SECTION 6 BUSINESS DEVELOPMENT OPTIONS

6.1 THE SOCIO-ECONOMIC ENVIRONMENT

6.1.1 The Economic Context

The Philippines is transitioning from the poor economic performance experienced in the l980s and up to the late 1990s to a new level of economic growth. The economic projections presented in Section 3 appear to open up new avenues for sustained growth in new sectors, where local economies such as Panglao can have a significant contribution.

Increasing surplus income in more economically advanced countries in the Asia-Pacific region has made the Philippines a new haven for leisure and services. More specifically, growth in countries such as South Korea, China, and Taiwan have spurred investment from these economies to the Philippines. Domestic growth fueled by remittances and private transfers further induce the expansive mood prevailing in the Philippine economy, which is becoming increasingly open.

With the generally improving economic condition of the Philippines projected into the future, the municipality of Panglao can capitalize on its inherent economic advantages. These include a well-endowed natural resource and a generally accommodating business environment. There is a rich and diverse cultural heritage in the general area of Bohol exemplified in traditions such as dances, music, theatre, festivals and fiesta, and in built resources such as old churches and ancestral houses, archaeological sites, church collections and state objects. Bohol has 18 world-class diving havens, rich marine resources and a variety of beaches, waterfalls, springs, caves, hills and exotic islands supported by a number of accommodation facilities as summarized in Table 6.1-1. Whether these resources can be harnessed to sustain economic growth is a function of political will and continued confidence in the economy.

Table 6.1-1 Inventory of Panglao and Bohol Tourism Facilities and Amenities

Description	Number
Cultural, historical and religious sites	29
Diving Sites	18
Festivals and Events	8
Recreation sites and parks	22
Natural Attractions	47
Restaurants and coffee shops in Resorts, hotels and lodges	59
Resorts, hotels and lodges	125

Source: Bohol Promotion Institute

6.1.2 The Challenges and Opportunities

While the foundation for sustained economic growth in Panglao is promising, it is challenged by several fundamental weaknesses. These include a low-skilled labor force, high unemployment rate, low literacy rate, high poverty incidence, poor access to information, inadequate access facilities, and low awareness of environmental preservation concerns.

The foregoing factors present a menu of external and internal considerations which need a more systematic consideration in the development of the business plan. Table 6.1-2 summarizes these concerns.

Table 6.1-2 Challenges and Opportunities

INTERNAL	**STRENGTHS** 1) Accessibility of Bohol/Panglao from Cebu 2) Varied and Potentially Strong Attraction Sites and Activities 3) Presence of Tribal/ethnic groups 4) Quiet labor unions (20 registered at Bohol)	**WEAKNESSES** 1) High unemployment rate among 716,000 working population 2) Low literacy rate (only 12% of adult population have college education) 3) High poverty incidence (9,990 poor and 139,714 ultra-poor families) 4) High dependency rate 5) Marginalized income 6) Lack in manpower skills 7) High Cost of Electricity 8) Poor Public and Private Transportation 9) Lack of information and promotion on tourist destinations 10) Violated Shoreline Setback Allowance 11) Dirty and unkempt tourist destination sites 12) Not globally competitive quality of souvenirs 13) Not much exciting activities happening at attraction sites 14) Poor safety condition of boats and other facilities at attraction sites
EXTERNAL	**OPPORTUNITIES** 1) Increasing Passenger Volume 2) Increasing Cargo Movement 3) Possible Rentals and Concessionaires coming from commercial office spaces, industrial businesses, restaurants, car rental agencies, automobile dealers, hotels, movie theaters, retail businesses, agricultural uses, warehousing, and parking lots	**THREATS** 1) Development of Competing Destinations 2) Unfavorable Marco-economic Environment 3) Unfavorable Government Investment Policies

6.2 RELATIONSHIP BETWEEN AVIATION AND PANGLAO'S ECONOMIC DEVELOPMENT

6.2.1 Panglao's Land Use Development Plan

The existing and proposed land use of the island of Panglao, as reflected in the current Comprehensive Land Use and Development Plan, is summarized in **Table 6.2-1**. Of special importance is the proposed Special Economic Zone component, of which the proposed Panglao Island airport is a vital component.

Table 6.2-1 Existing and Proposed Land Use

Land Use category	Existing Area (Has)	Percentage	Proposed Area (Has)	Percentage
Built-up Area/Urban	709.4	14.0%	2,472.8	49.0%
Preservation/Timberland/Mangrove	271.9	5.4%	271.9	5.4%
Agricultural	3,950.5	78.2%	770.5	15.3%
Roads	113.9	2.3%	125.2	2.5%
Special Economic Zone			1,187.0	23.5%
Planned Unit Development			90.0	1.8%
Light Intensity Industrial Zone			115.0	2.3%
Cemetery	4.8		18.0	0.4%
Total	5,050.3	100.0%	5,050.3	100.0%

Source: Panglao Comprehensive Land Use Plan 2001-2010

The Special Economic Zone, covered under PD 274 (series of 2002) consists of the reserved parcel of public land for eco-tourism development purposes. Within this area, the following land uses will be developed:

a) Tourism Estate - 156 hectare area in Barangay Libaong and Bolod to be provided with elaborate tourism facilities and amenities;
b) Golf Course - located in Brgys Bolod and Libaong, to serve as the transition zone between the rural areas and the coastal tourism areas;
c) Tourism Estate Expansion Area - a 159 hectare area reserved for future expansion of the Tourism Estate;
d) Nature Tourism Zone - located in Bolod Hill for nature tourism ;
e) Airport - as a replacement site to accommodate the future expansion of Tagbilaran Airport;
f) Rural Buffer Zone - intended to shield the coastal areas and beaches from encroachment; and
g) Restoration Zone – a five hectare area within Bolod Hill

Consistent with the CLUDP of the Municipality of Panglao, the proposed airport business plan provides linkage with a mix of light industrial, retail, residential, tourism, and cultural uses to help fulfill the development vision of the Municiplaity of Panglao. The Panglao Airport Master Plan takes advantage of the emerging economic opportunities in the following ways:

- It provides vastly improved infrastructure for export and import businesses, particularly those that ship by air;
- It provides site opportunities for new export-related domestic and international industries;

- It provides opportunities for economic linkages between commercial, service, industrial, and government sectors within a new environment;
- It provides potential recreational opportunities for local residents, the national population, and the international population that is easily accessible; and
- It helps relieve continued urban congestion in metropolitan areas including Mactan, Cebu and Tagbilaran, Bohol by providing a new town alternative buffered by open space and protected areas zones.

The Airport Master Plan was designed to fulfill certain economic goals that will enhance the ability to implement-the plan. These goals include the following:

- Strategic phasing to optimize utilization of resources
- Flexibility to respond to the changing conditions
- Functional efficiency for each component
- Linkages with economic development

6.3 MARKET SUPPORT TO PANGLAO ISLAND AIRPORT

As the economy grows, and air passenger travel and air cargo demand increases, the new Panglao Island Airport will expand in phases. It is envisioned that the airport will immediately serve the domestic business and tourism demand, and will evolve over time into an important aviation hub and facility in Southeast Asia. The airport component of Panglao Municipal Development Plan shall be pursued along three functional areas: (i) Airport Operations, (ii) Aviation-related Industries, and (iii) Aviation-related Estates.

6.3.1 Airport Operations

Revenue Sources

Airport Operations includes all services and facilities associated with serving air - passengers, air cargo, and associated aircraft movements. It also includes concession space within the airport, such as banks, duty free, food services, souvenir shops, and other services, including health and leisure.

Passenger service and aircraft operations are projected to reach the following levels:

Year	2015	2020	2035
Annual Passenger Movements ('1000)	656	938	1,882
Annual Cargo Movements (tons)	6,464	10,753	21336
Annual Commercial Aircraft Movements	5,969	8,024	9,655

The revenue sources for the new Panglao Island Airport are discussed in detail in the Viability Review section of this Report. Base revenues were projected based on rates that are currently charged by ATO. The major sources of revenues include: (i) Aeronautical Fees, (ii) Rentals, (iii) Concessionaire Privilege Fees, (iv) Passenger Terminal Fees, and (v) Miscellaneous Revenues.

Terminal Building and Concession Area Development

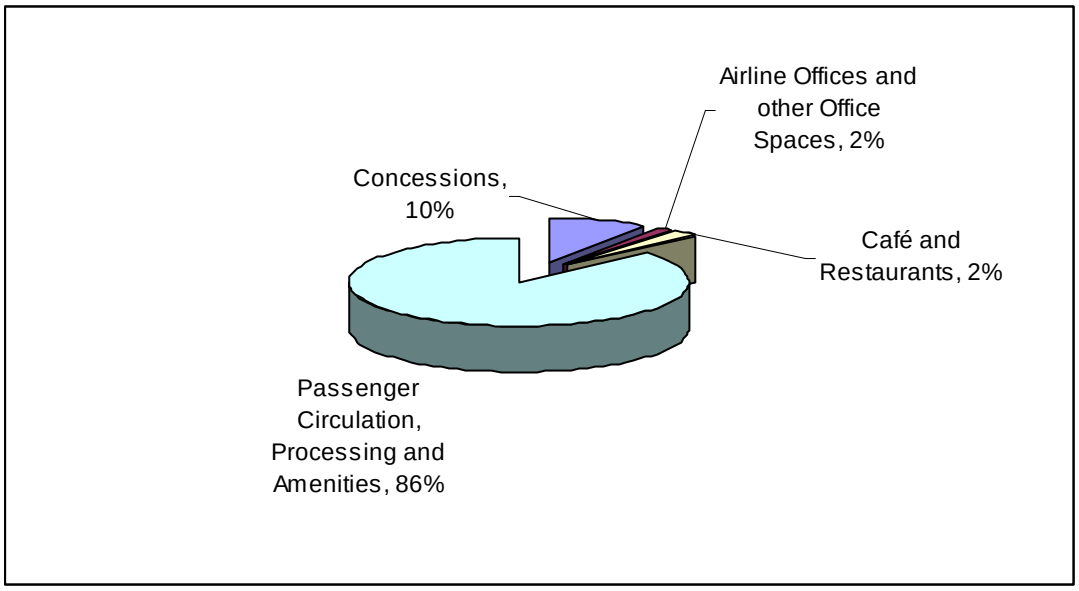
The airport operations phasing program is designed to accommodate the anticipated growth. The concession space is also tied to projected passenger levels, but also assumes a major increase in the amount and quality of commercial services, retail, food and beverage, and other concession space within the airport. It is assumed that upon completion, the new airport, will have approximately 15 times the amount of concession space that currently exists at Tagbilaran.

Tagbilaran Airport currently has approximately 35 square meters of concession space inside the passenger terminal building, while the new airport at Panglao will have approximately 538 square meters of space allocated for the purpose. The increase is necessary for the following reasons:

- To better serve the greater passenger levels
- To exploit the enhanced retail opportunities as Panglao becomes a major center
- To offer greater variety of food and beverage, retail, and business services

Space Allocation at the Passenger Terminal Building

Airport Spaces	Area (sq.m)
Concessions	716.50
Airline Offices and other Office Spaces	117.50
Café and Restaurants	188
Passenger Circulation, Processing and Amenities	6,518.05
Total	7,540.05



Comparison with International Models

The amount of concession space planned is comparable with some of the newly built or expanded airports in other parts of the world, where increased concessions are seen as an important revenue generator for the airport. Pittsburgh's new airport has approximately 9,300 square meters of concession space that currently serves 10 million annual enplanements. Atlanta's expanded airport has 16,300 square meters of concession space that currently serves 28 million annual enplanements. Denver International Airport currently has 21,400 square meters of concession space that serves approximately 16 million annual enplanements.

Among the newly expanded airports, the amount of concession space per 1,000 enplanements ranges from *0.58* square meters to 1.34 square meters with an average of 0.95 square meters per 1,000 enplanements. At 0.95 square meters per 1,000 enplanements, the 717 square meters at Panglao at opening year can very well serve 755 thousand enplaned passengers at opening year.

6.3.2 Aviation-Related Industries

This market support includes airport support services and aviation related industries, such as air charter services (e.g. packaged tour), company hangars, aircraft hangars, air cargo, and other related uses. The new airport will require an increasing amount of these services as airport activity grows. In addition, this component allows the Airport to market land and facilities that can be made available to aviation-related industries which may choose to locate in Panglao because of its geographic location, its available amenities and recreational facilities. Enough land should be devoted to accommodate this market support.

For this purpose it is necessary for the Municipality of Panglao to craft an updated Land Use and Zoning Plan, in coordination with the airport authority responsible for developing the new Panglao Island Airport, to enable the development of this market support. For this type of undertaking, private sector financing can be tapped by assigning the development rights to private investors.

6.3.3 Aviation-related Estates

The evolving land use plan, anchored around the new airport, shall include areas that are suitable for light, non-pollutive industrial locators that are compatible with the airport. It is expected that other compatible industrial uses that are not aviation-related would locate in this zone. This land area is an important supplemental income generator for the airport.

Consistent with the CLUDP of Panglao Municipality, the evolving land use plan consists of mixed uses which will create a new community with the following elements:

- A premier airport as the essential anchor
- Land for export/import industries that need air service
- Land for commercial recreation destinations
- Land for a residential community
- Land for retail development to serve residents, workers, and visitors

International and domestic industries that export, particularly by air, would find the industrial estates very ideal. The vicinity of Panglao Island Airport offers flat, developable land, and proximity to an international standard airport facility. Panglao, with a new domestic airport, can become a self-sufficient new industrial town, with a focus on light industries and recreational facilities.

The commercial recreation and resort areas, while offering an important amenity to the residents of Panglao, are commercial ventures that initially will target the Bohol and Cebu tourism market. With the new airport facilities, these commercial recreation uses will potentially attract the national and emerging Southeast Asia tourism markets. Resorts and tourist attractions will bring economic activity directly to Panglao and Bohol that can provide job opportunities for less skilled workers.

The residents, workers, tourists, and business visitors to Panglao will create demand for retail development at Panglao. As the other land uses generate the foundation for retail demand at Panglao, the opportunity is created to develop a critical mass of retail activity that can attract a share of the regional resident market as well.

Community-based commercial development will occur within the residential areas. This is where general shopping for daily goods, such as food, personal services, and some dry goods will occur.

6.4 THE WAY FORWARD

A prerequisite to developing the overall business plans to fully take advantage of the potential of the new airport facility is the crafting of a viable Land Use Plan and its related Zoning Plan. The purpose of this is to prevent any unwanted development which may hinder the robust development of the airport and to guide the development efforts into the right direction consistent with sound planning principles. A proposed conceptual land use scheme is shown in **Figure 6.4-1**. A more rigorous detailing of the extent of the various land use allocations should be initiated in a separate planning exercise to be coordinated by the Municipality of Panglao and the Bohol Provincial Office. The corresponding building height limitations required by the new airport operation is shown in **Figure 6.4-2**.

A marketing plan needs to be mounted consisting of various information dissemination schemes. During the operation stage, three basic printed formats are hereby proposed and described as follows:

Panglao Airport Publication

This publication should have a wide distribution. It should be available in all locations within the airport. It should also be available via other channels downtown. It should highlight discounts and promotions offered at the Panglao airport's shops in the "Airport Best Buys" section of the manuscript. This can be a venue for advertising other products and services within Panglao, a service which can be offered for a fee.

Early Check-In Guide

This should be made available at all hotels to encourage travelers to check in at the airport earlier, highlighting the various activities they can engage in and the shops they can visit.

Shop and Dine Guide

This handy and colorful guide should be available in dedicated racks in the airport in English, Chinese, Korean and Japanese versions to feature the thematic articles on the shopping experience within the airport with inputs from concessionaires on the items/dishes/services they like to promote.

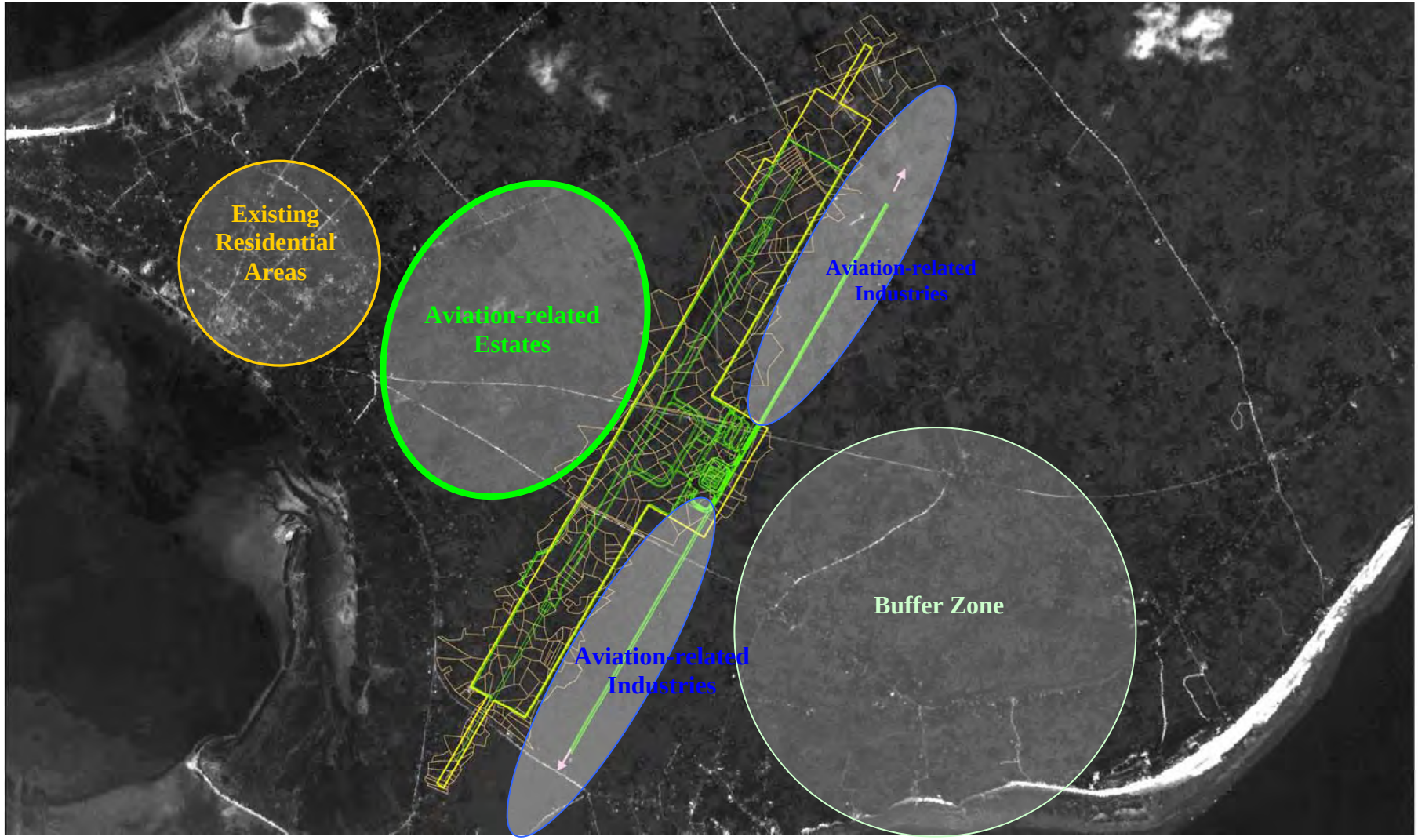


Figure 6.4-1 A Proposed Conceptual Land Use Development Scheme

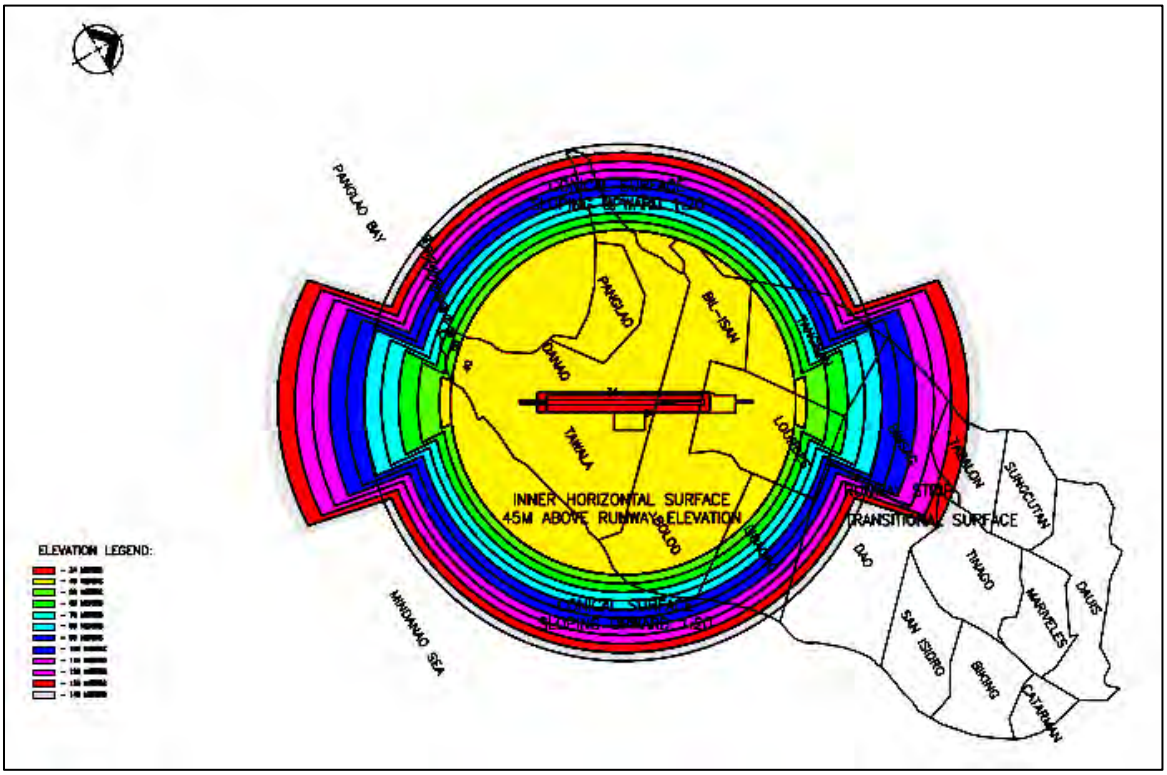


Figure 6.4-2 Building Height Limitations

SECTION 7 LAND ACQUISITION AND RESETTLEMENT REQUIREMENTS

7.1 ONGOING LAND ACQUISITION ACTIVITIES

7.1.1 Status

The acquisition of lands required under the proposed new airport project has already been an ongoing activity even before the commencement of this Study. While it appears that a Land Acquisition and Resettlement Plan (LARP) for the proposed project has not yet actually been formulated, implementing guidelines to govern land acquisition and relocation activities under the project have been prescribed and established by virtue of Executive Order No. 14, series of 2006 that was issued by the Bohol Provincial Governor on 29 August 2006. In addition, the Bohol Provincial Government has engaged the services of another consultant to conduct capability building and skills and livelihood training program for communities that will be affected by the land acquisition activities under the proposed project.

As of 31 July 2007, it was reported that out of approximately 195 hectares to be acquired, about 39 hectares consisting of forty-eight (48) lots have already been paid and acquired while ten (10) additional lots with a combined area of 6.5 hectares are being processed for payment. The Provincial Government is also currently in the process of bidding out the engagement of services for the conduct of lot and parcellary surveys of additional lands that will be affected by the project.

7.1.2 Inventory Survey

An inventory survey was conducted under this study to validate the type of structures and location relative to the proposed airport location. A majority of the structures to be affected are temporary or semi-permanent, consisting of a mix of concrete and wooden structures. The result of the inventory survey relative to the location of proposed runway is shown in **Figure 7.1-1** to

Figure 7.1-3.

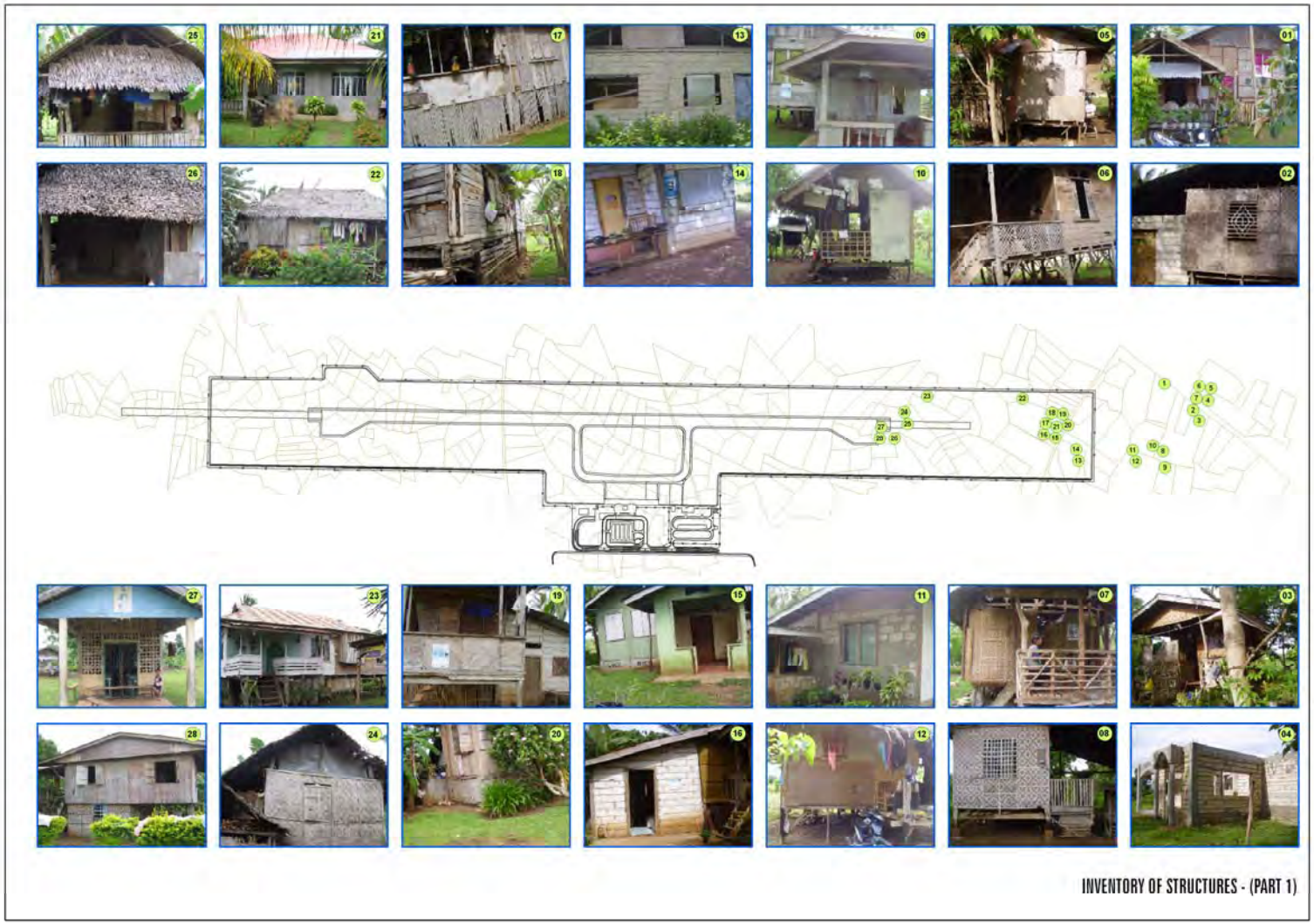


Figure 7.1-1 Inventory of Structures –Part 1

Figure 7.1-2 Inventory of Structures – Part 2

Figure 7.1-3 Inventory of Structures –Part 3

7.2 NEED FOR A LAND ACQUISITION AND RESETTLEMENT PLAN

The above notwithstanding, however, the formulation of some plan for the conduct of land acquisition and related activities under the proposed project should be carried out by concerned government units in order to develop a possibly more rationalized and systematic approach in carrying out these activities.

The succeeding discussion provides guidance on the formulation of an indicative plan for the conduct of related land acquisition and resettlement activities for the proposed new airport project. This indicative LARP is intended to inform and provide advice to concerned government units on the following:

(a) Objectives of the LARP for the proposed new airport;

(b) Legal basis and policy frameworks for carrying out land acquisition and resettlement activities;

(c) Parameters for granting compensation to families for the properties, structures, other fixed assets and sources of livelihood that will be affected by the implementation of the proposed project;

(e) Institutional structure/set-up for the implementation of land acquisition and resettlement activities; and

(f) Parameters for estimating the budgetary requirements to cover the cost of acquiring all the required land, including improvements and existing structures thereon.

7.2.1 Objectives of the Indicative LARP

The preparation of an indicative LARP for the project aims to:

(a) Establish appropriate parameters for the valuation of assets that will be acquired or affected under the project;

(b) Develop a fair and just compensation and assistance package for affected families;

(c) Minimize the adverse impacts that may result from the displacement of affected families;

(d) Present a design framework for resettlement/relocation of affected families that could improve or at least restore the families' pre-project living standards; and

(e) Develop a strategy that will ensure the timely acquisition of assets, payment of compensation and delivery of other benefits to affected families.

7.2.2 Legal and Policy Frameworks

There are a number of legal issuances relating to the conduct of land acquisition and resettlement activities but only the following two (2) major legal bases can be considered closely relevant to the conduct of land acquisition and resettlement activities under the proposed new airport project:

(a) Republic Act No. 8974 (An Act to Facilitate the Acquisition of Right-of-Way, Site or Location for National Government Infrastructure Projects and for Other Purposes) and its Implementing Rules and Regulations (IRR)

RA No. 8974 and its IRR prescribe the possible modes, including relevant conditions, that an implementing agency may avail of in the acquisition of private lands, together with all improvements thereon, for a project. These are: donation; quitclaim; exchange or barter; negotiated sale or purchase; expropriation; and other modes authorized by law. The law and its IRR also prescribe that the valuation of improvements and/or structures shall be determined using the replacement cost method. Replacement cost is "the amount necessary to replace the improvements/structures based on the current market prices for materials, equipment, labor, contractor's profit and overhead, and all other attendant costs associated with the acquisition and installation in place of the affected improvements/structures."

(b) Executive Order No. 14, series of 2006 (Establishing the Implementing Guidelines for the Land Acquisition and Relocation Activities for the Panglao Airport Development Project), of the Provincial Government of Bohol issued on 29 August 2006

EO No.14 of the Bohol Provincial Government defined the basic institutional framework for the conduct of land acquisition and relocation activities under the proposed project. It created various working committees corresponding to each aspect and stage of the land acquisition process. The EO also mandated the preparation of an action plan for the relocation of informal settlers that will be affected by the proposed project, including the corresponding program of work for the preparation of the proposed relocation site.

7.2.3 Defining the Scope of Land Acquisition

To effectively define the scope of land acquisition and resettlement activities, local consultations, interviews and various field surveys shall be conducted. For this purpose, the following data and information, among others, shall be collected and compiled:

(a) Total area and owners of the lands that will be acquired. These data shall be collected through lot and parcellary surveys.

(b) Inventory of all improvements, structures and other assets that will be affected by the project. This should include information on the severity of the impact and the type, nature, scope, and area of the improvement/structure/asset that will be affected. For affected residential structures, additional information on the nature of the occupancy (whether owned or leased) shall be obtained. These data and information shall be collected through appropriate site and field surveys, as well as interviews with affected households.

(c) Socio-economic profile of affected families and social impact concerns of the affected households in connection with the land acquisition activities. These data will be obtained and compiled through household surveys and interviews with the affected families.

7.2.4 Compensation Policy Framework and Valuation Method

The basic framework defining the relevant compensation policy shall be governed by the following general principles:

(a) Affected families (AFs) residing in, doing business or having rights over resources within the project area shall be entitled for compensation for lost assets (i.e., housing structures other fixed assets, lost income, etc.) and for other assistance. The lack of legal rights as in the case of informal settlers will not prevent the AFs from seeking compensation, provided, however, that such AFs must have stayed in the affected areas on or before the date of the survey of affected areas (cut-off date).

(b) AFs losing wholly their productive assets, as well as those incurring partial losses but where the remaining assets are no longer viable for productive use, shall be entitled to full compensation.

(c) In granting compensation, the following rules and procedures shall be observed and adhered to:

(i) Compensation for lands to be acquired shall be based on the current zonal valuation issued by the Bureau of Internal Revenue covering the area where the site of the proposed new airport project shall be located.

(ii) Compensation for improvements, houses and other related structures affected shall be based on the replacement cost of such affected improvement, house or related structure as defined under the provisions of RA No. 8974 and its IRR.

(iii) Compensation to informal settlers shall be made only to those AFs who have already stayed/resided in the project-affected areas on or before the cut-off date as earlier defined above.

(iv) Compensation for annual/perennial crops shall be provided to all AFs suffering this loss.

(v) Disturbance and transport allowances in the amounts of Php15, 000.00 and Php1, 500.00, respectively, shall be provided to AFs who are relocating residence. These shall likewise apply to informal settlers who have stayed/resided in the project-affected areas on or before the cut-off date.

(d) The cost of all applicable taxes, fees and documentary stamps shall be borne by the executing agency/government unit concerned.

A summary of entitlements consistent with the foregoing principles, rules and procedures is presented in **Table 7.2-1**.

Table 7.2-1 Matrix of Entitlements

Type of Loss	Application	Entitled Person	Compensation
Titled Residential / Agricultural Lands	Whole area needed by the project / Only part of the area needed by project but remaining portion not viable for continued use	Owners with full titles / acceptable proof of ownership	Cash compensation for the whole area based on the current zonal valuation price issued by the Bureau of Internal Revenue
	Only part of the area needed by project and remaining portion still viable for continued use	Owners with full titles / acceptable proof of ownership	Cash compensation for the portion of the area affected based on the current zonal valuation price issued by the Bureau of Internal Revenue
Untitled Residential / Agricultural Lands	Whole area needed by the project / Only part of the area needed by project but remaining portion not viable for continued use	Owners without titles	Cash compensation for the whole area based on the current zonal valuation price issued by the Bureau of Internal Revenue
	Only part of the area needed by project and remaining portion still viable for continued use	Owners without titles	Cash compensation for the portion of the area affected based on the current zonal valuation price issued by the Bureau of Internal Revenue
Residential Structures / Residential cum shop/ store	Partially affected	Owners of structures with or without acceptable proof of ownership over the land	- Cash compensation equal to replacement cost of the affected portion of the structure, including the cost of restoring the remaining structure and reconnection of damaged utilities, with no deduction for salvaged building materials. - Financial assistance for income loss, as applicable
		Renters (tenants) of affected structures	- If transferring, 1 month rental allowance for a similar structure and Php1, 500.00 transport allowance - Financial assistance to cover for income loss, as applicable
	Severely affected	Owners of structures with or without acceptable proof of ownership over the land	- Cash compensation equal to replacement cost of the entire structure - Financial assistance for income loss, as applicable, at Php200.00/day for 90 days - Disturbance allowance of Php15, 000.00 - Transport Allowance of Php1, 500.00

Type of Loss	Application	Entitled Person	Compensation
		Renters (tenants) of affected structures	- 1 month rental allowance for a similar structure and Php1, 500.00 transport allowance for transferring - Financial assistance to cover for income loss, as applicable
Other Fixed Structures	Partially or severely affected	Owners of structures with or without acceptable proof of ownership over the land	Cash compensation equal to replacement cost of the entire structure
Plants / Trees	Partially or severely affected	All AFs	Cash compensation at market value
Informal Settlers		Informal settlers who have stayed / resided at the project affected areas on or before the cut-off date	- Disturbance allowance of Php15, 000.00 - Transport allowance of Php1, 500.00 - Cash compensation equal to replacement cost of affected structure owned, if any - Residential plot at resettlement area/site

7.2.5 Organizational Framework for the LARP

In line with the province's stated tasks under the subject MOA, the Provincial Governor of Bohol issued EO 14 s. 2006 which further defined and established the organizational framework for the land acquisition and resettlement activities. The EO created the following working committees:

Table 7.2-2 Working Committees for Land Acquisition and Relocation Activities

Working Committee	Duties and Functions
Committee on Lot and Landowner Identification	Responsible for identification of the parcels of land to be procured and identification of corresponding landowners or heirs, as the case may be.
Committee on Consultation and Information Education Campaign	Responsible for explaining the significance of the project for the overall development of Bohol, generating public acceptability of the project especially among the affected landowners and stakeholders, listening to the sentiments of the affected landowners, and acting on or channeling the same to appropriate offices.
Committee on Inventory and Appraisal	Responsible for recording and classifying the specific improvements on the parcels of land to be acquired, gathering of social and economic data, and fixing of the acquisition price for the land and the improvements thereon based on the guidelines provided under R. A. 8974 and other related laws, rules and regulations.
Committee on Negotiation With Landowners	Responsible for reaching an agreement with affected landowners on issues relating to land acquisition and relocation.
Committee on Capability Building, Skills and Livelihood Training Programs	Responsible for providing capacity building and livelihood trainings to enable the affected individuals adjust and adapt to a new environment brought about by the implementation of the project.
Committee on Acquisition of Properties	Responsible for evaluating the submitted requirements and preparing the legal documents and other related papers for the acquisition of the identified properties.
Committee on Transfer and Titling Of Properties	Responsible for processing and initiating administrative or judicial proceedings to secure certificates of title over the acquired properties in the name of the Republic of the Philippines.
Committee on Clearing of Structures and Transfer of Dwellers	Responsible for clearing the acquired properties of structures and improvements and facilitating the transfer of dwellers and their personal belongings to a relocation site.

7.2.6 Design Framework for Relocation of Informal Settlers

A plan for the relocation/resettlement of the affected informal settlers should ensure that the adverse social impacts that may result from the displacement of these affected settlers are minimized. The resettlement/relocation plan of affected informal settlers should result in the improvement, or at least restoration, of the affected families' pre-project living standards and conditions. Towards this end, the following basic considerations should be taken into account:

Basic Requirements for Relocation Sites

(a) Minimum number of re-settlers - at least ten (10) severely affected families in a given barangay should signify their willingness to shift to an acceptable relocation site.

(b) Area of house plots in the relocation site - should be in accordance with the Housing and Land Use Regulatory Board (HLURB) regulations; for socialized housing project with pre-constructed dwelling units, the minimum area for a house plot is 36 sq. m., and for plots that are not provided with dwelling units, the minimum area is 100 sq. m.

(c) Amenities - the relocation site should be provided with the same services and amenities the re-settlers currently have, such as electricity, water, drainage, sewer system, road system, etc.; when the affected families do not have such services and amenities in their present location, the Provincial Government must at least ensure that each house plot in the relocation site is provided with a water-sealed toilet and a septic tank.

Basic Considerations in Selecting and Designing a Relocation Site

The Provincial Government should involve and ensure the participation of concerned affected families when selecting and designing the proposed relocation site. The families and the Provincial Government should jointly determine and agree whether or not a proposed relocation site is economically and socially feasible. In this regard, the Provincial Government should take into account the following factors:

(a) Adequacy of services, such as water and power, for the re-settlers and the host community;

(b) Geologic stability of the proposed relocation site;

(c) Livelihood opportunities within the site and in nearby areas; and

(d) Cost of site acquisition and development vis-à-vis the number of re-settlers.

The preparedness and capability of the host community to absorb re-settlers must likewise be assessed. Towards this end, the Provincial Government should undertake a socio-economic evaluation of the host community to obtain valuable insights on the capacity and willingness of the host community to take in re-settlers. Moreover, in designing and developing the relocation site, existing social and cultural institutions of both the re-settlers and that of the host community should be supported and used to the greatest extent possible. It is of utmost importance that re-settlers are integrated socially and economically into the host community.

The transfer/relocation of re-settlers will only commence after the basic amenities and services as mentioned above are already put in place.

Finally, when a relocation site is proposed for a group of AFs, a detailed development plan, inclusive of technical details, bills of materials, construction schedule, and costs, should be prepared. The preparation of said relocation site development plan should take into account the considerations cited in the foregoing.

7.2.7 Budget Estimation for Land Acquisition and Resettlement

Once the selection and design of the relocation site have been carried out and the relocation/resettlement plan completed, the total budgetary requirement of the full implementation of the Land Acquisition and Resettlement Plan (LARP) shall be estimated. The budget shall cover and include the cost of land acquisition, the compensation for the affected families, and the cost of relocating/resettling affected informal settlers.

SECTION 8 IMPLEMENTATION STRATEGY

8.1 PROJECT COST

The Project Cost as defined in this Study covers all the expenditures that are expected to be incurred in implementing the various components of the developmental works envisioned under the proposed project as earlier identified in Chapter 6, as well as all expenses that normally accompany the operation of the project facility after its completion. Expenditure requirements for the implementation of the various component works are referred to as the investment or development costs while those that occur during the subsequent operation of the project are referred to as the operating and maintenance (O&M) costs.

The investment or development costs that correspond to the expenditure requirements attendant to the implementation of the various work components of the proposed project can be classified into the following general cost categories, namely: (a) right-of-way (ROW)/land acquisition and compensation for families and households that will be affected by the project; (b) consulting services for the conduct and preparation of detailed engineering design, plans and specifications (DED) and construction management and supervision; (c) construction preliminaries and general requirements; (d) civil works; (e) buildings and structures; (f) airport utilities; (g) lighting and navigational aids; (h) various airport equipment (i) physical and price contingencies; (j) project administration; and (k) taxes and duties.

On the other hand, O&M-related costs that are anticipated to accompany the subsequent operation of the project include, among others, expenses for: (a) salaries and wages of concerned airport personnel and staff; (b) office supplies and other consumables; (c) utilities (power, water and communications); (d) fuel and lubricants for vehicles; (e) security services; and (f) maintenance, repair and upkeep of airport equipment, buildings, vehicles and related infrastructure facilities.

8.1.1 Development Cost Components

As mentioned in the above, the project investment/development costs consistent with the scope of the works envisioned under proposed project shall cover the following expenditure components:

(a) ROW/Land Acquisition and Related Activities

Based on the scope of the development works established earlier, a total area of about 2,159,450 sq. m. consisting mainly of agricultural lands would need to be acquired under the Project. Moreover, a preliminary survey has identified a total of forty-five (45) residential structures with an aggregate area of about 1,638 sq. m. that will be affected with the implementation of the project and for which the concerned household owners will have to be accordingly compensated.

Of the forty-five (45) structures that will be affected, eleven (11) houses having an aggregate area of 389 sq. m. are made of concrete, six (6) houses covering a total area of 199 sq. m. are semi-concrete structures while the remaining twenty-eight (28) houses with a combined area of 1,050 sq. m. are made of wood.

(b) Consulting Services

Consulting services shall cover the engagement of consultants for the conduct of detailed engineering design activities (preparation of detailed engineering design plans and technical specifications, preparation of related tender documents and assistance to the conduct of bidding) and construction management and supervision. The costs of consulting services will include and cover, among others, the professional fees for expert services, the cost of administrative and technical support, management fee, overhead expenses and social charges, and the reimbursable costs for expenses associated with the performance of the services. Reimbursable costs may include accommodation allowances for personnel to be assigned at the project site, per diems, domestic travel, communications, field office, office supplies, and so on.

(c) Construction Preliminaries and General Requirements

The cost of construction preliminaries and general requirements cover, among others, expenditures relating to the preparation of As-Built Plans, preparation of progress reports (including progress photographs) and the final construction report, provision of transport vehicles for the use of the Engineer, construction of temporary facilities such as project site office and laboratory for the Engineer including furnishings for the same, accommodations for project construction staff and personnel, security fencing and gate, the provision of temporary utilities at site, mobilization and demobilization costs, etc.

(d) Civil Works

The civil works component of the project investment/development cost covers expenditures for the implementation of horizontal structures forming part of the development works. These include the costs for the (i) earthworks; (ii) construction of a 132,440 sq. m. runway; (iii) construction of a 29,903 sq. m. passenger terminal apron and 7,670 sq. m. general aviation apron; (iv) construction of 25,523 sq. m. taxiways; (v) provision of 38,300 sq. m. of road/parking/walkway; (vi) construction of a 10,054 l. m. of security fence; (vii) construction of a 34,850 sq. m. perimeter road; (viii) provision of drainage system; (ix) construction of a retention pond; and (x) grouting of cavities.

(e) Buildings and Structures

Components of the project scope covering the construction of related airport buildings and structures that form part of the investment/development cost shall include the following: (i) 7,890 sq. m. passenger terminal building; (ii) 1,000 sq. m. administration building; (iii) 913.75 sq. m. cargo terminal building; (iv) 2,558 sq. m. Air Traffic Control (ATC)/Air Rescue Fire Fighting building; (v) 220.86 sq. m. pump house/reservoir; (vi) 381.84 sq. m. power house; (vii) 21.37 sq. m. ILS building; (viii) two (2) 9.92 sq. m. guard houses; and (ix) 640 sq. m. airport maintenance building.

(f) Airport Utilities

Airport utilities to be provided as part of the project scope cover the provision of (i) water supply system; (ii) sewerage system, which will include the construction of a sewerage treatment plant (STP); (iii) power supply system; and (iv) mechanical works for the various airport buildings and structures.

(g) Lighting and Navigational Aids

The cost of lighting and air navigational system that will be provided under the project will include expenses for the acquisition and installation of the following equipment and facilities:

(i) Radio Navigation Aids (1 CAT ILS, MM; 1 VOR/DME, Terminal Airspace Coverage);

(ii) ATO and Communication Control Switch (VCR Structure and Windows; Two ATS positions (APP/ADC, GMC/CCORD); Working Stations, Paper FP's, Auxiliary Data and Met Display, AGL, Controls; Voice Switch for 30 Connections; Two Air/Ground VHF; Voice and Data Recorders, 32 Channels; Master Time Source and Slave; Remote Control and Monitoring; Operations PABX; UPS (DC and Mains); Siren; Binoculars; Light Gun; Voice and Data Link with MNL, ATCC & AFTN Send, Receive; NAVAIDS, COMMS, AGL Site Links);

(iii) Airfield Ground Lighting System (Two PAPI; Precision Approach Lighting System (PALS); Simple Approach Lighting System (SALS); TWY Lights, Two Apron Entry/Exits; Apron Floodlighting; Obstruction Lighting; CCR's for Lightings; Rotating Beacon; MMX 2); and

(iv) Meteorological Observation System (Air Pressure Sensor; W/V for Thresholds and Midpoint; W/V Analyzer; IRVR; Automatic Weather Station)

(h) Airport Equipment

Various airport equipment that form part of the investment/development costs associated with the implementation of the proposed project include expenditure provisions for the acquisition and delivery/installation of the following:

(i) Special Equipment (Two Baggage Claim Device / Carousel; Two X-Ray Machine Equipment; Two Passenger Loadings Bridges; Miscellaneous Furniture and Counters; Flight Information and Display System);

(ii) Fire Fighting Equipment (Fire Truck; Command car); and

(iii) Airport Maintenance Equipment (Two Disc type mowers, Gas Power; Two Mechanized tractors; Three Manual mower; 6 x 6 truck; Pavement friction test device; Electric welding machine; Jet Vacuum (Suction) Truck; Street Sweeper Truck)

(i) Physical Contingencies

Physical contingency costs cover possible upward adjustments in the estimated base costs that are due to changes in material, labor and services requirements that are expected to arise as a result of attendant uncertainties in the initial engineering designs and specifications. These take into consideration the level of project preparedness in terms of available technical data, designs and specifications.

(j) Price Contingencies

Price contingency costs cover increases in the estimated base costs including cost allowances for physical contingencies as a result of upward fluctuations in the prices of goods, construction materials, labor and services required for the execution of works that are expected to occur subsequent to the base year price levels during project implementation and up to the scheduled/target time of the completion of the works.

(k) Project Administration

Project administration costs refer to expenses that are related to the operation and maintenance of the office unit that shall be created to oversee the day-to-day activities covering the implementation of the proposed Project.

(l) Taxes and Duties

The cost of duties and taxes are those as prescribed under applicable local revenue regulations that are expected to be imposed on the procurement of goods, civil works and services during the implementation of the Project. These include the value-added-tax (VAT) and duties levied on imported items.

8.1.2 Assumptions in Cost Estimation

In the estimation of the costs corresponding to each of the expenditure items described in the foregoing, which comprise the total project investment/development cost, the following parameters and assumptions were adopted:

(a) The cost of ROW/land acquisition is estimated based on the value of the lands as assessed by the Provincial Government of Bohol, and which is pegged at Php60.00 per square meter. On the other hand, the cost of compensation for affected residential structures situated in the affected properties that is to be paid to the concerned land owners is based on the estimated replacement cost of such affected structures. These are taken to be Php9, 990.00 per sq. m. for concrete houses, Php7, 492.50 per sq. m. for semi-concrete structures and Php4, 995.00 per sq. m. for wooden houses.

(b) The costs of consulting services were estimated based on the costs adopted under the feasibility study on the proposed Laoag International Airport Development Project, which are taken to be 4% for detailed engineering design and 6% for construction management and supervision of the costs of (i) construction preliminaries and general requirements; (ii) civil works; (iii) building and structures; (iv) airport utilities; (v) lighting and navigational aids; (vi) special equipment; (viii) fire fighting equipment; and (ix) airport maintenance equipment.

(c) The base costs of (i) construction preliminaries and general requirements; (ii) civil works; (iii) building and structures; (iv) airport utilities; (v) lighting and navigational aids; (vi) special equipment; (viii) fire fighting equipment; and (ix) airport maintenance equipment were arrived at based on canvasses made of prevailing rates and prices of related goods, construction materials, labor, equipment and services.

(d) Material costs for related construction works are taken to be 70% of the total cost of construction while labor and equipment utilization are pegged at 28% and 2% of the total cost of the corresponding works, respectively. The said estimating assumptions/parameters were based on those used under the feasibility study on the proposed Laoag International Airport Development Project

(e) The cost of physical contingencies is valued at 7% of the base costs of (i) construction preliminaries and general requirements; (ii) civil works; (iii) building and structures; (iv) airport utilities; (v) lighting and navigational aids; (vi) special equipment; (viii) fire fighting equipment; and (ix) airport maintenance equipment. The estimation of the cost of physical contingency was based on the estimating parameters used in the feasibility study prepared for the various airport projects covered under the ADB-assisted Intermodal Transport Development Project, which is deemed comparable with the proposed project's level of project preparedness in terms of available technical data, designs and specifications.

(f) The cost of price contingencies is taken at two percent (2%) per annum for foreign currency components and five percent (5%) per annum for local currency inputs, and is applied to all related expenditure items comprising the investment/development cost. The estimation of the cost of price contingencies was based on the parameters used in the feasibility studies conducted for various projects of the DOTC, such as the proposed Intermodal Transport Development Project, Laoag International Airport Development Project, Laguindingan Airport Development Project and so on.

(g) A twelve percent (12%) VAT is applied to all expenditure items, including an additional three percent (3%) duties/tariff on all imported items. These are based on existing applicable local revenue regulations.

(h) The cost of project administration is estimated at three (3%) of the estimated total project investment/development cost net of the cost of contingencies. This is based on the experience of the DOTC for similar airport projects.

Based on the foregoing estimating parameters and assumptions, the total investment/development cost requirement for the implementation of the proposed Panglao Airport Development Project is estimated at about Php4,041,199,270. A summary of the total estimated investment/development cost for the Project broken down by expenditure items cited in the foregoing is presented in **Table 8.1-1**.

The various cost items need to be segregated into materials, labor (skilled and unskilled) and equipment components, and further into their local and foreign exchange cost requirements, for shadow pricing purposes in the economic analysis part of this study. As mentioned in item (d) above, materials costs for related construction works are taken to be 70% of the total cost of construction while labor and equipment utilization are pegged at 28% and 2% of the total cost of the corresponding works, respectively. The cost of labor is further broken down into 90% unskilled labor and 10% skilled labor. In the determination of the equivalent foreign and local currency components of each of the related expenditure items, the currency mixes for comparable and similar cost items that have been established in previous past studies involving similar airport projects have been adopted. **Table 8.1-2** presents the investment cost broken down by items necessary in economic shadow pricing.

Table 8.1-1 Total Project Investment Cost (in Php)

	PARTICULARS	Total Cost (P)
1	PRELIMINARIES AND GENERAL REQUIREMENTS	42,775,791
2	CIVIL WORKS	1,463,433,633
3	BUILDINGS AND STRUCTURES (INCLUDING AIRPORT UTILITIES)	853,487,033
4	LIGHTING AND NAVIGATIONAL AIDS	469,541,016
5	SPECIAL EQUIPMENT	110,035,800
6	FIRE FIGHTING EQUIPMENT	50,051,160
7	AIRPORT MAINTENANCE EQUIPMENT	16,124,144
8	DEMOLITION OF EXISTING HOUSES	873,796
	Sub -Total of 1 to 8	3,006,322,372
9	ROW/REPLACEMENT COSTS	153,145,568
10	DETAILED ENGINEERING DESIGN (4% of 1 - 7)	120,217,943
11	CONSTRUCTION SUPERVISION (6% of 1 - 7)	180,326,915
12	PHYSICAL CONTINGENCIES (7% of 1 - 8)	210,442,566
13	PRICE CONTINGENCIES (2% p.a. FX; 5% p.a. LC)	271,537,889
14	PROJECT ADMINISTRATION COST (3% of Project Cost)	99,206,017
	GRAND TOTAL ----	4,041,199,270

Table 8.1-2 Investment Cost Breakdown by Items for Shadow Pricing (in million Php)

	Particulars	Total				2007				2008				2009				2010			
		FX	LC	Taxes	Total	FX	LC	Taxes	Total	FX	LC	Taxes	Total	FX	LC	Taxes	Total	FX	LC	Taxes	Total
1	PRELIMINARIES AND GENERAL REQUIREMENTS	8.56	29.41	4.81	42.78	-				8.56	29.41	4.81	42.78								
2	CIVIL WORKS	611.07	676.76	175.61	1,463.43					91.66	101.88	25.97	219.52	366.64	407.52	103.90	878.06	152.77	167.36	45.74	365.86
	Materials	598.85	302.63	126.14	1,027.62					89.83	45.65	18.95	154.43	359.31	182.61	75.81	617.72	149.71	74.37	31.38	255.47
	Labor	-	360.59	43.27	403.86						54.19	6.50	60.69		216.77	26.01	242.78		89.63	10.76	100.39
	Skilled	-	36.06	4.33	40.39						5.42	0.65	6.07		21.68	2.60	24.28		8.96	1.08	10.04
	Unskilled	-	324.53	38.94	363.48						48.77	5.85	54.62		195.09	23.41	218.50		80.67	9.68	90.35
	Equipment	12.22	13.54	3.46	29.21					1.83	2.04	0.52	4.39	7.33	8.15	2.08	17.56	3.06	3.35	0.86	7.26
3	BLDGS & STRUCTURES (INCL. AIRPORT UTILITIES)	338.00	412.60	102.89	853.49					50.70	61.35	15.97	128.02	202.80	248.99	60.30	512.09	84.50	102.25	26.62	213.37
	Materials	331.24	194.18	72.99	598.41					49.69	28.75	10.90	89.34	198.74	117.51	43.91	360.17	82.81	47.92	18.17	148.90
	Labor	-	210.17	25.22	235.39						31.37	3.76	35.14		126.50	15.18	141.68		52.29	6.27	58.57
	Skilled	-	21.02	2.52	23.54						3.14	0.38	3.51		12.65	1.52	14.17		5.23	0.63	5.86
	Unskilled	-	189.15	22.70	211.85						28.24	3.39	31.63		113.85	13.66	127.51		47.06	5.65	52.71
	Equipment	6.76	8.25	2.00	17.02					1.01	1.23	0.30	2.54	4.06	4.98	1.21	10.24	1.69	2.05	0.50	4.23
4	LIGHTING AND NAVIGATIONAL AIDS	375.63	33.54	60.37	469.54					-	-	-	-	300.51	26.83	48.30	375.63	75.13	6.71	12.07	93.91
	Materials/Instruments/Equipment	300.51	-	45.08	345.58									240.41		36.06	276.47	60.10		9.02	69.12
	Labor	75.13	33.54	15.29	123.96									60.10	26.83	12.23	99.17	15.03	6.71	3.06	24.79
	Skilled	75.13	-	11.27	86.40									60.10		9.02	69.12	15.03		2.25	17.28
	Unskilled	-	33.54	4.02	37.56										26.83	3.22	30.05		6.71	0.80	7.51
5	SPECIAL EQUIPMENT	88.03	7.84	14.17	110.04					-	-	-	-	70.42	6.29	11.32	88.03	17.61	1.55	2.85	22.01
	Materials/Instruments/Equipment	70.42	1.57	10.75	82.74									56.34	1.26	8.60	66.20	14.08	0.31	2.15	16.54
	Labor	17.61	6.27	3.39	27.27									14.08	5.03	2.72	21.83	3.52	1.24	0.68	5.44

	Particulars	Total				2007				2008				2009				2010			
		FX	LC	Taxes	Total	FX	LC	Taxes	Total	FX	LC	Taxes	Total	FX	LC	Taxes	Total	FX	LC	Taxes	Total
	Skilled	17.61	-	2.64	20.25									14.08		2.11	16.20	3.52		0.53	4.05
	Unskilled	-	6.27	0.75	7.02										5.03	0.60	5.63		1.24	0.15	1.39
6	FIRE FIGHTING EQUIPMENT	42.54	1.01	6.50	50.05					-	-	-	-	-	-	-	-	42.54	1.01	6.50	50.05
	Materials/Instruments/Equipment	34.03	0.20	5.13	39.37													34.03	0.20	5.13	39.37
	Labor	8.51	0.80	1.37	10.69													8.51	0.80	1.37	10.69
	Skilled	8.51	-	1.28	9.79													8.51		1.28	9.79
	Unskilled	-	0.80	0.10	0.90														0.80	0.10	0.90
7	AIRPORT MAINTENANCE EQUIPMENT	13.71	0.32	2.09	16.12					-	-	-	-	-	-	-	-	13.71	0.32	2.09	16.12
	Materials/Instruments/Equipment	10.96	0.06	1.65	12.68													10.96	0.06	1.65	12.68
	Labor	2.74	0.26	0.44	3.44													2.74	0.26	0.44	3.44
	Skilled	2.74	-	0.41	3.15													2.74		0.41	3.15
	Unskilled	-	0.26	0.03	0.29														0.26	0.03	0.29
8	DEMOLITION OF EXISTING HOUSES	-	0.78	0.09	0.87		0.78	0.09	0.87	-	-	-	-	-	-	-	-	-	-	-	-
	Materials/Instruments/Equipment	-	-	-	-													-	-	-	-
	Labor	-	-	-	-													-	-	-	-
	Skilled	-	-	-	-													-		-	-
	Unskilled	-	-	-	-														-	-	-
	Sub -Total of 1 to 8	1,477.53	1,162.25	366.54	3,006.32	-	0.78	0.09	0.87	150.91	192.64	46.76	390.31	940.37	689.64	223.81	1,853.81	386.25	279.20	95.88	761.32
9	ROW/REPLACEMENT COSTS	-	140.50	12.65	153.15		112.40	10.12	122.52	-	28.10	2.53	30.63	-	-	-	-	-	-	-	-
10	DETAILED ENGINEERING DESIGN (4% of 1 - 7)	-	106.10	14.12	120.22	-	21.47	2.58	24.04	-	84.63	11.54	96.17	-	-	-	-	-	-	-	-
11	CONSTRUCTION SUPERVISION (6% of 1 - 7)	-	160.71	19.62	180.33					-	20.61	2.81	23.42	-	99.31	11.92	111.23	-	40.79	4.89	45.68
12	PHYSICAL CONTINGEN	103.43	81.70	25.32	210.44	-	0.05	0.01	0.06	10.56	13.55	3.21	27.32	65.83	48.27	15.67	129.77	27.04	19.82	6.43	53.29

	Particulars	Total				2007				2008				2009				2010			
		FX	LC	Taxes	Total	FX	LC	Taxes	Total	FX	LC	Taxes	Total	FX	LC	Taxes	Total	FX	LC	Taxes	Total
	CIES (7% of 1 - 8)																				
	Materials	101.36	43.04	20.37	164.77	-	0.04	0.01	0.05	10.35	8.45	2.57	21.37	64.51	24.49	12.62	101.61	26.50	10.05	5.18	41.73
	Labor	-	37.02	4.44	41.47		0.01	0.00	0.01		4.82	0.58	5.40		22.82	2.74	25.56		9.37	1.12	10.50
	Skilled	-	3.70	0.44	4.15		0.00	0.00	0.00		0.48	0.06	0.54		2.28	0.27	2.56		0.94	0.11	1.05
	Unskilled	-	33.32	4.00	37.32		0.01	0.00	0.01		4.34	0.52	4.86		20.54	2.46	23.00		8.43	1.01	9.45
	Equipment	2.07	1.63	0.51	4.21	-	0.00	0.00	0.00	0.21	0.27	0.06	0.55	1.32	0.97	0.31	2.60	0.54	0.40	0.13	1.07
13	PRICE CONTINGENCIES (2% p.a. FX; 5% p.a. LC)	69.18	171.16	31.20	271.54					3.23	17.45	2.86	23.55	40.65	94.18	17.40	152.23	25.30	59.52	10.94	95.76
14	PROJECT ADMIN COST (3% of Project Cost)		99.21		99.21		0.75		0.75	-	15.30		15.30		58.95		58.95		24.21		24.21
	GRAND TOTAL ----	**1,650.13**	**1,921.62**	**469.44**	**4,041.20**	**-**	**135.45**	**12.79**	**148.24**	**164.71**	**372.28**	**69.71**	**606.70**	**1,046.84**	**990.36**	**268.80**	**2,305.99**	**438.58**	**423.53**	**118.14**	**980.26**

8.1.3 Comparison with the Tagbilaran Airport Redevelopment Option

In addition to the technical deficiencies and adverse social impacts of upgrading the existing Tagbilaran airport (as presented in Section 5 – Master Planning for the New Panglao Island Airport), such upgrading will also entail a very high investment cost. The total investment cost of this option is summarized in **Table 8.1-3**.

Table 8.1-3 Cost of Upgrading the Existing Tagbilaran Airport (in Php)

	PARTICULARS	FX COST (P)	Local Cost (P)	Total Cost (P)
1	PRELIMINARIES AND GENERAL REQUIREMENTS	8,555,158	34,220,632	42,775,791
2	CIVIL WORKS	477,880,257	666,587,043	1,144,467,300
3	BUILDINGS AND STRUCTURES (INCLUDING AIRPORT UTILITIES)	337,997,009	515,490,024	853,487,033
4	LIGHTING AND NAVIGATIONAL AIDS	375,632,813	93,908,203	469,541,016
5	SPECIAL EQUIPMENT	88,028,640	22,007,160	110,035,800
6	FIRE FIGHTING EQUIPMENT	42,543,486	7,507,674	50,051,160
7	AIRPORT MAINTENANCE EQUIPMENT	23,905,522	4,218,622	28,124,144
8	DEMOLITION OF EXISTING HOUSES	-	140,480,545	140,480,545
	Sub -Total of 1 to 8	1,354,542,885	1,484,419,904	2,838,962,788
9	ROW/REPLACEMENT COSTS	-	2,851,841,368	2,851,841,368
10	DETAILED ENGINEERING DESIGN (4% of 1 - 7)	-	107,939,290	107,939,290
11	CONSTRUCTION SUPERVISION (6% of 1 - 7)	-	161,908,935	161,908,935
12	PHYSICAL CONTINGENCIES (7% of 1 - 8)	94,818,002	103,909,393	198,727,395
13	PRICE CONTINGENCIES (2% p.a. FX; 5% p.a. LC)	63,781,481	205,650,536	269,432,017

	PARTICULARS	FX COST (P)	Local Cost (P)	Total Cost (P)
14	PROJECT ADMINISTRATION COST (3% of Project Cost)	-	93,264,330	93,264,330
	GRAND TOTAL ----	1,513,142,368	5,008,933,755	6,522,076,123

The higher total project investment cost for the Tagbilaran Airport Redevelopment option vis-à-vis that for the Panglao Airport Project option is attributed mainly to the differences in the estimated cost requirements covering expenditures relating to ROW/land acquisition activities. As presented in **Table 8.1-4**, the differences in the estimated base costs (net of contingencies) for expenditures relating to ROW activities – demolition of structures, replacement cost of structures and land acquisition – are very substantial such that the effect of the cost of the additional work components required under the Panglao Airport Project (i.e., the construction of detention pond and grouting of cavities) is rendered insignificant.

Table 8.1-4 Comparison of Investment Costs, in Php

Particulars	Panglao	Tagbilaran	% Difference – Tagbilaran vs. Panglao
	Total Amount	Total Amount	
Detention Pond	94,063,892	-	n.a.
Grouting Of Cavities	117,311,189	-	n.a.
Demolition Of Existing Airport Structures	-	26,863,789	n.a.
Demolition Of Structures Along ROW	873,795	111,386,372	12,647%
Replacement Cost of Structures Along ROW	10,621,867	1,374,476,218	12,840%
Land Acquisition	142,523,700	1,477,365,149	1,037%
TOTAL ----	365,394,443	2,990,091,530	

A comparative analysis of these cost components show that the resulting cost differences are due to differences in the (a) magnitude or scope of the works required under each of the two project options pertaining to said components and (b) corresponding cost per unit of construction. As shown in **Table 8.1-5**, the required magnitude of the works involving demolition and replacement of structures along the ROW is much higher for the Tagbilaran Airport Redevelopment option as compared to the Panglao Airport Project. The same is true for the cost per unit of construction, as shown in **Table 8.1-6**. Although the land area that is required to be acquired under the Panglao Airport Project is relatively higher than what is required under the Tagbilaran Airport Redevelopment option, the estimated value of the lands to be acquired for the latter is very much higher such that the effect on the total cost of the difference in scope is offset.

The magnitude or scope of the works involving demolition and replacement of structures along the ROW and the value of the lands to be acquired are both higher under the Tagbilaran Airport Redevelopment option in view of the fact that the area within and around the site of the present airport is comparatively more developed than the proposed site of the new airport. The proposed site of the new airport is located in an area consisting mainly of agricultural lands while the site of the present airport is situated around an area composed of residential and commercial lots.

Table 8.1-5 Comparison of Quantities

Particulars	Unit	Panglao	Tagbilaran	% Difference – Tagbilaran vs. Panglao
		Qty	Qty	
Grouting Of Cavities	cu. m.	27,145	-	n.a.
Demolition Of Existing Airport Structures	l. s.	-	l.s	n.a.
Demolition Of Structures Along ROW	cu. m.	4,422	343,735	7,672%
Repl Cost of Structures Along ROW	sq. m.	1,638	114,578	6,895%
Land Acquisition	sq. m.	2,159,450	1,136,434	-47%

Table 8.1-6 Comparison of Unit Costs (Average), in Php

Particulars		Panglao	Tagbilaran	% Difference – Tagbilaran vs. Panglao
Demolition Of Structures Along ROW	cost per cu. m.	197.58	324.05	64%
Repl. Cost Structures Along ROW	cost per sq. m.	6,484.66	11,995.92	85%
Land Acquisition	cost per sq. m.	60.00	1,300.00	2,067%

8.1.4 Operating and Maintenance Costs for the Proposed Panglao Island Airport

The operating and maintenance (O&M) costs are estimated in this study based on a combination of estimated historical O&M expenses in the existing Tagbilaran airport, patterns established in the Commission on Audit (COA) reports regarding the operations of the Air Transportation Office (ATO), and assumptions on facility maintenance requirements as established in other airport projects.

(a) Salaries

The computation of the salaries of personnel is based on the assumption that the organizational framework for the operation of the new airport will have the same functional setup as the existing Tagbilaran airport but with additional manpower to enable the ATO to deal with a larger facility and higher traffic volume. Based on the organizational chart and ATO plantilla positions, it is assumed that the existing 39 airport personnel will increase to 68 on the opening year and will further increase to 97 in year 2025.

(b) General operation and administration expenses

The base figures for these expenses were estimated based on the 2006 maintenance and other operating expenses (MOOE) of the Tagbilaran airport and adjusted using the projected inflation this year (2.6 percent to 3.1 percent according to the Bangko Sentral ng Pilipinas) to be able to arrive at 2007 constant prices. The relevant items gathered from the ATO-Tagbilaran 2006 MOOE record consist of the following:

Supplies and Materials	146,032
Office repairs & maintenance	22,835
Travel Expenses	77,696
Fuel/Oil	207,211
Miscellaneous	20,400
Communications	46,260
Water	154,141
Electricity	596,331

Real increases in general operation and administration expenses are also expected to occur in tandem with increases in manpower requirements.

(c) Airport Facility Maintenance

Based on historical data and documents (2005 and 2006 records) gathered from field, it was established that the average expenditure on airport facility maintenance actually incurred in the Tagbilaran airport are the following:

	Expenses (Php)	% Share
Repair & Maintenance of Airport Horizontal & Vertical Facilities	657,519	39%
Repair & Maintenance of Air Navigation Facilities	576,314	34%
Special Projects	467,627	27%
Total Airport Facility Maintenance	1,701,460	100%

The annual routine facility maintenance requirement of the project is computed using an allocation of 0.5% of the total basic cost of civil works, structures and equipment, as established in feasibility studies in the past for new airport development. The distribution of the maintenance requirement into horizontal and vertical facilities, air navigation facilities, and special projects is deemed similar to the historical percentage shares of the components of Tagbilaran airport facility maintenance. Annual nominal increases are based on the projected general inflation. Real increases will be required by periodic maintenance which is scheduled with three-year intervals and assumed as 10% of the routine maintenance requirement.

(d) Insurance Premium

Based on the COA report on the 2005 operations of the ATO, the annual insurance expense of the agency is about 0.075% of the depreciable asset. This translates to approximately Php1,124,429 insurance expense for this project. It is then assumed that the reasonable insurance premium for the new airport is a round figure of PHP1.1 million annually.

The real increases in O&M expenditures would be due to additional manpower requirements, additional general operation and administration spending, and periodic maintenance requirements. Nominal increases are taken into account by considering a general inflation rate of 3%-4%, the MTPDP target range. The higher rate of 4% is used in the 2007-2014 estimates and the optimistic 3% target is used in the 2015-2035 estimates. The O&M requirements of the project in nominal prices are summarized in **Table 8.1-7** below.

Table 8.1-7 Operating and Maintenance Costs, current prices (in Php)

Particulars	2011	2015	2020	2025	2030	2035
Salaries	13,085,804	14,728,188	17,074,006	27,380,031	31,740,960	36,796,473
General Operation and Administration Expenses	2,567,409	2,889,641	3,349,886	5,539,607	6,421,923	7,444,768
Airport Facility Maintenance	17,162,910	21,248,708	27,096,383	34,553,348	44,062,481	61,807,395
Repair & Maintenance of Airport Horizontal & Vertical Facilities	6,632,509	8,211,442	10,471,243	13,352,945	17,027,695	23,885,116
Repair & Maintenance of Air Navigation Facilities	5,813,375	7,197,305	9,178,014	11,703,817	14,924,724	20,935,234
Other repairs and maintenance	4,717,027	5,839,961	7,447,126	9,496,587	12,110,061	16,987,045
Insurance Premium	1,100,000	1,100,000	1,100,000	1,100,000	1,100,000	1,100,000
Total O&M	33,916,123	39,966,536	48,620,275	68,572,986	83,325,364	107,148,636

Simulating these estimates required finding a delicate balance between the operating efficiency requirements of a larger and more technically equipped facility and the scale economies naturally associated with increases in traffic volume. The results yield an implicit operating cost elasticity with respect to increases in passenger traffic of 0.79, meaning, scale economies are allowed to happen since the elasticity is less than 1. Although this seems good enough since it is not too far from the cost elasticity goal of 0.64 established in the *Master Plan Study on the Strategy for the Improvement of National Airports in the Philippines* (computed using cross-section data on all the airports in the Philippines), it would do well for the future managers of the Panglao airport to target such goal to ensure cost efficiency and higher productivity.

8.2 PROJECT IMPLEMENTATION AND CASH DISBURSEMENT SCHEDULES

8.2.1 Implementation Schedule

The Project will be implemented over a period of about two (2) years and four (4) months, with the detailed engineering design activities expected to kick off by December of 2007. Detailed engineering activities are anticipated to be completed in seven (7) months, or by the end of June 2008. Tendering activities, following the completion of the detailed engineering design, shall commence by July 2008 and completed within a period of four (4) months. Actual construction works are then expected to begin by November of 2008 and completed by 05 April 2010, for a total construction period of one (1) year and five (5) months.

The proposed time schedule for the implementation of the project in the form of a bar chart is given in **Table 8.2-1**.

Table 8.2-1 Proposed Project Implementation Schedule

	PARTICULARS	2007	2008	2009	2010
1.0	ROW AND RELATED ACTIVITIESACTIVITIES[1]	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪	▪▪▪▪▪▪▪▪		
2.0	DETAILED ENGINEERING AND TENDERING		▬▬▬▬		
3.0	PRELIMINARIES AND GENERAL REQUIREMENTS		▬		
4.0	CIVIL WORKS		▬▬▬▬	▬▬▬▬	▬▬
5.0	BUILDINGS AND STRUCTURES (INCL. UTILITIES)		▬▬▬▬	▬▬▬▬	▬▬
6.0	LIGHTING AND NAVIGATIONAL AIDS			▬▬▬▬	▬
7.0	SPECIAL EQUIPMENT			▬▬▬▬	▬
8.0	FIRE FIGHTING EQUIPMENT				▬
9.0	AIRPORT MAINTENANCE EQUIPMENT				▬

[1]ROW and related activities have already commenced and are currently ongoing.

8.2.2 Cash Disbursement Schedule

The estimated annual cash disbursement requirements of the Project consistent with the proposed implementation schedule and broken down by related expenditure components are provided in **Table 8.2-2**.

Table 8.2-2 Annual Cash Disbursement Schedule (in Php)

	Particulars	Total	2007	2008	2009	2010
1	PRELIMINARIES AND GENERAL REQUIREMENTS	42,775,791		42,775,791		
2	CIVIL WORKS	1,463,433,633		219,515,045	878,060,180	365,858,408
3	BLDGS & STRUCTURES (INCL. AIRPORT UTILITIES)	853,487,033		128,023,055	512,092,220	213,371,758
4	LIGHTING AND NAVIGATIONAL AIDS	469,541,016		-	375,632,813	93,908,203
5	SPECIAL EQUIPMENT	110,035,800		-	88,028,640	22,007,160
6	FIRE FIGHTING EQUIPMENT	50,051,160		-	-	50,051,160

	Particulars	Total	2007	2008	2009	2010
7	AIRPORT MAINTENANCE EQUIPMENT	16,124,144		-	-	16,124,144
8	DEMOLITION OF EXISTING HOUSES	873,796	873,796	-	-	-
	Sub -Total of 1 to 8	3,006,322,372	873,796	390,313,891	1,853,813,853	761,320,833
9	ROW/REPLACEMENT COSTS	153,145,568	122,516,454	30,629,114	-	-
10	DETAILED ENGINEERING DESIGN (4% of 1 - 7)	120,217,943	24,043,589	96,174,354	-	-
11	CONSTRUCTION SUPERVISION (6% of 1 - 7)	180,326,915		23,418,833	111,228,831	45,679,250
12	PHYSICAL CONTINGENCIES (7% of 1 - 8)	210,442,566	61,166	27,321,972	129,766,970	53,292,458
13	PRICE CONTINGENCIES (2% p.a. FX; 5% p.a. LC)	271,537,889		23,548,545	152,233,391	95,755,953
14	PROJECT ADMIN COST (3% of Project Cost)	99,206,017	747,522	15,297,212	58,951,281	24,210,002
	GRAND TOTAL ----	**4,041,199,270**	**148,242,526**	**606,703,922**	**2,305,994,325**	**980,258,497**

8.3 PROJECT FINANCING PLAN

Project financing refers to the manner by which funding will be provided to meet the expenditure requirements of the project, and is normally presented by breaking down the project cost in terms of the sources from which the necessary funds are to be drawn to meet each corresponding expenditure item. The cost of a project may be financed through a mixture of various funding sources that may include budgets appropriated by legislation, equity, internally generated cash, bonds and notes, local and foreign borrowings, etc.

8.3.1 Sources of Funds

For the purpose of the project, the estimated total project investment cost requirement in the amount of Php4.014 billion shall be financed wholly through government funds, specifically through a combination of funds from MIAA, DOTC and other national government (NG) agencies. Section 6 (Funding) of Memorandum Order (MO) No. 178 (Establishing the Panglao Tourism Special Infrastructure Program and Directing the Secretary of Tourism to Exercise Primary Oversight Functions) issued by President Gloria Macapagal-Arroyo on 04 July 2005, as amended by MO No. 178-A dated 13 January 2006 and further amended by MONo. 210 dated 10 April 2006, provides that "The DBM Secretary shall regularly release the allotment and

disbursement authority intended for projects under the PTSIP, as authorized in the General Appropriations Act, covering both loans proceeds and local fund counterparts, and from the budgets of DOTC, PTA, DOT, ATO, PPA and MIAA."

In accordance with the said provision of the above executive issuances, the MIAA has committed to provide funds for the development of the proposed Panglao Airport Project, to be drawn from the Authority's internally generated cash. MIAA initially indicated to provide Php2.9 billion, to be sourced from its receivables from PAL (which is approximately 3.961 billion according to COA audit report as of December 31, 2005). Likewise, in a Memorandum of Agreement entered into by and between the Republic of the Philippines, through the DOTC, and the Provincial Government of Bohol on 22 July 2006, the DOTC shall, among others, allocate available funds to cover the cost of the acquisition of lots and the payment of improvements thereon for the proposed new airport. To date, the DOTC has already released under two tranches a total of Php100.75 million (first tranche in the amount of Php27.75 million, second tranche in the amount of Php73 million) for ROW activities.

In accordance with the above therefore, the cost of ROW/land acquisition and related activities shall be financed through DOTC funds. In this study, it is assumed that the expenditure requirements for the implementation of the rest of the cost components, comprising the bulk of the total project investment cost, shall be financed first from the MIAA funds in the amount of Php2.9 billion until such amount is fully utilized. Such amount, however, may still change after the MIAA Corporate Board has officially decided on the amount to be allocated for the project. Upon depletion of the MIAA funds, the remaining expenditure requirements of the related cost components shall be financed from national government (NG) funds, which may be drawn from the budget of DOTC, PTA, DOT, ATO, and/or PPA.

The proposed financing plan with the estimated total project investment cost broken down by the related expenditure items and by proposed funding source following the arrangement cited in the above is shown in **Table 8.3-1** On the other hand, the estimated annual cash disbursement requirements of the Project consistent with the proposed implementation schedule and broken down by component and funding source are provided in

Table 8.3-2.

Table 8.3-1 Proposed Financing Plan (in Php)

Particulars		TOTAL	AMOUNT			PERCENTAGE		
			MIAA	DOTC	NG	MIAA	DOTC	NG
1	PRELIMINARIES AND GEN REQTS	42.78	42.78	0.00	0.00	100.00%	0.00%	0.00%
2	CIVIL WORKS	1,463.43	1,089.78	0.00	373.65	74.47%	0.00%	25.53%
3	BLDGS & STRUCTURES (INCL. AIRPORT UTILITIES)	853.49	640.12	0.00	213.37	75.00%	0.00%	25.00%
4	LIGHTING AND NAVIGATIONAL AIDS	469.54	375.63	0.00	93.91	80.00%	0.00%	20.00%
5	SPECIAL EQUIPMENT	110.04	88.03	0.00	22.01	80.00%	0.00%	20.00%
6	FIRE FIGHTING EQUIPMENT	50.05	0.00	0.00	50.05	0.00%	0.00%	100.00%
7	AIRPORT MAINTENANCE EQUIPMENT	16.12	0.00	0.00	16.12	0.00%	0.00%	100.00%
8	DEMOLITION OF EXISTING HOUSES	0.87	0.87	0.00	0.00	100.00%	0.00%	0.00%
9	ROW/REPLACEMENT COSTS	153.15	0.00	153.15	0.00	0.00%	100.00%	0.00%
10	DETAILED ENGINEERING DESIGN	120.22	120.22	0.00	0.00	100.00%	0.00%	0.00%
11	CONSTRUCTION SUPERVISION	180.33	134.65	0.00	45.68	74.67%	0.00%	25.33%
12	PHYSICAL CONTINGENCIES	210.44	157.15	0.00	53.29	74.68%	0.00%	25.32%
13	PRICE CONTINGENCIES	271.54	175.78	0.00	95.76	64.74%	0.00%	35.26%
14	PROJECT ADMIN COST	99.21	75.00	0.00	24.21	75.60%	0.00%	24.40%
	GRAND TOTAL ----	**4,041.20**	**2,900.00**	**153.15**	**988.05**	71.76%	3.79%	24.45%

Table 8.3-2 Annual Cash Disbursement Schedule By Funding Source (in Php)

PARTICULARS	2007			2008			2009			2010		
	M IAA	DOTC	NG	M IAA	DOTC	NG	M IAA	DOTC	NG	M IAA	DOTC	NG
PRELIMINARIES AND GEN REQTS	-			42.78			-	-	-		-	-
CIVIL WORKS	-			219.52			870.26	-	7.80		-	65.86
BLDGS & STRUCTURES (INCL UTILITIES)				128.02			512.09	-			-	213.37
LIGHTING AND NAVIGATION AIDS							375.63	-			-	93.91
SPECIAL EQPT	-						88.03	-			-	22.01
FIRE FIGHTING EQPT	-						-	-			-	50.05
AIRPORT MAINT. EQPT	-							-			-	16.12
DEMOLITION OF EXISTING HOUSES	0.87	-						-			-	-
ROW AND REL. ACTIVITIES		122.52			30.63			-			-	-
DETAILED ENG'G DESIGN	24.04			96.17				-			-	-
CONSTRUCTION SUPERVISION	-			23.42			111.23	-			-	45.68
PHYSICAL CONTINGENCIES	0.06	-		27.32			129.77	-			-	53.29
PRICE CONTINGENCIES	-	-		23.55			152.23	-			-	95.76
PROJECT ADMIN COST	0.75	-		15.30	-		58.95	-			-	24.21
GRAND TOTAL ----	**25.73**	**122.52**		**576.07**	**30.63**		**2,298.20**	**-**	**7.80**		**-**	**980.26**

8.4 IMPLEMENTATION PROGRAM ARRANGEMENTS

In order to optimize efficiency and enhance economy in the implementation of the proposed new airport project, a clear delineation and definition of the roles and responsibilities of each of the key players involved in the various aspects and stages of the project's implementation, among others, will need to be first established. In developing the suitable implementation arrangement and institutional framework for the proposed project, it is imperative to ensure that the responsibility for each task at every stage of the project implementation process is assigned to the concerned unit that is best suited to assume such responsibility.

In respect of the above, careful consideration has been given to the level of competency, experience and available resources of each key player involved in the proposed project vis-à-vis the requirements and nature of the various tasks in the framing of the suitable institutional arrangements and structure for the proposed project's implementation. It is pointed out, however, that in the assignment of tasks and delineation of roles among the concerned key players involved in the proposed project, a primary and overriding consideration is accorded to the existing legal mandates of each unit as prescribed by law, as well as the prescriptions of applicable executive and other legal issuances.

8.4.1 Institutional and Organizational Framework for Project Implementation

To provide for a clearer and more defined delineation of roles and responsibilities among the concerned players, the project implementation process for the project's purposes will be sub-divided into three (3) main stages. These are as follows:

(a) Pre-Construction Stage – This covers all activities preparatory to the actual execution of construction works. The relevant activities covered under this stage include the (i) conduct of land acquisition and resettlement/relocation works and (ii) conduct of detailed engineering design activities, which consist of the preparation of the detailed engineering design plans and specifications, preparation of related Tender Documents and bidding.

(b) Construction Stage – This involves the actual execution of all works comprising the various components of the project's scope up to their final completion.

(c) Post-Construction/Project Operation Stage – This stage entails putting on line the operation of the project facility after the completion of all relevant construction works.

Having established the main stages of the project implementation process and taking into consideration the level of competency, experience, available resources, and legal mandates of all concerned units, the proposed institutional and organizational frameworks delineating the roles and defining the corresponding tasks and responsibilities of each key player involved under each stage of the process shall be as follows:

Pre-Construction Stage

(a) Land Acquisition and Relocation/Resettlement

The existing set-up for the present conduct of land acquisition and relocation/resettlement activities shall be retained and will continue to operate. Under the present set-up, which had been framed with the execution of the Memorandum of Agreement (MOA) that was

entered into by and between the Republic of the Philippines, through the DOTC, and the Provincial Government of Bohol on 22 July 2006, the task and responsibility for carrying out the land acquisition and relocation/resettlement works required under the project is principally lodged with the Provincial Government of Bohol. Funds to meet the expenditure requirements of the land acquisition and relocation/resettlement works are however being provided by the DOTC out of its annual budgetary appropriation.

Organizationally, the various tasks involved in the conduct of land acquisition activities are carried out by working committees created under Executive Order No. 14 that was issued by the Bohol Provincial Governor on 19 August 2006. The working committees and their duties and functions are explained in detail in Section 7 (**Table 7.2-2**) of this study.

(b) Detailed Engineering Design

The conduct of the actual detailed engineering design activities shall be carried out by qualified consultants who shall be selected and engaged in accordance with the relevant provisions and prescriptions of Republic Act (RA) No. 9184, also known as the "Government Procurement Reform Act" or GPRA.

Consultant selection, contract award and execution and the subsequent administration of the related consulting services contract with the selected consultant shall on the other hand be the responsibility of the MIAA. This is in consideration of the fact that the cost of the consultant's services will be paid out of the funds to be provided by MIAA as indicated in Section 8.3. As such, the consultant's outputs shall be subject to the review and approval of the MIAA. For this purpose, however, the MIAA may request assistance from the ATO.

Construction Stage

(a) Construction Works

The actual execution of all related construction works shall be undertaken by qualified contractor(s) with proven expertise and experience in airport construction. The related contract for the execution of the works shall be awarded to the qualified contractor(s) through open competitive bidding following the rules and procedures prescribed under the relevant provisions of RA No. 9184.

As in the case of the selection of consultants for detailed engineering design services, the conduct of the bidding for the construction contract, bid evaluation and contract award and the subsequent administration of the contract with the winning contractor shall be the responsibility of the MIAA. On-site and day-to-day management and supervision of the construction works and the performance of the contractor shall be carried out by the engineering design consultant who shall serve as the Engineer or Owner's Representative during the execution of the contract works.

(b) Overall Project Monitoring

In order to ensure that the proposed project will be completed in accordance with pre-established time schedules, the Project Management Office that was created under EO No. 178 as amended by EO No. 178-A shall monitor the overall progress of the project's implementation, from the acquisition of lands to the conduct of engineering design activities and up to the final completion of the contract works. For the purpose, the PMO,

in cases where a critical deviation from the pre-established time schedule is noted at any stage of the project implementation process may call upon the concerned unit to institute necessary measures to speed up project implementation and put the overall progress of the project back on schedule.

Post-Construction/Project Operation Stage

In accordance with the legal mandate of ATO as prescribed under existing applicable laws, specifically Executive Order No. 125, as amended by Executive Order No. 125-A, the new Panglao Airport facility shall, upon the final completion of all construction works, be turned-over to the ATO for management and operation. In accordance with the terms and provisions of the subject executive issuances, the ATO is mandated "to operate and maintain national airports, air navigation and other similar facilities in compliance to ICAO standards".

It may be worthwhile to mention that the possibility for the MIAA to assume the task and responsibility for the operation and management of the new airport facility upon its completion has initially been considered. This is in consideration of the fact that MIAA will be providing most of the funds required to finance the implementation of the proposed project. For this purpose, Executive Order No. 341 (Reorganizing the Manila International Airport Authority (MIAA), Modifying Its Powers and Functions, and Authorizing and Directing the MIAA to Exercise Administrative Supervision and Control Over All International Airports in the Philippines) issued by President Gloria Macapagal-Arroyo on 04 August 2004 was looked into as a possible legal basis to enable MIAA to operate and manage the new airport terminal on the premise however that the new airport facility will be re-classified as an international airport.

A more careful reading subsequently made of the relevant provisions of EO No. 341 however tends to indicate that the said executive issuance does not provide sufficient legal basis to allow MIAA to operate and manage the new airport facility even if the same is re-classified as an international airport. Section 1 of the said EO, which is the relevant provision in this case, is quoted in full hereunder:

"*SECTION 1. Administrative Supervision and Control. - The Manila International Airport Authority (MIAA) is hereby authorized and directed to exercise administrative supervision and control over all international airports in the Philippines and shall formulate, promote and implement a comprehensive and integrated program for the management, operation, maintenance and development of all international airports in the Philippines to internationally-accepted standards.*

For this purpose, the MIAA, through its General Manager, shall perform any of the following actions, with respect to the Laoag International Airport, the Diosdado Macapagal International Airport (formerly the Clark International Airport), the Subic International Airport, the Mactan-Cebu International Airport, the Francisco Bangoy International Airport in Davao, the General Santos International Airport, the Zamboanga International Airport, and such other international airports as may be established in the Philippines:

a. Act directly on any matter involving the management, operation, maintenance or development of any of the international airports in the Philippines;

b. Direct any of the officials of the international airports to perform their duties or retrain the commission of acts;

c. Review, approve, reverse or modify acts and decisions of the governing board, officials or units of all the international airports;

d. Determine priorities in the execution of plans and programs; and

e. Prescribe standards, guidelines, plans and programs"

It appears plain enough from the provisions of Section 1 of the subject EO as quoted in full above that MIAA is accorded the authority to exercise administrative supervision and control over all international airports in the country. No provision, however, has been granted to MIAA that will allow it to assume the operation and management of the mentioned airports. Moreover, even though the EO was issued more than three years ago (August 4, 2004), it has not been implemented because it is perceived as inconsistent with the independent airports' charters approved by Congress; the EO cannot supersede the Republic Acts on which the airport authorities are created.

Upon completion and turn over of the new airport facility to the ATO, the present Tagbilaran Airport shall be closed and will cease to operate. The new Panglao Airport is proposed to continue to be managed, operated and maintained by the ATO, an agency attached to the DOTC. The management, operation and maintenance by the ATO of the new Panglao Airport, which shall also be classified as a domestic airport, is consistent and in line with the legal mandate of the ATO as stipulated under Executive Order No. 125, as amended by Executive Order No. 125-A, namely, "to operate and maintain national airports, air navigation and other similar facilities in compliance with ICAO standards". MIAA's substantial contribution to the financing of the new Panglao Airport can be offset through appropriate debits to its remittance of its net operating income to the national government, as supported by EO 298 s. 1983 (MIAA's Charter), RA 7656 (Dividends Law) and the New Government Accounting System (NGAS). Under the proposed set-up, the manpower complement of the ATO currently servicing the Tagbilaran Airport shall be transferred to the new airport. To comply with the minimum requirements under the new airport classification (4C), the existing organizational setup for airport operation will be retained (

Figure 8.4-1) but will be strengthened by adding manpower in the functional categories.

The traffic forecast shows that there is potential international traffic which may start as early as 2011 via chartered flights. The analysis of foreign visitor travel patterns and potential international routes to be served suggest that economies of scale for regular direct flights may be achieved in the future.

During operation in the medium term, it is crucial that the actual realization of the forecast international chartered flights be monitored in order to anticipate the timing of the potential regular direct flights and assess the re-classification of Panglao Airport into an international airport desired by some stakeholders. The absence of historical data on Panglao international flights and the fact that EO 341 has been held in abeyance because it is perceived as inconsistent with Congress-approved airport charters make it premature to plan for a re-organization of the Panglao airport under the control of MIAA.

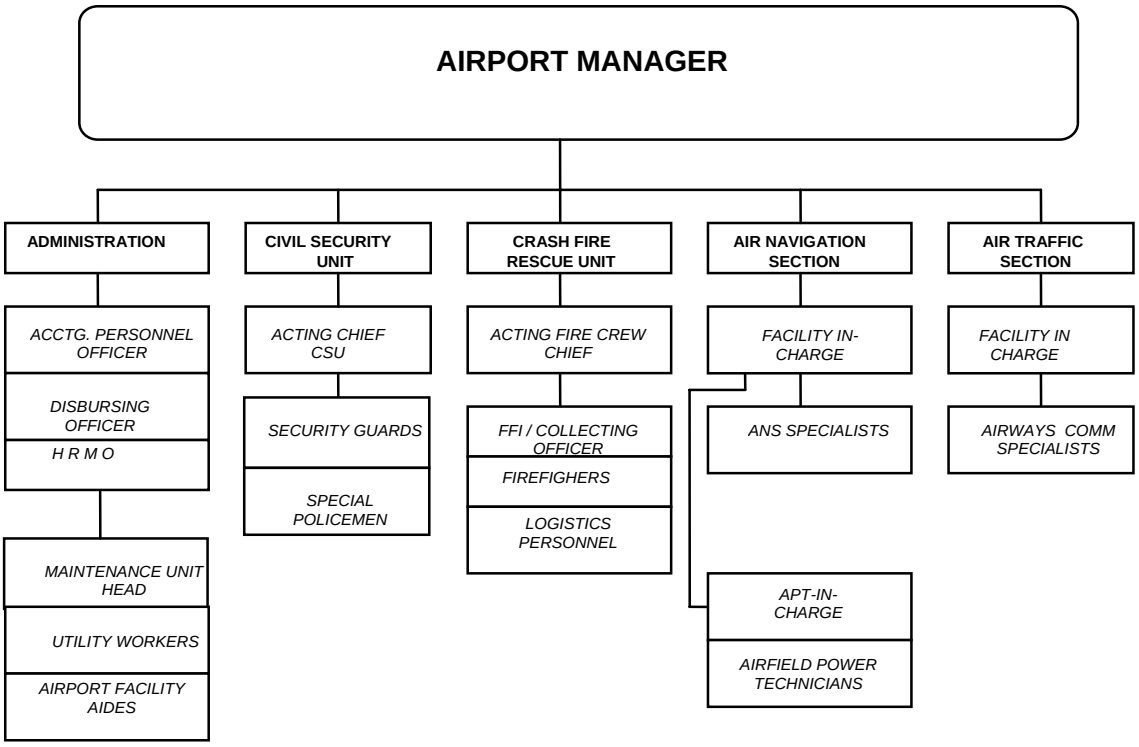


Figure 8.4-1 Existing Organizational Setup in Tagbilaran Airport

In any case, a more robust organizational structure suitable for an expanded operation of the new Panglao Airport is shown in Figure 8.4-2. A personnel complement consisting of at least 97 personnel is required, broken down as follows:

POSITION	No of Personnel	
General Manager		1
Assistant Managers		5
Finance & Administration		10
Planning & Engineering		6
Operations		
Airside		15
Air Traffic	7	
Air Navigation	8	
Landside		12
Maintenance		24
Buildings	10	
Grounds	10	
Vehicle	4	
Safety & Security		
Civil Security		11
ARFF		10
Safety		3
TOTAL		97

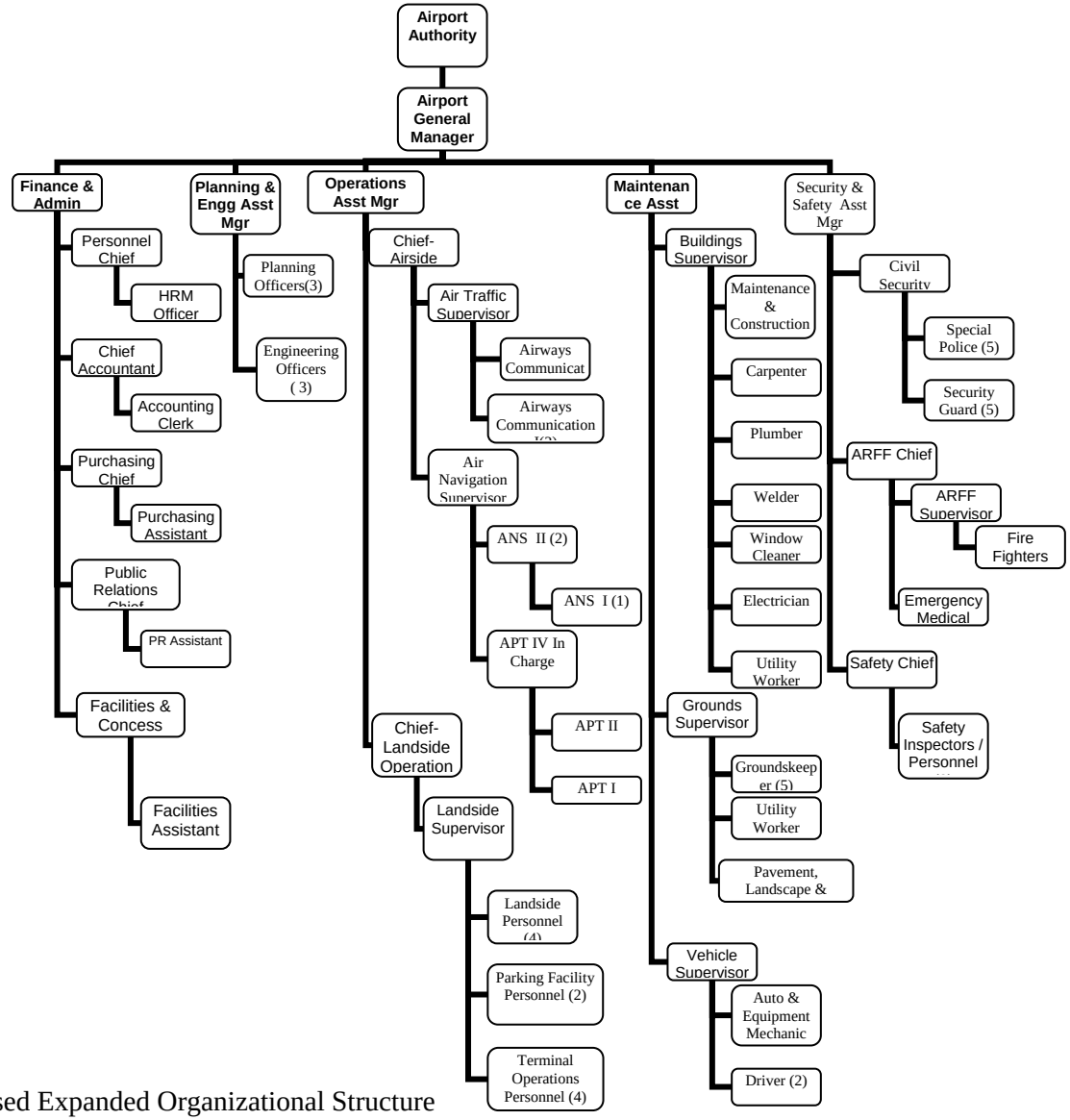


Figure 8.4-2 Proposed Expanded Organizational Structure

SECTION 9 VIABILITY REVIEW

9.1 ECONOMIC ANALYSIS

The objective of the economic analysis is to show whether there is economic merit in pursuing the project, and if there is, to evaluate the least cost of implementing it. Put another way, the economic analysis will show which among the alternative ways of implementing the project will yield the highest economic returns. The framework adopted here is the *with-* and *without-the-project* approach, utilizing the capacity-constrained forecast of passenger, cargo, and aircraft movements in the *without-the-project* scenario and the projected movements given the medium-term airport capacity expansion and upgrading in the *with-the-project* scenario.

It has been established in airport economics and project finance literature that runways, taxiways and aprons, if properly maintained, can last as long as 20 to 30 years (Pollio, Gerald (1999). *International Project Analysis and Financing*. Macmillan Press Ltd., London). For this project, the economic life of the project is assumed as 25 years.

9.1.1 Economic Costs

In the section on project cost analysis, two investment options are presented: (i) major rehabilitation and upgrading of the current Tagbilaran airport to expand its capacity and comply with international safety standards, with an estimated cost of PHP6.52 billion, and (ii) developing a new airport of international standard at Panglao, with a cost of PHP 4.04 billion. To estimate the economic costs, taxes and financing costs were excluded from the investment costs. Since economic costs must be in real terms or constant prices, the accounting for inflationary impacts as embedded in price contingencies was also ignored.

What remained of the investment costs were translated into economic costs using the following conversion factors: (i) 1.2 shadow price of foreign exchange for the foreign cost component; and (ii) 0.6 shadow wage rate for unskilled labor. These conversion factors are currently being used by evaluators of public sector projects in the Philippines. After making the necessary adjustments, the economic capital costs in 2007 constant prices were established. **Table 9.1-1** presents the economic investment cost if the project would be implemented in Panglao Island.

Table 9.1-1 Investment Cost in Economic Prices

	2007	2008	2009	2010	Total
Foreign Exchange Cost		193,774,524	1,207,431,850	495,941,490	1,897,147,863
Local Cost:					
Labor cost	6,990	57,848,430	253,412,577	102,236,353	413,504,350
Skilled	1,092	9,038,817	36,608,735	15,129,677	60,778,321
Unskilled	5,898	48,809,613	216,803,842	87,106,676	352,726,029
Non-labor cost	135,439,292	264,439,837	498,223,760	203,704,441	1,101,807,330
Total Local Cost	135,446,283	322,288,267	751,636,336	305,940,794	1,515,311,680
Total Investment Cost	135,446,283	516,062,791	1,959,068,186	801,882,284	3,412,459,544

To determine the economic cost equivalent of the operation and maintenance (O&M) costs, all transfers were also excluded and no adjustment for inflation was applied. The economic O&M costs are in constant 2007 prices.

9.1.2 Economic Benefits

The economic benefits considered in the analysis are: (i) the direct employment benefits of the project; (ii) the avoided cost of travel diversion; (iii) the output effects of incremental tourism; (iv) the avoided cost of aircraft delays if the airport were to operate in a less constrained environment; and (v) the economic value of land in Tagbilaran that will be freed up when the airport is transferred to Panglao.

The project is expected to result in other economic benefits such as positive economic impacts from local business activities to be generated in the project area, and avoided accidents and loss of life due to improved aviation safety. Although these benefits are significant, they are difficult to measure and thus are no longer quantified in this study.

As with the economic costs, the computation of economic benefits is referenced to 2007 base year and thus the future values of benefits are in constant 2007 prices.

Direct Employment Benefits

During construction, the project will be able to provide direct employment benefits. These benefits are deemed equivalent to the project's estimated requirements for skilled and unskilled local labor, adjusted using shadow wage rates:

Table 9.1-2 Direct Employment Benefits (million PHP)

	2007	2008	2009	2010
Local Labor Requirement	6,990	57,848,430	253,412,577	102,236,353

Avoided Cost of Travel Diversion

The traffic forecast shows that increases in domestic passenger traffic in the Manila-Tagbilaran air sector can be quite substantial. In the absence of airport capacity expansion, the next best alternative of incremental passengers is air travel using the Manila-Cebu route complemented by Cebu-Tagbilaran sea travel using fast ferries. This travel diversion entails two kinds of costs: (i) additional transportation fare because the longer route is more expensive than the direct Manila-Tagbilaran flight; and (ii) productivity losses because the longer route entails a longer travel time. **Table 9.1-3** below compares the transportation cost and travel time using the direct flight vis-à-vis the longer route, and **Table 9.1-4** presents the additional cost to be incurred by traffic that will be diverted to the longer route.

Table 9.1-3 Comparison of Travel Routes

	Direct Flight (Manila-Tagbilaran)		**Longer Route (Manila-Cebu-Tagbilaran)**
Fare			
Airfare (average of PAL & Cebu Pacific):	PHP 4,075	Airfare (average of PAL & Cebu Pacific):	PHP 3,880
Airport terminal fee (for departure only)	PHP 20	Airport terminal fee	PHP 200
		Mactan Airport to pier	PHP 200
		Cebu to Tagbilaran via fastcraft	PHP 300
Total fare	PHP 4,095	Total fare	PHP 4,580
Travel time			
Air travel	75 minutes	Air travel	75 minutes
		Mactan Airport to pier	15 minutes
		Cebu to Tagbilaran via fastcraft	75 minutes
Total travel time	75 minutes	Total travel time	165 minutes

Table 9.1-4 Additional Cost Incurred Due to Travel Diversion

Additional travel time for both departing and arriving passengers	1.5 hours
Additional fare for departing passengers	PHP 485
Additional fare for arriving passengers	PHP 395

The avoided additional transportation costs of PHP 485 for departing passengers and PHP395 for arriving passengers are applied to the domestic component only of the total incremental traffic.

Note that the additional travel time used in this study is a conservative estimate; the actual figure could be significantly higher considering that mismatches in the airline schedules and fast ferry schedules translate to higher additional waiting time. Time is valued using regional labor productivity, as estimated by the National Wages and Productivity Commission of the Department of Labor and Employment (**Table 9.1-5**). Assuming regional productivity growth is unchanged until 2007, labor productivity by 2007 can be estimated as PHP 183.55 per hour.

Table 9.1-5 Labor productivity, 2004 and 2005

	Region VII	NCR	average
2004 labor productivity, PHP/person	151,701	433,630	
2005 labor productivity, PHP/person	161,597	486,581	324,089
labor productivity growth	6.52%	12.21%	9.37%

Source: National Wages and Productivity Commission

This approximation of minimum productivity per hour is then used in conservatively estimating the avoided productivity losses of the incremental domestic passengers who would be diverted without the project. Not all of the computed incremental domestic passengers are used in the estimation. Only the timesaving of incremental work- and business-related trips is included in the benefit estimation. Work- and business-related trips were estimated using the results of the passenger survey conducted in Tagbilaran airport in May 2007. The survey was able to establish the following distribution of domestic passenger-respondents by trip purpose:

Table 9.1-6 Trip Purposes Established by the Passenger Survey

Trip Purpose	Percentage of Respondents
Leisure/ recreation	33%
Social visit	7%
To home	38%
Work-related	14%
School-related	4%
Business-related	2%
Others	2%

Output Effects of Incremental Tourism

With the constrained capacity of the Tagbilaran airport, a significant portion of the forecast domestic and foreign travelers cannot be accommodated. With the project, part of the benefits accruing from the incremental traffic is additional output to be generated by tourism-related industries. The output effects of tourism can be direct or indirect. Direct effects are output effects changes associated with the immediate effects of changes in tourism expenditures. These include increased sales by food and beverage industries, and transport services, hotels, recreation facilities, and other tourism-specific industries. Indirect effects are the production changes resulting from various rounds of re-spending of the tourism-specific industries' receipts in other backward-linked industries (e.g., industries supplying products and services to hotels).

Using data provided by the Philippine Tourism Satellite Accounts (PTSA), which was developed by the National Statistical and Coordination Board in 2001, an input-output (I-O) analysis is conducted in this study. The I-O analysis involved deriving the matrix of technical coefficients (the Leontief matrix) from the supply-and-use table provided by the PTSA and applying the usual linear programming routine in I-O analysis. The supply-and-use table (**Table 9.1-7**) was calculated by the NSCB using 1998 data. Input-output and supply-use tables are NSCB products which are not regularly prepared, unlike other accounts which are produced with some regularity (e.g., quarterly GDP accounts, annual GRDP accounts).

Table 9.1-7 Supply and Use Table of Tourism and Tourism-Related Industries in the Philippines, 1998

Code	Sectors	1	2	3	4	5	6	B	II	Total Intermediate Demand	Personal Consumption Expenditures	Government Consumption Expenditure	Gross Fixed Capital Formation	Changes in Stocks	Net Export	Total Final Demand	Total Output
I	Tourism-specific products																
A	Characteristic products and services																
1	Accommodation services	0	0	182		353	498	2,372	4,055	7,460	2,120				14,534	16,654	24,114
2	Food and beverage serving services	101	76	10,371	27	2,590	5,870	10,613	12,724	42,372	67,272				15,473	82,745	125,117
3	Passenger transport services	96	215	2,321	17	291	20,740	32,174	35,437	91,291	68,503		1,523		9,010	79,036	170,327
4	Travel agency, tour operator and tourist guide services	114	15	71		12		19	201	432	537				2,099	2,636	3,068
5	Recreation, entertainment, cultural and similar services	0	1	0		4,948		2	7,447	12,398	20,536				22,881	43,417	55,815
6	Retail trade services	241	1,794	2,948	40	140	1,099	5,119	53,850	65,231	123,313		30,654		54,599	208,566	273,797
B	Connected products	1,151	2,664	6,420	115	1,767	25,151	53,332	141,176	231,776	303,919		298,534	88	81,403	683,944	915,720
II	Non-specific products	10,495	80,864	80,811	1,312	11,276	40,599	183,338	1,579,980	1,988,675						1,704,475	3,693,150

The Leontief matrix (**Table 9.1-8**) is calculated from the supply and use table.

Table 9.1-8 Leontief Matrix

		1	2	3	4	5	6	B	II
Code	Sectors								
1	Accommodation services	0.0000000	0.0000000	0.0010685	0.0000000	0.0063245	0.0018189	0.0025903	0.0010980
2	Food and beverage serving services	0.0041884	0.0006074	0.0608888	0.0088005	0.0464033	0.0214392	0.0115898	0.0034453
3	Passenger transport services	0.0039811	0.0017184	0.0136267	0.0055411	0.0052137	0.0757496	0.0351352	0.0095953
4	Travel agency, tour operator and tourist guide services	0.0047275	0.0001199	0.0004168	0.0000000	0.0002150	0.0000000	0.0000207	0.0000544
5	Recreation, entertainment, cultural and similar services	0.0000000	0.0000080	0.0000000	0.0000000	0.0886500	0.0000000	0.0000022	0.0020164
6	Retail trade services	0.0099942	0.0143386	0.0173079	0.0130378	0.0025083	0.0040139	0.0055901	0.0145810
B	Connected products	0.0477316	0.0212921	0.0376922	0.0374837	0.0316582	0.0918600	0.0582405	0.0382264
II	Non-specific products	0.4352244	0.6463071	0.4744462	0.4276402	0.2020245	0.1482814	0.2002119	0.4278137

Each a_{ij} element in the Leontief matrix, or the *A* matrix, corresponds to the amount of *i*th input needed to produce a unit worth of output *j*. In the Leontief I-O model, each column sum in the input coefficient matrix *A* represents the *partial* input cost of producing a unit worth of some commodity, that is,

$$\sum_{i=1}^{n} a_{ij} < 1 \qquad (j = 1, 2, ..., n)$$

Thus, the value of the primary input needed in producing a unit of the *j*th commodity should be $1 - \sum_{i=1}^{n} a_{ij}$. If the *i* industries are to produce an output just sufficient to meet the input requirements of the *j* industries as well as the final demand, the output level *x* must satisfy the following equation (in matrix form):

$$(I\text{-}A)x = d$$

where *I* is an identity matrix and *d* is the final demand vector. The unique solution to the system of equation represented by the above matrix equation is:

$$\bar{x} = (I - A)^{-1} d$$

After calculating the inverse of the (*I-A*) matrix, the next step was then to estimate the likely change in final demand to be brought about by additional tourism expenditures of the incremental air passenger traffic. The output effects of the annual changes in final demand, assuming everything is constant, are then estimated using the $\bar{x} = (I - A)^{-1} d$ equation. It is assumed that about 25% of the output effects could be attributed to the project. In past airport studies, 20%-30% of tourism benefits are attributed to airport development projects.

Domestic tourists' expenditures are based on data from the National Statistics Office (NSO) and Department of Tourism (DOT) (**Table 9.1-9**).

Table 9.1-9 Domestic Travelers' Average Expenditure and Length of Stay

Expenditure Items (PHP)	**Average**
Accommodation	1,200
Food and beverage	400
Local transport	400
Sightseeing/guided tour	600
Entertainment and recreation	300
Shopping	1,100
Others	3,200
Average length of stay per domestic traveler (days)	4
Total expenditure, in PHP	7,200
Average daily expenditure, 2005, in PHP	1,800

Source: NSO-DOT Household Survey on Domestic Visitors, 2005

The NSO-DOT survey estimated that the average length of stay per domestic traveler is four days. Since the data are 2005 figures, adjustments for inflation are applied to get the 2007 estimates. The inflation figures used are 6.2% in 2006, actual figure from the Bangko Sentral ng Pilipinas (BSP), and 4% in 2007, the MTPDP target. After the adjustments, the average daily expenditure of a domestic traveler in 2007 is estimated at PHP1,988. Based on the trip purpose distribution established by the passenger survey conducted at the Tagbilaran airport in May, 2007, it is deemed that 30% of the incremental domestic passengers are traveling for leisure or recreation and 7% are making social visits.

In the case of foreign visitors, the estimates are based on the following:

Table 9.1-10 Foreign Visitors' Expenditure and Length of Stay in 2005

	Visitors	**Average Stay** (nights)	**Total Receipts** ($million)
Jan	213,263	10.13	225.81
Feb	194,166	7.44	131.73
Mar	210,004	9.17	162.46
Apr	197,364	9.73	149.41
May	202,966	8.21	148.62
June	206,383	8	166.23
Total receipts			984.26
Total visitor-nights			10,768,452 nights
Average length of stay			8.8 nights
Average daily expenditure in 2005			$ 91.40

Source: NSCB, 2006 Philippine Statistical Yearbook

The 2005 figures are again adjusted for inflation and exchange rate movements. The 2005 average exchange rate of PHP55.085=$1.00 recorded by the BSP is used to get the purchasing power in pesos of the daily expenditure in dollar terms. After making the adjustments, the 2007 average daily expenditure of foreign visitors is then approximated as PHP5,561. The passenger survey generated a 9.6 days average length of stay per foreign visitor but this may not be statistically reliable because only four respondents answered the question on length of stay. The 8.8 nights average length of stay based on

the Philippine Statistical Yearbook also seems too high. To be conservative, this study assumed a 4-day average length of stay for foreigners, similar with the assumption for domestic tourists.

Avoided cost of aircraft delays

Cost-benefit analysis in airport capacity expansion projects and air traffic management projects usually estimates the cost of delays in the airport system. In the case of this project which involves capacity expansion, the *without-the-project* case implies a less than optimal capacity and will result in significant delays to aircraft. In the Philippines, there are currently no studies estimating the cost per minute of aircraft delays. In the same way that some studies would refer to past studies or research institutions when indicators to be established are data input-intensive, this feasibility study referred to researches conducted by reliable institutions. To estimate the avoided cost of aircraft delays in the *with-the-project* case, this study adopted the computations by the University of Westminster[8] of the true cost to airlines per one minute of tactical delay. Then the estimates for the cost advantage of Asian low-cost carriers' relative to their counterparts in Europe, as computed by a study by IBM Consulting Services in 2004, "Winning at the margin: The impact of low-cost carriers in Asia", were applied. The IBM Consulting Services study has established that the so-called low-cost carriers, many of which are in the Asia aviation region, have operating costs substantially lower than the North American and European dominant carriers.[9]

[8] www.eurocontrol.int/prc/gallery/content/public/Docs/cost_of_delay.pdf
[9] IBM Consulting Services, 2004, "Winning at the margin: The impact of low-cost carriers in Asia"

Table 9.1-11 Aircraft delay costs in Europe
(in EU per minute, 2006 prices)

	Tactical without network effect		Tactical with network effect		Strategic	
	Ground	**Airborne**	**Ground**	**Airborne**	**Ground**	**Airborne**
Fuel costs	1	15	1	15	1	15
Maintenance costs	1	1	1	1		12
Crew costs	9	9	11	11	12	12
Ground and passenger handling						
Airport charges	0	0	0	0		
Aircraft ownership costs					10	10
Passenger compensation	14	14	26	26		
Direct cost to an airline	**25**	**39**	**39**	**53**	**23**	**49**
Passenger opportunity cost	22	22	39	39		
Overall cost	**47**	**61**	**78**	**92**	**23**	**49**

Source: www.eurocontrol.int/prc/gallery/content/public/Docs/cost_of_delay.pdf

With network effect means that the cost of reactionary knock-on effects to the sector aviation network are estimated; *without network effect* means that only the initial delay is considered. To be conservative in the estimation, this feasibility study adopts only the *without network effect* calculation. Assuming lower costs for fuel, maintenance, crew and passenger compensation for the Philippines (assuming similar with low-cost carriers)) and applying the estimated 2007 international inflation of 2.8% [10] 2007 average exchange rate of PHP63.4973=EU1.00 [11] , the following cost of delays is established:

Table 9.1-12 Estimated aircraft delay costs by low-cost carriers in Asia (in PHP per minute, 2007 prices)

	Low-cost carrier's (LCC) cost advantage	**LCC's cost of delays, without network effect (in EU/minute, 2006 prices)**		**LCC's cost of delays, without network effect (in PHP/minute, 2007 prices)**	
		Ground	**Airborne**	**Ground**	**Airborne**
Fuel costs	12.90%	0.871	13.065	56.85	852.82
Maintenance costs	12.90%	0.871	0.871	56.85	56.85
Crew costs	33.30%	6.003	6.003	391.85	391.85
Passenger compensation (insurance, refund, etc.)	15.40%	11.844	11.844	773.12	773.12
Direct cost to an airline		**19.589**	**31.783**	**1,278.68**	**2,074.64**

Notes: Cost advantage based on IBM Consulting Services, 2004, "Winning at the margin: The impact of low-cost carriers in Asia"
Exchange rates based on BSP statisitcs

This feasibility study is able to calculate based on historical data the ground delay only at the Tagbilaran airport during peak and off-peak hours. Thus, for lack of data, only the *with-* and *without-the-project* tactical delays on the ground are estimated even though there is also a theoretical basis for considering the delays of airborne aircraft. Using

[10] Based on international cost escalation factors calculated in *Global Development Finance* 2006 by the World Bank.
[11] Official data from the Bangko Sentral ng Pilipinas.

queuing simulation, delays in aircraft-minutes are calculated, as shown in **Table 9.1-13**. The table shows that *with the project*, ground delays are significantly minimized.

Table 9.1-13 Estimates of Aircraft Delays (Daily Average)

Year	Without Project				With Project				Without Project	With Project
	Ave Delay During Peak-Hour (mins)	Estimated Average Number of Delayed Aircraft (Peak-hour)	Ave Delay During Off-Peak (mins)	Estimated Average Number of Affected Aircraft (Off-Peak)	Ave Delay During Peak-Hour (mins)	Estimated Average Number of Affected Aircraft (Peak-hour)	Ave Delay During Off-Peak (mins)	Estimated Average Number of Affected Aircraft (Off-Peak)	Total Daily Delay (Aircraft-Mins per day)	
2006	10.18	2	1.91	11					41	
2015	19.95	3	10.37	18	1.2	3	0.5	18	246	12
2020	87.00	5	14.87	27	3.9	5	0.8	27	837	41
2035	117.50	6	28.01	33	5.9	6	3.1	33	1,629	136

Economic Value (Opportunity Cost) of Land

The 220,000 sq.m.-land that will be freed up for other economic uses when the existing Tagbilaran Airport property is cleared has an economic value equivalent to its opportunity cost, or the value of its alternative use. Without the project, the next best use of the land is for commercial development. To approximate the opportunity cost of the land, it is valued at the conservative price level of commercial land in Tagbilaran, which is PHP1,500/sq.m.

Non-quantified Benefits

The project is expected to result in other economic benefits such as positive economic impacts from tourism-related activities. The project could also generate local business opportunities in the project area and provide livelihood to the residents in the airport vicinity. Moreover, the avoided accidents and loss of life due to improved aviation safety cannot be discounted. Productivity benefits due to the setting up of a cargo terminal in the new airport are also possible. Although these benefits are significant, they are difficult to measure and thus are no longer quantified in this study.

9.1.3 Economic Evaluation

The project's economic viability is determined by calculating the viability indicators and comparing these with the hurdle rate/level. The main economic viability indicators considered here are: (i) the economic internal rate of return (EIRR); (ii) the benefit-cost (B-C) ratio; and (iii) the net present value (NPV) of economic flows. The hurdle rate for the EIRR is 15%, the social discount rate established in Philippine project evaluation. The hurdle level for the B-C ratio is one. The hurdle level for the NPV is any significant positive value.

The EIRR is the discount rate which equates the present value of expected economic benefits with the present value of projected economic costs, or the discount rate that sets the NPV of economic flows equal to zero. By definition,

$$\sum_{t=0}^{n} \frac{(B_t - C_t)}{(1+r)^t} = 0$$

where

B_t = economic benefits at year *t*, *t*=0 is the present

C_t = economic costs at year *t*

r = economic internal rate of return

A project is considered economically viable if its EIRR is above 15%, meaning, the economy recovers its invested capital and earn a rate of return greater than the 15% social opportunity cost of capital.

The use of the EIRR entails several disadvantages. The EIRR indicates the rate per peso of investment but does not indicate on how many pesos that rate can be earned. The EIRR also ignores differences in scale and because of this, the viability of mutually exclusive projects may be ordered wrongly. The EIRR may not be unique, that is, there could be multiple IRRs, which could happen when the net benefit flows from an economic investment turn from negative to positive more than once. The EIRR generally favors projects with shorter lives.

The Benefit-Cost Ratio (B-C ratio) is the ratio of the NPV of economic benefits to the NPV of the economic costs, using the social discount rate in the discounting of benefits and costs. The B-C ratio indicates the economic return per peso of expenditure. The decision rule is to accept a project with B-C ratio greater than one. One disadvantage of the B-C ratio is that it does not take account of differences in the scale of investment. Another problem is that it is very sensitive to the magnitude of the initial investment and thus, it usually favors less costly projects.

The NPV of economic flows is the discounted stream of net economic benefits (i.e., benefits minus costs) arising from the project. The rate used in discounting the stream of net benefits is also the 15% social discount rate. Thus,

$$NPV = \sum_{t=0}^{n} \frac{(B_t - C_t)}{(1+15\%)^t}$$

The NPV criterion is widely accepted by economists as the only one that consistently yields correct decisions in project evaluation. The decision rule is to accept a project with a positive NPV when discounted by a social discount rate, established at 15% in the Philippines. If there are several project alternatives, the rule is to maximize the NPV or to accept the project which yields the highest NPV. Or, if the investment is subject to a budget constraint, choose the package of projects that maximizes the NPV of the fixed budget. NPVs are additive, unlike EIRRs. The NPV criterion is also sensitive to the timing of a project (i.e., the start of project operation), whereas the EIRR is independent of the timing. Owing to its sensitiveness to scale, however, the NPV criterion is biased in favor of big projects.

It is apparent from the discussion above that each criterion has its own disadvantages. Nevertheless, the three viability indicators (NPV, EIRR, and B-C ratio) are computed here to enable the decision-makers to compare the results and check the consistency of the conclusions.

Two traffic scenarios are used in the runs—Scenario 1, assuming that potential international traffic via chartered flights will start arriving in 2011 (based on the projected foreign visitor arrivals in the recently released Bohol Tourism Master Plan and the Department of Tourism-Region VII's assertion that it is currently holding talks with potential chartered flights), and Scenario 2, assuming that potential international traffic will be realized starting in 2025 when economies of scale will allow regular (not chartered) flights. Based on discussions with the ATO and the DOT, the scenario with earlier arrivals of direct international flights is the more likely scenario.

Based on the computations, the Panglao Airport Development Project is economically viable. In Scenario 1, the NPV is Php 3,084 million, the EIRR is 23.6%, and the B-C ratio is 2.1. In Scenario 2, the NPV is Php2,313 million, the EIRR is 21.3% and the B-C ratio is 1.9. The net flows and viability indicators are shown in **Table 9.1-14** and **Table 9.1-15**.

The same runs for the Tagbilaran Airport Redevelopment option (**Table 9.1-16** and

Table 9.1-17), on the other hand, proved that the project will be marginally viable under Scenario 1 (international traffic by 2011) and not viable under Scenario 2. The viability indicators under Scenario 1are low—the EIRR is 16.2%, the NPV is Php 749 million and the B-C ratio is 1.2. The viability indicators under Scenario 2 failed to pass the hurdle levels—the EIRR is 14.97% and below the hurdle rate of 15%, the NPV is negative at Php21 million, and the B-C ratio is less than one at 0.996.

Table 9.1-14 Economic Evaluation Results-Panglao Island Airport Development Project, Scenario 1

Year	Costs		Incremental Benefits					Total Costs	Total Benefits	Net Flow
	Capital	Incremental O&M	Direct Employment Benefits	Avoided Cost of Travel Diversion	Output Effects of Tourism	Avoided Cost of Aircraft Delays	Economic Value of Tagbilaran Airport Property			
2007	135,446,283		6,990					135,446,283	6,990	(135,439,292)
2008	516,062,791		57,848,430					516,062,791	57,848,430	(458,214,361)
2009	1,959,068,186		253,412,577					1,959,068,186	253,412,577	(1,705,655,609)
2010	801,882,284		102,236,353					801,882,284	102,236,353	(699,645,931)
2011		20,547,297		18,321,158	255,232,027	-	330,000,000	20,547,297	603,553,185	583,005,888
2012		20,547,297		25,030,174	311,045,807	-		20,547,297	336,075,981	315,528,684
2013		20,547,297		32,714,642	376,506,854	-		20,547,297	409,221,497	388,674,200
2014		20,547,297		41,422,529	452,669,813	-		20,547,297	494,092,342	473,545,045
2015		22,028,633		51,190,228	540,628,761	109,514,358		22,028,633	701,333,346	679,304,713
2016		22,028,633		62,040,509	641,513,704	109,514,358		22,028,633	813,068,570	791,039,937
2017		22,028,633		73,980,754	756,488,284	109,514,358		22,028,633	939,983,395	917,954,762
2018		22,028,633		87,001,563	886,749,069	109,514,358		22,028,633	1,083,264,990	1,061,236,357
2019		23,658,103		101,075,840	1,033,526,757	109,514,358		23,658,103	1,244,116,955	1,220,458,852
2020		23,658,103		116,158,421	1,198,089,510	371,201,299		23,658,103	1,685,449,230	1,661,791,127
2021		23,658,103		132,186,307	1,381,748,587	371,201,299		23,658,103	1,885,136,193	1,861,478,089
2022		23,658,103		149,079,512	1,585,866,317	371,201,299		23,658,103	2,106,147,128	2,082,489,025
2023		25,450,520		166,742,518	1,811,866,395	371,201,299		25,450,520	2,349,810,212	2,324,359,691
2024		25,450,520		185,066,287	2,061,246,373	371,201,299		25,450,520	2,617,513,959	2,592,063,438
2025		30,724,553		203,930,760	2,335,592,188	371,201,299		30,724,553	2,910,724,247	2,879,999,694
2026		30,724,553		223,207,715	2,636,594,506	371,201,299		30,724,553	3,231,003,520	3,200,278,966
2027		32,696,212		242,763,880	2,966,066,627	371,201,299		32,696,212	3,580,031,805	3,547,335,593
2028		32,696,212		262,464,140	3,325,963,722	371,201,299		32,696,212	3,959,629,162	3,926,932,950
2029		32,696,212		282,174,708	3,718,403,170	371,201,299		32,696,212	4,371,779,176	4,339,082,965
2030		32,696,212		301,766,107	4,145,685,785	371,201,299		32,696,212	4,818,653,191	4,785,956,979
2031		34,865,036		321,115,864	4,610,317,818	371,201,299		34,865,036	5,302,634,981	5,267,769,944
2032		34,865,036		340,110,805	5,115,033,619	371,201,299		34,865,036	5,826,345,723	5,791,480,687
2033		34,865,036		358,648,886	5,662,818,960	371,201,299		34,865,036	6,392,669,144	6,357,804,108
2034		34,865,036		376,640,531	6,256,935,042	371,201,299		34,865,036	7,004,776,871	6,969,911,835
2035		37,250,744		394,009,465	6,900,943,315	696,830,784		37,250,744	7,991,783,565	7,954,532,821

EIRR:	**23.6%**
NPV (Php million)	**3,084**
B-C ratio	**2.1**

Table 9.1-15 Economic Evaluation Results-Panglao Island Airport Development Project, Scenario 2

Year	Costs		Incremental Benefits					Total Costs	Total Benefits	Net Flow
	Capital	Incremental O&M	Direct Employment Benefits	Avoided Cost of Travel Diversion	Output Effects of Tourism	Avoided Cost of Aircraft Delays	Economic Value of Tagbilaran Airport Property			
2007	135,446,283		6,990					135,446,283	6,990	(135,439,292)
2008	516,062,791		57,848,430					516,062,791	57,848,430	(458,214,361)
2009	1,959,068,186		253,412,577					1,959,068,186	253,412,577	(1,705,655,609)
2010	801,882,284		102,236,353					801,882,284	102,236,353	(699,645,931)
2011		20,547,297		18,321,158	138,149,463	-	330,000,000	20,547,297	486,470,621	465,923,324
2012		20,547,297		25,030,174	188,738,350	-		20,547,297	213,768,524	193,221,227
2013		20,547,297		32,714,642	246,682,568	-		20,547,297	279,397,210	258,849,913
2014		20,547,297		41,422,529	312,343,807	-		20,547,297	353,766,336	333,219,039
2015		22,028,633		51,190,228	385,996,480	109,514,358		22,028,633	546,701,066	524,672,432
2016		22,028,633		62,040,509	467,812,297	109,514,358		22,028,633	639,367,163	617,338,530
2017		22,028,633		73,980,754	557,846,914	109,514,358		22,028,633	741,342,025	719,313,392
2018		22,028,633		87,001,563	656,029,455	109,514,358		22,028,633	852,545,376	830,516,743
2019		23,658,103		101,075,840	762,155,596	109,514,358		23,658,103	972,745,794	949,087,690
2020		23,658,103		116,158,421	875,884,787	371,201,299		23,658,103	1,363,244,507	1,339,586,403
2021		23,658,103		132,186,307	996,741,987	371,201,299		23,658,103	1,500,129,593	1,476,471,490
2022		23,658,103		149,079,512	1,124,124,067	371,201,299		23,658,103	1,644,404,878	1,620,746,775
2023		25,450,520		166,742,518	1,257,310,777	371,201,299		25,450,520	1,795,254,593	1,769,804,073
2024		25,450,520		185,066,287	1,395,479,934	371,201,299		25,450,520	1,951,747,520	1,926,297,000
2025		30,724,553		203,930,760	2,335,592,188	371,201,299		30,724,553	2,910,724,247	2,879,999,694
2026		30,724,553		223,207,715	2,636,594,506	371,201,299		30,724,553	3,231,003,520	3,200,278,966
2027		32,696,212		242,763,880	2,966,066,627	371,201,299		32,696,212	3,580,031,805	3,547,335,593
2028		32,696,212		262,464,140	3,325,963,722	371,201,299		32,696,212	3,959,629,162	3,926,932,950
2029		32,696,212		282,174,708	3,718,403,170	371,201,299		32,696,212	4,371,779,176	4,339,082,965
2030		32,696,212		301,766,107	4,145,685,785	371,201,299		32,696,212	4,818,653,191	4,785,956,979
2031		34,865,036		321,115,864	4,610,317,818	371,201,299		34,865,036	5,302,634,981	5,267,769,944
2032		34,865,036		340,110,805	5,115,033,619	371,201,299		34,865,036	5,826,345,723	5,791,480,687
2033		34,865,036		358,648,886	5,662,818,960	371,201,299		34,865,036	6,392,669,144	6,357,804,108
2034		34,865,036		376,640,531	6,256,935,042	371,201,299		34,865,036	7,004,776,871	6,969,911,835
2035		37,250,744		394,009,465	6,900,943,315	696,830,784		37,250,744	7,991,783,565	7,954,532,821

EIRR:	**21.3%**
NPV (Php million)	**2,313**
B-C ratio	**1.9**

Table 9.1-16 Economic Evaluation Results-Tagbilaran Airport Redevelopment Option, Scenario 1

Year	Costs		Incremental Benefits					Total Costs	Total Benefits	Net Flow
	Capital	Incremental O&M	Direct Employment Benefits	Avoided Cost of Travel Diversion	Output Effects of Tourism	Avoided Cost of Aircraft Delays	Economic Value of Tagbilaran Airport Property			
2007	2,250,808,436		1,123,844					2,250,808,436	1,123,844	(2,249,684,592)
2008	953,302,779		49,911,167					953,302,779	49,911,167	(903,391,612)
2009	1,762,941,775		221,663,527					1,762,941,775	221,663,527	(1,541,278,248)
2010	734,891,598		89,312,350					734,891,598	89,312,350	(645,579,248)
2011		19,012,465		18,321,158	255,232,027	-	330,000,000	19,012,465	603,553,185	584,540,719
2012		19,012,465		25,030,174	311,045,807	-		19,012,465	336,075,981	317,063,516
2013		19,012,465		32,714,642	376,506,854	-		19,012,465	409,221,497	390,209,031
2014		19,012,465		41,422,529	452,669,813	-		19,012,465	494,092,342	475,079,877
2015		20,340,319		51,190,228	540,628,761	109,514,358		20,340,319	701,333,346	680,993,028
2016		20,340,319		62,040,509	641,513,704	109,514,358		20,340,319	813,068,570	792,728,252
2017		20,340,319		73,980,754	756,488,284	109,514,358		20,340,319	939,983,395	919,643,077
2018		20,340,319		87,001,563	886,749,069	109,514,358		20,340,319	1,083,264,990	1,062,924,672
2019		21,800,957		101,075,840	1,033,526,757	109,514,358		21,800,957	1,244,116,955	1,222,315,998
2020		21,800,957		116,158,421	1,198,089,510	371,201,299		21,800,957	1,685,449,230	1,663,648,273
2021		21,800,957		132,186,307	1,381,748,587	371,201,299		21,800,957	1,885,136,193	1,863,335,236
2022		21,800,957		149,079,512	1,585,866,317	371,201,299		21,800,957	2,106,147,128	2,084,346,171
2023		23,407,659		166,742,518	1,811,866,395	371,201,299		23,407,659	2,349,810,212	2,326,402,552
2024		23,407,659		185,066,287	2,061,246,373	371,201,299		23,407,659	2,617,513,959	2,594,106,299
2025		28,681,692		203,930,760	2,335,592,188	371,201,299		28,681,692	2,910,724,247	2,882,042,555
2026		28,681,692		223,207,715	2,636,594,506	371,201,299		28,681,692	3,231,003,520	3,202,321,827
2027		30,449,065		242,763,880	2,966,066,627	371,201,299		30,449,065	3,580,031,805	3,549,582,740
2028		30,449,065		262,464,140	3,325,963,722	371,201,299		30,449,065	3,959,629,162	3,929,180,097
2029		30,449,065		282,174,708	3,718,403,170	371,201,299		30,449,065	4,371,779,176	4,341,330,112
2030		30,449,065		301,766,107	4,145,685,785	371,201,299		30,449,065	4,818,653,191	4,788,204,126
2031		32,393,175		321,115,864	4,610,317,818	371,201,299		32,393,175	5,302,634,981	5,270,241,806
2032		32,393,175		340,110,805	5,115,033,619	371,201,299		32,393,175	5,826,345,723	5,793,952,549
2033		32,393,175		358,648,886	5,662,818,960	371,201,299		32,393,175	6,392,669,144	6,360,275,970
2034		32,393,175		376,640,531	6,256,935,042	371,201,299		32,393,175	7,004,776,871	6,972,383,696
2035		34,531,696		394,009,465	6,900,943,315	696,830,784		34,531,696	7,991,783,565	7,957,251,869

EIRR:	**16.2%**
NPV (Php million)	**749**
B-C ratio	**1.2**

Table 9.1-17 Economic Evaluation Results-Tagbilaran Airport Redevelopment Option, Scenario 2

Year	Costs		Incremental Benefits					Total Costs	Total Benefits	Net Flow
	Capital	Incremental O&M	Direct Employment Benefits	Avoided Cost of Travel Diversion	Output Effects of Tourism	Avoided Cost of Aircraft Delays	Economic Value of Tagbilaran Airport Property			
2007	2,250,808,436		1,123,844					2,250,808,436	1,123,844	(2,249,684,592)
2008	953,302,779		49,911,167					953,302,779	49,911,167	(903,391,612)
2009	1,762,941,775		221,663,527					1,762,941,775	221,663,527	(1,541,278,248)
2010	734,891,598		89,312,350					734,891,598	89,312,350	(645,579,248)
2011		19,012,465		18,321,158	138,149,463	-	330,000,000	19,012,465	486,470,621	467,458,156
2012		19,012,465		25,030,174	188,738,350	-		19,012,465	213,768,524	194,756,059
2013		19,012,465		32,714,642	246,682,568	-		19,012,465	279,397,210	260,384,745
2014		19,012,465		41,422,529	312,343,807	-		19,012,465	353,766,336	334,753,871
2015		20,340,319		51,190,228	385,996,480	109,514,358		20,340,319	546,701,066	526,360,747
2016		20,340,319		62,040,509	467,812,297	109,514,358		20,340,319	639,367,163	619,026,844
2017		20,340,319		73,980,754	557,846,914	109,514,358		20,340,319	741,342,025	721,001,707
2018		20,340,319		87,001,563	656,029,455	109,514,358		20,340,319	852,545,376	832,205,057
2019		21,800,957		101,075,840	762,155,596	109,514,358		21,800,957	972,745,794	950,944,837
2020		21,800,957		116,158,421	875,884,787	371,201,299		21,800,957	1,363,244,507	1,341,443,550
2021		21,800,957		132,186,307	996,741,987	371,201,299		21,800,957	1,500,129,593	1,478,328,636
2022		21,800,957		149,079,512	1,124,124,067	371,201,299		21,800,957	1,644,404,878	1,622,603,921
2023		23,407,659		166,742,518	1,257,310,777	371,201,299		23,407,659	1,795,254,593	1,771,846,934
2024		23,407,659		185,066,287	1,395,479,934	371,201,299		23,407,659	1,951,747,520	1,928,339,861
2025		28,681,692		203,930,760	2,335,592,188	371,201,299		28,681,692	2,910,724,247	2,882,042,555
2026		28,681,692		223,207,715	2,636,594,506	371,201,299		28,681,692	3,231,003,520	3,202,321,827
2027		30,449,065		242,763,880	2,966,066,627	371,201,299		30,449,065	3,580,031,805	3,549,582,740
2028		30,449,065		262,464,140	3,325,963,722	371,201,299		30,449,065	3,959,629,162	3,929,180,097
2029		30,449,065		282,174,708	3,718,403,170	371,201,299		30,449,065	4,371,779,176	4,341,330,112
2030		30,449,065		301,766,107	4,145,685,785	371,201,299		30,449,065	4,818,653,191	4,788,204,126
2031		32,393,175		321,115,864	4,610,317,818	371,201,299		32,393,175	5,302,634,981	5,270,241,806
2032		32,393,175		340,110,805	5,115,033,619	371,201,299		32,393,175	5,826,345,723	5,793,952,549
2033		32,393,175		358,648,886	5,662,818,960	371,201,299		32,393,175	6,392,669,144	6,360,275,970
2034		32,393,175		376,640,531	6,256,935,042	371,201,299		32,393,175	7,004,776,871	6,972,383,696
2035		34,531,696		394,009,465	6,900,943,315	696,830,784		34,531,696	7,991,783,565	7,957,251,869

EIRR:	**14.97%**
NPV (Php million)	**(21)**
B-C ratio	**0.996**

9.1.4 Economic Sensitivity Analysis

The objective of the sensitivity simulation is to determine whether the project will remain economically viable if changes in the assumptions used in the calculations were to take place. In this study, the impact of changes in projections, and thereby the impact of the underlying risk factors, was examined through simulations of the viability indicators assuming the following cases:

Case I - Increase in projected costs by 10% and 20%
Case II - Decrease in projected benefits by 10% and 20%
Case III - Combination of Cases I and II

The three viability indicators are robust when tested for sensitivity to increases in economic costs (capital and O&M costs) and decreases in economic benefits. Even with a 20% increase in costs, a 20% decrease in benefits, or a combination of both, the project remains economically viable. **Table 9.1-18** presents the results of the sensitivity analysis.

Table 9.1-18 Sensitivity to Increases in Costs and Reduction in Benefits

Scenario 1 – international traffic by 2011

	Hurdle level	Base Case	10% cost increase	10% reduction in benefits	combined 10% cost increase and 10% reduction in benefits
EIRR	15% SDR	23.6%	22.3%	22.2%	21.0%
NPV (Php million)	>0	3,084	2,815	2,506	2,237
B-C ratio	>1	2.1	2.0	1.9	1.8

	20% cost increase	20% reduction in benefits	combined 20% cost increase and 20% reduction in benefits
EIRR	21.2%	20.7%	18.6%
NPV (Php million)	2,546	1,929	1,391
B-C ratio	1.8	1.7	1.4

Scenario 2 – international traffic by 2025

	Hurdle level	Base Case	10% cost increase	10% reduction in benefits	combined 10% cost increase and 10% reduction in benefits
EIRR	15% SDR	21.3%	20.2%	20.1%	19.1%
NPV (Php million)	>0	2,313	2,044	1,813	1,544
B-C ratio	>1	1.9	1.7	1.7	1.5

	20% cost increase	20% reduction in benefits	combined 20% cost increase and 20% reduction in benefits
EIRR	19.3%	18.8%	17.0%
NPV (Php million)	1,775	1,312	774
B-C ratio	1.5	1.5	1.2

The sensitivity of the viability indicators to changes in the value of the prime commercial area that will be freed up in Tagbilaran airport is also analyzed. Three assumptions are used: (i) the price will stay at the current estimated value of the Tagbilaran airport property; (ii) the price could go as high as the winning bid for the old Iloilo airport property; (iii) the price could go as low as the value of agricultural land in Tagbilaran (a very unlikely assumption). The results are as follows:

Table 9.1-19 Sensitivity to Changes in the Value of Land

Scenario 1 – international traffic by 2011

	Base Case	Bid price for old Iloilo Airport property	Agricultural land value
Changing parameter:			
land value (Php per sq.m.)	1,500.00	2,222.22	60.00
Resulting viability indicators:			
EIRR	23.6%	24.0%	22.8%
NPV (Php million)	3,084	3,174	2,903
B-C ratio	2.1	2.2	2.1

Scenario 2 – international traffic by 2025

	Base Case	Bid price for old Iloilo Airport property	Agricultural land value
Changing parameter:			
land value (Php per sq.m.)	1,500.00	2,222.22	60.00
Resulting viability indicators:			
EIRR	21.3%	21.7%	20.6%
NPV (Php million)	2,313	2,404	2,132
B-C ratio	1.9	1.9	1.8

The Tagbilaran Airport Redevelopment option failed the sensitivity test—the project will no longer be viable at a combined 10% increase in cost and 10% decrease in benefits.

9.2 FINANCIAL ANALYSIS

The results of the economic evaluation show that there is economic merit in pursuing the project. Given two investment options

Option 1 - Tagbilaran Airport Redevelopment with a cost of Php6.5 billion; and
Option 2 - New Panglao Island Airport with a cost of Php 4.04 billion,

the least cost of implementing the project is definitely Option 2. Thus, the appropriate focus of the financial viability review is Option 2. Since this is a new development project and no further outlays will be devoted to the existing Tagbilaran airport, the treatment of investment and operating costs and project revenues is non-incremental, unlike the *with-* and *without-the-project* analysis in the economic evaluation part. Since the project will be financed using 100% government equity, no distinction is made between the all-capital viewpoint and equity viewpoint.

9.2.1 Financial Costs

The annual breakdown of the financial investment costs detailed in **Table 8.2-2 Annual Cash Disbursement Schedule** in Section 8 is used in the financial evaluation. The operating and maintenance costs discussed also in Section 8 and summarized in **Table 8.1-7 Operating and Maintenance Costs (Current Prices)** are used.

9.2.2 Projection of Operating Revenues

The sources of operating revenues are based on the ATO tariff structure. Even under an arrangement wherein MIAA (given its large equity infusion to the project) would have a significant role in deciding the future airport tariffs for the new airport, the structure of MIAA-based fees (as applied to NAIA) may not be applicable to a secondary airport.

The categories of airport charges used in the analysis are in the following table. The base case analysis and simulations of tariff increases used the current ATO tariff schedule for the following categories of fees:

Table 9.2-1 Existing ATO Airport Tariff

Particulars	Fee (Php)	Unit
LANDING AND TAKE-OFF FEES		
International Flights at Int'l Airports		
For gross weight up to 160,000 kgs	100.00	per (or fraction of) 1K kgs up to 160K kgs
For gross weight exceeding 160,000 kgs	80.00	per (or fraction of) 1K kgs in excess of 160K kgs
Domestic Flights at Int'l Airports		
For gross weight up to 160,000 kgs	70.00	per 1K kgs (or fraction of) up to 160K kgs
For gross weight exceeding 160,000 kgs	50.00	per (or fraction of) 1K kgs in excess of 160K kgs
Domestic Flights at National Airports		
Airports with PCC Runway	55.00	per 1K kgs
With Asphaltic concrete and Macadam Runway	45.00	per 1K kgs

Particulars	Fee (Php)	Unit
Night Landing Fees		
Landing and take-off between 6pm-6am	15.00%	additional percent of regular landing fees above
Landing before nighttime and take-off during daytime	10.00%	additional percent of regular landing fees above
AIRCRAFT PARKING CHARGES		
Jet Parking at Terminal Apron		
First hour	0.00	for first hour
Beyond the First Hour	10.00%	percent of appr landing fee for every additional 15 mins.
Jet Prop Parking at Terminal Apron		
First 45 Mins	0.00	for first 45 mins
Beyond the First 45 Mins	10.00%	percent of appr landing fee for every additional 15 mins.
For Other Parking Areas		
For paved areas	10.00	per 5K kgs per hour or fraction thereof
AIR NAVIGATION CHARGES		
International	9,900	per aircraft ($220)
Domestic	250	per aircraft
PASSENGER SERVICE CHARGE		
At Secondary Airports	20.00	per departing passenger
RENTAL OF FLOOR SPACES at TERMINAL BLDG.		
At National Airports (office space & other concession areas)		
Secondary	40.00	per sq.m. per month
RENTAL OF AIRPORT LAND AREAS		
Developed Areas	10.00	per sq.m. per month
Undeveloped Areas	5.00	per sq.m. per month
CONCESSION PRIVILEGE FEES		
Passenger Service Concessions		
Banks	600.00	per month
Travel Agencies	100.00	per month
Currency Exchange Dealer	200.00	per month
Insurance Agencies	200.00	per month
Hotel/Motel Reservations	600.00	per month
Food Service Concessions		
Restaurants	450.00	per month
Cocktail Lounge	250.00	per month
Kitchenette and Canteen	300.00	per month
Coffee Shop, Snack Bar , Refreshment Parlor	450.00	per month
Food Catering	100.00	per month
Transportation Utilitites Concessions		
Car Rental	150.00	per unit
Bus Services	150.00	per unit
Car Parking		highest bid
Fuel Service Station	300.00	per month
Miscellaneous Business Concessions	100 to 300	per month
ADVERTISING		
Indoor and Outdoor Advertising		

Particulars	Fee (Php)	Unit
Lighted Signboards or Display	60.00	per sq.m. per month
Unlighted Signboards or Display	40.00	per sq.m. per month
Circulars and Posters	30.00	per sq.m. per month
OTHER FEES AND CHARGES		
Utilities and Other Services		
Electric Power	10.00%	percent in addition to actual monthly charge
Telephone		
Commercial	225.00	per month per unit, in addition to monthly charge
Extension	75.00	per month per unit, in addition to monthly charge
Residential	100.00	per month per unit, in addition to monthly charge
Extension	50.00	per month per unit, in addition to monthly charge
Cable Pairs	35.00	per month per unit, in addition to monthly charge
Deposit for telephone	1,000.00	per set
Water Charges	10.00%	percent in addition to actual monthly charge
Airconditioning	10.00%	percent in addition to actual monthly charge
ROW for telephone cable pairs antenna system, etc.	115.00	per unit
Installation of Utilities		
Commercial	180.00	per unit
Residential	90.00	per unit

The financial evaluation considered the more likely traffic scenario wherein international traffic will arrive at an earlier date. The medium-growth assumption or *with-the-project* traffic assumption is used.

In projecting the revenues from the use of the runway, taxiways and navigation services by aircraft, the following aircraft movements disaggregated by aircraft size are used:

Table 9.2-2 Aircraft Movements by Aircraft Size, Domestic Flights

Year	Passenger Flights - Domestic				Total
	GA	SJ	MJ	LJ	
2006	1,112	2,194	0	0	3,306
2010	984	4,161	0	0	5,145
2015	977	3,120	1,872	0	5,969
2020	952	2,912	4,160	0	8,024
2025	713	0	7,176	0	7,889
2030	533	0	9,048	0	9,581
2035	399	0	5,408	3,848	9,655

Notes: GA – general aviation; SJ – small jet; MJ – medium jet; LJ – large jet

Table 9.2-3 Aircraft Movements by Aircraft Size, International Flights

Year	Potential Passenger Flights - International			Total
	SJ	MJ	LJ	
2006	0	0	0	0
2011	135	0	0	135
2015	179	0	0	179
2020	372	0	0	372
2025	208	312	0	520
2030	104	1,040	0	1,144
2035	0	1,976	0	1,976

The aircraft weights per type of aircraft are examined and the gross weights used in the final computation are the average of the weights per aircraft category. The average turn-around times per aircraft are also considered.

Table 9.2-4 Aircraft Take-off Weights and Turn-Around Times

	Aircraft Take-off Weights (kgs.)	Average Weights used	Turn-around time (mins.)
Turbo Prop:		34,788	60
DASH8-300	18,640		
FOKKER70	39,915		
FOKKER100	45,810		
Small Jet:		70,011	90
B737-200	52,390		
B737-400	68,050		
B757-200	115,900		
A319	64,000		
A320-200	75,500		
BAe146	44,225		
Medium Jet:		192,663	120
A330-300	212,000		
A340-300	257,000		
B767-200	142,900		
B767-300ER	158,750		
Large Jet:		291,365	180
B747-200	340,100		
B777	242,630		

Five tariff application scenarios are evaluated:

Base Scenario – applying ATO fees, no increases are assumed

Davao International Airport Fees Scenario – applying the revised fees in the new Davao International Airport, no increases are assumed

10% FIRR Scenario – applying ATO fees, simulating the required increases in order to achieve an FIRR of 10%

15% FIRR Scenario – applying ATO fees, simulating the required increases in order to achieve an FIRR of 15%

20% FIRR Scenario – applying ATO fees, simulating the required increases in order to achieve an FIRR of 20%

The existing environment in airport services pricing is a rigid one. The ATO tariff schedule issued through Department Order 98-1178 has not yet been revised after almost a decade of implementation; but there are talks that the fees will be revised soon. Even though some ATO staff indicate that the desirable fee increase is every three years, the analysis in this feasibility study has to work within the current environment. Thus, in the scenarios simulating the increases required to achieve FIRR targets, tariff adjustment every ten years is assumed. Per the terms of reference of the consultants, this study computed the tariff adjustments which would enable the project to achieve 10% FIRR, 15% FIRR and 20% FIRR.

For new airport development, the evolving tariff regulation policy is to adjust the airport charges when the new airport starts operating, as has happened in the case of the Davao International Airport (DIA). In June 2007, DOTC revised the fees and charges for the use and operation of the DIA through Department Order (DO) No. 2007-25. (Annex B of this study details the airport charges authorized under DO 2007-25.) This sets a precedent to a possible adjustment of tariff to be applied to the proposed Panglao airport. Assuming that fee increases would also be authorized in the case of Panglao airport, the financial evaluation also assessed the viability of the project if the tariff schedule would be similar with that being used in the DIA.

In all the financial evaluation scenarios, the resulting domestic passenger terminal fee on the opening year is compared with the willingness-to-pay (WTP) terminal fee derived from the passenger survey (Php69.50 per departing domestic passenger).

On the question of what cost of fund to use, this study assumes that the cost of government funds is equivalent to 7%, which is close to the 6.942% yield of 10-year treasury bonds as of March 2007 (Bureau of Treasury).

9.2.3 Results of the Financial Evaluation

Applying the assumptions under the different scenarios described above, the results of financial evaluation from the all-capital (government equity) point of view are summarized in **Table 9.2-5**. Measured against a hurdle rate of 7% FIRR, the results show that the Panglao Island Airport Development project would not be financially viable if the current ATO fees would be applied (FIRR is 2.69%). Even if the fees would be raised to the level of the recently adjusted fees in Davao International Airport, the project would remain not financially viable (FIRR is 6.39%). It would take 60.97% increase in ATO fees for the project to achieve 10% FIRR, 123.24% increase in fees to achieve 15% FIRR, and 205.04% increase in fees to achieve 20% FIRR. In all the scenarios evaluated, the opening year domestic passenger terminal fee is lower than the Php 69.50 willingness-to-pay fee established in the passenger survey.

Table 9.2-5 Summary of Financial Evaluation Results

	Scenarios				
	Base case	**Davao airport fees**	**10% FIRR**	**15% FIRR**	**20% FIRR**
Parameters:					
tariff increase	0%	0%	60.97%	123.24%	205.04%
domestic passenger terminal fee (Php), opening year	20.00	200.00	32.19	44.65	61.01
other airport charges, opening year	current ATO fees	current DIA fees	60.97% higher than current ATO fees	123.24% higher than current ATO fees	205.04% higher than current ATO fees
Viability Indicators:					
FIRR	2.69%	6.39%	10%	15%	20%
NPV (Php million)	(1,539)	(254)	1,797	7,478	19,450

The computations of the project FIRR and other indicators are presented in detail in **Table 9.2-6** to **Table 9.2-10**. If the current fees being applied in Tagbilaran would be revised, it is suggested that the fee increase not be greater than the adjustment resulting from the runs of the 10% FIRR scenario (i.e., 60.97% increase in fees). This is because the switching value calculation shows that 46.82% increase in fees is already enough for the project to achieve financial viability and at the same time pass the sensitivity analysis at a combined 10% increase in costs and 10% decrease in revenues. The revised schedule of ATO fees that will enable the project to achieve 10% FIRR is presented in **Table 9.2-11**. The breakdown of projected revenues by revenue item, as well as the projected balance sheet, income statement and cashflow statement of the airport operator, can be found in **Annex C – Projected Financial Statements**.

Table 9.2-6 Financial Evaluation – Base Scenario

Year	Capital Investment	O&M Costs	Total Costs	Inflows		Total Inflows	Net Flows
				Revenues	Proceeds from Sale of Tagbilaran Airport Property		
2007	148,242,526		148,242,526				(148,242,526)
2008	606,703,922		606,703,922				(606,703,922)
2009	2,305,994,325		2,305,994,325				(2,305,994,325)
2010	980,258,497		980,258,497				(980,258,497)
2011		33,916,123	33,916,123	114,559,250	330,000,000	444,559,250	410,643,128
2012		34,900,606	34,900,606	115,137,166		115,137,166	80,236,559
2013		35,914,625	35,914,625	115,758,300		115,758,300	79,843,675
2014		36,959,063	36,959,063	116,478,178		116,478,178	79,519,115
2015		39,966,536	39,966,536	173,069,366		173,069,366	133,102,830
2016		41,132,532	41,132,532	174,040,492		174,040,492	132,907,960
2017		42,333,508	42,333,508	175,186,966		175,186,966	132,853,458
2018		43,570,513	43,570,513	176,530,011		176,530,011	132,959,498
2019		47,236,189	47,236,189	178,102,818		178,102,818	130,866,629
2020		48,620,275	48,620,275	268,167,689		268,167,689	219,547,414
2021		50,045,883	50,045,883	270,300,902		270,300,902	220,255,018
2022		51,514,260	51,514,260	272,801,064		272,801,064	221,286,804
2023		55,987,583	55,987,583	275,703,069		275,703,069	219,715,487
2024		57,634,210	57,634,210	279,059,998		279,059,998	221,425,788
2025		68,572,986	68,572,986	343,453,447		343,453,447	274,880,460
2026		70,597,176	70,597,176	347,895,315		347,895,315	277,298,139
2027		76,347,856	76,347,856	352,975,000		352,975,000	276,627,144
2028		78,605,292	78,605,292	358,761,142		358,761,142	280,155,850
2029		80,930,450	80,930,450	365,326,222		365,326,222	284,395,771
2030		83,325,364	83,325,364	445,327,013		445,327,013	362,001,649
2031		90,330,560	90,330,560	453,682,769		453,682,769	363,352,209
2032		93,007,477	93,007,477	463,058,318		463,058,318	370,050,841
2033		95,764,701	95,764,701	473,542,429		473,542,429	377,777,727
2034		98,604,643	98,604,643	485,228,572		485,228,572	386,623,930
2035		107,148,636	107,148,636	592,272,787		592,272,787	485,124,151

FIRR	**2.69%**
vs.	
cost of capital	**7.00%**
Project NPV (million PHP)	(1,539)

Table 9.2-7 Financial Evaluation – Applying Davao Airport Fees

Year	Capital Investment	O&M Costs	Total Costs	Inflows		Total Inflows	Net Flows
				Revenues	Proceeds from Sale of Tagbilaran Airport Property		
2007	148,242,526		148,242,526				(148,242,526)
2008	606,703,922		606,703,922				(606,703,922)
2009	2,305,994,325		2,305,994,325				(2,305,994,325)
2010	980,258,497		980,258,497				(980,258,497)
2011		33,916,123	33,916,123	185,087,723	330,000,000	515,087,723	481,171,600
2012		34,900,606	34,900,606	189,356,693		189,356,693	154,456,087
2013		35,914,625	35,914,625	193,945,261		193,945,261	158,030,636
2014		36,959,063	36,959,063	198,876,873		198,876,873	161,917,809
2015		39,966,536	39,966,536	271,390,211		271,390,211	231,423,675
2016		41,132,532	41,132,532	277,048,423		277,048,423	235,915,891
2017		42,333,508	42,333,508	283,128,983		283,128,983	240,795,475
2018		43,570,513	43,570,513	289,634,211		289,634,211	246,063,697
2019		47,236,189	47,236,189	296,586,195		296,586,195	249,350,005
2020		48,620,275	48,620,275	417,123,488		417,123,488	368,503,213
2021		50,045,883	50,045,883	425,006,798		425,006,798	374,960,914
2022		51,514,260	51,514,260	433,442,296		433,442,296	381,928,036
2023		55,987,583	55,987,583	442,425,287		442,425,287	386,437,704
2024		57,634,210	57,634,210	451,985,768		451,985,768	394,351,558
2025		66,916,815	66,916,815	534,662,800		534,662,800	467,745,984
2026		68,891,320	68,891,320	545,479,815		545,479,815	476,588,495
2027		74,590,824	74,590,824	556,983,298		556,983,298	482,392,474
2028		76,795,549	76,795,549	569,217,604		569,217,604	492,422,056
2029		79,066,415	79,066,415	582,232,647		582,232,647	503,166,232
2030		81,405,408	81,405,408	685,367,897		685,367,897	603,962,489
2031		88,353,005	88,353,005	700,117,011		700,117,011	611,764,006
2032		90,970,596	90,970,596	715,832,949		715,832,949	624,862,353
2033		93,666,713	93,666,713	732,592,707		732,592,707	638,925,994
2034		96,443,715	96,443,715	750,481,127		750,481,127	654,037,412
2035		104,922,880	104,922,880	645,361,270		645,361,270	540,438,390

FIRR	**6.39%**
vs.	
cost of capital	**7.00%**
Project NPV (million PHP)	(254)

Table 9.2-8 Financial Evaluation – 10% FIRR Scenario

Year	Capital Investment	O&M Costs	Total Costs	Inflows		Total Inflows	Net Flows
				Revenues	Proceeds from Sale of Tagbilaran Airport Property		
2007	148,242,526		148,242,526				(148,242,526)
2008	606,703,922		606,703,922				(606,703,922)
2009	2,305,994,325		2,305,994,325				(2,305,994,325)
2010	980,258,497		980,258,497				(980,258,497)
2011		33,916,123	33,916,123	183,070,795	330,000,000	513,070,795	479,154,673
2012		34,900,606	34,900,606	183,960,943		183,960,943	149,060,337
2013		35,914,625	35,914,625	184,960,797		184,960,797	149,046,173
2014		36,959,063	36,959,063	186,119,602		186,119,602	149,160,538
2015		39,966,536	39,966,536	276,954,604		276,954,604	236,988,068
2016		41,132,532	41,132,532	278,517,848		278,517,848	237,385,316
2017		42,333,508	42,333,508	280,363,353		280,363,353	238,029,845
2018		43,570,513	43,570,513	282,525,285		282,525,285	238,954,771
2019		47,236,189	47,236,189	285,057,068		285,057,068	237,820,878
2020		48,620,275	48,620,275	429,588,905		429,588,905	380,968,629
2021		50,045,883	50,045,883	694,959,931		694,959,931	644,914,047
2022		51,514,260	51,514,260	701,438,369		701,438,369	649,924,109
2023		55,987,583	55,987,583	708,958,069		708,958,069	652,970,486
2024		57,634,210	57,634,210	717,656,570		717,656,570	660,022,360
2025		68,572,986	68,572,986	884,513,378		884,513,378	815,940,392
2026		70,597,176	70,597,176	896,023,181		896,023,181	825,426,006
2027		76,347,856	76,347,856	909,185,701		909,185,701	832,837,846
2028		78,605,292	78,605,292	924,178,797		924,178,797	845,573,506
2029		80,930,450	80,930,450	941,190,284		941,190,284	860,259,834
2030		83,325,364	83,325,364	1,148,488,962		1,148,488,962	1,065,163,598
2031		90,330,560	90,330,560	1,881,515,137		1,881,515,137	1,791,184,577
2032		93,007,477	93,007,477	1,920,621,737		1,920,621,737	1,827,614,260
2033		95,764,701	95,764,701	1,964,352,291		1,964,352,291	1,868,587,589
2034		98,604,643	98,604,643	2,013,096,674		2,013,096,674	1,914,492,032
2035		107,148,636	107,148,636	2,459,591,644		2,459,591,644	2,352,443,008

FIRR	**10%**
vs.	
cost of capital	**7%**
Project NPV (million PHP)	**1,797**
Required Tariff Increase	**60.97%**

Table 9.2-9 Financial Evaluation – 15% FIRR Scenario

Year	Capital Investment	O&M Costs	Total Costs	Inflows		Total Inflows	Net Flows
				Revenues	Proceeds from Sale of Tagbilaran Airport Property		
2007	148,242,526		148,242,526				(148,242,526)
2008	606,703,922		606,703,922				(606,703,922)
2009	2,305,994,325		2,305,994,325				(2,305,994,325)
2010	980,258,497		980,258,497				(980,258,497)
2011		33,916,123	33,916,123	253,035,674	330,000,000	583,035,674	549,119,551
2012		34,900,606	34,900,606	254,244,678		254,244,678	219,344,071
2013		35,914,625	35,914,625	255,631,285		255,631,285	219,716,660
2014		36,959,063	36,959,063	257,238,327		257,238,327	220,279,263
2015		39,966,536	39,966,536	383,043,557		383,043,557	343,077,021
2016		41,132,532	41,132,532	385,211,480		385,211,480	344,078,947
2017		42,333,508	42,333,508	387,770,845		387,770,845	345,437,337
2018		43,570,513	43,570,513	390,769,033		390,769,033	347,198,519
2019		47,236,189	47,236,189	394,280,135		394,280,135	347,043,945
2020		48,620,275	48,620,275	594,434,344		594,434,344	545,814,069
2021		50,045,883	50,045,883	1,333,416,356		1,333,416,356	1,283,370,473
2022		51,514,260	51,514,260	1,345,875,962		1,345,875,962	1,294,361,702
2023		55,987,583	55,987,583	1,360,338,165		1,360,338,165	1,304,350,582
2024		57,634,210	57,634,210	1,377,067,487		1,377,067,487	1,319,433,277
2025		68,572,986	68,572,986	1,697,973,511		1,697,973,511	1,629,400,524
2026		70,597,176	70,597,176	1,720,109,648		1,720,109,648	1,649,512,472
2027		76,347,856	76,347,856	1,745,424,360		1,745,424,360	1,669,076,504
2028		78,605,292	78,605,292	1,774,259,711		1,774,259,711	1,695,654,420
2029		80,930,450	80,930,450	1,806,976,917		1,806,976,917	1,726,046,467
2030		83,325,364	83,325,364	2,205,662,444		2,205,662,444	2,122,337,080
2031		90,330,560	90,330,560	5,012,617,282		5,012,617,282	4,922,286,722
2032		93,007,477	93,007,477	5,116,921,283		5,116,921,283	5,023,913,806
2033		95,764,701	95,764,701	5,233,558,159		5,233,558,159	5,137,793,458
2034		98,604,643	98,604,643	5,363,567,779		5,363,567,779	5,264,963,137
2035		107,148,636	107,148,636	6,554,446,342		6,554,446,342	6,447,297,706

FIRR	**15%**
vs.	
cost of capital	**7%**
Project NPV (million PHP)	**7,478**
Required Tariff Increase	**123.24%**

Table 9.2-10 Financial Evaluation Results - 20% FIRR Scenario

Year	Capital Investment	O&M Costs	Total Costs	Inflows		Total Inflows	Net Flows
				Revenues	Proceeds from Sale of Tagbilaran Airport Property		
2007	148,242,526		148,242,526				(148,242,526)
2008	606,703,922		606,703,922				(606,703,922)
2009	2,305,994,325		2,305,994,325				(2,305,994,325)
2010	980,258,497		980,258,497				(980,258,497)
2011		33,916,123	33,916,123	344,954,006	330,000,000	674,954,006	641,037,884
2012		34,900,606	34,900,606	346,581,916		346,581,916	311,681,310
2013		35,914,625	35,914,625	348,476,632		348,476,632	312,562,007
2014		36,959,063	36,959,063	350,672,558		350,672,558	313,713,494
2015		39,966,536	39,966,536	522,420,912		522,420,912	482,454,376
2016		41,132,532	41,132,532	525,383,247		525,383,247	484,250,715
2017		42,333,508	42,333,508	528,880,466		528,880,466	486,546,958
2018		43,570,513	43,570,513	532,977,310		532,977,310	489,406,797
2019		47,236,189	47,236,189	537,775,020		537,775,020	490,538,830
2020		48,620,275	48,620,275	811,004,689		811,004,689	762,384,414
2021		50,045,883	50,045,883	2,486,731,299		2,486,731,299	2,436,685,415
2022		51,514,260	51,514,260	2,509,995,351		2,509,995,351	2,458,481,092
2023		55,987,583	55,987,583	2,536,998,571		2,536,998,571	2,481,010,988
2024		57,634,210	57,634,210	2,568,234,861		2,568,234,861	2,510,600,651
2025		68,572,986	68,572,986	3,167,417,138		3,167,417,138	3,098,844,151
2026		70,597,176	70,597,176	3,208,748,806		3,208,748,806	3,138,151,630
2027		76,347,856	76,347,856	3,256,015,374		3,256,015,374	3,179,667,518
2028		78,605,292	78,605,292	3,309,855,534		3,309,855,534	3,231,250,243
2029		80,930,450	80,930,450	3,370,943,730		3,370,943,730	3,290,013,280
2030		83,325,364	83,325,364	4,115,352,635		4,115,352,635	4,032,027,271
2031		90,330,560	90,330,560	12,783,678,566		12,783,678,566	12,693,348,005
2032		93,007,477	93,007,477	13,049,795,555		13,049,795,555	12,956,788,078
2033		95,764,701	95,764,701	13,347,378,142		13,347,378,142	13,251,613,441
2034		98,604,643	98,604,643	13,679,079,405		13,679,079,405	13,580,474,762
2035		107,148,636	107,148,636	16,717,438,584		16,717,438,584	16,610,289,948

FIRR	**20%**
vs.	
cost of capital	**7%**
Project NPV (million PHP)	**19,450**
Required Tariff Increase	**205.04%**

Table 9.2-11 Schedule of Fees under the 10% FIRR Scenario

Particulars	Fee (Php)	Unit
LANDING AND TAKE-OFF FEES		
International Flights at Int'l Airports		
For gross weight up to 160,000 kgs	160.97	per (or fraction of) 1K kgs up to 160K kgs
For gross weight exceeding 160,000 kgs	128.78	per (or fraction of) 1K kgs in excess of 160K kgs
Domestic Flights at National Airports		
Airports with PCC Runway	88.53	per 1K kgs
With Asphaltic concrete and Macadam Runway	72.44	per 1K kgs
Night Landing Fees		
Landing and take-off between 6pm-6am	15.00%	additional percent of regular landing fees above
Landing before nighttime and take-off during daytime	10.00%	additional percent of regular landing fees above
AIRCRAFT PARKING CHARGES		
Jet Parking at Terminal Apron		
First hour	0.00	for first hour
Beyond the First Hour	10.00%	percent of appr landing fee for every additional 15 mins.
Jet Prop Parking at Terminal Apron		
First 45 mins	0.00	for first 45 mins
Beyond the first 45 mins	10.00%	percent of appr landing fee for every additional 15 mins.
For Other Parking Areas		
For paved areas	16.10	per 5K kgs per hour or fraction thereof
PASSENGER SERVICE CHARGE		
At Alt. International Airports		
International PAX	804.86	per departing passenger
At Secondary Airports		
Domestic PAX	32.19	per departing passenger
RENTAL OF FLOOR SPACES at TERMINAL BLDG.		
At Alternate Int'l Airports Pass. Terminal Building		
Gound Level		
Airlines	96.58	per sq.m. per month
Commercial Establishments	160.97	per sq.m. per month
Upper Floor Level		
Airlines	80.49	per sq.m. per month
Commercial Establishments	128.78	per sq.m. per month
At Secondary Airports	64.39	per sq.m. per month
RENTAL OF FLOOR SPACES at OTHER BLDGS.		
Hangar, Concrete/Steel Structures		
Office	48.29	per sq.m. per month
Hangar Proper	16.10	per sq.m. per month
Other Buildings, Concrete/Steel	48.29	per sq.m. per month
Other Buildings, Light Materials	32.19	per sq.m. per month
RENTAL OF AIRPORT LAND AREAS		
Developed Areas	16.10	per sq.m. per month

Particulars	Fee (Php)	Unit
Undeveloped Areas	8.05	per sq.m. per month
CONCESSION PRIVILEGE FEES		
Passenger Service Concessions		
Banks	965.83	per month
Travel Agencies	160.97	per month
Currency Exchange Dealer	321.94	per month
Commercial Cable & Telegraph	321.94	per month
Insurance Agencies	321.94	per month
Hotel/Motel Reservations	965.83	per month
Food Service Concessions		
Restaurants	724.38	per month
Cocktail Lounge	402.43	per month
Kitchenette and Canteen	482.92	per month
Coffee Shop, Snack Bar , Refreshment Parlor	724.38	per month
Food Catering	160.97	per month
Transportation Utilitites Concessions		
Taxicab Services	241.46	per unit
Limousine Services	241.46	per unit
Car Rental	241.46	per unit
Jeepney Services	241.46	per unit
Bus Services	241.46	per unit
Car Parking		highest bid
Fuel Service Station	482.92	per month
Miscellaneous Business Concessions		
Duty Free Shop	0.05	percent of monthly gross receipts
Porterage/Janitorial Service		highest bid
Cargo Forwarder/Broker	482.92	per month
Gift Shop, Curio and Novelty Stores	241.46	per month
Photographic Service	241.46	per month
Beauty Salon	241.46	per month
Barber Shop	160.97	per month
Cigar, Cigarette and Confectionary	160.97	per month
Vending Machine	120.73	per unit per month
Jukebox	193.17	per month
Art Gallery	160.97	per month
Newspaper, Magazine and Periodical	120.73	per month
Copying Machine	120.73	per month
Movie Filming	160.97	per 3 hours
Advertising and Documentary Filming	804.86	per 3 hours
Shoe Cleaning Service	80.49	per month
Bookstore and Office Supplies	120.73	per month
Public Telephone Booth	241.46	per month
Internet Shop	321.94	per month (assumed)
ADVERTISING		
Indoor and Outdoor Advertising		
Lighted Signboards or Display	96.58	per sq.m. per month
Unlighted Signboards or Display	64.39	per sq.m. per month
Circulars and Posters	48.29	per sq.m. per month
OTHER FEES AND CHARGES		

Particulars	Fee (Php)	Unit
Utilities and Other Services		
Electric Power		percent in addition to actual monthly charge
Telephone		
Commercial	362.19	per month per unit, in addition to monthly charge
Extension	120.73	per month per unit, in addition to monthly charge
Residential	160.97	per month per unit, in addition to monthly charge
Extension	80.49	per month per unit, in addition to monthly charge
Cable Pairs	56.34	per month per unit, in addition to monthly charge
Deposit for telephone	1,609.72	per set
Water Charges		percent in addition to actual monthly charge
Airconditioning		percent in addition to actual monthly charge
ROW for telephone cable pairs antenna system, etc.	185.12	per unit
Installation of Utilities		
Comercial	289.75	per unit
Residential	144.88	per unit
Construction Permit Fee		
Commercial	241.46	per application
Residential	120.73	per application
Height Clearance Permit	80.49	per application

9.3 CONCLUSION

The viability review shows that the Panglao Island Airport Development Project is economically viable. The NPV is positive at Php 3,097 million, the EIRR is 23.7% and greater than the 15% social discount rate (SDR), and the B-C ratio is 2.2. Even under a less likely traffic scenario that international traffic will start arriving in 2025, the three viability indicators show that the project is worth undertaking—the NPV is Php2,327 million, the EIRR is 21.4% and the B-C ratio is 1.9. The three viability indicators are also robust when tested for sensitivity to increases in economic costs (capital and O&M costs) and decreases in economic benefits. Even with a 20% increase in costs, a 20% decrease in benefits, or a combination of both, the project remains economically viable.

The more costly Tagbilaran Airport Redevelopment option, on the other hand, proved that the project will be marginally viable under the scenario that international traffic will start arriving in 2011 and not viable under the scenario that international traffic will start arriving in 2025. The original plan to close Tagbilaran Airport and develop a new airport in Panglao is thus worth undertaking from a cost-benefit perspective.

The results of financial evaluation from the all-capital (government equity) point of view show that the project would not be financially viable if the current ATO fees would be applied (FIRR is 2.69%, compared against a hurdle rate of 7%). Even if the fees would be raised to the level of the recently adjusted fees in Davao International Airport, the project would remain not financially viable (FIRR is 6.39%). It would take 60.97% increase in ATO fees for the project to achieve 10% FIRR, 123.24% increase in fees to achieve 15% FIRR, and 205.04% increase in fees to achieve 20% FIRR. In all the scenarios evaluated, the opening year domestic passenger terminal fee is lower than the Php 69.50 willingness-to-pay fee established in the passenger survey.

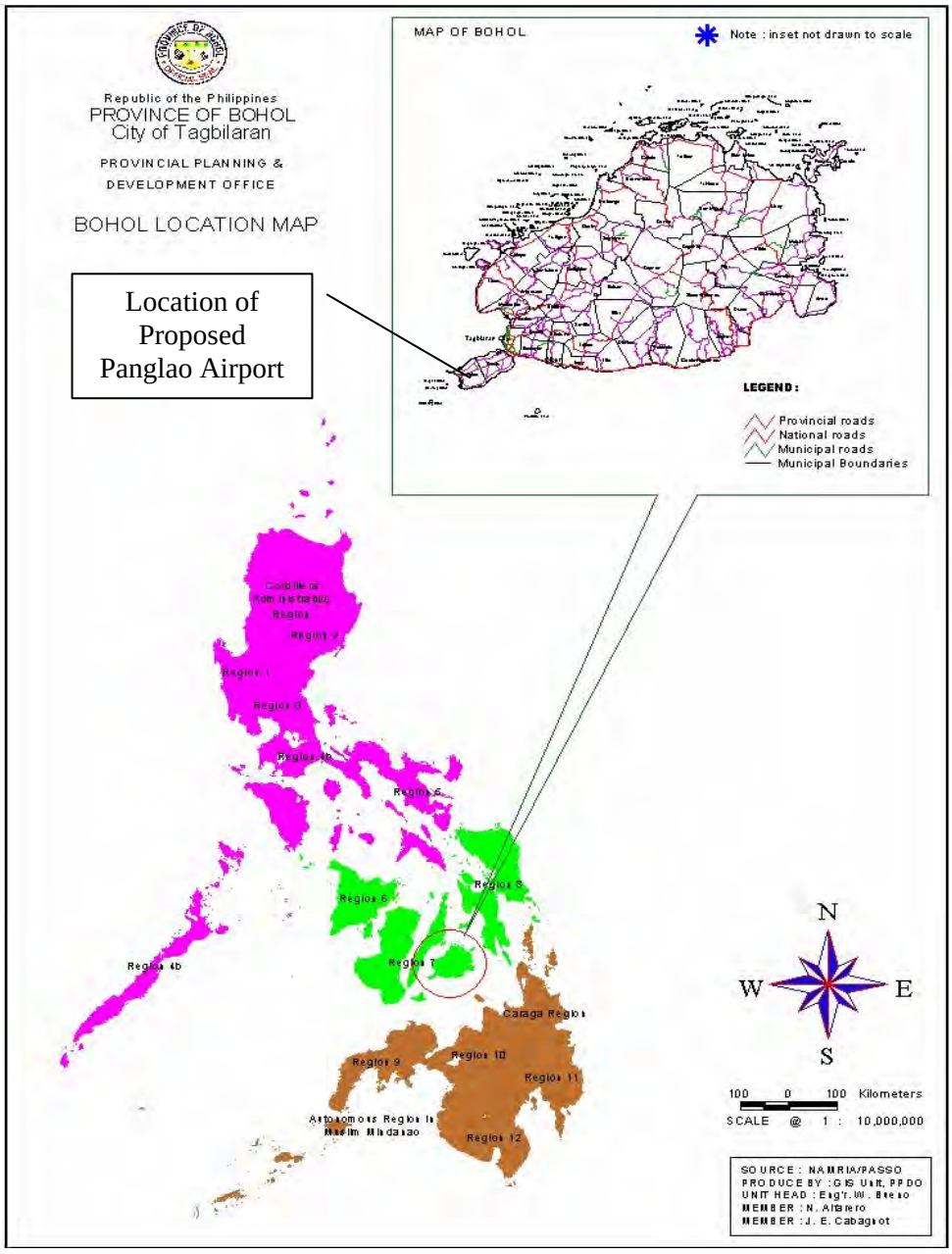
Although it should always be included in the information set of decision-makers, financial viability should not be the only goal in developing airports. It should also be borne in mind that the Panglao Island Airport would play a strategic role in relaxing the air transportation constraints posed by the congested Tagbilaran Airport and accelerating the economic development of the Central Philippines super-region. Besides, the users themselves implicitly revealed that they are willing to pay more for an improved air travel.

SECTION 10 ENVIRONMENTAL REVIEW

10.1 EXISTING ENVIRONMENT AT THE PROPOSED LOCATION

10.1.1 Summary of Existing Conditions

The proposed location of the new airport is located in the Municipality of Panglao shown in Figure 10.1-1. It is approximately 15 kms from Tagbilaran City. A summary of the environmental conditions at the proposed airport site is given in Table 10.1-1.



Source: Bohol Provincial Physical Framework Plan

Figure 10.1-1Project Location

Table 10.1-1 Summary of Environmental Conditions in Panglao Island

Environmental Setting	Environmental Characteristics	Brief Description of Existing Environment
A. Physical Environment		
Climate	Climate Type	Type IV (modified corona climate classification - rainfall max from September to November)
	Rainfall	Ave. Annual Rainfall of 1,332.7 mm
	Humidity	Average annual relative humidity (RH) is 81%, ranging from 78% in April to 85% in November. The months of October to December have the highest monthly relative humidity of lat least 84%.
	Wind	Wind speed is only one to two meters per second (mps) with an annual normal of 2 mps. Wind direction is from NE (October to May of the following year) to SW.
	Others	Tropical cyclone is experienced yearly with recorded 10 times under Signal Number 3 during past 11-year period
Topography	Landside	A low plateau with almost flat central topography
	Seabed	Generally flat with ave. elevation of 10m AMSL.
Geology	Soil and Rock Properties	Consists of 3 units characterized by Sierra Bullones Formation overlaid by Maribojoc Limestone and the recent unconsolidated deposits coral growth in the reefs.
	Other Properties	Doubly plunging syncline structure of the island forms boat-like formations, where edges at the shore curl up and the central portions remains deeper. The syncline structure trends N 55ºE parallel to the trend of the whole island. Thickest part of geologic units are in the middle of the island, and from this central axis, the rocks dip upward towards the southern and northern shores. The eastern and western ends of the island are tilted up creating a basin-like structure for the rocks. The thickest section of the rocks occurs at the ridge of the two hills near Dauis. There are no major faults observed in Panglao Island.
Hydrology and Water Resources	Systems	More than 530 and 260 households served with level III system in Panglao and Dauis, respectively. The main source for the municipality of Panglao is a deepwell in Barangay Lourdes referred to locally as the Canhilbas Spring. The main source of water for Dauis is deepwell with its main reservoir at Mansasa, Tagbilaran City. The reported maximum capacity of the pumping stations for the municipalities of Panglao and Dauis are 120 and 32 gpm respectively;
	Quality	Deepwells and dug wells show conductivity of 1,500 µmhs/cm which is indicative of brackish to saline water; not ideal for human consumption due to the salty taste and high dissolved solids content

	Groundwater	119 deepwells and 44 dug wells. Dug wells vary from 3 to 45 meters deep based on water table measurements. The shallow area is located at the coastal areas.
Air	Ambient Air Quality	Air quality testing at various stations yielded values ranging from 2.96 – 95.37 ug/Ncm with the exception of three stations with values ranging from 158.99 ug/Ncm to 775.08 ug/Ncm. Two stations exceeded the DENR one-hour ambient standard of 300 ug/Ncm for the SO_2 and 260 ug/Ncm for NO_2.
	Noise Levels	Noise level testing at various stations yielded values ranging from less than 40 to 50 decibels [dB (A)].
B. Biological Environment		
Coastal Ecology	Mangrove forest	Nearest mangrove forest ecosystem is located about 1.25 kilometers away from the south-south-western tip of the airport
Terrestrial Ecology	Environment	Predominantly agricultural area with approximately 5,933 hectares or 65.78 percent of its total land area devoted to agriculture
	Vegetation Cover	Bushland accounts for approximately 1,795 hectares or 19.90 percent of the island's total land area. Some isolated patches are mixed with agricultural lands in the relatively flat areas of Dauis municipality. Grasslands comprise about 94.7 hectares or 2.15 percent of the island. The airport site is basically an open area dominated by residential and agricultural lands with occasional patches of fruit trees and bamboo thickets. About 30% of the site are regulated with native shrubs and grasses which have low economic value and are furthermore fire-prone. Of the 177 species, there are 81 trees (majority are rather small), 40 herbs, 36 shrubs, 9 vines and 11 species belonging to a special group that includes the palms, pandans, bamboo, and cycads
	Fauna	There are 177 species of plants encountered during the 1997 ecoprofiling. The most number of plant species are found among man-made plant communities (coconut plantations, corn fields, banana plantations, ube fields, omelina plantations, mahogany plantations, fallow fields, and built-up areas.
	Wildlife Areas	63 species of wildlife were recorded, comprised of one species of amphibians, seven species of reptiles, 48 species of birds and eight species of mammals.
	Rare/Threatened Species	There are no rare and threatened or endangered life forms in the project site.
C. Socio Economic Environment		
Population and Communities	Total Population	21,337 people in Panglao; population density is 3 people per square kilometer; 1,139,130 people in Bohol (2000); regional population growth rate of 2.79%.

10.2 LOCAL GEOLOGY AND TERRAIN FEATURES

10.2.1 General Characteristics

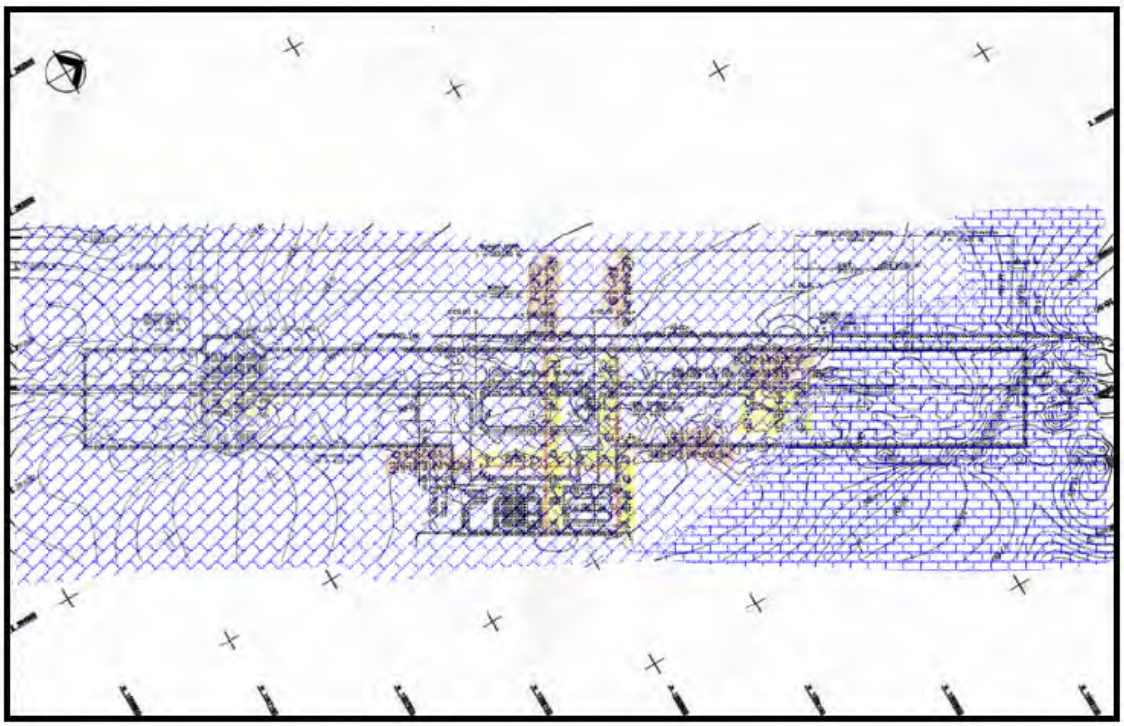
The project area in Panglao Island is proposed on a series of land parcels aligned in a northeast-southwest direction covering the villages of Tawala, Bolod, Libaong and Lourdes. It is generally characterized by an undulating terrain with sags and swales on the southern to middle part and a terraced feature towards the northern end.

It is built on a raised coral reef mantled with organic silts and clayey soil of considerable thickness to warrant rice and vegetable farming as a means of livelihood in the local community. The coral reef strikes N50°-60°E and from 70°-85° northwesterly dip. It appears to be intermediate between an atoll a ring-shaped feature at the southwest end, and a fringing reef judging from its terrace structure that extends northeastward to the south-southwest coastline of mainland Bohol. There appears to no surface manifestations of either an incipient or existing sinkhole at depth i.e. large circular depressions, subsidence cracks, etc. The terrain, however, is characterized by coral protrusions alternating with soil mantled ground indicating a highly irregular bedrock surface with possible cavities extending to deeper horizons.

The bedrock is spongy, hard but brittle. It is a moderately strong cemented mass of coral and other carbonate material with low particle strength (e.g. aragonite – The calcium carbonate of the coral often changes from a weak and unstable form called 'aragonite' into a stronger and more stable calcite mineral) with large proportion of plastic fines due to particle weakness. Enlarged pores as wide as 50 centimeters are common feature of the coral mass.

Unconfined compressive strength measurements on rock exposures showed highly variable indices ranging from 60 kg/cm2 to as high as 300 kg/cm2, depending on the degree and character of the weathering. Typical with limestone rocks, the weathering is differential resulting in highly irregular and uneven bedrock surface (Photo-PA01 to 04).

Figure 10.2-1 is a Simplified Geologic Map of the project area.



LEGEND

TERRACED LIMESTONE – Reefal or coralline, gray, porous with maximum pore diameter measuring 20 cm, vertical open fractures or solution cavities very pronounced, qu = 60 to 300 kg/cm2. Occur as continuous terraced bedrock.

PINNACLED LIMESTONE – Reefal or coralline, with large clay-filled pores measuring 50 cm in diameter, qu = 60 to 160 kg/cm2. Occur as rock pinnacles protruding from the ground and mantled with variable thickness of clayey soil.

Figure 10.2-1 Simplified geologic map of project area
Panglao domestic airport

10.2.2 Ground Penetrating Radar Survey Results

For purposes of this report, a brief discussion on the methodology and its limitations are herein presented for clarity and most objective overview of the GPR survey results. There were two approaches made in order to ascertain the natural ground and sub-surface features in the project area. These are vertical and lateral probing.

Methodology And Limitation

The GPR survey was conducted from July 17 to 19, 2007 and covered an aggregate total of 2,900 scan line meters. About 1,400 meters have been made parallel to the runway alignment and approximately 1,500 meters have been conducted perpendicular to the runway. Tabulated below is the GPR scan line allocation:

Table 10.2-1 SCAN LINE SCHEDULE AND ALLOCATION

	Runway Northern End	Runway Southern End	Runway Middle Section	Terminal Building
Parallel	300	300	0	800
Transverse	0	0	800	700
Total	300	300	800	1500

The scan line schedule and depth of penetration were delimited by the presence of impounded rain water, thick bushes, and the highly reflective terra rossa. The parallel scan line along both ends of the runway covered a total distance of 300 meters each, where as about 1,500 scan line meters for the terminal building and appurtenant structures have been made. The scan is based on the standard one meter GPR window every 50 transmitted pulses (~33.33 line meters). Maximum depth of penetration is 15 meters with some scans penetrating very thick soil overburden registering as "faulty signals" due to high reflectance.

The continuous profiles generated by the scan consist of interfaces or point objects. The interfaces are continuous returns typically representing a layer or strata underground. Point objects are typically displayed as hyperbolic patterns on the profile and represent a number of anomalies in the subsurface from the naturally occurring void or cavity to the artificial or a buried object. Due to time constraint there are a number of point objects and features that were not considered as replicating targets (i.e. double X-ing).
Figure 10.2-2 is the "GPR Survey Plan" showing the approximate location of the scan lines along the runway alignment and the terminal building site. Note that scan line is equivalent to 100 meters.

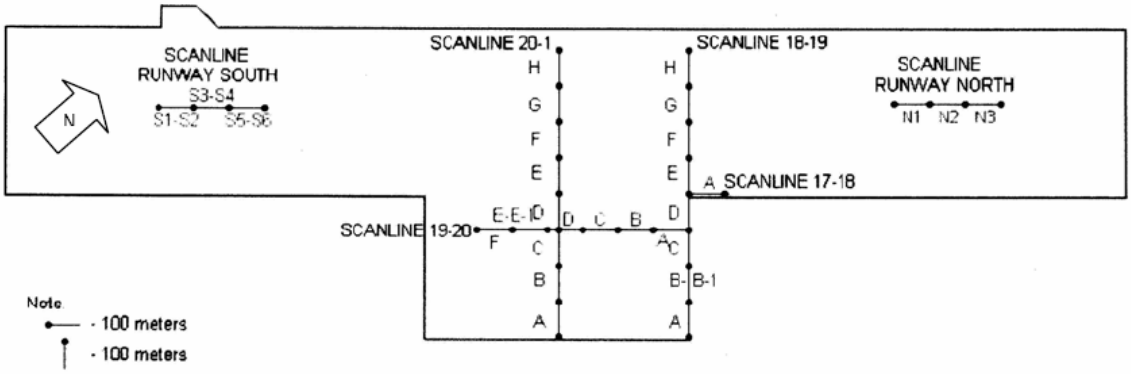


Figure 10.2-2 GPR SURVEY PLAN

The following photos show primary and secondary porosity that characterized the reef limestones. The sponge texture reef limestone showed both small and large pores that are either filled or un-filled. The reef limestone is characterized by very irregular bedrock surface that is both steeped, and pinnacled to undulating. Some large pores developed into perfect circular patterns as shown by the picture above. Close and tight fractures developed into large cavities due to inherent solubility of the reef limestone.

10.2.3 DATA DEDUCTION AND REDUCTION

Scan images of the NNE area assigned for the proposed terminal building facility (Scan Lines, 17-18/A 18-19/AD, 19-20/AF, and 20-1/AD) indicates a more porous foundation material (with large, open, air-filled voids) than at the Middle and SSE section of the building. The SSE section images indicate a less porous coralline limestone with clay-filled voids and thick overburden.

Layer scans showed a highly irregular depth to bedrock surface ranging from less than a meter to greater than 15 meters depth. Images also showed essentially "large contrast" scattering mapping out point objects (i.e. cavities and large pores) at particular depths beneath the terminal building. Tabulated below are depth indications of cavities and/or large air-filled voids:

CAVITY INDICATIONS
AT THE PROPOSED TERMINAL BUILDING SITE

TERMINAL BUILDING SECTION	SCAN LINE	DEPTH OF OPEN CAVITY (METERS)	GEOLOGICAL REMARKS
NNE SECTION 200 m/400 m cross traverse	17-18/A	1.70	One-meter wide cavity seems to occur at bound 17
	18-19/A	0.60	May indicate sponge-texture or open, large voids
	18-19/B	0.40	
	18-19B1	0.70	
	18-19/C	1.20	Less than a meter of open cavity Seem to occur 300 meters from bound 18
	18-19/D	*NCD	Faulty-signal –may indicate thick cavity filling of clay and boulder?
	19-20/A	2.70	Cavity appear to be continuous and very evident from A to B
	19-20/B	1.10	
SSE Section 400 m Single line Traverse	19-20/C	1.10	May represent the same cavity scan from 19-20/A-B
	19-20/D	0.90	-do-
	19-20/E	0.70	May indicate sponge-texture or open, large voids
	19-20E1	0.40	
	19-20/F	0.50	
Middle Section 400 m single line Traverse	20-1/A	1.80	Open cavity, discontinuous and isolated
	20-1/B	*NCD	Cavity detected showed "small contrast" with large open pores
	20-1/C	1.70	Open cavity may be continuous from C to D
	20-1/D	1.80	

*NCD - No Cavity Detected

Processing and further enhancement of the images representing the central section (scan lines 18-19/EH and 20-1/EH), northern segment (scan lines N1 to N3) and southern end (scan lines S1 to S6) of the proposed runway alignment yielded "cavity anomalies" at the following depths:

CAVITY INDICATIONS
AT THE RUNWAY ALIGNMENT

RUNWAY SECTION	SCAN LINE	DEPTH OF OPEN CAVITY (METERS)	GEOLOGICAL REMARKS
Northern Segment 300 m Single line traverse	N1	1.60	May indicate open fracture filled with soft clay and gravel material
	N2	1.10	
	N3	NCD	Similar condition at 18-19/D
Southern End 600 m Single line Traverse	S1	1.30	Open cavity or large fracture
	S2	1.70	
	S3	0.80	May indicate sponge-texture or open, large voids
	S4	1.40	
	S5	1.30	Cavity appear to be continuous and very evident from S5 toS6
	S6	1.20	
Central Section 400 m double line Traverse	18-18/E	NCD	Similar condition at 18-19/D
	18-19/F	1.50	One-meter wide cavity
	18-19/G	1.10	Primary porosity, spongy rock mass with open large voids
	18-18/H	1.50	
	20-1/E	1.00	
	20-1/F	1.-00	
	20-1/G	1.60	Open cavity or large fracture
	20-1/H	1.30	

*NCD - No Cavity Detected

Layer contrasts along the proposed runway alignment indicates abrupt contacts probably as a result of the heterogeneity and irregularity of the coralline limestone due to differential weathering and its inherent solubility. Near the central section of the runway, a boulder-filled cavity may exist considering the high reflectance emitted by the transducer similar with condition at the middle section of the terminal building site. Figure 10.2-3 are enhanced images showing the different layers and features mapped-out by radar scanning.

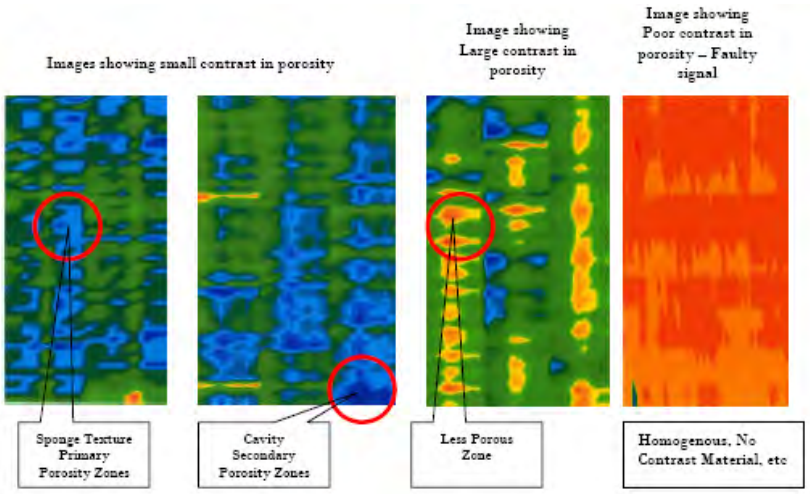


Figure 10.2-3 ENHANCED LATERAL SCAN IMAGES

10.2.4 Pertinent Design And Construction Considerations

There are a number of important considerations to be considered when designing and constructing civil structures on a highly variable limestone terrain. This variability makes it particularly important to test and assess each material sample, rather than assuming a particular material type will be of a certain quality and suitability. The following general information may serve as preliminary inputs for design and construction tender preparation:

Engineering Variability And Excavatability Of Raised Reefs

Raised reef deposits are often very variable. This is due to the variability of the coral producing organisms, the density of coral on the reef, the other organic and nonorganic material which fill the spaces in the rock and the degree of cementation, weathering, uplifting and crystallization. It is therefore necessary to manage the deposit well to prevent contamination of good material with poor material. Depending on the strength of the deposit, a bulldozer/ripper and front end loader or a tracked excavator may be required. Some deposits have strong horizontal limestone layers which would require blasting and crushing – these should be avoided if alternative sites are available. Oversized material may have to be crushed and screened, although because particles are not strong, a grid roller can be effective. It is important to keep deposits dry as wet coralline material can be difficult to handle.

Loading Capacity Limitations

The limestone gravel and bouldery signatures in potential cavity clay-fill at the NNE section of the terminal building and at the middle section of the runway indicates a highly heterogenous sub-soil foundation. The heterogeneity of the sub-soil should be considered in lieu of severe bearing limitations associated with such soils. This is crucial when building multi-storey or high-rise structures because of the risk to differential settlement and bearing capacity failures. Pinnacled limestone foundation such as the one prevalent at the project area may also cause differential settlement vis-à-vis foundation stiffness problem due to the unevenness of the rock head. To provide uniform stiffness, individual footings should be constructed with supporting reinforced beam (i.e. tie or grade beam).

Heaving

Risks of bulges and cracks along floor pavement are relatively high even in moderately heavy structures when founded on highly plastic and swelling clays due to poor drainage aggravated by the alternate dry and wet season in the country. This is particularly true with residual clayey soils from limestone due to the conversion of anhydrite to gypsum causing expansion of the crystal lattices and soil heaving.

Drainage And High Plasticity

The terra rosa or red clay is very poorly drained. Alignment of the culverts should take into consideration localized terrain peculiarities such as small sags for efficient draining and or towards natural depressions such as gullies and creeks. Plastic materials lose strength when wet. It is recommended that when materials with high plasticity are used, the drains should be very carefully designed and maintained to reduce the likelihood of the materials becoming saturated and lose its strength. The maximum water absorption of material used in a base layer should be 15% on lightly trafficked roads and 10% on heavily trafficked roads. No specification is required when the material is used in a sub-base layer or in a gravel wearing course under low traffic levels. Since this test is rapid, it can be used on occasions when the Ten Percent Fines test would be disruptive to the work.

Grading and Cavity Re-Filling

Cavity-fills that may be exposed during grading may include large boulders and rubbles that are generally difficult to handle. An adequate disposal or stockpile area may be required. All exposed cavities should be emptied of fillings and replaced by engineered material. Particular attention should be given to the materials to be used in the runway construction and the cavity-fill material at the middle part of the terminal building. Oversize particles can cause problems during construction and compaction. Placing the correct thickness of material can be difficult and the material surrounding large particles often remains inadequately compacted. The maximum particle size should be equal to half the specified compacted layer thickness. If a grid roller is used to break down oversized particles, it will be necessary to sample the material after placement and compaction to check that maximum particle size meets the specification. Excessive fines can reduce the stability of a compacted layer and prevent interlock between the larger particles. The proportion of the material which is finer than 75 microns should be less than 30%.

Particle Strength – Problems Associated With Coralline Gravel

The compacted dry density and strength of some coralline gravel are sensitive to the moisture content at which they were compacted. Cases wherein the top material is of high quality while the bottom material, because it is as excessively moisture sensitive, is referred to as poor quality (i.e. top material has less fines and a higher degree of aggregate interlock than the bottom material). Soaked CBR measurements should therefore be properly conducted probably within 5% moisture content range.

Because the particle strength of coralline material can be low, the grading can change during placement and compaction. However, checking the grading after compaction is time consuming, destructive and expensive if the material fails. Therefore it is recommended that trials are carried out to assess the degree to which the material breaks

down during compaction and that grading is checked after compaction only if it is known to change significantly.

To prevent weak particles breaking down during construction and under load, the minimum 10% Fines wet strength of the material used in a base layer should be 15 kN on lightly trafficked roads and 20 kN on heavily trafficked roads.

Grouting Of Sponge Texture Or Primary Porosity Zones

There are certain sections along the runway (southern end and central section fronting the terminal building) where primary porosity zones have been identified i.e. inherent sponge texture of the reef. These sections may be amenable to grouting as a means of improving the strength of the reef. More detailed and close-grid scanning should be conducted to cross traverse target points and accurately delineate primary porosity zones to secondary porous zones as a result of fracturing and/or cavity formation. Scan lines should be aligned in consideration of the local geology and terrain condition. For data optimization, the scan line program may have to consider the locations of boreholes for correlation and continuous radar profiling.

10.3 ENVIRONMENTAL AND SOCIAL CONCERNS

10.3.1 Environmental Impacts during Project Construction

The Environmental Impact Statement (EIS), prepared for the application for an environmental clearance certificate (ECC) in 2003, showed that the majority of adverse impacts of the project on the physical, biological and social environment will be incurred during the construction phase. These impacts, however, are considered of low to medium significance and can be mitigated, as outlined below:

Environmental Aspects	Impacts	Mitigating Measures
A. Physical/Chemical Effects		
Topography and Drainage	Land subsidence/alteration of natural drainage pattern that could lead to localized flooding/soil erosion	Setting-up the necessary structural support foundations and adequate channels/use of interceptor dikes, pipe slope drains, and sediment traps
Soil quality	Soil contamination due to oil/fuel spill	Close supervision during construction stage; provision of secondary containment and lining to fuel and oil storage areas; train workers re: proper handling and disposal of used oil and other hazardous wastes' strict enforcement of proper fuel/oil handling procedures
Air quality	Potential increase of ambient TSP or dust concentration around the project site	Regular sprinkling of exposed areas with water; imposition of speed limits on hauling trucks
Noise and vibration	Potential increase in noise levels around the project site	Noise generating construction activities should be from 7:00 p.m. to 7:00 a.m.
Water quality	Potential increase in sediment load Potential increase in BOD loading due to sanitary discharges Possible oil contamination	Drainage channels should be improvised Provision of portable toilets and proper disposal of wastes Provision of secondary containment and lining to fuel/oil storage areas
B. Ecological Effects		

Environmental Aspects	Impacts	Mitigating Measures
Flora and Fauna	Loss of vegetation, fish and wildlife	Selective removal of vegetation cover; re-greening of project site at the conclusion of the construction phase
C. Aesthetics		
Aesthetics	No adverse impacts on the general aesthetics	No mitigation measures needed
D. Socio-economic Effects		
Vehicular traffic	Possible congestion in narrow Barangay roads Potential increase in risk of road accidents	Contractors will formulate comprehensive traffic plan Strict enforcement of traffic rules
Community structures	Disruption of existing community Resettlement and land titling	No mitigation is required. People will easily adjust to the new neighborhood Resettlement should be well planned and provided with usual amenities
Land use	Alteration of land use and increase in land valuation Decrease of space for agricultural land	The Bohol Provincial Govt and LGU concerned within the project site should generate a land use and zoning plan of the area around the project site. Loss of agricultural land is offset by increase in land value
Employment	Availability of construction jobs to local residents	Qualified local residents will be given priority in hiring
Business	Increase in business receipts	No mitigation required

10.3.2 Environmental Impacts During Project Operation

The main operational effects of the project include noise, effects on air quality, effects on water quality, and impacts on the community. The operational phase impacts would be experienced even in the "without the project" case, albeit in a different local environment (i.e., Tagbilaran airport vicinity) and to a slightly different level. It is expected that the only major adverse impact that may be experienced is the increase in noise level. This increase is expected because of the additional aircraft movements "with the project." However, flights are normally scheduled during the daytime to minimize noise disruption to residential and noise-sensitive establishments such as schools and hospitals near the airport sites.

Predicted Noise Levels

The predicted increase in noise on the area surrounding the airport was estimated using Integrated Noise Model Version 7 (INM 7) of the Federal Aviation Administration. INM estimates long-term average effects and uses the concept of average annual day, which is a user-defined best representation of the typical long-term average conditions for the airport. The model calculates the approximate noise contours around the proposed Panglao Island Airport. A summary of the predicted Noise Impact Reach which characterizes the resulting contours during the short and medium-term are outlined in

Table 10.3-1

Table 10.3-1 Predicted Noise Impact Reach

L_{DN}	2015		2020	
	Lateral Distance (m)	Longitudinal Distance (m)	Lateral Distance (m)	Longitudinal Distance (m)
55	1,500	7,200	1,620	7,800
60	1,020	5,190	1,220	6,500
65	580	2,900	700	3,670
70	420	1,500	490	1,950
80	145	440	180	580

Noise Standards

For airport noise, ATO adopts the ICAO aircraft engine noise acceptable standard of L_{DN} = 65 dBA for analysis. NPCC, however, prescribes a more stringent set of standards as shown in Table 10.3-2.

Table 10.3-2 Noise Levels Recommended by NPCC

Area	**Maximum Allowable Noise Level (dB (A)**		
	Daytime 0900H-1800H	**Morning/Early Evening 0500H-0900H/2200H-0500H**	**Nighttime 1800H-2200H**
Schools, Hospitals	50	45	40
Residential	55	50	45
Commercial	65	60	55
Light Industrial	70	65	60
Heavy Industrial	75	70	65

Based on very conservative estimates of airport noise levels, no breach in acceptable noise standards is expected from project for the years 2011 to 2020 (Figure 10.3-1).

Figure10.3-1 Noise Contour (2020)

10.3.3 ENVIRONMENTAL CLEARANCE CERTIFICATE AMENDMENT/EXTENSION

The DENR issued an Environmental Clearance Certificate (ECC) to the project in June 2003. The issuance of the ECC certified that the proposed project has complied with the requirements of the EIS System regulation and is cleared for implementation. This ECC has a validity of five years, meaning, construction should commence on or before June 2008, after which time the ECC shall be revoked unless an extension from the DENR has been sought.

The procedure for application of amendment to, or extension of, an ECC is set out in the provisions of Chapter 8 of the DENR Department Administrative Order (DAO) 2003-30 Procedural Manual. DAO 2003-30 provides that a project proponent is given the opportunity to seek relief from the requirement of, or continued compliance with, ECC commitments under the following circumstances:

(i) A project was not implemented;

(ii) A project was issued ECC, but has since been re-classified as Category D (Non-coverage); and

(iii) A project has been terminated (including projects that have been abandoned, completed, or decommissioned).

The project implementation timetable implies that the start of construction activities for the Panglao airport project will likely be past the filing period for ECC extenstion (April 2008). Thus, DOTC must (i) apply for relief from its ECC commitment due to the non-implementation of the project, and (ii) ask for an extension of the ECC validity and/or amendments to certain conditions thereof. DAO 2003-30 provides that there are different levels of approval of an ECC amendment, depending on the nature of the modifications, described as:

(i) Modifications required to the ECC, which is a project and location-specific document, due to changes in project location, major changes in process flow or technology to be used that may affect the validity of the EIS findings, or baseline characteristics have changed significantly that the impact assessment (as embodied in the EMP) are no longer appropriate;

(ii) Major modifications to the original proposal such as: expansion of land/project area, increase in production capacity, or major changes in process flow or technology to be used; and

(iii) Minor modifications to the original proposal such as: extension of deadlines for submission of post-ECC requirements, extension of ECC validity, change in company name/ownership, or decrease in land/project area or production capacity.

The requested period of extension of ECC validity should not exceed three years and should be filed at least three months before the expiration of the ECC.