and distribution due to smothering of the benthic community in the sea beds	Raising the awareness of environmentally friendly practices to minimize negative impacts of all aspects of construction. Implementation of appropriate reclamation methodologies and development procedures should be thoroughly considered in the final design engineering to limit the impacted zone.	No residual effects
	Disturbance to marine ecology	Proper management of use and navigation vessels	No residual effects
Water Quality	Degradation of surface water quality due to Local and temporal re-suspension of sediments causing increased turbidity.	Silt curtains, using geo-textile materials, shall be installed in the reclamation area. This shall hold the silts within the area.	No residual effects
	Degradation of surface water quality due to potential accidents and damages/injury to another vessel/structure or cetacean	This is of low impact with minor consequence/severity because it is unlikely to happen with only 1 or 2 vessels/barges.	No residual effects

	Contamination of water / Possible oil spills/leaks	Regular checking of all equipment including vessels or barges for leakage will be done. Moreover, oil spill kits will be ready in case there will be accidental spills.	No residual effects
		Institute and implementation of oil spill containment protocols should be followed during development in cases of occurrence.	No residual effects
	Contamination of water brought by heavy equipment and vessels	Regular checking of all equipment (including sea vessels) for leakage will be done. Moreover, oil spill kits will be ready in case there will be accidental spills.	No residual effects
	Marine water quality	Solid and Hazardous waste management shall be strictly implemented in compliance with RA 9003 and RA 6969. A centralized treatment facility can be established to ensure wastewater has been treated before discharging to any bodies of water	No residual effects
	Water availability and competition for use	· IEC should be conducted by the MDRRMC and the barangay for water conservation programs and water reuse and recycling.	No residual effects
		· Adaptation measures include protection of water aquifers, conduct of massive information and education campaigns, establishment of protection measures for coastal areas, and strengthening the protection of ecosystems.	No residual effects
The Air			
Air Quality	Degradation of air quality due to dust and particulate matter generation and GHG generation.	Minimize heavy machinery during reclamation works. Regularly maintain diesel driven engines of transport vehicles, equipment and barges and ensure they meet required emission levels for diesel vehicles.	No residual effects

Noise	Increase in noise pollution during operation of various construction equipment and vehicles	<p>Proper scheduling of high noise generating construction activities during the daytime to avoid sensitive periods;</p> <p>Installation of temporary noise barriers such as galvanized iron shields will also be used particularly in noise-sensitive areas such as churches, schools and hospitals in the immediate vicinities of the construction area;</p> <p>Positioning of temporary site compounds as far as reasonably practicable from sensitive receptors.</p>	No residual effects
Meteorology/Climatology	Contribution in terms of greenhouse gas emissions (or GHG mitigation potential)	It is recommended that the proponent initiate enhancement programs related to carbon sink sequestration in line with the government's greening program considering that a 100-hectare land mass will be generated as a result of the reclamation project.	No residual effects
The People			
People	Possible accidents for workers	Orientations and strict implementation of safety practices will be done.	No residual effects
	Health hazard to Workers (Increased Dust Generation)	Use of protective gears	No residual effects
	Social unrest of sectors in the community, psycho-social impacts on communities surrounding the project and disturbance in their socio- economic activities	The proponent initiate intensive IEC activities to update stakeholders on the status of the project, initiate programs that will promote livelihood, skills development, health and nutrition, disaster risk reduction and response and other similar activities as part of the proponent's Social	No residual effects

		Development Plan. Proponent with the LGU to Implement appropriate sectoral consultations and IEC programs to raise project knowledge and awareness an community engagement	
	Employment generation · Priority jobs for the men and women of direct and indirect impact areas	<ul style="list-style-type: none"> · IEC on nature of jobs · Consultation on job requirements and qualification · Local hiring priority for qualified Barangay residents · Skills training to upgrade local skills of residents that can be hired by the project · Engagement of residents as manpower for the preliminaries and implementation of the Coastal Resource Management Program · Generation of livelihood opportunities by putting-up food stalls, variety stores and other services near the Project 	Positive effects in terms of employment, livelihood
People	Risk to flooding after the development of the reclamation project. Storm surge hazard and other Hazards	Storm surges are one of the many natural hazards that are difficult to control. Break waters and barriers may help or minimize the effect of coastal waves. Vigilance and awareness about storm surges must be undertaken with the help of PAGASA that regularly gives weather information on the direction and strength of typhoons. It is very important that the people and the local leaders in the coastal areas know of the basic things that they should undertake if they experience the effects of the storm surges.	No residual effects

	For offshore earthquakes capable of generating tsunami	Even if the future tsunami has a low impact on the proposed project site, vigilance and sustained community-level public education on tsunami awareness, preparedness and mitigation are still very important. Coastal communities must be aware of tsunami facts and must react appropriately during an earthquake at any time. It is very important that the people and the local leaders in the coastal areas are aware of the basic things that they should know and do if they experience a very strong earthquake.	No residual effects
	Impact of Climate Change	Vulnerability mapping should be conducted to identify priority households for evacuation.	No residual effects
		Non-structural disaster mitigation measures should be implemented in line with the LGUs Disaster Risk Reduction and Management (DRRM) plans.	No residual effects
Peace and Order	Unauthorized entry of outsiders and establishments which might cause problems in peace and order	<ul style="list-style-type: none"> · Coordination with the Barangay LGU Tanods to ensure authorized establishments and control of unauthorized entry of outsiders. <p>Buffer zones should be established around the perimeter of the reclamation area during construction</p>	No residual effects
Health and Safety	<ul style="list-style-type: none"> · Entry of migrant workers with families, which might cause problems of congestion, peace and order and security breaches. · In like manner, they cause health problems due to diseases, overuse of 	<ul style="list-style-type: none"> · Management of entry of migrant workers. · Increase and train Barangay tanods to be deployed in areas where migrant workers reside as well as the management of waste. · Proponent provide Health clinic with a Doctor, Nurse and Health workers 	No residual effects

	<p>public utilities /services, competition of resources, social conflicts, peace and order, increase in pollution due to solid, liquid and toxic wastes.</p> <ul style="list-style-type: none"> · Possible Health and safety risk in the operation of the reclaimed area due to noise and air pollution · Increase in traffic flow causing air (dust) and noise pollution 	<ul style="list-style-type: none"> · Health certificate for workers prior to hiring into the project · Implementation of the Social Development Program · IEC on proper scheduling of hauler trucks and construction operations to avoid entry and dismissal of school children as well as late hours. · Environment Risk Management for the operation of the Plant and surrounding communities 	
--	---	---	--