Final Report

THE ROAD-RORO TERMINAL SYSTEM: Bicol Mainland-Masbate-Cebu Connection

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Prepared for

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Preface

This report is the result of technical assistance provided by the Economic Modernization through Efficient Reforms and Governance Enhancement (EMERGE) Activity, under contract with the CARANA Corporation, Nathan Associates Inc. and The Peoples Group (TRG) to the United States Agency for International Development, Manila, Philippines (USAID/Philippines) (Contract No. AFP-I-00-00-03-00020 Delivery Order 800). The EMERGE Activity is intended to contribute towards the Government of the Republic of the Philippines (GRP) Medium Term Philippine Development Plan (MTPDP) and USAID/Philippines' Strategic Objective 2, "Investment Climate Less Constrained by Corruption and Poor Governance." The purpose of the activity is to provide technical assistance to support economic policy reforms that will cause sustainable economic growth and enhance the competitiveness of the Philippine economy by augmenting the efforts of Philippine pro-reform partners and stakeholders.

This report, an investment folio, was written by Dr. Ruperto Alonzo, Team Leader, Gudmund Rognstad, RoRo Shipping Expert, Asaf Ashar, Ports Specialist, and Adoracion Navarro, Research Associate, after several months of analysis beginning in May 2006 at the request of Marietto A. Enecio, Senior Vice President, Development Bank of the Philippines. Brief biographies of the team members are included on the following page.

The views expressed and opinions contained in this publication are those of the authors and are not necessarily those of USAID, the GRP, EMERGE or the latter's parent organizations.

Biographical Sketch of the Study Team

Ruperto Alonzo – Team Leader

Ruperto Alonzo has conducted several studies over the past three decades on the Philippines' infrastructure sector, including transport. His first experience as transport economist dates back to 1973, in the preparation of the feasibility study of the EDSA interchanges. In 1995 he was with the team that conducted an economic evaluation of liberalization and deregulation in the domestic shipping industry for USAID. He is currently Professor of Economics at the University of the Philippines: As NEDA Deputy Director-General in August 1998-January 2001, he chaired the technical boards of the Investment Coordination Committee and Infrastructure Committee and represented NEDA in the Toll Regulatory Board. He holds an M.A. in Economics from the University of the Philippines and has completed Ph.D. coursework at the University of Chicago.

Gudmund Rognstad – RoRo Shipping Expert

Gudmund Rognstad specializes in transport analysis and logistics, shipping, and ferry operation and management. He is the president and owner of SHIPDECO, a Norwegian shipping development company that was formed to assist the Norwegian Aid Agency and other donor organizations in shipping and shipyard projects in developing countries. His experience in Philippine projects dates back to 1987, when he became a project manager for two shipping-related projects. In 1995, he worked as project manager for the technical assistance component of the Domestic Shipping Modernization Program loan by DBP from Japan. He has been doing collaborative work with DBP since then. He holds an M.Sc. in Physics and Operations Research from the Technical University of Trondheim, Norway.

Asaf Ashar – Ports Specialist

Asaf Ashar has extensive international experience with multi-modal transportation systems for containerized, breakbulk and bulk cargoes, with an emphasis on the linkage between ships, barges, trains, and trucks. He has directed numerous planning projects, including master plans for ocean and inland waterway ports, intermodal railyards, inland distribution centers (dry ports), and rail-to-barge transfer facilities. He has been involved in a wide array of port-related feasibility studies, including: productivity enhancement systems and handling technologies for containerized, bagged and neo-bulk cargoes. He is currently Professor at the University of New Orleans and Research and Group Manager for Port and Intermodal Systems of the university's National Ports and Waterways Institute. He holds a Ph.D. in Maritime Studies and International Transport from the University of Wales and an M.S. in Marine Systems Management from the Massachusetts Institute of Technology.

Adoracion Navarro – Research Associate

Adoracion Navarro has evaluated several transport projects for the Philippine government while at the NEDA-Infrastructure Staff and the Build-Operate-Transfer Center. She has produced infrastructure-related research papers for the University of the Philippines-Law Center and the Philippine Institute for Development Studies. She has also conducted research in a multilateral setting, as Summer Scholar at the International Monetary Fund. She currently works as Transport Economist for WBG Consulting Services International and Project Economics Consultant for the Asian Development Bank. She holds an M.A. in Economics from the University of the Philippines and an M.P.A. in Economic Policy Management from Columbia University.

THE ROAD-RORO TERMINAL SYSTEM

Bicol Mainland-Masbate-Cebu Connection

Executive Summary

The Road-RoRo Terminal System (RRTS) is one of the flagship programs of the Arroyo administration. Executive Order (EO) 170 and subsequent issuances set the policy that the RRTS be integrated into the national highway system. The RRTS can be made to work with significant private sector participation, as presented by this study in its viability analysis of the Bicol Mainland-Masbate-Cebu connections.

In practice, roll-on-roll-off (RoRo) vessel operation and RoRo terminal operation in the Philippines are often viewed as separate activities—the government through the Philippine Ports Authority (PPA) or the local governments provide the port services and the private sector supplies the vessel services. However, this study points out that in principle, for any defined route, the two are actually interdependent and complementary investments (one cannot operate without the other), and there is merit in "bundling" both into a single business if integration proves to be viable. For the case at hand, i.e., the Bicol Mainland-Masbate-Cebu connections, integrated operation, even under the new RRTS paradigm of charging only passage and terminal fees and eliminating certain other passenger and vehicle fees and charges, is financially viable, offering sufficient returns to attract private sector interest not just in vessel but in port operations as well.

Macro and Micro Perspectives

The 2004-2010 *Medium-Term Philippine Development Plan* (MTPDP) lays out the blueprint for a nautical highway system in the archipelago by identifying the road-RoRo links that need to be developed, namely, the Western Nautical Highway (also called the Strong Republic Nautical Highway or SRNH), the Central Nautical Highway, and the Eastern Nautical Highway. The 919-kilometer SRNH was promoted in 2003 to enhance the accessibility of local destinations in the western part of the country; since then, it is reputed to have reduced travel costs by 40 percent for passengers and 30 percent for cargo.

A visit to Roxas, Oriental Mindoro—one of the links in the SRNH—provides an interesting perspective on the impact of the SRNH on the local economy. The Roxas-Caticlan route became part of the SRNH when RoRo vessels started operating in the route in June 2003. With the opening of the route, the municipality of Roxas in Oriental Mindoro was transformed from a sleepy village into a town with steadily growing commercial activities.

The RRTS Concept

The RRTS concept regards ferries as part of the road network. Thus, traveling along an RRTS sea route is similar to crossing a bridge (like San Juanico). RRTS is *not to be regarded as part of regular shipping*. When crossing a bridge or using an expressway, one may have to pay a toll fee, but under no circumstances is one asked to declare what he or she carries in the vehicle. One just pays for the passage or, in other words, the use of that facility.

The RRTS concept suggested by this study is based on criteria and conditions that are distinct and separate from regular shipping, namely:

1. Only self-driven vehicles and passengers are allowed. There is therefore no need for cargo handling.
2. No manifests are required for cargo inside the vehicles.
3. The passage rate for vehicles is based on occupancy of lane meters onboard.
4. A given RoRo terminal is dedicated to a single ferry operator, with no other users than the operator himself.
5. The ferry operator is given a special franchise and may enjoy no direct competition for that particular terminal.
6. The ferry operator is responsible for compliance with safety regulations.
7. The ferry operator is selected (ideally) based on an open bidding for the franchise.
8. The franchise may be given to the one who offers the highest fee (either lump sum or present value at a specified discount rate) to the franchise issuer, with lane meter charges fixed, or to the one who offers the lowest lane meter charges to the users.

This concept is largely consistent with the policies laid down by EO 170, issued in January 2003, and its subsequent amendments. EO 170 spells out the elements and principles of the RRTS. It defines RRTS as a network of RoRo terminals all over the country, separated by a distance of not more than 50 nautical miles and linked by RoRo vessels. It also defines the RRTS toll as consisting of the terminal fee, passage fee, and berthing fee. EO 170-A, issued in June 2003, amended EO 170 and abolished the 50-nautical mile distance qualification. A second amendment, issued in September 2005, EO 170-B, calls for an increase in the number of RoRo-capable ports and the conversion of more private noncommercial port operations to private commercial port operations. It also directs the port authorities and MARINA to ensure that cargo handling charges are not retained in any form or manner (e.g., by changing the nomenclature of the fee or charge), and that RRTS charges are applied uniformly in all ports.

Profile of the Bicol Mainland-Masbate-Cebu Connection

The Bicol Mainland-Masbate-Cebu Connection has been identified as one of the missing links in the Central Nautical Highway. In 2005, the Maritime Industry Authority (MARINA) and the Japan International Cooperation Agency (JICA) examined in *The Study on Domestic Shipping Development Plan in the Philippines* the possible routes for this connection and recommended the Pilar-Masbate City-Cataingan-Bogo route as an "RRTS Pilot Project." In May 2006, the Development Bank of the Philippines (DBP) accessed a technical assistance grant from the USAID-funded Economic Modernization through Efficient Reforms and Governance Enhancement (EMERGE) Project to finance a viability study for the Bicol Mainland-Masbate-Cebu Connection that can be used in its promotion of RRTS investments.

The RRTS routes pre-identified by DBP for this study are Pilar-Aroroy for the southern Sorsogon-northern Masbate connection and Cawayan-Daan Bantayan for the southern Masbate-northern Cebu connection. Sorsogon province in the Bicol mainland is a second-class province. It had a total population of 650,535 and a population density of 304 persons per sq. km. in the 2000 census. According to the Bicol Medium-Term Regional Development Plan, the priority crops and commodities in the province are coffee, abaca, fimbriated herring, seaweeds, and mussels. The municipality of Pilar is located at the northwestern part of Sorsogon province. It is 57 kilometers away from the

provincial capital of Sorsogon and 47 kilometers away (about one hour by car) from Legazpi City in nearby Albay province.

The province of Masbate lies south of Sorsogon and is at the center of the Philippine archipelago. In 2000, Masbate's population was 707,668 and the population density was 175 persons per sq. km. Masbate is the biggest cattle raising province in the Bicol region. Fishing is also a major industry in the province, which produces over a quarter of the fishery production in the region. Masbate City is the capital of Masbate province. The municipality of Aroroy is in the northernmost part of the province and can be reached from Masbate City within 2 to 3 hours by road. The municipality of Cawayan lies southeast of the province and can be reached from Masbate City within 1½ to 2 hours by road.

Cebu province, a first-class province, consists of the main Cebu Island and smaller groups of islands. It lies 365 miles south of Manila. In census year 2000, the province posted a population of 3,356,137 and a population density of 693.9 persons per sq. km. Cebu City is the hub of economic activity and the center for trade and commerce in the Central Visayas Region. Most domestic shipping companies in the Philippines have their central offices in Cebu City. The Port of Cebu handles more ships carrying more domestic cargo and passengers than the domestic port in Manila. The municipality of Daan Bantayan lies about 128 km. from Cebu City and is located at the northernmost tip of the island. It can be reached by road from Cebu City in about three hours.

Required Investments and Results of the Viability Analysis

The passenger and vehicle demand projections imply the following RoRo vessel specifications and acquisition costs for the specified routes:

	Pilar-Aroroy route	**Cawayan-Daan Bantayan route**
Passenger capacity	150	250
Vehicle capacity	80	110
Vessel acquisition cost	P50.26 million	P56.33 million

The following RoRo terminal development costs are used in the financial viability calculation:

Pilar-Aroroy route	
Pilar terminal	P64 million
Aroroy terminal	P23 million
Cawayan-Daan Bantayan route	
Cawayan terminal	P49 million
Daan Bantayan terminal	P23 million

In Pilar, the study recommends the existing Pilar Municipal Fishport as site for the RoRo terminal. The terminal development requires constructing a pier, a turning area and a RoRo ramp. For the Aroroy terminal, the existing Port of Aroroy can be made RoRo-capable by adding an 11m X 9m ramp for one vessel at the start. As demand grows in the future, additional ramps may be added.

In Cawayan, the PPA is about to start constructing the Cawayan Port and thus the agency's cost estimate is adopted for this study. In Daan Bantayan, the local government's preparations for the capital investment are already in an advanced stage. The cost estimate of the Cebu provincial government for the Daan Bantayan Port is P15 million. The Cebu Ports Authority estimate for the same port is P20 million. Both of these estimates seem unrealistically low, especially because the site is covered with coralline bed and needs dredging. Thus, for a more realistic financial model, this study adopts the higher P23 million basic cost of a RoRo terminal reflected in the Aroroy cost estimate. This figure, and consequently the financial viability analysis, will have to be adjusted once the Cebu provincial government's cost estimate has been firmed up.

The financial analysis first examines the viability of vessel and RoRo terminal operations separately, then looks at the two as an integrated project. For each operation taken separately and for both operations viewed as a single enterprise, the financial analysis is conducted from two viewpoints: that of all the capital invested in the project and that of equity capital only, after taking account of leveraging, especially since DBP offers relatively soft terms for both vessel acquisition and terminal development.

A 20-year projection period is used to coincide with the life of the vessels. In the financial viability indicators for the vessel component, the computations consider the operator deploying only one vessel, even though the projected traffic growth dictates that an additional vessel be added by the sixth year of operation. This simplifying assumption is adopted because the study's interest is basically to see if RoRo vessel service is indeed feasible for the routes concerned. For the RoRo terminal component, however, the growth in traffic throughout the 20-year projection period is assumed to be accommodated by an additional vessel in year 6 onwards. The operator of the additional vessel need not be the same as the original one. Thus, additional port and terminal revenues are considered throughout the life of the terminal operations.

The financial internal rates of return (FIRRs) before income taxes are estimated as follows:

	Pilar-Aroroy	**Cawayan-Daan Bantayan**
Integrated operation		
All capital	16.6%	31.6%
Equity capital*	23.4%	52.9%
Vessel component		
All capital	21.4%	41.3%
Equity capital	30.9%	62.9%
Terminal component		
All capital	13.4%	20.7%
Equity capital	17.5%	33.1%
*Assuming 80% leverage ratio under DBP's SLDP terms.		

A 19% return on equity is taken as the upper bound for the "hurdle rate" against which investors would compare a project's equity FIRR. With leverage, the financial viability indicators from the viewpoint of all capital and investors' equity can be compared with 12% and 15%, respectively.

It is obvious from the FIRRs above that while the vessel operations are highly remunerative, the terminal operations are only marginally so. One reason for the low FIRRs in the terminals considered is the high investment cost. While the FIRRs for vessel operations look very attractive, it should be noted that one cannot operate the vessel along a given route without the RoRo terminals at either end of the route. In other words, the two are interdependent or complementary activities.

The MARINA *Domestic Shipping Development Plan* (2005) concedes that domestic port projects have always been pursued based on their social desirability and very rarely are domestic ports developed based on their financial viability. Thus, domestic port projects have often relied on government subsidy. In the case here, a government subsidy may not be necessary if investors would pursue an integrated vessel and port operation and let the commercially viable vessel component cross-subsidize the less profitable port component.

Viewed as integrated operations, the Pilar-Aroroy link gets to look more viable with an FIRR of 16.6%, while the Cawayan-Daan Bantayan route yields a high 31.6%. Focusing on returns to the investors' equity alone (with 80% leverage), the feasibility indicators look even more attractive: 23.4% for Pilar-Aroroy and 52.9% for Cawayan-Daan Bantayan.

The feasibility of the proposed routes from the economy's viewpoint is also examined in this study. The methodology for the economic analysis adopts an integrated approach where the benefits and costs to the economy are estimated as the aggregate of the benefits and costs to the different stakeholders directly affected by the project: the users, the vessel operators, the terminal operators, the financiers, and the government. Spillovers (or externalities) to other stakeholders indirectly affected are then added on.

For the Pilar-Aroroy link, the EIRR for the integrated vessel and RoRo terminal operations is 19.9%; for the Cawayan-Daan Bantayan link, it is 37.9%. These numbers compare favorably against the opportunity cost of capital from the economy's viewpoint, which would be about 16% in nominal terms (12% real rate plus 4% inflation).

Conclusions and Recommendations

For the cases at hand, all the four local governments (Pilar, Aroroy, Cawayan, and Daan Bantayan) express the desire to invest in RoRo terminals, but tight fiscal positions coupled with the difficulty of having two local governments at either end of a potential connection coordinate with each other have kept the investment opportunities from materializing. This study has shown that these investments are financially and economically worthwhile, even in the context of the new RRTS paradigm whereby there would be port facilities dedicated to RoRo operations that do away with the arrastre charges for services that are not even needed. At the same time, an implication flowing from the financial analysis is that, in the absence of any port or terminal development that dedicates a ramp for RoRo services, it would pay for the vessel operators to invest in the facilities themselves. The present policy environment allows this arrangement, as both PPA and local governments have the mandate to engage the private sector in long-term concession agreements.

There are also significant policy and institutional considerations. One important policy matter is the separation of the RRTS from the regular ports operated by either

PPA or the Cebu Ports Authority (CPA). Most of the existing RRTS connections today have terminals within the jurisdiction of PPA (CPA in the case of Cebu province), with the contracts between PPA and the arrastre companies still in force. This is why PPA, despite EO 170, has to pay to the arrastre companies a part of the terminal fees. For the intentions of EO 170 t be realized, it is crucial that the RRTS is to be looked at differently from the regular shipping and port operations. There should be no cargo handing in the RRTS; only the terminal fee and the passage fee have to be paid for so that the seamless travel for vehicles and passengers can be achieved.

An important step towards the creation of a truly nautical highway is to relieve both MARINA and PPA of the overall responsibility over the RRTS. A separate regulatory body (a “Nautical Highway Regulatory Board” or NHRB) is perhaps needed to implement the RRTS concept. EO 170 says that the RRTS shall be considered as part of the national highways. It is therefore natural that DPWH should be given a clear mandate and should take a leading role in developing the RRTS. MARINA’s role should simply be to assure the riding public that the RoRo vessels are seaworthy and safe while the PPA should confine its role to that of leasing out the terminals to private operators. It may take some time before such a regime is put in place; meanwhile, in the short run, the policies of MARINA and PPA should be aligned with the RRTS concept.

One recommendation emanating from the financial and economic analysis in this study is the formation of a joint venture corporation (JVC) between local governments that would competitively bid out either a concession agreement or a solicited BOT. The role of DBP, aside from the offer of financing to both the LGUs and the private sector partners, is to assist the LGUs concerned in the creation of the JVC and the formulation of the terms of reference for the competitive tender in either mode.

In conclusion, the routes have sufficiently high yields when viewed as an integrated operation, even from a private sector perspective. The challenge then is how to design the institutional arrangements that would encourage more private sector participation in the development of RoRo terminals.

For the specific connections that are the subject of this study, practically all of the four prospective terminals have recently gotten the commitment of either the national government or the provincial government for financial assistance in RoRo-enabled port development (PPA for Pilar, Aroroy, and Cawayan, the Cebu provincial government for Daan Bantayan). While this is very much welcome for the concerned municipalities, the possible downside is that support from above may cause project implementation to diverge from the RRTS framework.

Nevertheless, it is hoped that this study shall have helped stimulate private sector interest not only in vessel operations but in terminal operations as well, and shall have enlightened the stakeholders from government, both national and local, on the benefits of keeping faithful to the RRTS concept.

THE ROAD-RORO TERMINAL SYSTEM

Bicol Mainland-Masbate-Cebu Connection

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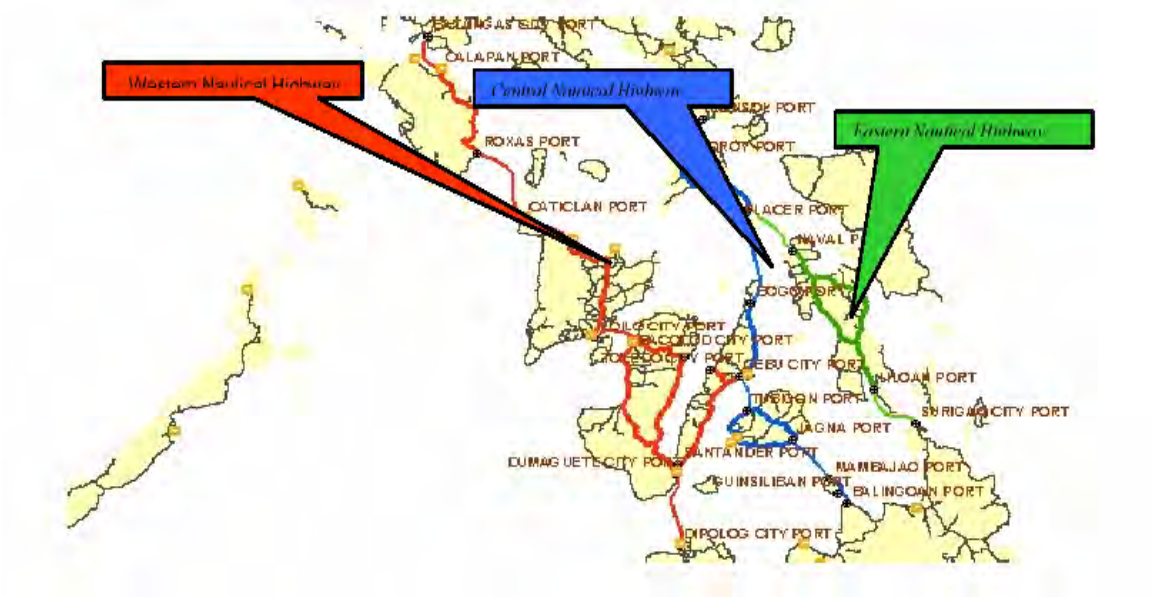
I. BACKGROUND

A. Macro Perspectives: The Philippine Nautical Highway System

A nautical highway system that maximizes the use of roll-on-roll-off (RoRo) vessel routes and road connections is envisioned for the Philippine archipelago to develop its island economies into a unified, well-integrated economy where people and goods can move swiftly and efficiently. The 2004-2010 *Medium-Term Philippine Development Plan* (MTPDP) lays out the blueprint for this nautical highway system by identifying the road-RoRo links that would be developed, namely, the Western Nautical Highway (also called the Strong Republic Nautical Highway or SRNH), the Central Nautical Highway, and the Eastern Nautical Highway.



The road-RoRo links identified as priority routes[1] for developing the nautical highways are as follows:

Western Nautical Highway

- Oroquieta City-Dapitan City-Dipolog City Road
- Dipolog-Dumaguete City RoRo Tollway
- Dumaguete-Samboan, Cebu RoRo Tollway
- Samboan-Barili-Toledo City Road
- Toledo-San Carlos City RoRo Tollway
- San Carlos-Dumaguete Road
- Dumaguete-Bacolod City Roads
  – Dumaguete-Bais-Mabinay-Kabankalan-Bacolod route
  – Dumaguete North Road-San Carlos Coastal-Bacolod North Road
- Bacolod-Iloilo City RoRo Tollway

[1] Although the MTPDP label them as high priority routes, the actual routes for development shall depend on technical factors and their financial and economic viability.

- Iloilo City-Caticlan (Aklan) Roads
  – Iloilo City-Passi-Calinog-Ivisan-Kalibo-Nabas-Caticlan Road
  – Iloilo East Coast-Capiz Road
- Caticlan, Aklan-Roxas, Mindoro Oriental RoRo Tollway
- Roxas-Calapan, Mindoro Oriental Road
- Calapan-Batangas City RoRo Tollway

Central Nautical Highway

- Calinan, Davao-Buda, Bukidnon-Misamis Oriental Road
- Butuan City-Agusan del Norte-Misamis Oriental Road
- Balingoan, Misamis Oriental-Guinsiliban, Camiguin RoRo Tollway
- Guinsiliban-Mambajao Road, Camiguin
- Mambajao, Camiguin-Jagna, Bohol RoRo Tollway
- Jagna-Tubigon Roads, Bohol
  – Bohol Circumferential Road
  – [Loay Interior Road] Jagna-Sierra Bullones-Clarin-Tubigon Road
- Tubigon, Bohol-Cebu City RoRo Tollway
- Cebu City-Toledo Road
- Toledo-San Carlos RoRo Tollway
- San Carlos-Dumaguete Road
- Dumaguete-Samboan RoRo Tollway
- Samboan-Cebu City Road
- Cebu City-San Remigio, Cebu Road
- San Remigio-Placer, Masbate RoRo Tollway
- Placer, Masbate-Aroroy, Masbate Road
- Aroroy, Masbate-Boca Engano, Masbate RoRo Tollway
- Boca Engano, Masbate-Claveria, Masbate Road
- Claveria, Masbate-Pantao, Albay RoRo Tollway
- Claveria, Masbate-San Pascual, Masbate Road
- San Pascual, Masbate-Pasacao, Camarines Sur RoRo Tollway

Eastern Nautical Highway

- Davao-Compostela Valley-(Alegria-Santiago, Bayugan-San Francisco-Trento-Monkayo)-Agusan-Surigao Road
- Surigao City-Liloan, Southern Leyte RoRo Tollway
- Liloan, Southern Leyte-Naval, Biliran Highway
- Naval, Biliran-Cataingan, Masbate RoRo Tollway
  Cataingan-Aroroy, Masbate Highway

The Department of Agriculture also recognizes the significant economic benefits from the nautical highway system and lists the following as components of what it calls the “RoRo Food Highway”: (a) the main route, which uses the nautical highway from Manila to Dapitan/Dipolog/Iligan; (b) the Grains Highway from Cagayan de Oro to Batangas, which involves the use of bulk-handling ships and facilities in transporting grains, principally corn; and (c) the Cagayan de Oro-Dumaguete-Batangas-Manila Long Haul Route, which involves the use of super ferries with RoRo ramps in transporting agricultural and fishery commodities from Mindanao to Luzon.

The 919-kilometer SRNH was promoted in 2003 to enhance the accessibility of local destinations west of the Philippines and accelerate the development of the country's southern islands by opening an alternative and low-cost trade, travel, and tourism route through Oriental Mindoro as gateway to and from Metro Manila. The SRNH covers Oriental Mindoro, Marinduque, Romblon, and Batangas in Luzon; Aklan, Antique, Iloilo, Capiz, Negros Oriental, Negros Occidental, Bohol, Cebu, Guimaras, and Siquijor in the Visayas; and Misamis Occidental, Misamis Oriental, Lanao del Norte, and Dapitan City in Mindanao.

B. Micro Perspectives: Progress in the Roxas-Caticlan Route

Studies have shown that the SRNH has enhanced investment opportunities in agro-industries, commerce, trade, and tourism, and has provided cheaper, efficient, and convenient travel movement of local and international tourists and investors. The MTPDP 2005 Update in particular claims that the SRNH introduced in 2003 has reduced travel costs by 40 percent for passengers and 30 percent for cargo. Although no formal study of the benefits of the whole SRNH route has been made yet, a visit to Roxas, Oriental Mindoro—one of the links in the SRNH—provides interesting perspectives on the impact of the SRNH on the local economy.

The Roxas-Caticlan route became part of the SRNH when RoRo vessels started operating in the route in June 2003. With the opening of the route, the municipality of Roxas in Oriental Mindoro was transformed from a sleepy village into a town with steadily growing commercial activities. Barangay Dangay, the port site in Roxas, used to be the loading site for wooden motor bancas (*batels*) which were the only service to the Visayas during the time. What used to be a loading area for bancas is now a terminal facility for RoRo passengers. In Dangay Port, where rice fields and nipa huts stood before, there are now port facilities like the marshalling area and access road. In the nearby areas, commercial establishments like restaurants, general merchandise stores, small hotels, lending institutions, and gas stations have sprouted. The University of Asia and the Pacific (UA&P) study on the “Economic Impact of RoRo Shipping on the Development of the Municipality of Roxas, Oriental Mindoro” describes the socio-economic effects in terms of new establishments that have been set up in Roxas ever since the RoRo operations began in 2003: two small hotels, four gasoline stations, five lending institutions, and a number of restaurants.

North portion of Dangay Port: passenger terminal (with blue roof), PPA building, port road and port gate (far right); to the right of the port is the marshalling area (not visible)

South portion of Dangay Port: pier and RoRo vessels

II. THE RRTS CONCEPT

A. How the RRTS Differs from Regular RoRo Services

At the outset, it is important to distinguish the RRTS from regular RoRo services. The RRTS concept is based on the ferries being a part of the road network and thereby similar to crossing a bridge (like San Juanico). It is *not to be regarded a part of the regular shipping*. When crossing a bridge or using an expressway, one may have to pay a toll fee, but under no circumstances is one asked to declare what he or she carries in the vehicle. One just pays for the passage or, in other words, the use of that facility.

The RRTS concept is based on criteria and conditions that are distinct and separate from regular shipping:

1. Only self-driven vehicles and passengers are allowed. There is therefore no need for cargo handling.

2. No manifests are required for cargo inside the vehicles.

3. The passage rate for vehicles is based on occupancy of lane meters onboard.

4. A given RoRo terminal is dedicated to a single ferry operator, with no other users than the operator himself.

5. The ferry operator is given a special franchise and may enjoy no direct competition for that particular terminal.

6. The ferry operator is responsible for compliance with safety regulations.

7. The ferry operator is selected (ideally) based on an open bidding for the franchise.

8. The franchise may be given to the one who offers the highest fee (either lump sum or present value at a specified discount rate) to the franchise issuer, with lane meter charges fixed, or to the one who offers the lowest lane meter charges to the users.

What do these criteria really require or imply?

1. There should be no arrastre or stevedoring for the RRTS; thus, there should be no cargo handling fees to be charged.

2. There is therefore no need for the declaration of cargo inside the vehicles.

3. Since the ferry operator only sells space on the vehicle deck, the lane meter occupancy charge is most appropriate, not volume or weight of the vehicle.

4. The ferry operation requires available berthing space at any time. (Normally, for short ferry connections, there will be a ferry docking every few hours, leaving no room for others to utilize the ramp.)

5. Since the ferry connection is considered part of the road network, only one operator (or in some cases two) will undertake the service. See also item No. 7 below.

6. The ferry operator has to comply with the safety regulations of MARINA. Problems with cargo overloading cargo are very seldom for this type of RoRo service, but the Philippine practice of allowing more passengers onboard during peak seasons than prescribed still presents a problem. However, the ferry operator should be subject only to random checks as to overcrowding the vessels, not to pre-departure clearance and charges by the Philippine Coast Guard (PCG). This may need some amendments of MARINA regulations.

7. The ferry operator for a given connection should ideally be selected after a public bidding, based either on equity contribution or the lowest crossing rate offered. In cases where there are uncertainties regarding the viability of ferry connections, there may be the need for some kind of guarantees given to the operators by government for some basic revenue from operation, in the form of either direct subsidy or tax and duty incentives.

Operationally, the points raised above may be further amplified as follows:

1. There should be no loose cargo or containers on flat-beds to go with the RRTS vessels. This would require cargo handling equipment like forklifts and prime movers and imply related charges for cargo handling. The attempt to allow Cha-Ro (cargo handling with RoRo) under the RRTS would destroy the RRTS concept and make it a part of regular RoRo shipping.

2. There is no need to declare what cargo a vehicle is carrying inside except for insurance purposes of the owner of the cargo; no manifest is needed for the ferry operator as the ferry crossing seen from the insurance company's viewpoint is regarded as part of the road. The ferry operator needs only to register the license plate of the vehicle.

3. The passage fees of the vehicles should be based on the actual length of the vehicles and how many lane meters they occupy, not the type of vehicle. The going practice is looking at four categories: (a) bicycles and motorcycles; (b) regular cars and sedans; (c) two-ton jeepneys; and (d) eight-ton trucks and buses, measuring 2, 5, 7 and 12 meters respectively. This has obvious limitations as many of the trucks and even buses are more than 12 meters long and many trucks less than 12 meters are longer than 7 meters. Some ferry operators are implementing actual measurement of the vehicles to be able to charge appropriate fees for the passage, which should be the case for all RRTS connections. In addition, there should be extra charges for extra heavy vehicles and those requiring more space than a regular width of the lanes.

4. The going practice today is that the RRTS ferries share RoRo ramps with other operators, often leading to some waiting time before being able to berth the ferry. This should not be the case. The RoRo ramps should be dedicated to a connection to avoid delays in berthing. Unfortunately, there are only a few connections, involving private operators and terminals, which enjoy this privilege, and not one involving public ports and terminals.

5. Under an RRTS setting, the ferry operators would face no competition in the connection as long as they meet the standards set by the RRTS "Board." With Administrative Order (AO) 123, the Department of Transportation and Communications (DOTC) is given the overall responsibility to properly implement the RRTS. It remains to be seen if the DOTC can fully implement the RRTS without mixing it with the regular RoRo shipping as done at present through the prevailing Implementing Rules and Regulations (IRR). It remains to be seen if it will establish given standards for the RRTS connections and how it will deal with the establishment of the "missionary" connections, not to mention the existing connections.

   It is hard to see how this can be improved as long as the port authorities are not willing or able to dedicate portions of the port area to the RRTS operators. For many smaller ports (like Aroroy and Pilar) it may be difficult to dedicate an area for the RRTS, but in other cases like Masbate City port, it is easy to assign the northern portion of the pier, building a RoRo ramp, and fence off the RRTS terminal area for the exclusive use of, say, the Pilar–Masbate city operations. The same could be done also in Daan Bantayan and Cawayan.

6. The Maritime Industry Authority (MARINA) is given the task of issuing the Certificates of Public Convenience (CPCs) for the shipping operators. So far it is also issuing the same for the RRTS operators, but it should be put on the agenda if the RRTS (DOTC) Board will change that – another item that is not part of the regular RoRo shipping. However, MARINA will always have the task of ensuring the seaworthiness and safety of the vessels.

7. In relation to these items concerning the RRTS, many of the indicated ferry connections are already serviced by shipping operators with various degrees of real RoRo vessels and service, some very close to the RRTS operation described above. This goes among others for Regina Shipping operating between Albay and Catanduanes as well as for Daima Shipping operating across Pangil Bay, Osamis to Lanao del Norte as well as several operators for the Batangas to Calapan connection.

For missionary connections, ideally the franchise should be based on competitive bidding, realizing there might be a need for some kind of subsidies. Being a part of the road network, the RRTS should be subject to government appropriations similar to what it comes to building a bridge or maintaining a road.

The bill being deliberated on in Congress aims at P20 billion in appropriations. That amount should be adequate for most remote places to secure access to proper transport means – not the least a RoRo ferry connecting the area to the adjacent island or market place, thus spurring economic activities in the area.

B. Policy Initiatives: Executive and Legislative

The policy initiative that jumpstarted the SRNH is Executive Order (EO) 170 issued on January 22, 2003, which aims to promote private sector participation and investment in the development and operation of the road-RoRo terminal system (RRTS). In EO 170, the elements and principles of the RRTS are spelled out. The RRTS is defined as a network of RoRo terminals all over the country, separated by a distance of not more than 50 nautical miles and linked by RoRo vessels. The RRTS toll is defined as consisting of the terminal fee, passage fee, and berthing fee. The EO also stipulates that the RRTS shall be considered part of the national highway system.

After EO 170 was issued, it became apparent that there is a need to expand the coverage of the RRTS to include long-haul RoRo vessels so as to support further the agri-fisheries modernization and food security programs of government and to reduce the cost of inter-island transportation. Thus, EO 170 was amended by EO 170-A, issued on June 9, 2003. The 50-nautical mile distance qualification is abolished by the amendment and the RRTS is then defined as a network of terminals all over the country, *regardless of the distance covered* and linked by RoRo vessels.

The different government entities tasked by EOs 170 and 170-A to contribute to the development of a nationwide RRTS have subsequently issued implementing orders and policy clarifications. In support of the RRTS and consistent with the mandate of EOs 170 and 170-A, the Philippine Ports Authority (PPA) issued Administrative Order No. 03-2004 prescribing the guidelines on the development, construction, management, and operations of ferry terminals under the RRTS. The AO also stipulates the procedures for the privatization of PPA-owned RoRo Terminals listed under the identified links.[2] MARINA, on the other hand, has clarified that the rolling vehicle fee based on lane meter, and the passage fee, except for third class accommodation, are deregulated. However, the procedures and conditions for the adoption and subsequent upward or downward adjustment of deregulated rates must comply with MARINA Memorandum

[2] Philippine Ports Authority 2004 Annual Report

Circular No. 153 which provides the rules for implementing the deregulation of domestic shipping rates.[3]

The Development Bank of the Philippines (DBP) has made accessible its Sustainable Logistics Development Program (SLDP) financing facility for RRTS investments. The SLDP is an investment financing program designed to bring about cost-effective ways of moving people and goods, particularly grains and perishables like fish, meat, fruits, and vegetables. The program has three components: the Grains Highway, the RRTS, and the Cold Chain. One of the sources of funds for the SLDP is the Domestic Shipping Modernization Program II, a program loan from the Japan Bank for International Cooperation (JBIC).

The aims of EO 170 were further expanded through the issuance of Administrative Order (AO) 123 on July 4, 2005 and EO 170-B on September 19, 2005. With AO 123, the DOTC is tasked to be the lead agency for the implementation of the RoRo system including RRTS. AO 123 also formed an inter-agency group with private sector representatives for the implementation of the RoRo system. EO 170-B calls for an increase in the number of RoRo-capable ports and the conversion of more private non-commercial port operations to private commercial port operations. It is expected that the latter will reduce the investment requirements in expanding the country's port system. EO 170-B also directs the port authorities and MARINA to ensure that cargo handling charges are not retained in any form or manner (e.g., by changing the nomenclature of the fee or charge), and that RRTS charges are applied uniformly in all ports.

The policy environment continues to evolve. At present, there is a pending House Bill No. 335 on RRTS sponsored by Representative Imee Marcos. The House Bill aims to institutionalize via legislation the spirit of RRTS as contained in EOs 170, 170-A, and 170-B. The bill is currently being discussed and improved upon by a technical working group set up by Representative Augusto Bacullo.

III. THE BICOL MAINLAND-MASBATE-CEBU CONNECTION: A MISSING LINK IN THE CENTRAL NAUTICAL HIGHWAY

The RRTS as a whole can be fully functional once the missing links are connected. For the Central Nautical Highway, one such missing link that has been identified is the connection from Luzon to Cebu via Masbate Island. In 2005, MARINA and the Japan International Cooperation Agency (JICA) examined the possible routes for this connection and recommended the Pilar-Masbate City-Cataingan-Bogo route as an "RRTS Pilot Project." The "RRTS Pilot Project" is part of a much bigger study by JICA/MARINA, *The Study on Domestic Shipping Development Plan in the Philippines*.

The DBP approached the USAID-funded Economic Modernization through Efficient Reforms and Governance Enhancement (EMERGE) Project to finance a study on the viability of the Bicol Mainland-Masbate-Cebu Connection that can be used in its promotion of RRTS investments. The existing JICA/MARINA study was then adopted as source of secondary information for this EMERGE project.

[3] Speech by MARINA Deputy Administrator Gloria Banas, SRNH Conference, October 22, 2003

A. Regional Characteristics

A.1 The Bicol Region

The Bicol region, or Region V in the Philippines' administrative classification, is in the southeastern part of Luzon and consists of the provinces of Albay, Camarines Norte, Camarines Sur, Catanduanes, Masbate, and Sorsogon. Albay, Camarines Norte, Camarines Sur, and Sorsogon comprise the Bicol Peninsula in mainland Luzon; Catanduanes is an island province north of the peninsula; and Masbate is an island province south of the peninsula.

As of 2000 (latest census), the population in the region stood at 4.67 million. The region's population growth rate is 1.68% annually (based on 1995-2000 data). Although lower than the national growth rate of 2.36%, it is still considered a high growth rate. Its net migration rate (immigration minus outmigration) of -24.9 per 1000 people indicates that Bicol is an outmigration region. Despite this, however, the region's population continues to grow because of a high crude birth rate of 29.6 per 1000 population. Seventy-two percent of the regional population reside in rural areas. Poverty incidence has improved between the estimation periods by the National Statistical Coordination Board (NSCB)—40.6% of families in the region were poor in 2003, down from 45.3% in 2000. These numbers nevertheless are way above the national poverty incidence of 24.4% in 2003 and 27.5% in 2000.

According to the *Medium-Term Regional Development Plan* (MTRDP) for 2004-2010, the following are the roles of the Bicol region in relation to the rest of Luzon and the Philippines:

- geothermal energy producer
- agri-industrial production center
- mineral-based production center
- food basket of Luzon
- ecotourism destination
- South Luzon's gateway to the Visayas, Mindanao and the Pacific

For 2005, the Bicol region registered a gross regional domestic product (GRDP) of P136.6 billion. The 2005 GRDP per capita is P26,316, which is way below the GRDP per capita of P63,556 for the whole country. Annual regional economic growth was at 5% from 2004-2005. The region is predominantly agriculture-based. In 2005, gross value added of the agriculture and fishery sector to the local economy was P27.4 billion or 20% of total GRDP.

Bicol is basically a resource-based economy where products exported utilize raw materials indigenous to its provinces. The region's exports are classified as traditional and nontraditional. Traditional exports include copra, abaca fiber, and coconut oil, whereas nontraditional exports include giftware, holiday decors, and garments.

The major agricultural produce in the region are coconut, abaca, cassava, pineapple, pili nuts, rice and corn. About 21% of the country's coconut plantations are found in Bicol—651,571 hectares or 37% of the total regional land area are planted with coconuts. The export value of coconut products for 1997-2003 amounted to US$198.5 million, or 5.22% of the country's coconut product exports. There is a high demand from China and Japan for coconut oil as fuel additive. The region has six operating oil mills or refineries, eight decorticating plants, one virgin coconut oil plant and one nata de coco producer. However, the production level of 38 coconuts per tree per year indicates a low productivity of coconut farms in the region.

The Bicol region contributes 25% to the national abaca production. Abaca fiber is the leading raw material for export-oriented handicrafts and is also an input to the pulp and paper industries. The major abaca-producing provinces are Albay, Catanduanes,

Sorsogon, and Camarines Sur. However, the average yield in abaca production is low at 0.45 MT per hectare as against the 0.7 MT per hectare national average.

Bicol is the second major cassava-producing region in the country. Camarines Norte and Camarines Sur are the leading cassava-producing provinces. A high demand for cassava tubers was registered in 2004: a Batangas exporter-manufacturer required 20 tons of cassava per week; B-MEG needed 300 tons of dried cassava chips per month; four manufacturing plants for noodles required two tons of cassava starch per month.

It is also the third largest pineapple-producing region in the country, promoting the sweetest variety of pineapple, the “Queen” or “Formosa” variety. Pineapple planting is mostly concentrated in Camarines Norte. The area planted to this crop was 3,643 hectares in 2003, of which 3,150 hectares were in Camarines Norte

Pili, a nut the quality of which can strongly compete with other nuts such as cashew and those grown in other countries, is a prime commodity of the Bicol region. Approximately 4,000 hectares of land in the region, mostly in Sorsogon and Albay, are planted with pili.

Bicol contributes 7% to total Philippine rice production. Rice production in 2003 was 846,000 MT for a 74% sufficiency level. The average yield of rice increased from 2.44 MT per cropping per hectare in 2001 to 3.90 MT in 2003, but is much lower than the potential yield of 6.5 MT per cropping. Only 48% of the 212,833 hectares of irrigable land do have irrigation.

Corn production in 2003 was 67,000 MT for a 91% sufficiency level. Prime corn lands are concentrated in the provinces of Masbate (57%), Camarines Sur (26%), and Albay (16%).

The region is also home to the leading cattle-producing province in the country, Masbate. It has an extensive coastline and sea coasts which are indented with numerous bays and gulfs. There are 16 marine fishing grounds, six of which are among the richest in the country, namely, Lagonoy Gulf, Lamon Bay, Ragay Gulf, Visayan Sea, Samar Sea, and Sibuyan Sea. The major marine species that can be caught in the region are *siganid* and tuna.

A.2 The Central Visayas Region

The Central Visayas Region (Region VII) lies at the center of the Philippine archipelago between the major islands of Luzon and Mindanao. It is bounded on the north by the Visayan Sea, on the east by the Camotes Sea and the Camigao Channel, on the south by the Mindanao Sea, and on the west by the province of Negros Occidental. Four provinces comprise the region—Bohol, Cebu, Negros Oriental and Siquijor.

Based on the results of the 2000 Census of Population, Central Visayas is the fifth most populous region in the Philippines. Its population of a little over 5.7 million accounts for 7.4 percent of the country's total. On the average, the regional population grew at an annual rate of 2.79 percent from 1995 to 2000.

Central Visayas, with its total land area of 1.5 million hectares, is one of the most densely populated regions in the country. From 335 persons for every square kilometer of land in 1995, the population density rose to 381 persons per square kilometer in 2000. The population density of the region is higher than the national average of 255 persons per square kilometer.

The region registered a GRDP (in current prices) of P376.8 billion in 2005. The 2005 GRDP per capita is P59,272, close to the country's domestic product per capita of P63,556 per year. Annual regional economic growth was at 6% from 2004 to 2005.

Among the economic sectors, services had the highest gross value added in 2005, contributing 59% to total GRDP, followed by the industry sector which contributed 32%. Table 1 compares Bicol and Central Visayas value added by sector. Trade is the leading subsector among the service activities, and is also the subsector with the highest value added to total GRDP—contributing 46% to the services sector or 27% to total GRDP. In the industry sector, manufacturing is the leading subsector and is also next to trade in its contribution to GRDP; the manufacturing gross value added is 70% of the industry sector or 22% of total GRDP.

Table 1. Sectoral Contribution to GRDP, 2005
(in thousand pesos at constant 1985 prices)

	Region V	% of total	Region VII	% of total
Total GRDP	34,418,606	100%	85,944,059	100%
I. Agriculture, Fishery & Forestry Sector	11,663,402	34%	10,025,514	12%
a. Agriculture & Fishery	11,662,881	34%	10,019,178	12%
b. Forestry	521	0%	6336	0%
II. Industry Sector	7,791,610	23%	25,411,261	30%
a. Mining & Quarrying	1,647,271	5%	681,577	1%
b. Manufacturing	445,719	1%	17,920,338	21%
c. Construction	1,937,637	6%	4,602,338	5%
d. Electricity, Gas & Water	3,760,983	11%	2,207,008	3%
III. Service Sector	14,963,594	43%	50,507,284	59%
a. Transport, Communication & Storage	2,135,471	6%	6,426,013	7%
b. Trade	4,193,843	12%	28,529,044	33%
c. Finance	478,873	1%	2,254,263	3%
d. Ownership of Dwellings & Real Estate	2,981,793	9%	4,747,032	6%
e. Private Services	2,981,940	9%	6,412,057	7%
f. Government Services	2,191,674	6%	2,138,875	2%

Although agriculture was only 12% of GRDP in 2005, in terms of land use and employment generation, it is still the dominant economic activity in the region. Coconut, palay, and sugarcane plantations, and fishery and poultry areas can be seen in the

landscapes of Bohol, Negros Oriental, Siquijor, and Cebu provinces. Vegetable plots, flowers, and mango trees are gaining ground in the interior hilly areas.

Central Visayas is one of the international gateways of the country, and a trade and services hub of the Visayas-Mindanao area. The region's economic strengths are in exports, tourism, and commerce. The region is home to several special economic zones, nationally recognized tourist attractions and facilities, and shipping and trading companies. The region is currently a net exporter. Export growth has been stimulated and sustained by production from the Mactan Export Processing Zones.

Infrastructure facilities include the Mactan Cebu International Airport, the Cebu International Port, the port and airport network in the provinces, and the power and telecommunications facilities. Most of the country's major shipping lines are based in Cebu. These include WG&A, Sulpicio Lines, and Gothong Lines, which ply the Luzon-Visayas, intra-Visayas and Visayas-Mindanao routes for passengers and cargo. Inter-island fast ferry operation, started by a local corporation, Aboitiz, is most active in the region. Fast ferry routes now include Cebu-Maasin-Surigao, Siquijor-Dumaguete-Oslob, Cebu-Camotes, and Cebu-Hilongos, in addition to the original Cebu-Tagbilaran, Cebu-Dumaguete, and Cebu-Ormoc routes.

Central Visayas is also one of the anchor tourist destinations in the country. Bohol and Cebu have already been firmly placed in the itineraries of travel agencies, while Negros Oriental and Siquijor are priming to get a part of the tourist market.

B. The Local Economies in the Project Areas

B.1 Sorsogon Province

Sorsogon is in the southernmost tip of the Bicol peninsula. The total population of the province as of 2000 was 650,535. The annual growth rate of the population was 2.04% from 1995 to 2000, with a population density of 304 persons per sq. km.

Sorsogon is a second-class province, according to the classification by the Department of Finance (DOF). Poverty incidence was at 41.4% in 2000 and 33.7% in 2003, indicating an improving situation.

According to the MRTDP, the priority crops and commodities in the province are coffee, abaca, fimbriated herring, seaweeds, and mussels.

Municipality of Pilar[4]

The municipality of Pilar is located at the northwestern part of Sorsogon province. It is 57 kilometers away from the provincial capital of Sorsogon and 47 kilometers away (about one hour by car) from Legazpi City in nearby Albay province. It is composed of 49 barangays, 13 of which are considered coastal barangays while four urban barangays comprise the Poblacion, or the urban center of the municipality. The rest are considered rural barangays.

[4] The primary source of data is the Pilar Municipal Development Plan 2000-2010. Where not stated, the statistics mentioned are from the municipality's inventory of resources in year 2000.

As of 2000, the population of Pilar stood at 57,875; the annual growth rate was 2.55% from 1995 to 2000. By income classification, Pilar is a third-class municipality with a total income of P51.4 million in 2004 that grew to P67.2 million in 2005, mainly because of a P12.0 million loan it incurred for its new public market. Almost 90% of its general fund comes from the Internal Revenue Allotment (IRA). Non-tax revenues account for about 75%-80% of its earnings from local sources.

Pilar's local economy is mainly agriculture-based, with 75% of its total land area devoted to agricultural crops like coconut, rice and corn. Despite efforts at diversification, Pilar's agriculture sector is heavily dependent on the monoculture of coconut, which is planted to 70% of its total land area. Pilar is a major supplier of copra to the coconut oil milling industry in Bicol. Only 483 hectares of the area planted with rice are irrigated. Corn is also planted in upland farms as an alternative to rice.

The fishing grounds for municipal fishing are the waters between Sorsogon and Masbate. Pilar is known for its prawns and mudcrabs. Its 330 hectares of fishery resources devoted to fishponds and other inland culture have an estimated yield of 92.75 MT of fishery products annually. Fish caught are usually sold at the local public market; some small-scale brokers also deliver catch to nearby urban centers. The quality catch are sold in Metro Manila.

Livestock and poultry are mainly backyard operations, except for three contract growers who each raise 5,000 to 7,000 birds per batch. Carabao is primarily raised as a farm work animal.

Handicraft activity, though farmed out to cottage-level production, produces finished and semi-finished products for the export market through a network of local middlemen. Raw materials include bamboo, *buri* and coconut midribs, abaca hemp, rattan, vines, anahaw leaves, and *karagumoy*. These are turned into tables and chairs, decorative objects, placemats, baskets, containers, blinds, hand fans, and mats.

The local government considers its cultural and natural places of interest as promising tourist areas. The cultural places of interest are relics from the Spanish period and a newly constructed Pilar Inter-Faith Memorial Park. Natural tourist spots include white beaches and the whale shark (*butanding*) interaction site. The beaches are still undeveloped while the whale shark interaction has available boats and trained people who can accompany tourists. (It must be noted, however, that the Department of Tourism promotes Donsol, a nearby municipality, as the whale shark interaction site for tourists, but with Pilar providing the accommodations.)

B.2 Masbate Province

The province of Masbate lies south of Sorsogon and is at the center of the Philippine archipelago. It is composed of a wedge-shaped mainland (Masbate), two major islands (Ticao and Burias), and 14 small islands. The province covers a total land area of 4,047.7 sq. km. It is politically subdivided into three congressional districts, 20 municipalities, one city and 550 barangays.

Masbate's population was 707,668 in 2000. The average population density is 175 persons per square kilometer. The average annual growth rate was 1.71% from 1995 to 2000. Masbate has consistently ranked among the five poorest provinces in the country. Poverty incidence was 68.9% in 1997 and 70.9% in 2000, indicating a worsening poverty situation.

Masbate is the biggest cattle raising province in the Bicol region. Its main economic activity is agriculture with copra, rice, corn, and tobacco as its main products. Fishing is also a major industry in the province. Over a quarter of the fishery production of Region V is accounted for by the province. In 2000, it produced 30,051 metric tons of fish. Until the closure of a gold mining company in 1994, the province was the site of the biggest gold mining operation in the region. Other minerals found in the province are manganese and limestone.

Masbate City

Masbate City, the capital of Masbate province, is only a fifth-class city. The municipality of Masbate was converted into a component city on September 30, 2000. The city is 362 nautical miles from Manila. It is bounded on the northeast by Masbate Pass, on the southeast by Tugbo River and the municipality of Mobo, on the southwest by the municipality of Milagros and on the northwest by a portion of Asid River and the municipalities of Milagros and Baleno. Masbate City has a well-protected port with Ticao Island acting as barrier against the effects of inclement weather from the northeast.

Masbate City is politically subdivided into 30 barangays, nine of which are in the *poblacion* (town center) and considered by the National Statistics Office as urban.. As of census year 2000, Masbate City had a population of 71,441 and a population density of 398 persons per sq. km. The city's primacy within the province is therefore rather weak, as it accounts for only about 10% of the total provincial population. A minimum basic needs survey conducted in 2001 to assess the poverty profile of the population concluded the following: about 70% of the households were in the low-income bracket, with household income of P5,000 per month and below; 18% were in the medium-income bracket, earning P5,001-P10,000 per month; and 12% were in the high-income bracket, earning P10,001 and above per month.

Masbate City nevertheless is the service and institutional center of the province. The local economy is largely based on the trading of agriculture, livestock, and fishery products of the province. The city's commercial establishments serve as the intra-

province distributor of tradable products entering Masbate City Port. The Masbate City Airport, which currently has commercial flights to and from Manila via Asian Spirit, serve as another gateway to the province. There are registered 393 service establishments in the city, about 75% of the total registered establishments in the province. The service establishments include 10 banking institutions.

The city has a total land area of 188.0 sq. km. representing 4.44% of the total land area of Masbate province. Eighty-one percent of the area consists of mountain ranges and rolling hills covered with pasture grasses suitable for ranching and suited for coconut and other upland crops. Nineteen percent is composed of plains and areas with fertile soil suitable for rice, corn, vegetables, root crops, and upland rice production.

Masbate City had a total of 563 hectares of land devoted to rice production in year 2000. It also had a total of 700 hectares of land planted with corn, which is the second staple food of Masbateños. Corn is consumed by almost 15% of the city's population. Vegetables planted in small areas in the city—bush *sitao* (string beans), okra, *pechay*, *upo*, squash, and green onions—supply only 30% of the vegetables sold in the market. The remaining 70% comes from mainland Bicol, Manila, and Leyte.

Masbate City's main products are copra and marine catch. These are traded with Manila, Lucena, Legazpi, and Cebu. The city's coconut plantations have the highest productivity in the province, averaging 40 nuts per tree per year. In addition to its own catch, fish and other marine products coming from other towns of Masbate province like Milagros, Cawayan, Dimasalang, Mandaon, Aroroy, Baleno, Balud, and Uson are landed and traded in Masbate City. The city imports products mainly from Manila, Lucena, Cebu, and Legazpi. These are mostly rice, baking inputs, vehicles, appliances, farm inputs, construction materials, and basic commodities. The city trades these products to other municipalities in the whole province.

Municipality of Aroroy

The municipality of Aroroy is in the northernmost part of mainland Masbate. It has 41 barangays. Its population stood at 58,751 as of the 2000 census. It is the second biggest local government unit in the province, after Masbate City. The annual population growth rate was 1.29% from 1995 to 2000. It is a second-class municipality, according to DOF classification, with an income of P63.3 million in 2005. As is typical of most Philippine towns, the IRA comprises 90% of the LGU's revenues. Aroroy spends P1.7 million annually for debt service.

It has a total land area of 440.4 sq. km. It accounts for 10.9% of the total land area of Masbate province. Around 35.8% of the municipality's land area consist of agricultural areas, beach sand, major rivers, and open mines. The rest, 64.2% of the land, are timberlands, which consist of existing and proposed reforestation areas.

Aroroy is blessed with a variety of abundant resources and minerals are one of them. Gold mining is a flourishing activity until the closure of the Atlas Consolidated Mining and Development Corporation in 1994. Since the closure, many residents and small investors have resorted to small-scale mining. Filminera Resources Corporation recently came in to mine gold but it is yet to start full-scale operation. Other minerals present in Aroroy in varying amounts are rock phosphate, *guano*, and limestone.

The municipality depends largely on agriculture. Around 16.0% of the land area of the municipality are devoted to pasture lands on which various kinds of livestock and poultry depend (the most abundant are cattle, chicken, and swine). Land devoted to agricultural crop production (mostly coconut) covers about 34.3% of the total land area.

While the land is fertile and suitable for crop production, fishing grounds are equally abundant with marine resources. Aroroy has several investors in fishponds; there is one big firm engaged in the culture of fish and prawns.

Business activities are mostly concentrated on buying and selling of goods. Manufactured goods are mostly bought from Masbate City, Lucena City, and Pilar, Sorsogon. The seafood and copra produce of the municipality are usually sold in Pilar, Sorsogon, and Manila.

Municipality of Cawayan

The municipality of Cawayan is about 66 kilometers southeast of Masbate City. Cawayan is bounded on the east by the municipalities of Placer and Palanas, on the west by sea facing the marine-rich Asid Gulf, on the northwest by the municipality of Milagros, and on the north by the municipalities of Dimasalang and Uson. Cawayan is a third-class municipality, according to DOF classification, with revenues of P48.7 million and debt service of P866.8 thousand in 2005.

As of census year 2000, Cawayan had a total population of 52,256 and a population density of 189 persons per sq. km. It is the second biggest municipality in the province, after Aroroy. As of a 2000 survey, 46.4% of the households were earning only P30,000 or less in a year. The municipality has a total land area of 260.2 sq. km. and is politically subdivided into 38 barangays. Cawayan is basically a coastal municipality. Nine barangays are along the seashore, two are inland water barangays and eight are island barangays. Barangay Divisoria is the commercial center of the municipality. This barangay hosts the fish port.

Fishing is the major occupation of the people of Cawayan. The municipality's fishing grounds include Cawayan Bay and a great part of Asid Gulf and the Visayan Sea. There are ice and storage facilities in the municipality for fresh fish catch. Some of the fish catch are also dried, salted, packed, and exported to Cebu, Panay Island, Bicol, Manila, and some areas in Mindanao.

About 7,895 hectares or 26.1% of the total land area of the municipality are devoted to agricultural crop production. It is planted with corn, coconuts, fruits, root crops, and other diversified crops. Corn is the staple food crop, occupying 41% of the land devoted to agriculture. It is estimated that 90% of the local residents are corn eaters. Rice farms cover about 8% of the agricultural land. Coconut production accounts for over 20% of the land devoted to agriculture. It gives an annual yield of 489 metric tons of copra. The people also engage in livestock breeding. Cattle are raised along with other livestock animals on a minor scale and slaughtered for local consumption.

B.3 Cebu Province

Cebu province consists of the main Cebu Island and smaller groups of islands. The province lies 584 km. south of Manila. The main island of Cebu is long and narrow

and has a total land area of about 4,400 sq. km. The smaller group of islands, namely, Mactan, Bantayan and Camotes Islands, has a total land area of 436 sq. km.

Cebu is classified as a first-class province by the DOF. As of census year 2000, the province has a population of 3,356,137 and a population density of 693.9 persons per sq. km. Population grew at an average of 2.87% per year during the 1995-2000 period. The province is composed of six cities (Cebu, Danao, Lapu-lapu, Mandaue, Toledo and Talisay) and 47 municipalities. Cebu City, the oldest Philippine city, is the second international gateway in the country, next to Manila. Metro Cebu, an informal geo-political grouping of contiguous cities and municipalities, consists of the four cities of Cebu, Mandaue, Lapu-lapu and Talisay and the six municipalities of Cordova, Consolacion, Liloan, Compostela, Minglanilla, and Naga.

Cebu's economic advantage can be summarized as follows. As the capital of Cebu province, Cebu City is the hub of economic activity and the center for trade and commerce. Most of the domestic shipping companies in the Philippines have their central offices in Cebu City. The Port of Cebu handles more ships carrying more domestic cargo and passengers than the domestic port in Manila. The improvement of air transportation facilities at Mactan International Airport triggered the development of the Mactan Export Processing Zone in Lapu-lapu City. Cebu City's neighbor, Mandaue City, has become the manufacturing center of Cebu province. A good number of firms put up their factories in Mandaue to take advantage of incentives and low tax rates. Mandaue is also home to small and medium enterprises which serve as either exporters or subcontractors to the firms located in the Mactan Export Processing Zone.

The Port of Cebu is the second major port in the Philippines, next to Manila. It consists of a base port at Cebu City and four sub-ports: Toledo in the west of Cebu, Argao in the south, Danao-Carmen in the north, and Sta. Fe at Bantayan Island. Aside from these ports, there are 37 other smaller national and municipal ports throughout the province that are under the jurisdiction of the Cebu Ports Authority (CPA).

The Cebu City base port consists of a 20,000-sq.m. cargo back-up area with three kilometers of berth for coastwise shipping. The Cebu International Port (CIP) forms part of this base port. CIP covers ten hectares and has almost 700 meters of berthing space. About half of CIP's terminal is reserved for foreign ships and the rest service large cargo and passenger vessels plying domestic routes. It is equipped with modern cargo handling facilities and standby power supply. It has 2,418 ground slots for containers which translate to 1 million TEUs of annual throughput capacity.

There is an international airport located in Lapu-Lapu City, Cebu. The Mactan Cebu International Airport serves as hub of air travel in southern Philippines. It is located approximately 600 kilometers south of the Ninoy Aquino International Airport. It is managed by the Mactan Cebu International Airport Authority (MCIAA).

Municipality of Daan Bantayan

The municipality of Daan Bantayan lies about 128 km. from Cebu City, and is located at the northernmost tip of the island. It is bounded on the north and the west by the Visayan Sea, on the south by the municipality of Medellin, and on the east by the Camotes Sea. As of the 2000 census, its population stood at 69,336. It has a population density of 754 persons per sq. km. It is a third-class municipality which is politically

subdivided into 20 barangays; Barangay Poblacion is the sole urban barangay. For 2005, its revenues were P67.0 million, including loan proceeds of P15.8 million.

Daan Bantayan has a land area of only 92.3 sq. km. It is basically agricultural, with about 71% of the total land area cultivated. Coconut, corn, and sugarcane are the major crops produced. Based on a 2000 municipal survey, coconut production ranked first with an average yield of 3.50 metric tons per hectare. The survey also found that livestock consisted of 6,455 head and poultry consisted of 12,656 birds.

Daan Bantayan is endowed with rich fishing resources. It has both offshore and inland (fishpond) sites which are sources of income for a number of residents. Fishponds occupy an aggregate area of 37.8 hectares. There are three fish landing sites, located in barangays Poblacion, Tapilon, and Maya. Fish catch in 2000 was 1.9 million metric tons.

As is typical of rural municipalities in the province, Daan Bantayan's dominant commercial establishments are *sari-sari* stores, which comprise 90% of the total number of establishments in the municipality in 2001. There are three banking institutions—two rural banks and one cooperative bank—in the municipality. The industrial establishments are limited to cottage and small-scale industries such as furniture, ceramics, hollow blocks, and rope. The available post-harvest facilities include four rice and corn mills, two ice plants, and two fish ports. There are also a number of beach resorts in the municipality. The most famous tourist destination in the municipality is Malapascua Island where there are 20 beach resort and diving resort operators.

IV. THE PROJECT PROFILE

A. Market Aspects – Supply and Demand Analysis

The analysis of the market aspects as well as the ensuing financial analysis was conducted only for the routes pre-identified by DBP—the Pilar-Aroroy route in the southern Sorsogon-northern Masbate connection and the Cawayan-Daan Bantayan route in the southern Masbate-northern Cebu connection.

A.1 Existing Supply Situation

In all four terminal sites, there are no RoRo services yet and therefore there is no observed vehicle traffic. The existing passenger traffic is primarily served by wooden-hulled pumboats or motor bancas. The connecting roads are all national roads but are of various surface types and conditions; the Cebu road links are generally in better shape than the Masbate province road links.

Metro Manila-Pilar Road Connection

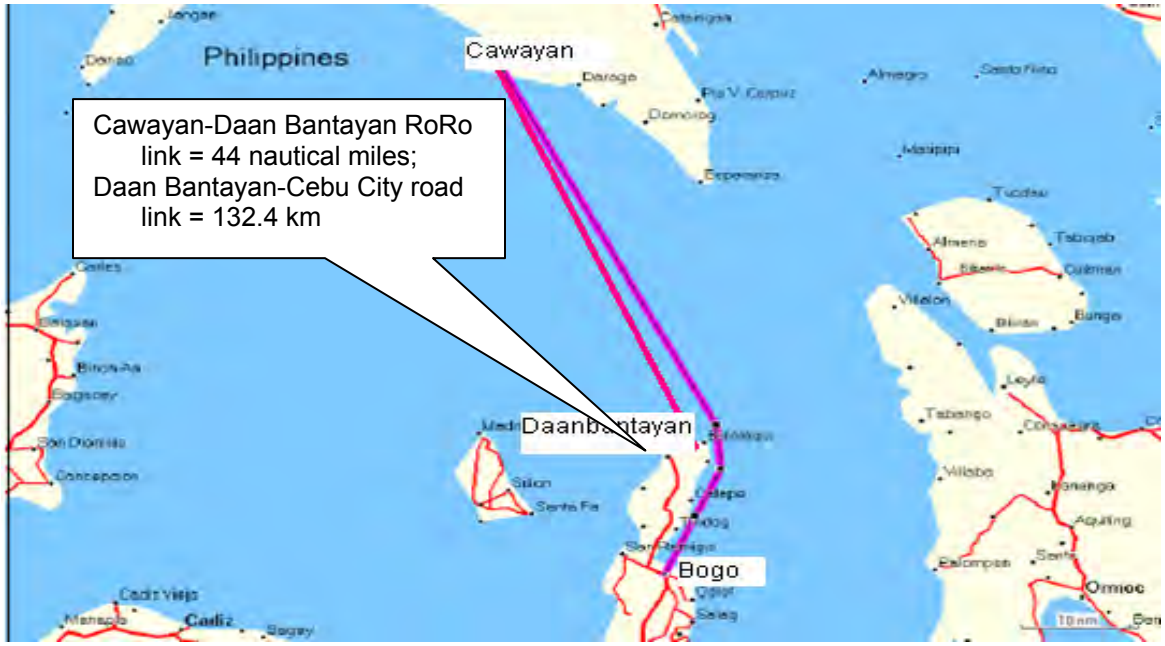
The road connection between Metro Manila and Pilar, Sorsogon is via the Maharlika Highway (also called the Pan-Philippine Highway). The approximate distance is 560 kilometers and travel time is about 11 hours. The road is paved with concrete and in generally good condition. However, travel time is less than optimal, according to logistics managers who are members of the Distribution Management Association of the Philippines (DMAP). The Maharlika Highway passes through congested town centers, causing road travel to be longer than necessary. There are also hardly any by-pass roads along the way.

Pilar-Aroroy Link

1. Existing Sea Connection

During its May 2006 field visit to Aroroy, the RRTS study team learned that the motor banca service for the Pilar-Aroroy connection is only once a day; travel time is approximately 2 ½ hours. Pilar is just one of the many destinations of bancas that depart

from Aroroy Port. Other destinations include Tigbao, Lanang, Matalangtalang, Don Pablo, Bugui, Gumahang, Sawang, Calanay, Don Pablo, San Agustin, Burias, Mataba, Colorado, Sawang, and Balawing. Similarly, boats leaving Pilar have many destinations in Masbate province other than Aroroy. In particular, fastboats and smaller pumpboats carrying passengers regularly ply the Pilar-Masbate City route.



2. Existing Road Connection to Masbate City

Table 2. Alternative Routes to Masbate City

Route	Distance (in km)	Travel Time (in hours)	Road Type	Road Condition
Route 1:				
Aroroy-Baleno	35.1	1.5	paved: Aroroy-Malinta; gravel: Malinta-Baleno	fair
Baleno-Masbate City	15.5	0.5	gravel	bad
Total	50.6	2.0		
Route 2:				
Aroroy-Milagros	42.0	2.0	gravel	bad
Milagros-Masbate City	22.0	1.0	asphalt/concrete	good
Total	64.0	3.0		

Source: "The Study on Domestic Shipping Development Plan in the Philippines," MARINA Master Plan funded by JICA (2005).

Authorities say that Route 1 identified above would be the likely route of RoRo vehicle traffic because it has longer road segments that are in better condition and travel time is shorter. However, the RRTS study team traversed Route 2 on its May 25, 2006 field visit because of the precarious security situation in Route 1 during that time. The team was able to validate that Route 2 is not advisable for RoRo vehicle traffic because of the bad road condition and the additional one hour travel time.

3. Existing Road Connection to the Proposed Cawayan RoRo Terminal

Table 3. Road Connection to Cawayan

Route	Distance (in km)	Travel Time (in hours)	Road Surface Type	Road Condition
Aroroy-Masbate City, Route 1	50.6	2.00	paved/gravel	some portions fair; some bad
Masbate-Uson	30.0	0.75	asphalt	fair
Uson-Cawayan	25.0	0.83	concrete/gravel	fair
Total	105.6	3.58		

Source: "The Study on Domestic Shipping Development Plan in the Philippines," MARINA Master Plan funded by JICA (2005).

The study team tried this road connection in May 2006 and was able to validate the above information.

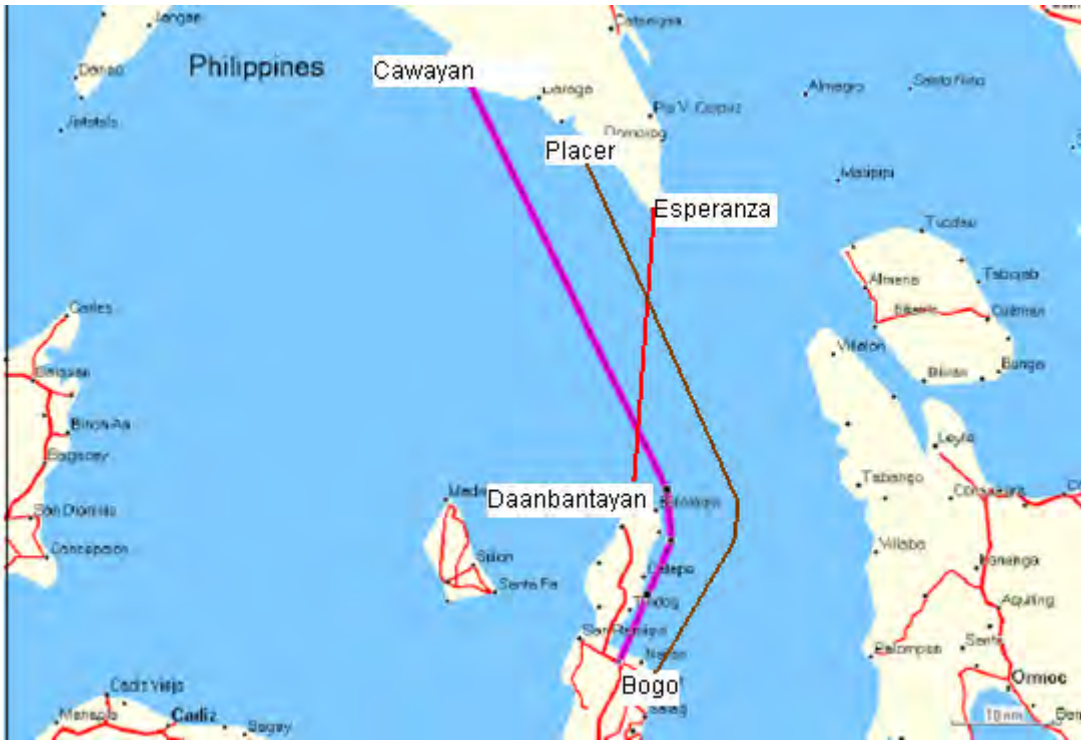
Cawayan-Daan Bantayan Link

1. Existing Sea Connection

At present, there is no direct sea connection between Cawayan, Masbate and Daan Bantayan, Cebu. During the May 2006 fieldwork in Cawayan and the June 2006 fieldwork in Daan Bantayan and Bogo in Cebu, the team learned that the existing sea connection between southwestern Masbate and northern Cebu is via motor bancas (outriggers and pumpboats) and through the following routes:

Cawayan-Bogo	2 trips daily
Esperanza-Daan Bantayan	1 trip per week
Placer-Bogo	2 trips daily

Motor banca routes between southwestern Masbate and northern Cebu



2. Existing Road Connection to Cebu City

The existing road connection to Cebu City, the city nearest to the proposed RoRo terminal site in Barangay Maya, Daan Bantayan, is via the following routes:

Table 4._Road Types and Conditions

Route	Distance (in km)	Travel Time (in hours)	Road Type	Road Condition
Maya Port-Daan Bantayan Poblacion	8.4	0.33	gravel/concrete	bad
Daan Bantayan Poblacion-Bogo Poblacion	27.0	0.67	concrete/gravel	fair
Bogo Poblacion-Cebu City	97.0	2.00	asphalt/concrete	good
Total	132.4	3.00		

Source: "The Study on Domestic Shipping Development Plan in the Philippines," MARINA Master Plan funded by JICA (2005).

The study team was able to validate the above information when it tried this road connection in June 2006.

A.2 Demand Estimation Methodology

The demand estimates for the sites consider two components: (a) the potential demand for RoRo services based on the diversion of part of the present and projected future passenger and cargo flows (expected "normal" traffic) between destinations, and (b) the induced demand ("generated" traffic) once the RoRo service becomes available. The potential or latent (diverted) demand for RoRo services is estimated as some percentage of the existing traffic carried by motor bancas or pumboats plying the Pilar-Aroroy and Cawayan-Daan Bantayan routes plus the diverted demand from the more developed routes. Generated traffic, on the other hand, is considered as arising from induced travel unleashed by the availability of the road-RoRo terminal system in the area; it is an all-encompassing estimate of newly generated trips due to factors like higher local economic activity, changes in transportation mode preference, greater willingness for longer road travel, and intensified tourism activities.

Because of time and resource constraints, this study does not conduct its own survey to establish the baseline traffic. It relies instead on the data gathered through on-site interviews during the brief field visits and official data from government agencies, supplemented by secondary data from the 2005 JICA/MARINA survey for the RRTS chapter of the "Domestic Shipping Development Plan in the Philippines," a master plan for the domestic shipping sector. Where this study differs from the JICA/MARINA study is in the RRTS operating framework and demand projection methodology. As mentioned earlier in section II, the true RRTS concept bases passage rates for vehicles on the occupancy of lane meters onboard and eliminates the need for cargo handling. The estimates of cargo traffic and part of passenger traffic are therefore converted into lane meter equivalents.

Among other assumptions underlying the demand projections is an initial vessel load factor of 65% (based on the 1992 JICA "Nationwide RORO Ferry Network Development Study"), increasing gradually over time to 70% for passengers and 80% for vehicles. Another assumption is that all vessels considered in the analysis (motor banca, fastcraft, and RORO vessel) operate for 330 days a year. To simplify the calculation, two-way traffic projections are estimated; there is no distinction between inbound and outbound traffic.

A.3 Pilar-Aroroy Route

Passenger Traffic

1. Potential Diverted Traffic

During the May 2006 fieldwork in Aroroy, it was established that the average daily traffic the Pilar-Aroroy route is 42 passengers. From this average, the *existing annual traffic* in the Pilar-Aroroy route is estimated as:

42 banca passengers * 330 days = 13,860 banca passengers per year.

It is assumed that about half of the existing traffic served by bancas would transfer to RoRo if the RoRo tariff is set close to the existing banca tariff, which is P5.56 per person per nautical mile as of 2006, and if passengers perceive RoRo travel as safer

and more pleasant than banca travel. With this assumption, the *existing latent demand for RoRo service* in the Pilar-Aroroy route is then estimated as:

13,860 banca passengers per year * 50% = 6,930 RoRo passengers per year.

A source of potential diverted traffic is the more developed Pilar-Masbate City route. This route has no existing RoRo service but there are services by motor bancas and fastboat. During the May 2006 fieldwork, an interviewee at Masbate City Port said that there are about 1,000 passengers per day plying the Pilar-Masbate City route. The fastboat makes 3 round trips per day and has a full loading capacity of 150 passengers. Using a 65% load factor (1992 JICA study), the estimated fastboat traffic is then 585 passengers per day. Thus, it is assumed that the remaining balance of daily passenger daily traffic is via motor bancas, at 415 passengers per day.

It is unlikely that a very high traffic volume will be diverted from the Pilar-Masbate City route to the Pilar-Aroroy route on the first year of RoRo operation because of the poor quality of roads from Masbate City to Aroroy and additional road travel time. Pilar-Aroroy sea travel will be approximately 2 to 2 ½ hours given a RoRo vessel speed of 12 knots. Aroroy is 50.6 km. away from Masbate City and can be reached by bus in two hours. The direct Pilar-Masbate City route by fastboat, however, takes only 1 ½ hours. Thus, a low diversion rate of 20% is assumed (for those whose final destination is other than Masbate City and those who prefer the convenience of RoRo service). With this diversion rate, the *potential diverted traffic* from the Pilar-Masbate City route to the Pilar-Aroroy route is then estimated as:

330,000 passengers per year * 20% = 66,000 diverted passengers per year

A fastcraft unloading passengers at Masbate City Port

Thus, the estimate of the total potential RoRo passenger traffic in the Pilar-Aroroy route is 72,930 passengers for the base year 2006. This base passenger traffic is assumed to grow at an accelerated rate in the first few years of project operation due to the inducement of demand, then stabilizing at an assumed long-term growth thereafter.

2. Generated Traffic

It has been mentioned earlier that induced demand for RoRo service is assumed to account for newly generated trips due to factors like higher local economic activity, changes in transportation mode preference, greater willingness for longer road travel, and more active tourism. This study draws from the Roxas-Caticlan experience to get an indication of the possible magnitude of this induced demand.

Before RoRo service was introduced in the Roxas-Caticlan route in June 2003, the only service available was via motor bancas (called *batel* in the local language). Since then, both vehicle traffic and passenger traffic have been continuously growing and the following inducement of demand was observed: slow growth on the first year of RoRo operation, very high growth on the second year, and a slowing down of growth on the third year (displaying a logistic pattern commonly observed in studies on rates of adoption of new technologies). Passenger traffic grew by 89% on the second year of RoRo operation, and by 65% on the third year.

For the Pilar-Aroroy route, it is assumed that the same logistic pattern would be experienced. A *very conservative* inducement of demand, however, is assumed—only half of what was observed in the Roxas-Caticlan link, or 44.5% traffic growth on the second year and 32.5% traffic growth on the third year.

Induced demand in the Roxas-Caticlan link is high probably because of several factors: (a) the link is closer to Metro Manila which is the origin of most flow-through traffic; (b) the Batangas-Calapan cargo trading via RoRo had been in existence for many decades and the Roxas-Caticlan link may have provided a venue for the pent-up demand in cargo trading; and (c) the Boracay factor—Boracay Island was already a very famous tourist attraction even before the Roxas-Caticlan link opened and provided a more affordable alternative for tourists wanting to go to Boracay. The Pilar-Aroroy link, however, together with the Cawayan-Daan Bantayan link, has its own tourist attractions, among which are Mayon Volcano in Legazpi City (an hour's drive from Pilar), *butanding* interaction in Donsol (just a few minutes from Pilar), and the beach and dive resorts of Malapascua Island (some 30 minutes' boat ride from Daan Bantayan).

3. Passenger Traffic Forecast

Table 5 shows the annual RoRo passenger traffic forecast with the project in place. The projection uses 2006 as base year for forecasting, 2008 as start of project operation, and a 20-year forecast period that coincides with the RoRo vessel operation and loan repayment period. The assumed long-term passenger traffic growth is 5.53% per year. This growth rate is based on Region V annual population growth of 1.92% as projected by the National Statistics Office (NSO), an elasticity of transport demand with respect to real Gross Regional Domestic Product (GRDP) per capita of 1.2, and 2004-2005 Region V real GRDP per capita growth of 2.95%. [5]

[5] Calculation of the long-term passenger traffic growth rate:
$\Delta T/T = (1+\Delta P/P)*(1+\varepsilon\Delta Y/Y) -1 = [1+1.92\%]*[1+(1.2*2.95\%)] = 5.53\%$
where T = traffic, P = population, ε = elasticity of transport demand with respect to GRDP per capita, and Y = GRDP per capita

Table 5. Pilar-Aroroy Passenger Traffic Forecast

Year	Growth Rate	Passenger Traffic
2008	5.53%	81,215
2009	44.50%	117,315
2010	32.50%	155,496
2011	5.53%	164,091
2012	5.53%	173,160
2013	5.53%	182,731
2014	5.53%	192,831
2015	5.53%	203,489
2016	5.53%	214,737
2017	5.53%	226,606

Vehicle Traffic

1. Estimate of Potential Types 3 and 4 Vehicle Traffic

There is no observed vehicle traffic and there are no available data on cargo traffic for the Pilar-Aroroy route. Thus, the estimate of the latent demand by vehicles for RoRo service in the Pilar-Aroroy route is based on the estimate of potential diverted cargo traffic from more developed routes, transformed into cargo-carrying types 3 and 4 vehicle traffic.

It is assumed that the average cargo capacity of a jeepney (a type 3 vehicle) is 2 metric tons and that of a truck (a type 4 vehicle) is 8 metric tons (based on the 1992 JICA "Nationwide RoRo Ferry Network Development Study"). With these average load capacities, the estimates of potential diverted cargo traffic are converted to potential vehicle traffic.

It is expected that the sources of diverted cargo traffic will be the following routes: Masbate City-Pilar, Masbate City-Lucena, and Masbate City-Manila. It is also expected that traffic from the latter two routes will be diverted to Pilar-Aroroy if cargo carriers would find road travel using Maharlika Highway (the road connection from Metro Manila to the Bicol region) combined with Pilar-Aroroy sea travel more efficient.

The raw data for cargo traffic estimates are based on the traffic data handled by the Masbate City Port. During the May 24, 2006 fieldwork, the Philippine Ports Authority (PPA)-Masbate Office advised the study team to gather data from the arrastre company serving the port, the Masbate Consolidated Arrastre, Inc. (MACAI), because there were discrepancies in the PPA data which had not yet been corrected at the time. From the MACAI data, it was estimated that that the average cargo traffic handled by Masbate City Port in 2005 was 784 metric tons per day. Unfortunately, the MACAI cargo traffic data are disaggregated by type of cargo rather than by destination. Thus, it is necessary to estimate the volume split by route, which is described in the succeeding discussion.

Working backwards from the total figure established using the MACAI data and combining the 2005 JICA/MARINA survey data for Masbate City-Pilar and Masbate City-Cebu City, as contained in the Domestic Shipping Development Plan (DSDP) in the

Philippines (a master plan which discusses RRTS, among others), the following volume split is established:

Masbate City-Pilar	19%
Masbate City-Cebu City	14%
Others (Masbate City to Manila, Lucena, Ormoc, Calubian, etc.)	67%
Total (based on MACAI data)	100%

To disaggregate the Masbate City-Manila and Masbate City-Lucena traffic, a further 25%:75% volume split between these routes and the rest (Masbate City to Ormoc, Calubian and foreign destinations) is assumed. The total traffic estimate for the developed routes being considered as sources of diverted traffic is thus:

Masbate City-Pilar	150 metric tons per day
Masbate City-Manila/Lucena	131 metric tons per day
Total	281 metric tons per day

The 20% diversion rate used in the passenger traffic estimation is also adopted here. Thus, it is estimated that the potential cargo traffic that would be diverted from more developed routes (i.e., Masbate City-Pilar and Masbate City-Manila/Lucena) to the Pilar-Aroroy route is 18,546.0 metric tons for 2005 (20% of 281 MT/day*330 days/year).

It was observed during the fieldwork that there are more trucks than jeepneys carrying cargo. Assuming a 60%-40% volume split between truck cargo and jeepney cargo, the vehicle traffic for 2005 is reconstructed as:

Jeepneys (type 3 vehicle)	3,709 per year
Trucks (type 4 vehicle)	1,391 per year

Bus (type 4 vehicle) traffic projections are necessary because it is expected that the RoRo service would attract bus traffic if road-RoRo travel would prove to be a cost- and time-saving alternative. Based on the results of the 2005 JICA/MARINA origin-destination survey of passengers (as contained in the DSDP), 95% of the passengers in the Masbate City station originated from Masbate and 41% were bound for Manila; in the Pilar station, 95% were bound for Masbate and 36% were from Manila. Thus, around 38.5% of the motorboat and fastcraft passengers during the survey period were bus passengers. A slightly lower percentage is assumed here, i.e., 37% of potential RoRo passenger traffic are at the same time potential bus passengers. Given an average of 50 passengers per bus, this translates to an estimate of 540 buses per year, raising the base 2005 number to 1,931 type 4 vehicles.

2. Potential Types 1 and 2 Vehicle Traffic

Type 1 vehicles include motorcycles and tricycles; type 2 vehicles include cars, mini-vans, SUVs, AUVs, owner-type jeepneys, and short public utility jeepneys (for up to 16 passengers). It is very difficult to estimate potential traffic for types 1 and 2 vehicles in the absence of origin-destination survey per type of vehicle in the study area. Thus, the base potential types 1 and 2 vehicle traffic are simply estimated as a certain percentage of vehicle ownership in Region V.

Here, the established ratios in the Roxas-Caticlan link and data from the Land Transportation Authority (LTO) become useful. On the first year of operation in the Roxas-Caticlan link, type 1 vehicle traffic is 0.09% of the registered type 1 vehicles in Region IV, and type 2 vehicle traffic is 2.29% of the registered type 2 vehicles in Region IV. Applying these ratios to 2005 Region V LTO data, the estimate of latent demand for RoRo service in 2005 by types 1 and 2 vehicles in the Pilar-Aroroy route is:

Type 1	81 vehicles per year
Type 2	1,028 vehicles per year

These numbers are probably on the conservative side, as motorcycles, AUVs, and passenger jeepneys are a common means of transport in rural Philippines.

3. Generated Traffic

Again, a parallelism is drawn from the Roxas-Caticlan experience. Vehicle traffic grew by 106% on the second year of RoRo operation, and by 41% on the third year of operation.

For the Pilar-Aroroy route, it is assumed that the same pattern of high growth of vehicle traffic on the second year and deceleration afterwards would be observed. For the same reasons mentioned earlier, a very conservative inducement of demand is assumed—only half of what was observed in the Roxas-Caticlan link, or 53.0% vehicle traffic growth on the second year and 20.5% vehicle traffic growth on the third year.

4. Vehicle Traffic Forecast

Table 6 shows the annual RoRo vehicle traffic forecast with the project in place. Given the data constraints, the projection uses 2005 as base year for forecasting vehicle traffic per type. The forecast period also considers 2008 as the start of project operation over a 20-year period that coincides with the RoRo vessel operation and covers the 10-year vessel loan repayment period. As in the projection for passenger traffic, the assumed long-term growth is 5.53% per year, which factors in the regional growth rates of population and real GRDP per capita times the income elasticity of transport demand. Real GRDP growth is used rather than vehicle registration growth (as may be established using LTO data) because the demand for vehicles is but a derived demand arising from growth in economic activity.

Table 6. Pilar-Aroroy Vehicle Traffic Forecast

	Growth	Type 1	Type 2	Type 3	Type 4	Lane meters
2008		96	1,208	4,359	2,269	63,973
2009	53.00%	146	1,848	6,669	3,471	97,867
2010	20.50%	176	2,227	8,036	4,183	117,935
2011	5.53%	186	2,350	8,480	4,414	124,450
2012	5.53%	196	2,480	8,949	4,658	131,331
2013	5.53%	207	2,617	9,444	4,915	138,587
2014	5.53%	219	2,761	9,966	5,187	146,249
2015	5.53%	231	2,914	10,517	5,474	154,339
2016	5.53%	243	3,075	11,098	5,776	162,859
2017	5.53%	257	3,245	11,711	6,096	171,868
Lane meters/vehicle		2	5	7	12	

A.4 Cawayan-Daan Bantayan Route

Estimate of Passenger Traffic

1. Potential Passenger Traffic

Based on interviews during the May 2006 fieldwork in Cawayan, Masbate and June 2006 fieldwork in Daan Bantayan and Bogo in Cebu, the study team learned that the existing traffic carried by motor bancas (outriggers and pumpboats) are the following:

Cawayan-Bogo	2 trips daily, 100-passenger capacity
Esperanza-Daan Bantayan	1 trip per week, 100-passenger capacity
Placer-Bogo	2 trips daily, 150-passenger capacity

With a 65% load factor, these figures translate to a total existing average daily traffic of 687 passengers, or 226,757 passengers per year. It is assumed that 30% of the existing banca passenger traffic in these routes would transfer to RoRo if the RoRo tariff will be set close to the existing banca tariff and if passengers perceive RoRo travel as safer and more convenient than banca travel. This 30% diversion rate is lower than the 50% rate assumed for Pilar-Aroroy, given that the Cawayan-Daan Bantayan route has no existing traffic at all. With this assumption, the base latent demand for RoRo service in the Cawayan-Daan Bantayan route is then estimated at 68,027 passengers for 2006.

The more developed routes that are identified as potential sources of diverted traffic are the Masbate City-Cebu City route and the Cataingan-Cebu City route. From the 2005 JICA/MARINA survey for the DSDP, the existing traffic for these routes is established:

Masbate City-Cebu City	1,100 passengers per week
Cataingan-Cebu City	1,750 passengers per week

These figures translate to 134,357 passengers a year. Using a 20% diversion rate, the potential diverted traffic from the more developed routes to the Cawayan-Daan Bantayan route is estimated as 26,871 passengers for 2005. This is extrapolated to 2006 using an estimated rate of growth in "normal" transport demand that takes into account, for Regions V and VII, the annual growth rates in population (1.97%, as projected by NSO) and GRDP per capita (3.31%, average for the two regions in 2004-2005), and the income elasticity of demand for transport services (1.2, based on rural Philippine and other country transport studies). Following the equation given earlier, this yields a growth rate of 6.02% per year. Thus, the total potential passenger traffic for 2006 in the Cawayan-Daan Bantayan route is estimated as:

Diverted from southwest Masbate-north Cebu	68,027
Diverted from more developed routes	28,489
Total potential passenger traffic	96,516

2. Induced Demand

As explained earlier, the behavior of induced demand is based on the Roxas-Caticlan experience. In the Roxas-Caticlan link, passenger traffic grew by 89% on the second year of RoRo operation, and by 65% on the third year of operation. For the

Cawayan-Daan Bantayan link, it is assumed that the same pattern of high growth of passenger traffic on the second year and deceleration afterwards would be observed. For the same reasons mentioned earlier in section IV.A, a conservative rate of induced demand is assumed—only half of what was observed in the Roxas-Caticlan link, or 44.5% passenger traffic growth on the second year of operation and 32.5% passenger traffic growth on the third year of operation.

3. Passenger Traffic Forecast

Table 7 shows the annual RoRo passenger traffic forecast for Cawayan-Daan Bantayan assuming the project is in place. The projection uses 2006 as base year for forecasting, 2008 as start of project operation and a 20-year period that coincides with the RoRo vessel operation and includes the 10-year loan repayment period. After the initial "spikes" in years 2 and 3 of operation, traffic goes back to the assumed long-term growth rate of 6.02%.

Table 7. Cawayan-Daan Bantayan 10-Year Passenger Traffic Forecast

Year	Growth Rate	Passenger Traffic
2008		108,486
2009	44.50%	156,762
2010	32.50%	207,709
2011	6.02%	220,213
2012	6.02%	233,469
2013	6.02%	247,522
2014	6.02%	262,422
2015	6.02%	278,219
2016	6.02%	294,967
2017	6.02%	312,723

Estimate of Vehicle Traffic

1. Potential Types 3 and 4 Vehicle Traffic

Following the methodology for Pilar-Aroroy in section 4.A, this study estimates the latent demand for RoRo service by vehicles in the Cawayan-Daan Bantayan route based on the estimate of potential diverted cargo traffic, transformed into cargo-carrying types 3 and 4 vehicle traffic.

According to on an interviewee during the June 2006 fieldwork in Bogo, Cebu, about 36 crates of marine products are conveyed from Placer, Masbate to Bogo for every trip of the pumpboat. The pumpboat makes two trips per day. This translates to approximately 1.55 metric tons of cargo traffic per day or 512 metric tons per year.

There is already an element of a supply logistics chain in Bogo for the livestock and marine products coming from Masbate. Trucks wait on schedule for the cargo and have a network of deliveries in Cebu. Sea transport, however, is inefficient. Considering this apparent dissatisfaction with the available service, the analysis here assumes that

50% of the existing cargo traffic in the Bogo-Placer route will transfer to RoRo when the Cawayan-Daan Bantayan RoRo link becomes operational. This means 256 metric tons per year of potential cargo traffic.

It is also expected that some cargo traffic would be diverted from the following more developed routes: Masbate City-Cebu City, Cataingan-Cebu City, Cataingan-Mandaue, and direct Bicol mainland-Cebu City. Based on the 2005 JICA/MARINA survey for DSDP, the existing cargo traffic volumes in the routes are as follows:

Masbate City-Cebu City	770 metric tons/week
Cataingan-Cebu City	540 metric tons/week
Cataingan-Mandaue	55 metric tons/week
Bicol mainland-Cebu City	1,660 metric tons/week
Total existing traffic	3,025 metric tons/week

This translates to 142,607 metric tons of cargo traffic per year. Assuming 20% of this is diverted to the proposed Cawayan-Daan Bantayan route when the RoRo service becomes available, the potential cargo traffic is 28,521 metric tons a year. Thus, the total potential cargo traffic in 2005, which is used as basis for estimating the cargo-carrying types 3 and 4 vehicle traffic, is:

Diverted from Bogo-Placer route	256 metric tons
Diverted from more developed routes	30,087 metric tons
Total potential cargo traffic	30,343 metric tons

Marine products being unloaded from a Bogo-Placer outrigger

Using an average cargo capacity for a jeepney (a type 3 vehicle) of 2 metric tons, an average cargo capacity for a truck (a type 4 vehicle) of 8 metric tons, and a 40:60 cargo volume split between jeepneys and trucks (as is done in section IV.A above), the potential vehicle traffic in the Cawayan-Daan Bantayan route is estimated as:

Jeepneys	6,069 per year
Trucks	2,276 per year

Additional bus (type 4 vehicle) traffic is also computed as is done for the Pilar-Aroroy link, taking as given the expectation that the RoRo service would attract bus traffic if road-RoRo travel would prove to be a cost- and time-saving alternative. Based on the results of the 2005 JICA/MARINA origin-destination survey of passengers (as contained in the DSDP), 95% of the passengers in the Cataingan station originated from Masbate and 100% were bound for Cebu; in the Bogo station, 100% of the passengers originated from Cebu and 32% were bound for Masbate. Thus, around 66% of the motorboat passenger traffic during the survey date were bus passengers.

Since the survey areas do not include either the Cawayan or Daan Bantayan station, a lower percentage is assumed here; i.e., 50% (rather than 66%) of the potential RoRo passenger traffic are at the same time potential bus passengers. Given an average of 50 passengers per bus, this translates to a bus traffic estimate of 882 buses for 2005. Thus, the estimate of latent demand for RoRo service in 2005 by types 3 and 4 vehicles in the Cawayan-Daan Bantayan route is as follows:

Type 3	6,069 vehicles per year
Type 4	3,241 vehicles per year

2. Potential Types 1 and 2 Vehicle Traffic

Again as in section IV.A, the potential types 1 and 2 vehicle traffic volumes are estimated as a certain percentage of vehicle ownership in Regions V and VII, based on established ratios in the Roxas-Caticlan link and data from the Land Transportation Authority (LTO). On the first year of operation in the Roxas-Caticlan link, type 1 vehicle traffic is 0.09% of the registered type 1 vehicles in Region IV and type 2 vehicle traffic is 2.29% of the registered type 2 vehicles in Region IV. Applying these ratios to 2005 Regions V and VII LTO data, the estimate of latent demand for RoRo service in 2005 by types 1 and 2 vehicles in the Cawayan-Daan Bantayan route is:

Type 1	263 vehicles per year
Type 2	4,604 vehicles per year

3. Induced Demand

Vehicle traffic growth rates in the Roxas-Caticlan route during the second and third years of operation are used as basis in predicting the induced demand. Vehicle traffic grew by 106% on the second year and by 41% on the third year of RoRo operation. For the Cawayan-Daan Bantayan route, it is assumed that the same pattern of high growth of vehicle traffic on the second year and deceleration afterwards would be observed, but a very conservative inducement of demand is assumed—only half of what was observed in the Roxas-Caticlan link. Thus, vehicle traffic growth is set at 53.0% on the second year and 20.5% on the third year.

4. Vehicle Traffic Forecast

Table 8 shows the annual RoRo vehicle traffic forecast assuming the project is in place. Given data availability, the projection uses 2005 as base year for forecasting

types 1 to 4 vehicles. The forecast period also considers 2008 as the start of project operation and a 10-year period that coincides with the RoRo vessel operation and loan repayment period. The assumed long-term growth is 5.49%, the average real GRDP growth rate for Regions V and VII from 2004-2005. As mentioned earlier, real GRDP growth is used rather than vehicle growth because the growth of cargo-carrying vehicles is more a function of economic growth than vehicle growth.

Table 8. Cawayan-Daan Bantayan Vehicle Traffic Forecast

	Growth	Type 1	Type 2	Type 3	Type 4	Total lane meters
2008		313	5,486	6,821	3,643	119,519
2009	53.00%	479	8,394	10,437	5,574	182,875
2010	20.50%	577	10,115	12,576	6,716	220,353
2011	6.02%	612	10,724	13,333	7,120	233,615
2012	6.02%	649	11,369	14,136	7,549	247,683
2013	6.02%	688	12,054	14,987	8,003	262,591
2014	6.02%	729	12,779	15,889	8,485	278,396
2015	6.02%	773	13,549	16,845	8,996	295,158
2016	6.02%	820	14,364	17,859	9,537	312,917
2017	6.02%	869	15,229	18,934	10,112	331,765
lane meters/vehicle		2	5	7	12	

B. Technical Aspects – Vessel and Terminal Operations

B.1 RoRo Vessel Specifications and Operating Parameters

Since the connections are new (developmental), it is not likely that the revenues would be high enough to service the investments in new or newer vessels. Therefore, it seems more practical to deploy older vessels at the initial stage. However, the age should not be more than 20 years, preferably less, and the vessels should carry IACS certificates (a basic requirement for DBP financing).

For each route, the vessel is assumed to make two roundtrips a day and operate for 330 days in a year. Given the higher volume of traffic projected for Cawayan-Daan Bantayan, a slightly bigger capacity is proposed for this link. Table 9 gives the vessel specifications.

The distance between Pilar and Aroroy is 23 nautical miles. The 12-knot speed of the vessel specified above implies that the travel time is 1.92 hours, a little less than two hours. Meanwhile, the distance between Cawayan and Daan Bantayan is 44 nautical miles; with the12-knot speed of the vessel, the travel time is 3.67 hours.

B.2 RoRo Vessel Acquisition Cost

For both routes, the vessel costs are estimated by checking the prices of vessels on various lists of vessels for sale by international shipbrokers. The prices for a given size/capacity depend particularly on two factors, age and quality (as evidenced by class certificates). The quoted price of the Pilar-Aroroy vessel is $800,000 or P42,400,000, at an exchange rate of P53=$1. The quoted price of the Cawayan-Daan Bantayan vessel is

$900,000 or P47,700,000. The strengthening of the peso relative to the US dollar in recent months would mean lower vessel acquisition cost.

Table 9. Vessel Specifications for Both Routes

Vessel Specifications	Pilar-Aroroy	Cawayan-Daan Bantayan
Built Date	Around 1985-1990	Around 1985 - 1990
Class	IACS	IACS
L.O.A.	40 meters (m)	50 m
L.B.P.	35 m	42 m
Breadth	9 m	10 m
Depth	3.5 m	3.5 m
Draft	2.5 m	2.5 m
Capacity:		
Passengers	150	250
Cars	20	27
15T Trucks	6	7
Lane Meters	80	110
Speed	12 knots	12 knots
Minimum Crew	8	10
Main Engine (M/E) Type		
M/E HP*RPM	1,200*1800	2,000*1800
General Engine (G/E) Type		
G/E HP*RPM	150*1800	200*1800
Grade of Bunker/ F.O	HSD	HSD

The estimated cost of conduction is based on the experience in acquiring vessels in the Southeast Asia region and represents the actual cost of conduction for other vessels from within the region to the Philippines. Thus, the total vessel acquisition costs for the vessels are as follows:

Table 10. Vessel Acquisition Cost, Both Routes

Pilar-Aroroy vessel:			
Quoted Price			P 42,400,000
Conduction			1,500,000
Acquisition cost before duties and taxes			43,900,000
Taxes:			6,360,000
Customs Duties	3%	1,272,000	
VAT	12%	5,088,000	
Total vessel acquisition cost			P 50,260,000
Cawayan-Daan Bantayan vessel:			
Quoted Price			P 47,700,000
Conduction			1,500,000
Acquisition cost before duties and taxes			49,200,000
Taxes:			7,155,000
Customs Duties	3%	1,431,000	
VAT	12%	5,724,000	
Total vessel acquisition cost			P 56,355,000

B.3 RoRo Vessel Operating and Maintenance Requirements

General Assumptions in Estimating O&M Expenses

The cost of drydocking and maintenance is based on the average industry experience. The costs would normally increase with the size of the vessel. The cost of administration is also based on industry figures per vessel.

For the insurance on hull and machinery, the normal rate is 2.5% of (market) value of vessel as long as it is classed by an IACS member, and higher for vessels classed by local classification societies. Although the cost of classification by an IACS member is somewhat higher than the cost of a local one, the saving in the cost of insurance makes the difference negligible. In addition, the market value of the vessel is considerably higher for an IACS-classed vessel.

For P & I, the going rate is 0.5% of P100,000 per passenger multiplied by the passenger capacity of the vessel. It should be noted that it is much easier to get a P & I insurance for an IACS classed vessel than for other vessels.

Fixed and Variable O&M Expenses

With the vessel specifications mentioned above, the annual O&M costs consist of fixed and variable operating expenditures given in Table 11. O&M costs are much higher for Cawayan-Daan Bantayan because of the bigger vessel and longer distance.

Table 11. Annual O&M Costs, Both Routes

Pilar-Aroroy Route		
Fixed Operating Expenditures (pesos per year)		
Crew Cost		1,944,000
Administrative Cost		1,800,000
Insurance		1,172,500
Drydocking & Maintenance		1,200,000
Variable Operating Expenditures (pesos per year)		
Fuel for ME & Auxiliary Services	13,984 per trip	18,458,880
Lubricants & Consumables	1,398 per trip	1,845,888
Berthing	1,000 per trip	1,320,000
Total O&M Costs		27,741,268
Cawayan-Daan Bantayan Route		
Fixed Operating Expenditures (pesos per year)		
Crew Cost		1,944,000
Administrative Cost		1,800,000
Insurance		1,355,000
Drydocking & Maintenance		1,200,000
Variable Operating Expenditures (pesos per year)		
Fuel for ME & Auxiliary Services	44,587 per trip	58,854,400
Lubricants & Consumables	4,459 per trip	5,885,440
Berthing	1,000 per trip	1,320,000
Total O&M Costs		72,358,840

B.4 RoRo Terminal Development and Operating Parameters

Description of the Sites for the RoRo Terminals

1. Pilar

The study team visited three possible sites for the RRTS terminal in Pilar:

- the existing Pilar Municipal Fishport
- Sitio Dao – undeveloped site, 2 km north of the nearest provincial road
- Barangay San Antonio – undeveloped site, 7 km north of Pilar town proper.

It seems that, at present, the logical location for the RoRo terminal is the existing municipal port. The other sites are either problematic or involve high costs. Sitio Dao has no access road nor utilities and land ownership is unclear. The 2 km-distance between the provincial road and the Dao coast is a rugged footpath that goes through a hilly forest area. Barangay San Antonio has a partially paved road to the site (very close to it), but the area is zoned for tourism. The Pilar municipal planning office is concerned about the possible environmental impact on the *butanding* (whale shark) interaction site of RoRo operations if the San Antonio alternative is pursued. San Antonio is very near the path of the *butanding* and is beside Donsol, the *butanding* interaction site currently being promoted by the Department of Tourism. Also, the site is outside the protected bay, which may require protection for the berth and higher construction cost. Generally, the cost involved in constructing a terminal in undeveloped sites would be two to three times higher than within the existing port, especially when considering access.

Motor bancas docked at Pilar Fishport

Wooden pontoon for fastcraft passengers at Pilar Port

2. Aroroy

Aroroy was selected because it is easier to implement the RRTS concept in a new port or terminal development rather than in a relatively large existing commercial port like the Masbate City Port. Being at the tip of Masbate, it also provides the shortest sea travel route from Sorsogon to Masbate. The existing port in Aroroy is a feeder port which was constructed using a JBIC loan under the national government's Second Feeder Port Program. It has available electric and water utilities. It can be made RoRo-capable by adding an 11m X 9m ramp for one vessel at the start. As demand grows in the future, additional ramps may be added.

The Aroroy Port office

A large vessel docked at Aroroy Port

Motorized bancas at Aroroy Port

3. Cawayan

The selected site for the north end of the RRTS link between Masbate and Cebu is the existing causeway in Barangay Mahayahay, Cawayan. The site was selected because the capital investment is already under way. Even before the RRTS study took off, the local government's plan to develop the much-dilapidated Cawayan causeway into a RoRo-capable port is already in an advanced stage. The last time the port was

repaired was in the 1960s. At present, the causeway can only be used by motor bancas; occasional larger vessels that temporarily anchor in Cawayan have to stay a few meters from the causeway and the passengers have to be fetched by bancas. Through the intervention of the local leaders and the Congresswoman assigned to the district, the PPA allocated a budget for port development.

The causeway at Cawayan from two perspectives

4, Daan Bantayan

There is an existing wharf in Barangay Maya, Daan Bantayan where motor bancas serving the Esperanza, Masbate-Daan Bantayan, Cebu passenger traffic dock. The wharf is also currently being used as the jump-off point to Malapascua Island, a premier diving spot in Cebu. The wharf could be developed into a RoRo-capable port by adding an 11m X 9m ramp.

The Cebu provincial government has plans to develop a RoRo-capable port in Sitio Tagasa, also in Barangay Maya. The site is a few kilometers southwest of the

existing wharf in Maya. This study is recommending that the port to be developed by the LGU be considered as the south end of the Masbate-Cebu RRTS link because preparations for the capital investment are already in an advanced stage. The Cebu provincial government already has detailed plans and the project is in the construction bidding stage. The cost, however, appears underestimated based on what the study team saw on field.

The proposed site in Sitio Tagasa in Maya, Daan Bantayan

RoRo Terminal Development Costs

1. Pilar

The capital cost of developing a RoRo terminal in the Pilar fishport is estimated at P64,000,000.

100m R.C. Pier on R.C. Piles 9m plus turning area	40,000,000
RoRo Ramp 11m X 9m	20,000,000
Fendering and Mooring	600,000
Project Management and Contingencies	3,400,000
Total	64,000,000

2. Aroroy

The cost of adding a RoRo ramp and additional facilities in the existing Aroroy Feeder Port is estimated as P23,000,000.

RoRo Ramp 11m X 9m	20,000,000
Fendering and Mooring	600,000
Project Management and Contingencies	2,400,000
Total	23,000,000

3. Cawayan

The PPA is about to start construction of the Cawayan port with a cost estimate of *P48,984,502*. The PPA, however, did not provide a cost breakdown.

4. Daan Bantayan

The cost estimate of the Cebu provincial government for the port in Sitio Tagasa is only P15 million. The Cebu Ports Authority estimate for the same port is P20 million, as reflected in the inputs to the President's 2006 State of the Nation Address. Both of these estimates seem unrealistically low, especially because the site is covered with coralline bed and needs dredging (see pictures above). Thus, to arrive at a more realistic financial model, a slightly higher *P23 million* basic cost of a RoRo terminal similar to that for the Aroroy RoRo terminal development is used. This estimate, and subsequently the financial viability analysis, will have to be adjusted once the LGU cost estimate has been firmed up.

For all the RoRo terminals, the O&M cost is estimated at about P660,000 per year per terminal by 2008. The economic life of a port can be very long and theoretically can last forever if proper maintenance and rehabilitation is undertaken. However, a 40-year economic life is assumed in the next section for financial modeling purposes.

C. Financial Analysis – Vessel and Terminal Operations

The financial analysis first examines the viability of vessel and RoRo terminal operations separately, and then looks at the two as an integrated project. While, in

principle and in actual practice, the two are often viewed as separate activities, with the government (local or national) providing the port services and the private sector supplying the vessels, the emerging mode is for the private sector to get involved in port operations as well, with the "bundling" of both into a single business. Particularly in the context of the RRTS framework, for a given route, vessel and terminal operations may be viewed as interdependent and complementary investments. One cannot be financially viable without the other.

Aside from better coordination in scheduling and other management aspects, cash flow and income tax considerations may favor a single operator: initial deficits in one activity may be covered by the other, and operating losses in one may be used to reduce the tax liabilities of the other. Recent policy pronouncements (see Section II earlier) allow this modality of one operator for both vessels and terminal.

For each operation taken separately and for both operations viewed as a single enterprise, the financial analysis is conducted from two viewpoints: that of all the capital invested in the project and that of equity capital only, after taking account of leveraging, especially since DBP offers relatively easy terms for both vessel acquisition and terminal development. For each viewpoint, before-tax and after-tax profitability is calculated. The analysis is done in current prices, so that the effects of depreciation allowance and interest expenses (which are in practice not adjusted for inflation) on income tax liability are taken into account. The value used for the overall inflation rate is 4% per year, which is the projected growth in the implicit price index for GDP as contained in the current MTPDP. This rate is applied to all revenue and expense items except depreciation and debt service.

The viability indicators computed in this study for each of the two links are the financial internal rate of return (FIRR) and net present value (NPV), without and with financing. For NPV, the discount rate used is the opportunity cost of capital from the investors' viewpoint (which may be different between the private sector and the local government).

C.1 Projected Revenues

Revenues are projected for both vessel and terminal operations. A 20-year projection period is used here to coincide with the life of the vessels. For the terminal operations, although the life of the facilities is assumed to be 40 years, the same 20-year projection period is used for convenience, with the remaining value of the assets at the end of year 20 of operations taken to be one-half of the initial cost, in real terms.

For the financial viability indicators for the vessel component, the computations consider the operator deploying only one vessel, even though the projected traffic growth dictates that an additional vessel be added by the sixth year of operation. This simplifying assumption is adopted because the interest is basically to see if RoRo vessel service is indeed feasible for the routes concerned.

For the RoRo terminal component, however, growth in traffic throughout the 20-year projection period is assumed to be accommodated by an additional vessel in year 6 onwards. The operator of the additional vessel need not be the same as the original one. Thus, additional port and terminal revenues are considered throughout the life of the terminal operations.

Revenues from Vessel Operations

1. Passage Fee for Passengers

At present, RoRo passage fees are deregulated and therefore the RoRo passage fee for passengers assumed by this study is set close to the prevailing market rate. Executive Order 213 deregulated in 1994 all domestic shipping (including RoRo) passage and cargo and freight rates, but the government through MARINA reserves the right to intervene in cases of unreasonably high rates.

To get an approximation of the market rate, data obtained from Montenegro Shipping Lines during the June 2006 fieldwork were used to calculate the passage fee per person per nautical mile prevailing in the following competitive routes, where there are at least two vessel operators: Batangas-Puerto Galera, Batangas-Abra de Ilog, Batangas-Calapan, Batangas-Odiongan, Batangas-Romblon, Batangas-San Jose, Caticlan-Roxas, Odiongan-Romblon, Lucena-Balanacan, Lucena-Kawit, and Bacolod-Iloilo. The passage fees are then averaged and the result is P5.20 average passage fee per person per nautical mile, slightly lower than the average motor banca passage fee of P5.56 per person per nautical mile in the Masbate area as of 2006. For this study, the passenger passage fee by 2008 (start of vessel operation) is assumed to be P6.00 per person per nautical mile, as the inflation rate of 4% per year is factored in.

2. Passage Fee for Vehicles

One of the objectives of the RRTS is to have a passage fee structure based on the lane-meter space occupied by vehicles onboard the RoRo vessel, regardless of the vehicle and freight tonnage. At present, some RoRo vessel operators still charge vehicle passage fees based on the tonnage of the vehicle and the freight carried by the vehicles. From the data gathered from Montenegro Lines, it can be inferred that the company is charging in terms of lane-meter space occupancy, in line with the objective of the RRTS.

To get an approximation of the market rate, the vehicle passage fees per lane meter per nautical mile imposed by Montenegro Lines in the competitive routes enumerated in section III above are examined. Although there were wide variations in the vehicle passage fees in these routes, thereby making the averaging of fees less straightforward, the commonly observed fee is P10.71 per lane meter per nautical mile.

The vehicle passage fee by 2008 (start of vessel operation) assumed in this study is P11.50 per lane meter per nautical mile. This is reasonable given the market rate for vehicle passage fees prevailing in 2006, as established in the preceding paragraph.

Revenues from Terminal Operations

1. Terminal Fees

The following are the assumed terminal fees for the RRTS:

Passenger terminal fee	P10.00 per passenger
Vehicle terminal fee	P32.00 per lane meter

The passenger terminal fee is based on the existing fee for RoRo and fastcraft passengers at the Batangas City Port and in many other PPA ports. The vehicle terminal fee is based on PPA's existing vehicle terminal fee structure:

Vehicle Type	Terminal Fee
Type 1	55
Type 2	110
Type 3	220
Type 4	440

For true RRTS implementation, it is envisioned that the passage fee and terminal fee would be bundled to facilitate a convenient one-stop payment for passengers and vehicle-drivers, or at least there would be only one collector for both. The fees are shown as unbundled in the financial analysis to facilitate the scrutiny of assumptions and to ensure the transparency of the financial model. It must be borne in mind that this does not invalidate the objective of the RRTS to have a bundled fee.

2. Other Sources of Terminal Revenues

Other sources of port/terminal revenues are assumed as follows:

Berthing fee	P1,000 per port call
Miscellaneous port revenues	1,000 per day
Local business revenues	10 per passenger

The main sources of berthing fee revenues are the RoRo vessels plying the RRTS routes. With one vessel per route making two round-trips per day, the berthing fee revenue is P4,000 per day in each route. In the financial viability calculation for the port/terminal component alone, it is assumed that berthing fee revenues will double starting in year 6 of project operation because the traffic forecast dictates that an additional vessel in each route has to be provided to accommodate the growing traffic.

The occasional berthing and anchorage by vessels carrying non-containerized cargo like logs, uncrated live animals, etc., and the lay-up fee from vessels on temporary lay or anchor are potential sources of miscellaneous port revenues. For lack of a reliable basis of estimation, a conservative figure of seven port calls a week or P1,000 per day is assumed.

It is also expected that the port activities would generate local businesses such as food stalls, souvenir and gift shops, general merchandise stores, small-scale service centers, etc. Thus, concession revenues could be earned by the port owner. It is hard to estimate these revenues; therefore, a conservative figure of P10.00 local business revenue per passenger is assumed.

C.2 Fee Adjustments

Fee adjustments would normally be close to what is dictated by the domestic inflation rate. Thus, it is assumed that passage fees, terminal fees, and other sources of

port/terminal revenues increase by 4% annually, the domestic inflation rate projected by the 2004-2010 Medium-Term Philippine Development Plan.

C.3 Financial Internal Rates of Return and Net Present Values

General Assumptions

Given that the RRTS routes examined in this study are developmental routes (or missionary routes), and given the relatively small size of the market, only a single RoRo vessel operator per route is feasible in the early years of operation. Thus, the financial model assumes that there is only one RoRo vessel operator per route initially.

The economic life of the RoRo vessel is assumed as 20 years, considering the built date earlier and the 31 years average age of Philippine domestic fleet (as stated in MARINA's Domestic Shipping Development Plan of the Philippines, 2005). The useful life of the RoRo terminal, on the other hand, is assumed as 40 years. In all the calculations, the RoRo vessel and the RoRo terminal are depreciated using the straight-line method.

In addition to the revenue and cost assumptions described in earlier sections, an exchange rate of P53 = $1.00 and a corporate income tax rate of 32% are assumed. (The appreciation of the peso relative to the US dollar in recent months suggests that investment costs for both the vessel and the terminal may be lower than the estimates used in this study by the time the project takes off.) The working capital for both the RoRo vessel and RoRo terminal operation is assumed as equivalent to three months of operation and maintenance requirements.

DBP Loan Terms and Investors' Cost of Capital

1. Loan Terms

The available re-lending facility for RRTS investments is the Domestic Shipping Modernization Program II (DSMP II), a program loan by the Japan Bank for International Cooperation (JBIC) to the Philippine government. DSMP II is being administered by the DBP. The program allows re-lending for both vessel acquisition and port investment.

The sub-loan under DSMP II has the following terms: payable semi-annually, 10 years to pay inclusive of three years' grace period, and with annual interest of 7.5% on the first three years and 8.5% thereafter.

2. Investors' Cost of Capital

The willingness of investors to engage in a venture depends on the whether the FIRR on the project exceeds their opportunity cost of capital, computed in most finance textbooks as the weighted average cost of (equity and debt) capital or WACC.

As an approximation of the potential investors' *opportunity cost of equity capital*, the established equity return in an industry or among a group of firms involved in the same business as the project being studied can be used as a benchmark. No observed benchmark for the RoRo shipping industry, or even for the whole domestic shipping industry, is easily available. The 19% return on equity in 2005 posted by Aboitiz Equity

Ventures (AEV), which has substantial equity holdings in domestic shipping, is thus used as a starting reference point.[6] The AEV report says that the 19% return on equity was a "record high" and that "all AEV operating companies performed well in 2005, except for the transport group, as it was affected by large fuel cost increases." The 19% return on equity may be taken as an upper bound for the "hurdle rate" with which investors would compare a project's equity FIRR. Meanwhile, with Philippine financial markets getting more competitive, with the peso gaining strength, and with interest rates on the downtrend, a cost of debt capital for established Philippine corporations of 10%-12% (medium- to long-term) is reasonable to expect. Leverage ratios ranging from 50% to 75% will result in a WACC of 12% to 15%.

FIRR and NPV Calculations without and with the DBP Loan

The tables showing the detailed cash flow projections and FIRR calculations are in Appendix A for the Pilar-Aroroy Link and Appendix B for the Cawayan-Daan Bantayan Link. The financial viability indicators (FIRR and NPV at 12% and 15%) from both the viewpoint of all capital and investors' equity (with leverage) are reported in Tables 12-13.

Table 12. FIRRs and NPVs for Pilar-Aroroy

Pilar-Aroroy	***20-year projection period***			
	Project		**Equity**	
Financial Internal Rate of Return	***before tax***	***after tax***	***before tax***	***after tax***
Vessel Operations	21.4%	16.5%	30.9%	23.6%
RORO Terminal Operations	13.4%	10.4%	17.5%	13.5%
Integrated Operations	16.6%	12.8%	23.4%	18.1%
Net Present Value at 12%	***before tax***	***after tax***	***before tax***	***after tax***
Vessel Operations	54,402,882	23,395,599	61,238,107	33,506,386
RORO Terminal Operations	12,149,649	(13,042,968)	25,695,537	6,346,558
Integrated Operations	66,552,531	10,869,128	86,933,644	40,941,082
Net Present Value at 15%	***before tax***	***after tax***	***before tax***	***after tax***
Vessel Operations	30,757,699	6,483,559	41,372,063	20,013,169
RORO Terminal Operations	(11,932,092)	(30,853,164)	9,103,209	(4,621,058)
Integrated Operations	18,825,606	(23,866,582)	50,475,272	16,403,697

Table 13. FIRRs and NPVs for Cawayan-Daan Bantayan

Cawayan-Daan Bantayan	***20-year projection period***			
	Project		**Equity**	
Financial Internal Rate of Return	***before tax***	***after tax***	***before tax***	***after tax***
Vessel Operations	41.3%	32.5%	62.9%	48.9%
RORO Terminal Operations	20.7%	16.5%	33.1%	26.7%
Integrated Operations	31.6%	25.0%	52.9%	41.3%
Net Present Value at 12%	***before tax***	***after tax***	***before tax***	***after tax***
Vessel Operations	300,844,117	185,965,278	308,504,551	197,296,729
RORO Terminal Operations	79,837,602	36,643,483	91,045,579	54,220,245
Integrated Operations	380,681,719	223,207,565	399,550,130	251,516,974
Net Present Value at 15%	***before tax***	***after tax***	***before tax***	***after tax***
Vessel Operations	219,833,172	129,949,187	231,728,998	145,112,213
RORO Terminal Operations	42,460,513	10,040,079	59,865,291	33,196,787
Integrated Operations	262,293,685	140,572,450	291,594,288	178,309,000

The results of the financial calculations show that the Cawayan-Daan Bantayan link is generally more lucrative than the Pilar-Aroroy link because there is more existing passenger and cargo traffic that could potentially be diverted into this route. There is

[6] Source: "AEV reports banner year for 2005", www.aboitiz.com/newsroom

lively small-scale trade carried by outriggers and pumpboats between southwestern Masbate and northern Cebu: Cawayan and Bogo, Placer and Bogo, and Esperanza and Daan Bantayan. There is also significant cargo traffic observed in the more developed routes between Masbate City and Cebu City, Cataingan and Cebu City, and Cataingan and Mandaue City.

It may also be seen from the financial analysis is that, while the vessel operations are highly remunerative, the terminal operations are only marginally so. For Pilar-Aroroy, the project FIRR (before leveraging) for the RoRo terminals is only 13.4% before income tax. The returns are more attractive for Cawayan-Daan Bantayan (with a 20.7% project FIRR), but these internal rates of return come nowhere near the project FIRR for vessel operations of 21.4% for Pilar-Aroroy and 41.3% for Cawayan-Daan Bantayan.

One reason for the low FIRRs in the terminals considered is the high investment cost. For Pilar, while this study considers locating the RoRo terminal in the existing municipal port, the major problem with the present location is that it is heavily silted and thus relatively shallow, requiring an extension of the causeway for RoRo operations. Other sites, on the other hand, either are even more costly to develop or pose a threat to the *butanding* interaction tourism activities in nearby Donsol.

Nevertheless, the relatively low traffic volumes for the Pilar-Aroroy link may be on the conservative side. Pilar has a bustling economy, with the port area populated by buses loading and unloading fastcraft passengers going to and coming from Masbate and Cebu. Aroroy in the near future could be a take-off point from the Bicol mainland to Panay Island via Balud, which is only 95 km. (about 51 nautical miles) to Capiz.

As an alternative to Aroroy, the study team looked into the feasibility of having Masbate City as the RoRo link to Pilar, and, as one would expect, such a link is highly feasible, with a project FIRR for the RoRo terminal exceeding 25% (before income tax). Masbate City, after all, already offers RoRo services, although not of the type envisioned under the RRTS concept.

While the FIRRs for vessel operations look very attractive, it should be noted that one cannot operate the vessel along a given route without the RoRo terminals at either end of the route. In other words, the two are interdependent or complementary activities. The MARINA *Domestic Shipping Development Plan* (2005) concedes that domestic port projects have always been pursued based on their social desirability and very rarely are domestic ports developed based on their financial viability (p. 11-63). Thus, domestic port projects have often relied on government subsidy. In the case here, a government subsidy may not be necessary if investors would pursue an integrated vessel and port operation and let the commercially viable vessel component cross-subsidize the less profitable port component.

Viewed as integrated operations, the Pilar-Aroroy link gets to look more viable with an FIRR of 16.6%, while the Cawayan-Daan Bantayan route yields a high 31.6%. Focusing on returns to the investors' equity alone (with 80% leverage), the feasibility indicators look even more attractive: 23.4% for Pilar-Aroroy and 52.9% for Cawayan-Daan Bantayan.

Figures 1 and 2 summarize the FIRR and NPV runs for the two routes, providing a more picturesque tableau of the results reported in Tables 12 and 13.

Figure 1. Summary of FIRR and NPV calculations: Pilar-Aroroy

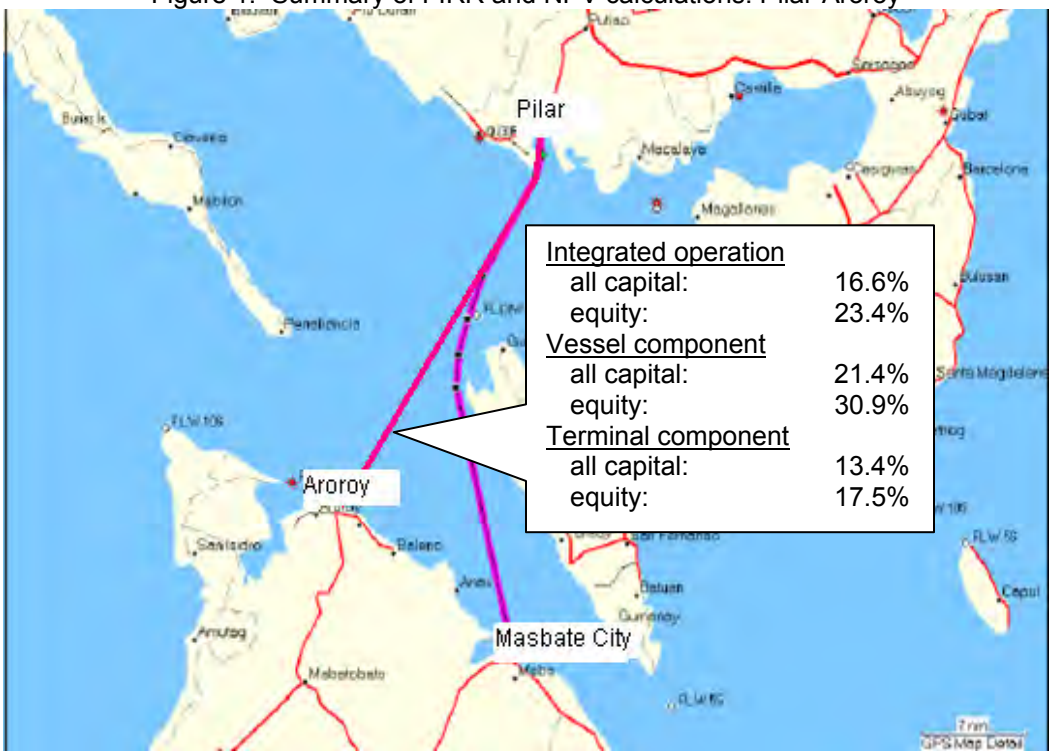
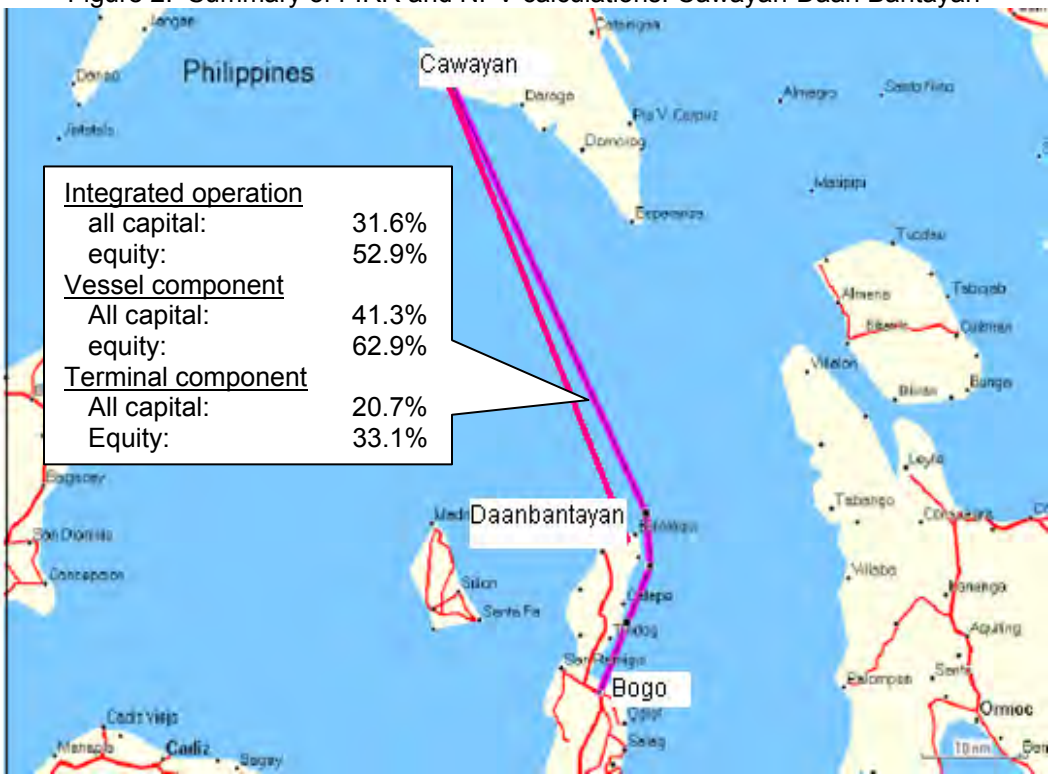


Figure 2. Summary of FIRR and NPV calculations: Cawayan-Daan Bantayan



Vessel Acquisition: Financing Options

For the potential investors, leveraging through loans that offer interest rates lower than their opportunity cost of capital, such as that from DSMP II, therefore appears to be a necessary course of action, especially for RoRo terminal development. With an 80:20 debt-equity ratio, the equity FIRR for RoRo terminal development in Pilar-Aroroy rises to 17.5%, while that for Cawayan-Daan Bantayan reaches 32.9% (before income taxes).

One other financing arrangement that this study looks into is the lease-purchase option. Vessel operators may acquire the RoRo vessels through a financial lease (or lease-purchase) from the National Maritime Equity Corporation (NMEC), a subsidiary of the National Development Company (NDC). NMEC terms[7] are as follows:

lease period:	10 years
interest:	10% per annum, to be included in the lease charge
lease deposit:	10% of the total vessel acquisition cost

While the lease terms cited above look very favorable, they do not compare well with the terms of DBP's DSMP II, which offers only 7.5% per year during the three-year grace period and 8.5% per year for the remaining period of the 10-year loan. The cross-over discount rate for the lease-purchase option to be more attractive than the straight-loan option is 38%. That is, if the borrower's cost of capital is less than 38%, then the straight-loan option would be the better choice.

Table 14 shows the computations comparing the two options, before income tax. For the loan option, included in the outflow for year 0 is the equity that the investors would have to put up to purchase the vessel. For the lease option, the outflow in year 0 represents the 10% deposit, which the investors get back in year 10. An IRR (cross-over discount rate) for the difference in cash flows that is higher than the investors' cost of capital means that the first option is preferred.

Table 14. Loan vs. Lease Financing, before Income Tax

Year	Pilar-Aroroy			Cawayan-Daan Bantayan		
	Loan	Lease	Loan - Lease	Loan	Lease	Loan - Lease
0	(15,140,000)	(5,026,000)	(10,114,000)	(16,995,000)	(5,635,500)	(11,359,500)
1	(2,634,000)	(8,179,584)	5,545,584	(2,952,000)	(9,171,517)	6,219,517
2	(2,634,000)	(8,179,584)	5,545,584	(2,952,000)	(9,171,517)	6,219,517
3	(2,634,000)	(8,179,584)	5,545,584	(2,952,000)	(9,171,517)	6,219,517
4	(6,759,761)	(8,179,584)	1,419,823	(7,575,860)	(9,171,517)	1,595,657
5	(6,759,761)	(8,179,584)	1,419,823	(7,575,860)	(9,171,517)	1,595,657
6	(6,759,761)	(8,179,584)	1,419,823	(7,575,860)	(9,171,517)	1,595,657
7	(6,759,761)	(8,179,584)	1,419,823	(7,575,860)	(9,171,517)	1,595,657
8	(6,759,761)	(8,179,584)	1,419,823	(7,575,860)	(9,171,517)	1,595,657
9	(6,759,761)	(8,179,584)	1,419,823	(7,575,860)	(9,171,517)	1,595,657
10	(6,759,761)	(3,153,584)	(3,606,177)	(7,575,860)	(3,536,017)	(4,039,843)
IRR			38.0%			37.9%

[7] These are the terms indicated in the RRTS chapter of the DSDP (2005 JICA/MARINA study). The actual terms may vary depending on NMEC's source of funds (bond flotation, development loan, etc.). Only one lease-purchase application has thus far been approved by NMEC.

From the investors' viewpoint, however, the lease-purchase mode of financing offers the financial advantage of reducing the project's income tax liabilities, if the tax regime allows the full deduction of lease payments from taxable income. (The tradeoff is that the lessee cannot charge depreciation expenses against income until he gains full ownership of the asset; it is the lessor who can avail of the depreciation expenses.)

The computations show that for the Pilar-Aroroy vessel operations, the crossover discount rate (at which the lease-purchase option dominates the loan option) is 20.1%. That is, if the investors' opportunity cost of capital is higher than 20.1%, then the lease-purchase option gets chosen over the loan option.

For Cawayan-Daan Bantayan vessel operations, however, the present value of the incremental net cash flow with the lease-purchase option over the loan option is positive at any discount rate. This result is due to the fact that the Cawayan-Daan Bantayan route is much more profitable than the Pilar-Aroroy link and tax savings from lease-purchase financing are therefore higher. It should be noted that this result is based on the relative terms of the two options. The higher the implicit interest rate with the lease financing, and the lower the equity requirement with the loan financing, the more favorable the latter is.)

It should also be pointed out that project viability from the economy's viewpoint should not depend on the mode of financing.

C.4 Sensitivity Analysis and Risk Assessment

Sensitivity Analysis

The size of the market probably the most critical factor affecting the profitability of both the RoRo vessel and terminal operations. For the two RoRo links under study, the absence of any significant RoRo traffic in all the four proposed terminal sites means that the expected market will be coming from diverted and induced or generated traffic, which are both unobserved.

For diverted traffic, the methodology followed by the study team in the demand projections is to take off from data on existing traffic using alternative modes, but adopt a conservative assumption on the proportion that would transfer to the proposed facilities which would offer competitive tariffs plus the convenience of better service. Only 20% of observed existing traffic (as reconstructed from field interviews and secondary sources) is assumed to move to the proposed facilities.

For induced or generated traffic, the methodology of basing the projections on the observed experience with recently developed Roxas-Caticlan RoRo route is probably less robust, but nevertheless reasonable to adopt. Masbate province is, after all, slightly bigger even than Mindoro Oriental in terms of population, and Roxas is smaller than any of the municipalities hosting the proposed RoRo terminals.

In any case, Table 15 below shows the sensitivity of the project and equity FIRRs to changes in the assumptions on market demand for RoRo services in the areas concerned. The profitability indicators for the Cawayan-Daan Bantayan route generally remain high, while the Pilar-Aroroy route becomes unattractive.

Table 15. Sensitivity Analysis: Failing to Realize Demand Projections

	Pilar-Aroroy		Cawayan-Daan Bantayan	
	All Capital	Equity	All Capital	Equity
	base case			
Vessel Operations	21.4%	30.9%	41.3%	62.9%
RORO Terminal Operations	13.4%	17.5%	20.7%	33.1%
Integrated Operations	16.6%	23.4%	31.6%	52.9%
	20% diversion down to 15% diversion			
Vessel Operations	18.6%	24.2%	38.8%	57.0%
RORO Terminal Operations	11.4%	14.0%	19.3%	30.3%
Integrated Operations	14.6%	19.0%	30.0%	48.4%
	20% diversion, no induced traffic			
Vessel Operations	16.3%	20.4%	27.8%	36.6%
RORO Terminal Operations	9.7%	11.1%	16.0%	23.3%
Integrated Operations	12.7%	15.7%	22.9%	32.5%
	15% diversion, no induced traffic			
Vessel Operations	8.9%	9.2%	25.5%	32.4%
RORO Terminal Operations	8.0%	8.1%	14.9%	21.0%
Integrated Operations	8.4%	8.7%	21.2%	29.1%

Meanwhile, on the cost side, the analysis shows that project profitability, as measured by the FIRR on all capital before income tax, is very sensitive to increases in investment cost for vessel operations but not for terminal operations (Table 16). This is probably because of the latter's longer economic life. With NPV as the criterion, of course, a 10% increase in terminal investment cost would still mean millions of pesos in added losses.

Table 16. Sensitivity Analysis: Exceeding Investment Cost Estimates

	Pilar-Aroroy		Cawayan-Daan Bantayan	
	All Capital	Equity	All Capital	Equity
	base case			
Vessel Operations	21.4%	30.9%	41.3%	62.9%
RORO Terminal Operations	13.4%	17.5%	20.7%	33.1%
Integrated Operations	16.6%	23.4%	31.6%	52.9%
	10% increase in investment cost			
Vessel Operations	20.0%	27.0%	39.3%	56.4%
RORO Terminal Operations	12.4%	15.7%	19.5%	30.1%
Integrated Operations	15.4%	20.8%	29.9%	47.7%
	20% increase in investment cost			
Vessel Operations	18.8%	24.2%	37.5%	51.5%
RORO Terminal Operations	11.6%	14.2%	18.4%	27.5%
Integrated Operations	14.4%	18.7%	28.4%	43.6%

Risk Assessment and Mitigating Measures

The risk assessment matrix presented in Table 17 below enumerates the different kinds of risks faced by the project and the risk-mitigating measures. Note that the list is not exhaustive, but is still a good approximation of the possible circumstances that may pose a threat to project viability.

Table 17. Risk Assessment Matrix

Risks	Likelihood of occurrence	Risk-mitigating measures
General risks that raise O&M costs and lower revenues	Medium	If O&M cost increase is due to price or wage inflation, the project operator may consider raising tariffs; if O&M cost increase is due to inefficiency, operator must institute cost-saving measures; if revenue decrease is due to the regulator disallowing tariff increases due to inflation, risk is beyond the control of the project operator; if revenue decrease is due to low traffic, strategy depends on the specific risks that could lower traffic
Low induced demand	High	Ensure that roads are improved; ensure predictability of RoRo vessel trip duration and schedule; ensure that fares are competitive.
Low diversion of traffic from more developed routes to RRTS routes	High	Ensure that roads are improved; ensure predictability of RoRo vessel trip duration and schedule; ensure that fares are competitive; promote the RRTS link plus road travel as a cost- and time-saving strategy to distributors, livestock raisers, marine product traders and cargo carriers.
Low conversion of cargo into rolling vehicles	Medium	Ensure that roads are improved; ensure predictability of RoRo vessel trip duration and schedule; ensure that fares are competitive.
Non-participation of bus companies	Medium	Promote the RRTS link plus road travel as a cost- and time-saving strategy, and therefore will attract passenger traffic, to bus companies.
Delays in road improvement	Medium	Address political factors; coordinate with DPWH, DBM and LGUs.
Low diversion of banca traffic	Low	Ensure predictability of RoRo vessel trip duration and schedule; ensure that fares are competitive.

D. Economic Analysis

The conventional approach to the cost-benefit analysis of port development projects from the economy's viewpoint is to measure benefits in terms of savings in transport cost for passengers and cargoes. The reduction in transport cost is expected to be brought about by: (a) higher efficiency in cargo handling; (b) the reduction in time required for the vessels' stay at the port; and (c) efficiency gains due to the increase in transport capacity and speed of operations. Passengers are also expected to gain substantial savings in travel time. In addition, maritime transport safety is enhanced. Among the positive spillovers or externalities cited (but often not estimated) are is the expansion in shipping-related industries such as shipbuilding and related services including insurance, finance, and forwarding. With this methodology, however, the link between the financial and the economic aspects of the project altogether disappear, when one should in fact naturally flow from the other.

In this study, the methodology for the economic analysis adopts an integrated approach where the benefits and costs to the economy are estimated as the aggregate of the benefits and costs to the different stakeholders directly affected by the project: the users, the vessel operators, the terminal operators, the financiers, and the government. Spillovers (or externalities) to other stakeholders indirectly affected are then added on.

Viewed from this perspective, the project FIRR (i.e., the return on all the capital invested in the project) before income tax is a good first approximation of the economic IRR (EIRR). In addition, indirect taxes are to be disregarded as they are simply transfers from the project to government. PPA, in its pre-feasibility studies of port projects, uses a factor of 0.72 to reduce financial costs to economic costs. For conservatism, this study uses a factor of only 0.90, and applied only to terminal development cost and vessel O&M cost. (Customs duties and VAT are also removed from vessel acquisition cost.)

For the Pilar-Aroroy link, the resulting EIRR for the integrated vessel and RoRo terminal operations rises to 18.5% after the economic cost adjustments (see Table 18). For Cawayan-Daan Bantayan, the effect on the EIRR is much more dramatic, with the economic viability indicator rising to 34.8%. These numbers compare favorably against the opportunity cost of capital from the economy's viewpoint, which would be about 16% in nominal terms (12% real rate plus the 4% inflation assumed in the study).

Table 18. Economic Internal Rates of Return Estimates

	Pilar-Aroroy	**Cawayan-Daan Bantayan**
	base case	
Vessel Operations	21.4%	41.3%
RoRo Terminal Operations	13.4%	20.7%
Integrated Operations	16.6%	31.6%
	with economic prices	
Vessel Operations	25.1%	46.7%
RoRo Terminal Operations	14.5%	22.2%
Integrated Operations	18.5%	34.8%

The EIRR estimates do not yet include the various multiplier effects on the local economy that an RRTS connection is expected to bring about. The narrative description given earlier in section I.B of the contribution of the RoRo terminal to the progress of the formerly sleepy town of Roxas in Mindoro Oriental illustrates how major improvements in port infrastructure may trigger rapid progress even within a short span of three years. By its second year of operation, passenger traffic grew by 89%; by the third year, a further 65% growth was observed. There are now public utility vans that pick up and deliver passengers door-to-door, for a fare that is even cheaper than the regular bus-and-fastcraft services. This phenomenal growth in traffic, according to the MTPDP 2005 Update, was triggered by the substantial saving in travel and transport costs of as much as 40% for passengers and 30% for cargo (for the SRNH as a whole).

The main beneficiaries of income and employment multiplier effects are usually those engaged in the service sector: In Roxas, the start of regular RoRo services has given birth to new service establishments: two small hotels, four gasoline stations, five lending institutions, and a number of restaurants within a span of three years. What this means for the local government is an enhanced local tax base, which is an indirect way of recovering investments in infrastructure.

Local development will not be limited to the areas where the RRTS terminals will be located. Neighboring towns that are part of the "economic district" are also major beneficiaries. For Masbate province in particular, the proposed RRTS connections will help integrate the agricultural economy more fully with mainland Bicol and with Cebu. The high FIRRs to vessel operations estimated in the previous section suggest there is room for passenger and vehicle passage fees to be driven down in the future with more competition (or even just the threat of competition). Farmgate prices of Masbate's agricultural and fisheries exports to Luzon and Cebu will rise as more traders come in, stimulating increased production. It is also possible for the RRTS connections to trigger the downstream processing of poultry, fish, and livestock, as cold chain logistics systems become more feasible. Meanwhile, prices of consumer goods imports are expected to decline.

V. ISSUES AND CONCERNS

A. Policy Considerations

Major policy reforms in the Philippine maritime industry started back in the late 1980s. MARINA's Memorandum Circular (MC) 46, issued in May 1989, removed fare ceilings on first and second class passage, and freight rates for Class C Basic were made very close to Class C rates (with just a 2% difference for distances beyond 300 nautical miles). Third class passage rates were increased by 22%, while Class A to C freight rates rose by 8% from 1986 levels. The sharpest rise was for basic commodities, whose rates had been frozen since 1977. The deregulation of 1st and 2nd class passage fares, however, applied only to vessels that allocated at least 50% of passenger capacity for 3rd class.

MC 46 was followed by a series of other issuances aimed at further liberalization and deregulation in domestic shipping. The most visible impact of these efforts that fostered a more competitive environment has undoubtedly been the improvement in passenger services, which shipping lines are proud to announce in various media. Liberalization in domestic shipping has also helped narrow the differential between retail and wholesale prices and farmgate commodity prices, as new vessels facilitate the shipment of goods from surplus to deficit areas, reducing actual shipping costs as well as other hidden transaction costs that go with a highly regulated environment.

The issuance of EO 170 in January 2003 promoting private sector participation and investment in the development and operation of the RRTS, and the subsequent policy pronouncements discussed earlier, may be viewed as a continuance of the reform efforts begun in the late 1980s. EO 170 stipulates that the RRTS shall be considered part of the national highway system. But more reforms need to be put in place.

One important policy matter is the separation of the RRTS from the regular ports operated by either PPA or CPA. Most of the existing RRTS connections today have terminals within the jurisdiction of PPA (CPA in the case of Cebu province), with the contracts between PPA and the arrastre companies still in force. That is why PPA has, despite EO 170, to pay to the arrastre companies a part of the terminal fees. In Masbate City Port, for example. MACAI, the arrastre concessionaire, gets 60% of the terminal fees collected from the using the RoRo vessels, even though it does not provide any

services. Even in some of the LGUs terminals under the RRTS, exorbitant charges for use of the port area is often applied.

To be able to implement the intentions of EO 170, it is crucial that the RRTS is to be looked at differently from the regular shipping and port operations. There should be no cargo handing in the RRTS; only the terminal fee and the passage fee have to be paid for so that the seamless travel for vehicles can be achieved. It should not be a problem for the terminal operator to charge for both payments at the entrance of the terminal in a one-stop booth. But such a one-stop booth is nowhere to be seen in any of the RRTS terminals. For both passenger and vehicle, one has to pay for entering the terminal and pay again separately for the passage.

An important step towards the creation of a truly nautical highway is to relieve both MARINA and PPA of the overall responsibility over the RRTS. Under AO 123 passed in 2005, the President instructed DOTC to establish and chair a board with representatives of various government agencies, like DTI, DPWH, and DBP, together with private sector representatives (PCCI) to map out the details of implementing the RRTS. MARINA and PPA, however, dominate the board, which does not look promising for significant changes to be effected for the present RRTS system.

A separate regulatory body (a “Nautical Highway Regulatory Board” or NHRB) is perhaps needed to implement the RRTS concept. EO 170 says that the RRTS shall be considered as part of the national highways. It is therefore natural that DPWH should be given a clear mandate within the NHRB and take a leading role in developing the RRTS. MARINA’s role should simply be to assure the riding public that the RoRo vessels are seaworthy and safe while the PPA should confine its role to leasing out the terminals to private operators. On the other hand, NHRB should take on the responsibility to develop the “bridge foundations,” or the RoRo facilities in the ports and terminals, where the ferry operators can lease the facilities from NHRB for their own purposes. DOTC is by law the agency mandated to oversee and regulate the flow of vehicular and passenger traffic. The NHRB would not interfere with this mandate, but would merely put the “roads and ferry bridges” in place for the traveling public.

The NHRB would oversee the RRTS connections both in terms of service quality, including frequencies of trips and prices. It would be bidding out the various connections. MARINA’s role would be to ensure the seaworthiness and safety of the vessels. PPA, meanwhile, would lease out the proper areas of its ports to NHRB; these areas should be dedicated to RRTS operations and outside PPA jurisdiction. NHRB would then bid out the operation through a re-lease agreement from NHRB. The same procedure could be applied to privately owned ports.

RRTS links (“ferry bridges”) are of course only as good as the roads that they connect. DPWH is responsible for national roads while the provinces and municipalities are responsible for provincial and municipal roads. This could be the case also under the RRTS. The NHRB should see to it that the provinces are establishing their own “boards” and cooperate with NHRB for RRTS links not connecting national roads. Likewise, the provincial “board” should make the concerned municipalities do the same. This “board” need not be an added layer in the local bureaucracy. It could be an existing committee within the present setup assigned the RRTS supervision functions. NHRB would have overall responsibility for the system, but this will enable a smooth cooperation between the NHRB and the LGUs in the development of the RRTS.

The NHRB may be a novel concept in the Philippine setting, but it is the accepted practice in many European countries. In this country, new legislation may be needed for it to be institutionalized. Under the present legal and regulatory framework, it would be difficult to implement a truly functional RRTS scheme and avail of the efficiency gains that the RRTS would bring about.

Nevertheless, before such a regime is put in place, policies of MARINA and PPA could be aligned to the concept through AO 123. DPWH should also be more active in the formulation of implementing guidelines for the RRTS, as this agency is after all the one responsible for the road component of the system.

B. Implementation Concerns

In the earlier discussion on the financial aspects, it has been pointed out that while vessel operations appear to be much more lucrative than terminal operations, for any given route, the two activities are really interdependent: one cannot operate without the other. Under the current institutional setup, however, vessel operations are the concern of the private sector while most RoRo-capable ports are run by either PPA or the local governments. It is therefore often the case that financially and economically viable investment opportunities fail to be realized because of institutional constraints. A given route with strong market potential is not provided RoRo services because there is no existing mechanism by which vessel and terminal operations could function as an integrated enterprise.

For the cases at hand, all the four local governments (Pilar, Aroroy, Cawayan, and Daan Bantayan) express the desire to invest in RoRo terminals, but tight fiscal positions coupled with the difficulty of having two local governments at either end of a potential connection coordinate with each other have kept the investment opportunities from materializing. There is also the hope among LGUs that the national government through the PPA would come in to support their port development. Already, PPA has allocated funds for Cawayan and has included Pilar and Aroroy in its port development plan (with RoRo facilities), while the Cebu provincial government has committed to assist Daan Bantayan.

The role, then, of this study has been to show that these investments are indeed financially and economically worthwhile, even in the context of the new RRTS paradigm whereby there would be facilities dedicated to RoRo operations that do away with those arrastre charges for services that are not even needed. The common fear among regular port operators used to the old system of charges is that port revenues would fall with the RRTS. But the more efficient services that a true RRTS brings about would engender an increase in the flow of passenger and vehicle traffic using the terminal that may more than make up for lost revenues due to lower charges. Indirectly as well, more traffic brings more business to the local community, and more business means more tax and non-tax revenues for the local government.

At the same time, an implication flowing from the financial analysis is that, in the absence of any port or terminal development that dedicates a ramp for RoRo services, it would pay for the vessel operators to invest in the facilities themselves. The present policy environment allows this arrangement, as both PPA and local governments have the mandate to engage the private sector in long-term concession agreements. The

RoRo terminal operation at the Port of Kolambogan in Lanao del Norte is often cited as a "good practice" example of how public-private partnerships in terminal development can be made to work, for the benefit not only of the investors but also of the public at large.

C. Possible Institutional Arrangements

One promising institutional arrangement to see a viable RRTS to fruition is for the LGUs at the two ends of a given RoRo route to form a joint venture corporation (JVC) that would initiate a given RRTS project. The LGUs may be at the municipal level or at the provincial level. Either mode is within the mandate and powers of LGUs under the Local Government Code. The advantage of the municipal level is less bureaucracy, with only two parties initially involved. In a provincial setup, two additional entities will have to be included (the two provincial LGUs). Municipal LGUs in the rural areas, however, may not have the fiscal or the institutional capacity to engage in a JVC. The participation of provincial LGUs from the very start would also help in determining the optimum location of the RoRo links and identifying other viable routes between the two provinces. At the same time, complementary RRTS investments in road and other infrastructure would be more easily effected. (Both municipal and provincial LGUs may of course join the JVC.)

The JVC can then invite private sector participation by competitively tendering either a concession agreement or a solicited BOT. The JVC will have to decide if it wants to undertake the investment in the terminal facilities or to include such investment in the tender. From the viewpoint of the potential private sector participants, a local franchise on a given route would be simpler, as it would mean lower political risk on their part: they could easily take their business elsewhere if the political environment turns sour. On the other hand, one entity running both vessel and terminal operations has logistical advantages.

Under a concession agreement, the JVC constructs the RoRo terminals and bids out the operation and maintenance of the terminals to the private sector. To recover its investment, the bid terms of reference (TOR) may specify a fixed annual lease to be paid by the operator over the life of the concession. This fixed annual lease should cover both the JVC's cost of equity capital and the debt service (if the JVC borrows, say, from the SLDP window of DBP). The bid parameter may then be the initial terminal fees that the operator may charge. As there are separate terminal fees for passengers and vehicles, a fixed ratio of the two fees may be imposed. Whoever bids the lowest initial terminal fees wins the concession. The TOR should define the methodology for computing future adjustments in terminal fees to account for cost inflation and the possible occurrences of force majeure. Rate rebasing after five or ten years may be included in the agreement. Vessel passage fees per passenger and per vehicle lane meter need not be fixed in the TOR, as the threat of competition from alternative transport modes will impose the necessary discipline on the operator and keep it from charging monopoly tariffs.

In a solicited BOT mode, the JVC issues a competitive tender on the construction and operation of a RoRo terminal at each end of a given link, bundled with the franchise to run the vessel operations. The TOR should specify minimum technical requirements for the terminal facilities (including a one-stop booth). As in the concession agreement, the bid parameter may be the terminal fees to be charged.

In either case, a local government undertaking that would enhance the possibility of a successful tender by the JVC is a time-bound commitment to improve road access

to the terminals. Where national roads are involved, DPWH may have to be the entity to issue the performance undertaking. The role of DBP is to extend technical assistance in the formation of the JVC and the preparation of the TOR.

Simulations carried out by the Study Team for the Pilar-Aroroy Tollway show that with the Concession Agreement mode where lease payments by the private operator begin in Year 0 (even during construction of the terminal facilities), initial terminal fees would be bid down to P4.20 per passenger and P13.43 per vehicle lane meter if the cost of equity capital of the winning private operator were 20%. If lease payments were to begin in Year 1 (start of operations), the corresponding initial tariffs would be P4.15 per passenger and P13.29 per vehicle lane meter. With the solicited BOT mode, on the other hand, where a Build-Own-Operate (BOO) scheme seems appropriate, the initial terminal fees would rise to P5.64 per passenger and P18.04 per vehicle lane meter. The BOT mode leads to higher tariffs because the cost of equity capital of private investors is assumed to be higher than that of the JVC (and the LGUs owning the JVC). But these fees are still way below the current PPA-set fees of P10 per passenger and P32 per vehicle lane meter.

V. CONCLUDING REMARKS

The approach adopted in this study differs from conventional feasibility studies of port development projects in that the analysis of market, financial, and economic aspects is conducted using the RRTS framework. Both the financial viability and the economic feasibility of RoRo vessel and terminal investments are examined both singly and as an integrated operation. The indicators of project worth show that vessel operations have high FIRRs that are above the typical cost of private capital, but the FIRRs of terminal operations (particularly for the Pilar-Aroroy link) may not be attractive enough for risk-averse investors. Viewed as an integrated operation, however, the yield is sufficiently high, even from a private sector perspective. The challenge then is how to design the institutional arrangements that would encourage more private sector participation in the development of the RRTS, and the previous section has outlined recommendations that may help realize this objective.

For the specific connections that are the subject of this study, practically all of the four prospective terminals have recently gotten the commitment of either the national government or the provincial government for financial assistance in RoRo-enabled port development (PPA for Pilar, Aroroy, and Cawayan, the Cebu provincial government for Daan Bantayan). While this is very much welcome for the concerned municipalities, the possible downside is that support from above may cause project implementation to diverge from the RRTS framework.

Nevertheless, it is hoped that this study shall have helped stimulate private sector interest not only in vessel operations but in terminal operations as well, and enlighten the stakeholders from government, both national and local, on the benefits of keeping faithful to the RRTS concept.

Projected Cash Flows – Pilar-Aroroy (1)

			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Demand Forecast			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Passenger Traffic			81,215	117,355	155,496	164,091	173,160	182,731	192,831	203,489	214,737	226,606
Vehicle Traffic												
Type 1			96	146	176	186	196	207	219	231	243	257
Type 2			1,208	1,848	2,227	2,350	2,480	2,617	2,761	2,914	3,075	3,245
Type 3			4,359	6,669	8,036	8,480	8,949	9,444	9,966	10,517	11,098	11,711
Type 4			2,269	3,471	4,183	4,414	4,658	4,915	5,187	5,474	5,776	6,096
in total lane meters			63,973	97,867	117,935	124,450	131,331	138,587	146,249	154,339	162,859	171,868
Vessel Loading Capacity Projection			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Load Factors: Passengers			65%	65%	70%	70%	70%	70%	70%	70%	70%	70%
Vehicles			65%	65%	70%	75%	80%	80%	80%	80%	80%	80%
Passenger Traffic			81,215	117,355	138,600	138,600	138,600	138,600	138,600	138,600	138,600	138,600
Vehicle Traffic (in lane meters)			63,973	68,640	73,920	79,200	84,480	84,480	84,480	84,480	84,480	84,480
Vessel Revenue Projection (PHP)			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Projected Passage Fees:												
Passengers			138.00	143.52	149.26	155.23	161.44	167.90	174.61	181.60	188.86	196.42
Vehicles			264.50	275.08	286.08	297.53	309.43	321.80	334.68	348.06	361.99	376.47
Passage Fee Revenues:												
Passengers			11,207,670	16,842,790	20,687,547	21,515,049	22,375,651	23,270,677	24,201,504	25,169,564	26,176,347	27,223,400
Vehicles			16,920,859	18,881,491	21,147,270	23,564,101	26,140,443	27,186,060	28,273,503	29,404,443	30,580,621	31,803,846
Total Vessel Operation Revenues			28,128,529	35,724,281	41,834,817	45,079,150	48,516,093	50,456,737	52,475,007	54,574,007	56,756,967	59,027,246
Vessel Operating & Maintenance (O&M) Expenses Schedule (PHP)			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Fixed Costs:												
Crew Cost			1,944,000	2,021,760	2,102,630	2,186,736	2,274,205	2,365,173	2,459,780	2,558,171	2,660,498	2,766,918
Admin			1,800,000	1,872,000	1,946,880	2,024,755	2,105,745	2,189,975	2,277,574	2,368,677	2,463,424	2,561,961
Insurance			1,172,500	1,219,400	1,268,176	1,318,903	1,371,659	1,426,526	1,483,587	1,542,930	1,604,647	1,668,833
Drydocking & Maintenance			1,200,000	1,248,000	1,297,920	1,349,837	1,403,830	1,459,983	1,518,383	1,579,118	1,642,283	1,707,974
Variable Costs:												
Fuel ME & Aux			18,458,880	19,197,235	19,965,125	20,763,730	21,594,279	22,458,050	23,356,372	24,290,627	25,262,252	26,272,742
Lubricants and Consumables			1,845,888	1,919,724	1,996,512	2,076,373	2,159,428	2,245,805	2,335,637	2,429,063	2,526,225	2,627,274
Berthing			1,320,000	1,372,800	1,427,712	1,484,820	1,544,213	1,605,982	1,670,221	1,737,030	1,806,511	1,878,772
Total O&M Costs			27,741,268	28,850,919	30,004,955	31,205,154	32,453,360	33,751,494	35,101,554	36,505,616	37,965,841	39,484,474
Vessel Working Capital Schedule (PHP)			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Change in working capital			6,935,317	277,413	288,509	300,050	312,052	324,534	337,515	351,016	365,056	379,658
Recovery of working capital (inflow)												
Recovery of working capital (inflow)												
Vessel Operation Cashflow, All Capital Viewpoint		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Inflows												
Passage Fee Revenues			28,128,529	35,724,281	41,834,817	45,079,150	48,516,093	50,456,737	52,475,007	54,574,007	56,756,967	59,027,246
Recovery of working capital												
Outflows												
Capital expenditure		50,260,000										
O&M costs			27,741,268	28,850,919	30,004,955	31,205,154	32,453,360	33,751,494	35,101,554	36,505,616	37,965,841	39,484,474
Change in working capital			6,935,317	277,413	288,509	300,050	312,052	324,534	337,515	351,016	365,056	379,658
Net Cashflow, all capital	-	(50,260,000)	(6,548,057)	6,595,949	11,541,352	13,573,947	15,750,682	16,380,709	17,035,938	17,717,375	18,426,070	19,163,113
Vessel Operation Cashflow, Equity-Owner's Viewpoint		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cashflow, all capital		(50,260,000)	(6,548,057)	6,595,949	11,541,352	13,573,947	15,750,682	16,380,709	17,035,938	17,717,375	18,426,070	19,163,113
Loan proceeds from DBP		35,120,000										
Debt service			(2,634,000)	(2,634,000)	(2,634,000)	(6,759,761)	(6,759,761)	(6,759,761)	(6,759,761)	(6,759,761)	(6,759,761)	(6,759,761)
Income tax liability		-	-	(654,196)	(2,240,276)	(2,807,682)	(3,615,156)	(3,937,131)	(4,277,433)	(4,637,267)	(5,017,928)	(5,420,807)
Net Cashflow before Tax	-	(15,140,000)	(9,182,057)	3,961,949	8,907,352	6,814,185	8,990,921	9,620,948	10,276,177	10,957,614	11,666,309	12,403,352
Net Cashflow after Tax	-	(15,140,000)	(9,182,057)	3,307,754	6,667,077	4,006,504	5,375,765	5,683,817	5,998,743	6,320,347	6,648,381	6,982,545
Memo:												
Earnings before Income Taxes (EBIT)		-	387,260	6,873,362	11,829,862	13,873,996	16,062,734	16,705,243	17,373,453	18,068,391	18,791,126	19,542,771
EBIT less: Depreciation			2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000
Interest expense			2,634,000	2,634,000	2,634,000	2,904,991	2,570,372	2,206,707	1,811,474	1,381,932	915,102	407,749
= Taxable income		-	(4,441,740)	2,044,362	7,000,862	8,774,006	11,297,361	12,303,536	13,366,979	14,491,459	15,681,024	16,940,022

Projected Cash Flows – Pilar-Aroroy (2)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Demand Forecast	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Passenger Traffic	239,131	252,348	266,296	281,015	296,547	312,938	330,234	348,487	367,749	388,075
Vehicle Traffic										
Type 1	271	286	302	319	336	355	374	395	417	440
Type 2	3,424	3,613	3,813	4,024	4,246	4,481	4,729	4,990	5,266	5,557
Type 3	12,359	13,042	13,763	14,523	15,326	16,173	17,067	18,010	19,006	20,056
Type 4	6,433	6,788	7,163	7,559	7,977	8,418	8,883	9,374	9,892	10,439
in total lane meters	181,371	191,387	201,966	213,127	224,908	237,342	250,458	264,298	278,910	294,325
Vessel Loading Capacity Projection	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Load Factors: Passengers	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Vehicles	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Passenger Traffic	138,600	138,600	138,600	138,600	138,600	138,600	138,600	138,600	138,600	138,600
Vehicle Traffic (in lane meters)	84,480	84,480	84,480	84,480	84,480	84,480	84,480	84,480	84,480	84,480
Vessel Revenue Projection (PHP)	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Projected Passage Fees:										
Passengers	204.27	212.44	220.94	229.78	238.97	248.53	258.47	268.81	279.56	290.75
Vehicles	391.52	407.19	423.47	440.41	458.03	476.35	495.40	515.22	535.83	557.26
Passage Fee Revenues:										
Passengers	28,312,336	29,444,830	30,622,623	31,847,528	33,121,429	34,446,286	35,824,138	37,257,103	38,747,387	40,297,283
Vehicles	33,075,999	34,399,039	35,775,001	37,206,001	38,694,241	40,242,011	41,851,691	43,525,759	45,266,789	47,077,461
Total Vessel Operation Revenues	61,388,336	63,843,869	66,397,624	69,053,529	71,815,670	74,688,297	77,675,829	80,782,862	84,014,176	87,374,743
Vessel Operating & Maintenance (O&M) Expenses Schedule (PHP)	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Fixed Costs:										
Crew Cost	2,877,595	2,992,699	3,112,407	3,236,903	3,366,379	3,501,034	3,641,076	3,786,719	3,938,187	4,095,715
Admin	2,664,440	2,771,017	2,881,858	2,997,132	3,117,018	3,241,698	3,371,366	3,506,221	3,646,470	3,792,329
Insurance	1,735,586	1,805,010	1,877,210	1,952,299	2,030,391	2,111,606	2,196,071	2,283,913	2,375,270	2,470,281
Drydocking & Maintenance	1,776,293	1,847,345	1,921,239	1,998,088	2,078,012	2,161,132	2,247,577	2,337,481	2,430,980	2,528,219
Variable Costs:										
Fuel ME & Aux	27,323,652	28,416,598	29,553,262	30,735,392	31,964,808	33,243,400	34,573,136	35,956,061	37,394,304	38,890,076
Lubricants and Consumables	2,732,365	2,841,660	2,955,326	3,073,539	3,196,481	3,324,340	3,457,314	3,595,606	3,739,430	3,889,008
Berthing	1,953,922	2,032,079	2,113,363	2,197,897	2,285,813	2,377,245	2,472,335	2,571,229	2,674,078	2,781,041
Total O&M Costs	41,063,853	42,706,408	44,414,664	46,191,250	48,038,900	49,960,456	51,958,875	54,037,230	56,198,719	58,446,668
Vessel Working Capital Schedule (PHP)	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Change in working capital	394,845	410,639	427,064	444,147	461,913	480,389	499,605	519,589	540,372	561,987
Recovery of working capital (inflow)										14,611,667
Recovery of working capital (inflow)										
Vessel Operation Cashflow, All Capital Viewpoint	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Inflows										
Passage Fee Revenues	61,388,336	63,843,869	66,397,624	69,053,529	71,815,670	74,688,297	77,675,829	80,782,862	84,014,176	87,374,743
Recovery of working capital										14,611,667
Outflows										
Capital expenditure										
O&M costs	41,063,853	42,706,408	44,414,664	46,191,250	48,038,900	49,960,456	51,958,875	54,037,230	56,198,719	58,446,668
Change in working capital	394,845	410,639	427,064	444,147	461,913	480,389	499,605	519,589	540,372	561,987
Net Cashflow, all capital	19,929,638	20,726,823	21,555,896	22,418,132	23,314,857	24,247,451	25,217,349	26,226,043	27,275,085	42,977,755
Vessel Operation Cashflow, Equity-Owner's Viewpoint	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Net Cashflow, all capital	19,929,638	20,726,823	21,555,896	22,418,132	23,314,857	24,247,451	25,217,349	26,226,043	27,275,085	42,977,755
Loan proceeds from DBP										
Debt service	-	-	-	-	-	-	-	-	-	-
Income tax liability	(5,801,434)	(6,061,588)	(6,332,147)	(6,613,529)	(6,906,166)	(7,210,509)	(7,527,025)	(7,856,202)	(8,198,546)	(8,554,584)
Net Cashflow before Tax	19,929,638	20,726,823	21,555,896	22,418,132	23,314,857	24,247,451	25,217,349	26,226,043	27,275,085	42,977,755
Net Cashflow after Tax	14,128,203	14,665,235	15,223,749	15,804,603	16,408,691	17,036,942	17,690,324	18,369,841	19,076,539	34,423,171
Memo:										
Earnings before Income Taxes (EBIT)	20,324,482	21,137,462	21,982,960	22,862,278	23,776,770	24,727,840	25,716,954	26,745,632	27,815,457	28,928,076
EBIT less: Depreciation	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000
Interest expense	-	-	-	-	-	-	-	-	-	-
= Taxable income	18,129,482	18,942,462	19,787,960	20,667,278	21,581,770	22,532,840	23,521,954	24,550,632	25,620,457	26,733,076

Projected Cash Flows – Pilar-Aroroy (3)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Terminal Fees:											
Passengers		10	10.40	10.82	11.25	11.70	12.17	12.65	13.16	13.69	14.23
Vehicles (per lane meter)		32	33.28	34.61	36.00	37.44	38.93	40.49	42.11	43.79	45.55
Local business revenue/pax		10	10.40	10.82	11.25	11.70	12.17	12.65	13.16	13.69	14.23
Inflows											
Terminal Fee Revenues:											
Passengers, 1st RORO vessel		812,150	1,220,492	1,499,098	1,559,062	1,621,424	1,686,281	1,753,732	1,823,881	1,896,837	1,972,710
Passengers, 2nd RORO vessel							536,921	686,195	853,895	1,041,987	1,252,600
Vehicles, 1st RORO vessel		2,047,136	2,284,339	2,558,460	2,850,855	3,162,549	3,289,051	3,420,613	3,557,437	3,699,735	3,847,724
Vehicles, 2nd RORO vessel							2,106,542	2,501,040	2,941,750	3,432,546	3,980,172
Berthing Fee Revenues, 1st RORO vessel		1,320,000	1,372,800	1,427,712	1,484,820	1,544,213	1,605,982	1,670,221	1,737,030	1,806,511	1,878,772
Berthing Fee Revenues, 2nd RORO vessel							1,605,982	1,670,221	1,737,030	1,806,511	1,878,772
Miscellaneous port revenues		330,000	343,200	356,928	371,205	386,053	401,495	417,555	434,257	451,628	469,693
Local business revenues		812,150	1,220,492	1,681,845	1,845,801	2,025,727	2,223,202	2,439,927	2,677,776	2,938,824	3,225,310
Recovery of working capital											
Selling value of depreciated port/terminal											
Total Inflows		5,321,436	6,441,323	7,524,042	8,111,743	8,739,967	13,455,456	14,559,505	15,763,057	17,074,580	18,505,752
Outflows											
Development cost, Pilar & Aroroy	87,000,000										
O&M cost		1,315,932	1,368,569	1,423,312	1,480,244	1,539,454	1,601,032	1,665,074	1,731,676	1,800,944	1,872,981
Change in working capital	-	328,983	13,159	13,686	14,233	14,802	15,395	16,010	16,651	17,317	18,009
Total Outflows	87,000,000	1,644,915	1,381,728	1,436,998	1,494,477	1,554,256	1,616,427	1,681,084	1,748,327	1,818,260	1,890,991
Net cashflow, all capital	(87,000,000)	3,676,521	5,059,595	6,087,045	6,617,266	7,185,710	11,839,029	12,878,421	14,014,730	15,256,319	16,614,761

RORO Terminal Operation Cashflow, Equity-Owner's Viewpoint

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net cashflow, all capital	(87,000,000)	3,676,521	5,059,595	6,087,045	6,617,266	7,185,710	11,839,029	12,878,421	14,014,730	15,256,319	16,614,761
Loan proceeds from DBP	69,600,000										
Debt service	-	(5,220,000)	(5,220,000)	(5,220,000)	(13,396,337)	(13,396,337)	(13,396,337)	(13,396,337)	(13,396,337)	(13,396,337)	(13,396,337)
Income tax liability	-	-	-	-	-	-	(1,710,263)	(2,294,775)	(2,932,159)	(3,626,987)	(4,385,025)
Net Cashflow before Tax	(17,400,000)	(1,543,479)	(160,405)	867,045	(6,779,072)	(6,210,627)	(1,557,308)	(517,917)	618,393	1,859,982	3,218,424
Net Cashflow after Tax	(17,400,000)	(1,543,479)	(160,405)	867,045	(6,779,072)	(6,210,627)	(3,267,571)	(2,812,691)	(2,313,766)	(1,767,005)	(1,166,601)
Memo:											
Earnings before Income Taxes (EBIT)	-	4,005,504	5,072,754	6,100,730	6,631,499	7,200,512	11,854,424	12,894,431	14,031,381	15,273,636	16,632,771
EBIT less: Depreciation		2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000
Interest expense	261,000	5,220,000	5,220,000	5,254,800	5,724,576	5,058,619	4,334,853	3,548,259	2,693,385	1,764,302	754,568
= Taxable income	(261,000)	(3,389,496)	(2,322,246)	(1,329,070)	(1,268,077)	(33,107)	5,344,571	7,171,172	9,162,996	11,334,334	13,703,203

Integrated RORO Vessel and RORO Terminal Operation

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net cashflow, all capital, before tax	(137,260,000)	(2,871,535)	11,655,544	17,628,397	20,191,212	22,936,392	28,219,739	29,914,359	31,732,105	33,682,389	35,777,875
Net Cashflow, equity, before tax	(32,540,000)	(10,725,535)	3,801,544	9,774,397	35,114	2,780,294	8,063,640	9,758,260	11,576,007	13,526,291	15,621,776
Vessel	(15,140,000)	(9,182,057)	3,961,949	8,907,352	6,814,185	8,990,921	9,620,948	10,276,177	10,957,614	11,666,309	12,403,352
RORO terminal	(17,400,000)	(1,543,479)	(160,405)	867,045	(6,779,072)	(6,210,627)	(1,557,308)	(517,917)	618,393	1,859,982	3,218,424
Income tax liability	-	-	-	(1,814,973)	(2,401,897)	(3,604,561)	(5,647,394)	(6,572,208)	(7,569,426)	(8,644,915)	(9,805,832)
Net Cashflow, equity, after tax	(32,540,000)	(10,725,535)	3,801,544	7,959,424	(2,366,783)	(824,268)	2,416,246	3,186,052	4,006,581	4,881,376	5,815,944
Memo:											
Taxable income, vessel	-	(4,441,740)	2,044,362	7,000,862	8,774,006	11,297,361	12,303,536	13,366,979	14,491,459	15,681,024	16,940,022
Taxable income, terminal	(261,000)	(3,389,496)	(2,322,246)	(1,329,070)	(1,268,077)	(33,107)	5,344,571	7,171,172	9,162,996	11,334,334	13,703,203
Taxable income, combined	(261,000)	(7,831,235)	(277,884)	5,671,792	7,505,928	11,264,255	17,648,106	20,538,151	23,654,455	27,015,359	30,643,225

If all capital is equity capital:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Vessel operations											
Net Cashflow before tax	(50,260,000)	(6,548,057)	6,595,949	11,541,352	13,573,947	15,750,682	16,380,709	17,035,938	17,717,375	18,426,070	19,163,113
Taxable income	-	(1,807,740)	4,678,362	9,634,862	11,678,996	13,867,734	14,510,243	15,178,453	15,873,391	16,596,126	17,347,771
Income tax	-	-	1,497,076	3,083,156	3,737,279	4,437,675	4,643,278	4,857,105	5,079,485	5,310,760	5,551,287
Net Cashflow after tax	(50,260,000)	(6,548,057)	5,098,874	8,458,197	9,836,668	11,313,007	11,737,432	12,178,833	12,637,890	13,115,310	13,611,826
RORO terminal operations											
Net Cashflow before tax	(87,000,000)	3,676,521	5,059,595	6,087,045	6,617,266	7,185,710	11,839,029	12,878,421	14,014,730	15,256,319	16,614,761
Taxable income	-	1,830,504	2,897,754	3,925,730	4,456,499	5,025,512	9,679,424	10,719,431	11,856,381	13,098,636	14,457,771
Income tax	-	585,761	927,281	1,256,234	1,426,080	1,608,164	3,097,416	3,430,218	3,794,042	4,191,564	4,626,487
Net Cashflow after tax	(87,000,000)	3,090,760	4,132,314	4,830,811	5,191,186	5,577,546	8,741,614	9,448,203	10,220,688	11,064,756	11,988,275
Integrated operations											
Net Cashflow before tax	(137,260,000)	(2,871,535)	11,655,544	17,628,397	20,191,212	22,936,392	28,219,739	29,914,359	31,732,105	33,682,389	35,777,875
Taxable income	-	22,765	7,576,116	13,560,592	16,135,495	18,893,246	24,189,667	25,897,884	27,729,772	29,694,762	31,805,542
Income tax	-	7,285	2,424,357	4,339,389	5,163,358	6,045,839	7,740,693	8,287,323	8,873,527	9,502,324	10,177,774
Net Cashflow after tax	(137,260,000)	(2,878,820)	9,231,187	13,289,008	15,027,854	16,890,553	20,479,045	21,627,036	22,858,578	24,180,066	25,600,101

Projected Cash Flows – Pilar-Aroroy (4)

RORO Terminal Operation Cashflow, All Capital Viewpoint											
			Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Terminal Fees:												
Passengers			14.80	15.39	16.01	16.65	17.32	18.01	18.73	19.48	20.26	21.07
Vehicles (per lane meter)			47.37	49.26	51.23	53.28	55.41	57.63	59.94	62.33	64.83	67.42
Local business revenue/pax			14.80	15.39	16.01	16.65	17.32	18.01	18.73	19.48	20.26	21.07
Inflows												
Terminal Fee Revenues:												
Passengers, 1st RORO vessel			2,051,619	2,133,683	2,219,031	2,307,792	2,400,104	2,496,108	2,595,952	2,699,790	2,807,782	2,920,093
Passengers, 2nd RORO vessel			1,488,104	1,751,098	2,044,454	2,371,314	2,735,131	3,139,729	3,589,269	4,088,390	4,642,138	5,256,062
Vehicles, 1st RORO vessel			4,001,633	4,161,699	4,328,166	4,501,293	4,681,345	4,868,599	5,063,343	5,265,876	5,476,511	5,695,572
Vehicles, 2nd RORO vessel			4,589,515	5,266,509	6,019,164	6,854,615	7,781,628	8,809,466	9,947,958	11,208,562	12,604,144	14,147,576
Berthing Fee Revenues, 1st RORO vessel			1,953,922	2,032,079	2,113,363	2,197,897	2,285,813	2,377,245	2,472,335	2,571,229	2,674,078	2,781,041
Berthing Fee Revenues, 2nd RORO vessel			1,953,922	2,032,079	2,113,363	2,197,897	2,285,813	2,377,245	2,472,335	2,571,229	2,674,078	2,781,041
Miscellaneous port revenues			488,481	508,020	528,341	549,474	571,453	594,311	618,084	642,807	668,519	695,260
Local business revenues			3,539,723	3,884,782	4,263,485	4,679,106	5,135,235	5,635,837	6,185,221	6,788,180	7,449,920	8,176,155
Recovery of working capital												693,117
Selling value of depreciated port/terminal												43,500,000
Total Inflows			20,066,920	21,769,949	23,629,366	25,659,389	27,876,521	30,298,540	32,944,496	35,836,063	38,997,171	86,645,918
Outflows												
Development cost, Pilar & Aroroy												
O&M cost			1,947,900	2,025,817	2,106,849	2,191,123	2,278,768	2,369,919	2,464,716	2,563,304	2,665,836	2,772,470
Change in working capital			18,730	19,479	20,258	21,068	21,911	22,788	23,699	24,647	25,633	26,658
Total Outflows			1,966,630	2,045,296	2,127,107	2,212,192	2,300,679	2,392,706	2,488,415	2,587,951	2,691,469	2,799,128
Net cashflow, all capital			18,100,289	19,724,654	21,502,258	23,447,197	25,575,841	27,905,834	30,456,082	33,248,112	36,305,701	83,846,790
RORO Terminal Operation Cashflow, Equity-Owner's Viewpoint												
			Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Net cashflow, all capital			18,100,289	19,724,654	21,502,258	23,447,197	25,575,841	27,905,834	30,456,082	33,248,112	36,305,701	83,846,790
Loan proceeds from DBP												
Debt service			(6,028,352)	-	-	-	-	-	-	-	-	-
Income tax liability			(5,023,443)	(5,622,123)	(6,191,205)	(6,813,845)	(7,495,281)	(8,241,159)	(9,057,530)	(9,951,283)	(10,930,027)	(12,001,706)
Net Cashflow before Tax			12,071,938	19,724,654	21,502,258	23,447,197	25,575,841	27,905,834	30,456,082	33,248,112	36,305,701	83,846,790
Net Cashflow after Tax			7,048,495	14,102,531	15,311,053	16,633,352	18,080,560	19,664,675	21,398,552	23,296,829	25,375,674	71,845,084
Memo:												
Earnings before Income Taxes (EBIT)			18,119,019	19,744,133	21,522,516	23,468,266	25,597,752	27,928,622	30,479,781	33,272,759	36,331,334	39,680,330
EBIT less: Depreciation			2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000
Interest expense			245,760	-	-	-	-	-	-	-	-	-
= Taxable income			15,698,259	17,569,133	19,347,516	21,293,266	23,422,752	25,753,622	28,304,781	31,097,759	34,156,334	37,505,330
Integrated RORO Vessel and RORO Terminal Operation												
			Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Net cashflow, all capital, before tax			38,029,927	40,451,477	43,058,154	45,865,329	48,890,698	52,153,285	55,673,431	59,474,155	63,580,786	126,824,545
Net Cashflow, equity, before tax			32,001,575	40,451,477	43,058,154	45,865,329	48,890,698	52,153,285	55,673,431	59,474,155	63,580,786	126,824,545
Vessel			19,929,638	20,726,823	21,555,896	22,418,132	23,314,857	24,247,451	25,217,349	26,226,043	27,275,085	42,977,755
RORO terminal			12,071,938	19,724,654	21,502,258	23,447,197	25,575,841	27,905,834	30,456,082	33,248,112	36,305,701	83,846,790
Income tax liability			(10,824,877)	(11,683,710)	(12,523,352)	(13,427,374)	(14,401,447)	(15,451,668)	(16,584,555)	(17,807,485)	(19,128,573)	(20,556,290)
Net Cashflow, equity, after tax			21,176,698	28,767,767	30,534,802	32,437,955	34,489,251	36,701,618	39,088,876	41,666,670	44,452,213	106,268,255
Memo:												
Taxable income, vessel			18,129,482	18,942,462	19,787,960	20,667,278	21,581,770	22,532,840	23,521,954	24,550,632	25,620,457	26,733,076
Taxable income, terminal			15,698,259	17,569,133	19,347,516	21,293,266	23,422,752	25,753,622	28,304,781	31,097,759	34,156,334	37,505,330
Taxable income, combined			33,827,741	36,511,594	39,135,476	41,960,544	45,004,522	48,286,462	51,826,735	55,648,391	59,776,792	64,238,406
If all capital is equity capital:	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20		
Vessel operations												
Net Cashflow before tax			19,929,638	20,726,823	21,555,896	22,418,132	23,314,857	24,247,451	25,217,349	26,226,043	27,275,085	42,977,755
Taxable income			18,129,482	18,942,462	19,787,960	20,667,278	21,581,770	22,532,840	23,521,954	24,550,632	25,620,457	26,733,076
Income tax			5,801,434	6,061,588	6,332,147	6,613,529	6,906,166	7,210,509	7,527,025	7,856,202	8,198,546	8,554,584
Net Cashflow after tax			14,128,203	14,665,235	15,223,749	15,804,603	16,408,691	17,036,942	17,690,324	18,369,841	19,076,539	34,423,171
RORO terminal operations												
Net Cashflow before tax			18,100,289	19,724,654	21,502,258	23,447,197	25,575,841	27,905,834	30,456,082	33,248,112	36,305,701	83,846,790
Taxable income			15,944,019	17,569,133	19,347,516	21,293,266	23,422,752	25,753,622	28,304,781	31,097,759	34,156,334	37,505,330
Income tax			5,102,086	5,622,123	6,191,205	6,813,845	7,495,281	8,241,159	9,057,530	9,951,283	10,930,027	12,001,706
Net Cashflow after tax			12,998,203	14,102,531	15,311,053	16,633,352	18,080,560	19,664,675	21,398,552	23,296,829	25,375,674	71,845,084
Integrated operations												
Net Cashflow before tax			38,029,927	40,451,477	43,058,154	45,865,329	48,890,698	52,153,285	55,673,431	59,474,155	63,580,786	126,824,545
Taxable income			34,073,502	36,511,594	39,135,476	41,960,544	45,004,522	48,286,462	51,826,735	55,648,391	59,776,792	64,238,406
Income tax			10,903,521	11,683,710	12,523,352	13,427,374	14,401,447	15,451,668	16,584,555	17,807,485	19,128,573	20,556,290
Net Cashflow after tax			27,126,407	28,767,767	30,534,802	32,437,955	34,489,251	36,701,618	39,088,876	41,666,670	44,452,213	106,268,255

Projected Cashflows – Cawayan-Daan Bantayan (1)

			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Demand Forecast			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Passenger Traffic			108,486	156,762	207,709	220,213	233,469	247,522	262,422	278,219	294,967	312,723
Vehicle Traffic												
Type 1			313	479	577	612	649	688	729	773	820	869
Type 2			5,486	8,394	10,115	10,724	11,369	12,054	12,779	13,549	14,364	15,229
Type 3			6,821	10,437	12,576	13,333	14,136	14,987	15,889	16,845	17,859	18,934
Type 4			3,643	5,574	6,716	7,120	7,549	8,003	8,485	8,996	9,537	10,112
in total lane meters			119,519	182,875	220,353	233,615	247,683	262,591	278,396	295,158	312,917	331,765
Vessel Loading Capacity Projection			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Load Factors: Passengers			60%	65%	70%	70%	70%	70%	70%	70%	70%	70%
Vehicles			60%	65%	70%	75%	80%	80%	80%	80%	80%	80%
Passenger Traffic			108,486	156,762	207,709	220,213	231,000	231,000	231,000	231,000	231,000	231,000
Vehicle Traffic (in lane meters)			87,120	94,380	101,640	108,900	116,160	116,160	116,160	116,160	116,160	116,160
Vessel Revenue Projection (PHP)			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Projected Passage Fees:												
Passengers			264.00	274.56	285.54	296.96	308.84	321.20	334.04	347.41	361.30	375.75
Vehicles			506.00	526.24	547.29	569.18	591.95	615.63	640.25	665.86	692.50	720.20
Passage Fee Revenues:												
Passengers			28,640,304	43,040,575	59,309,726	65,395,354	71,342,654	74,196,361	77,164,215	80,250,784	83,460,815	86,799,248
Vehicles			44,082,720	49,666,531	55,626,515	61,983,831	68,760,730	71,511,159	74,371,605	77,346,470	80,440,328	83,657,941
Total Vessel Operation Revenues			72,723,024	92,707,106	114,936,241	127,379,185	140,103,384	145,707,520	151,535,820	157,597,253	163,901,143	170,457,189
Vessel Operating & Maintenance (O&M) Expenses Schedule (PHP)			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Fixed Costs:												
Crew Cost			1,944,000	2,021,760	2,102,630	2,186,736	2,274,205	2,365,173	2,459,780	2,558,171	2,660,498	2,766,918
Admin			1,800,000	1,872,000	1,946,880	2,024,755	2,105,745	2,189,975	2,277,574	2,368,677	2,463,424	2,561,961
Insurance			1,355,000	1,409,200	1,465,568	1,524,191	1,585,158	1,648,565	1,714,507	1,783,088	1,854,411	1,928,588
Drydocking & Maintenance			1,200,000	1,248,000	1,297,920	1,349,837	1,403,830	1,459,983	1,518,383	1,579,118	1,642,283	1,707,974
Variable Costs:												
Fuel ME & Aux			58,854,400	61,208,576	63,656,919	66,203,196	68,851,324	71,605,377	74,469,592	77,448,375	80,546,310	83,768,163
Lubricants and Consumables			5,885,440	6,120,858	6,365,692	6,620,320	6,885,132	7,160,538	7,446,959	7,744,838	8,054,631	8,376,816
Berthing			1,320,000	1,372,800	1,427,712	1,484,820	1,544,213	1,605,982	1,670,221	1,737,030	1,806,511	1,878,772
Total O&M Costs			72,358,840	75,253,194	78,263,321	81,393,854	84,649,608	88,035,593	91,557,016	95,219,297	99,028,069	102,989,192
Vessel Working Capital Schedule (PHP)			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Change in working capital			18,089,710	723,588	752,532	782,633	813,939	846,496	880,356	915,570	952,193	990,281
Total working capital investment (outflow)			18,089,710	723,588	752,532	782,633	813,939	846,496	880,356	915,570	952,193	990,281
Recovery of working capital (inflow)												
Vessel Operation Cashflow, All Capital Point of View		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Inflows												
Passage Fee Revenues			72,723,024	92,707,106	114,936,241	127,379,185	140,103,384	145,707,520	151,535,820	157,597,253	163,901,143	170,457,189
Recovery of working capital												
Outflows												
Capital expenditure		56,355,000										
O&M costs			72,358,840	75,253,194	78,263,321	81,393,854	84,649,608	88,035,593	91,557,016	95,219,297	99,028,069	102,989,192
Change in working capital			18,089,710	723,588	752,532	782,633	813,939	846,496	880,356	915,570	952,193	990,281
Net Cashflow, all capital		(56,355,000)	(17,725,526)	16,730,324	35,920,388	45,202,698	54,639,837	56,825,431	59,098,448	61,462,386	63,920,881	66,477,717
Vessel Operation Cashflow, Equity-Owner's Viewpoint		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cashflow, all capital		(56,355,000)	(17,725,526)	16,730,324	35,920,388	45,202,698	54,639,837	56,825,431	59,098,448	61,462,386	63,920,881	66,477,717
Loan proceeds from DBP		39,360,000										
Debt service			(2,952,000)	(2,952,000)	(2,952,000)	(7,575,860)	(7,575,860)	(7,575,860)	(7,575,860)	(7,575,860)	(7,575,860)	(7,575,860)
Income tax liability		-	-	(3,853,412)	(10,003,494)	(12,886,280)	(16,036,187)	(16,876,418)	(17,756,363)	(18,678,139)	(19,643,998)	(20,656,327)
Net Cashflow before Tax		(16,995,000)	(20,677,526)	13,778,324	32,968,388	37,626,838	47,063,978	49,249,571	51,522,588	53,886,526	56,345,022	58,901,857
Net Cashflow after Tax		(16,995,000)	(20,677,526)	9,924,912	22,964,894	24,740,558	31,027,790	32,373,153	33,766,226	35,208,387	36,701,024	38,245,530
Memo:												
Earnings before Income Taxes (EBIT)			364,184	17,453,912	36,672,920	45,985,331	55,453,776	57,671,927	59,978,804	62,377,956	64,873,074	67,467,997
EBIT less: Depreciation			2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000
Interest expense			2,952,000	2,952,000	2,952,000	3,255,707	2,880,691	2,473,121	2,030,171	1,548,771	1,025,582	456,977
= Taxable income			(5,047,816)	12,041,912	31,260,920	40,269,624	50,113,085	52,738,806	55,488,633	58,369,185	61,387,493	64,551,021

Projected Cash Flows – Cawayan-Daan Bantayan (2)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Demand Forecast	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Passenger Traffic	331,547	351,505	372,664	395,097	418,880	444,095	470,828	499,170	529,218	561,075
Vehicle Traffic										
Type 1	921	977	1,036	1,098	1,164	1,234	1,309	1,387	1,471	1,559
Type 2	16,146	17,118	18,148	19,240	20,399	21,626	22,928	24,308	25,772	27,323
Type 3	20,074	21,282	22,563	23,922	25,362	26,888	28,507	30,223	32,042	33,971
Type 4	10,720	11,366	12,050	12,775	13,544	14,359	15,224	16,140	17,112	18,142
in total lane meters	351,730	372,910	395,353	419,150	444,385	471,122	499,495	529,555	561,440	595,234
Vessel Loading Capacity Projection	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Load Factors: Passengers	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Vehicles	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Passenger Traffic	231,000	231,000	231,000	231,000	231,000	231,000	231,000	231,000	231,000	231,000
Vehicle Traffic (in lane meters)	116,160	116,160	116,160	116,160	116,160	116,160	116,160	116,160	116,160	116,160
Vessel Revenue Projection (PHP)	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Projected Passage Fees:										
Passengers	390.78	406.42	422.67	439.58	457.16	475.45	494.47	514.25	534.82	556.21
Vehicles	749.00	778.96	810.12	842.53	876.23	911.28	947.73	985.64	1,025.06	1,066.07
Passage Fee Revenues:										
Passengers	90,271,217	93,882,066	97,637,349	101,542,843	105,604,556	109,828,739	114,221,888	118,790,764	123,542,394	128,484,090
Vehicles	87,004,259	90,484,429	94,103,807	97,867,959	101,782,677	105,853,984	110,088,144	114,491,670	119,071,336	123,834,190
Total Vessel Operation Revenues	177,275,477	184,366,496	191,741,155	199,410,802	207,387,234	215,682,723	224,310,032	233,282,433	242,613,731	252,318,280
Vessel Operating & Maintenance (O&M) Expenses Schedule (PHP)	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Fixed Costs:										
Crew Cost	2,877,595	2,992,699	3,112,407	3,236,903	3,366,379	3,501,034	3,641,076	3,786,719	3,938,187	4,095,715
Admin	2,664,440	2,771,017	2,881,858	2,997,132	3,117,018	3,241,698	3,371,366	3,506,221	3,646,470	3,792,329
Insurance	2,005,731	2,085,960	2,169,399	2,256,175	2,346,422	2,440,278	2,537,890	2,639,405	2,744,981	2,854,781
Drydocking & Maintenance	1,776,293	1,847,345	1,921,239	1,998,088	2,078,012	2,161,132	2,247,577	2,337,481	2,430,980	2,528,219
Variable Costs:										
Fuel ME & Aux	87,118,889	90,603,645	94,227,791	97,996,902	101,916,778	105,993,449	110,233,187	114,642,515	119,228,216	123,997,344
Lubricants and Consumables	8,711,889	9,060,364	9,422,779	9,799,690	10,191,678	10,599,345	11,023,319	11,464,251	11,922,822	12,399,734
Berthing	1,953,922	2,032,079	2,113,363	2,197,897	2,285,813	2,377,245	2,472,335	2,571,229	2,674,078	2,781,041
Total O&M Costs	107,108,759	111,393,110	115,848,834	120,482,788	125,302,099	130,314,183	135,526,750	140,947,820	146,585,733	152,449,162
Vessel Working Capital Schedule (PHP)	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Change in working capital	1,029,892	1,071,088	1,113,931	1,158,488	1,204,828	1,253,021	1,303,142	1,355,268	1,409,478	1,465,857
Total working capital investment (outflow)	1,029,892	1,071,088	1,113,931	1,158,488	1,204,828	1,253,021	1,303,142	1,355,268	1,409,478	1,465,857
Recovery of working capital (inflow)										38,112,291
Vessel Operation Cashflow, All Capital Point of View	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Inflows										
Passage Fee Revenues	177,275,477	184,366,496	191,741,155	199,410,802	207,387,234	215,682,723	224,310,032	233,282,433	242,613,731	252,318,280
Recovery of working capital										38,112,291
Outflows										
Capital expenditure										
O&M costs	107,108,759	111,393,110	115,848,834	120,482,788	125,302,099	130,314,183	135,526,750	140,947,820	146,585,733	152,449,162
Change in working capital	1,029,892	1,071,088	1,113,931	1,158,488	1,204,828	1,253,021	1,303,142	1,355,268	1,409,478	1,465,857
Net Cashflow, all capital	69,136,825	71,902,298	74,778,390	77,769,526	80,880,307	84,115,519	87,480,140	90,979,346	94,618,519	136,515,551
Vessel Operation Cashflow, Equity-Owner's Viewpoint	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Net Cashflow, all capital	69,136,825	71,902,298	74,778,390	77,769,526	80,880,307	84,115,519	87,480,140	90,979,346	94,618,519	136,515,551
Loan proceeds from DBP										
Debt service	-	-	-	-	-	-	-	-	-	-
Income tax liability	(21,666,150)	(22,564,283)	(23,498,343)	(24,469,765)	(25,480,043)	(26,530,733)	(27,623,450)	(28,759,876)	(29,941,759)	(31,170,918)
Net Cashflow before Tax	69,136,825	71,902,298	74,778,390	77,769,526	80,880,307	84,115,519	87,480,140	90,979,346	94,618,519	136,515,551
Net Cashflow after Tax	47,470,676	49,338,015	51,280,047	53,299,761	55,400,264	57,584,786	59,856,690	62,219,469	64,676,760	105,344,633
Memo:										
Earnings before Income Taxes (EBIT)	70,166,717	72,973,386	75,892,321	78,928,014	82,085,135	85,368,540	88,783,282	92,334,613	96,027,998	99,869,117
EBIT less: Depreciation	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000	2,460,000
Interest expense	-	-	-	-	-	-	-	-	-	-
= Taxable income	67,706,717	70,513,386	73,432,321	76,468,014	79,625,135	82,908,540	86,323,282	89,874,613	93,567,998	97,409,117

Projected Cash Flows – Cawayan-Daan Bantayan (3)

RORO Terminal Operation Cashflow, All Capital Viewpoint											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Terminal Fees:											
Passengers		10	10.40	10.82	11.25	11.70	12.17	12.65	13.16	13.69	14.23
Vehicles (per lane meter)		32	33.28	34.61	36.00	37.44	38.93	40.49	42.11	43.79	45.55
Local business revenue/pax		10	10.40	10.82	11.25	11.70	12.17	12.65	13.16	13.69	14.23
Inflows											
Terminal Fee Revenues:											
Passengers, 1st RORO vessel		1,084,860	1,630,325	2,246,581	2,477,097	2,702,373	2,810,468	2,922,887	3,039,802	3,161,395	3,287,850
Passengers, 2nd RORO vessel							201,015	397,589	621,370	875,433	1,163,173
Vehicles, 1st RORO vessel		2,787,840	3,140,966	3,517,882	3,919,926	4,348,505	4,522,445	4,703,343	4,891,476	5,087,135	5,290,621
Vehicles, 2nd RORO vessel							5,734,231	6,605,937	7,577,998	8,661,969	9,869,039
Berthing Fee Revenues, 1st RORO vessel		1,320,000	1,372,800	1,427,712	1,484,820	1,544,213	1,605,982	1,670,221	1,737,030	1,806,511	1,878,772
Berthing Fee Revenues, 2nd RORO vessel							1,605,982	1,670,221	1,737,030	1,806,511	1,878,772
Miscellaneous port revenues		330,000	343,200	356,928	371,205	386,053	401,495	417,555	434,257	451,628	469,693
Local business revenues		1,084,860	1,630,325	2,246,581	2,477,097	2,731,257	3,011,484	3,320,475	3,661,172	4,036,827	4,451,023
Recovery of working capital											
Selling value of depreciated port/terminal											
Total Inflows		6,607,560	8,117,616	9,795,683	10,730,145	11,712,402	19,893,102	21,708,228	23,700,137	25,887,409	28,288,943
Outflows											
Development cost, Pilar & Aroroy	71,984,502										
O&M cost		1,315,932	1,368,569	1,423,312	1,480,244	1,539,454	1,601,032	1,665,074	1,731,676	1,800,944	1,872,981
Change in working capital	-	328,983	13,159	13,686	14,233	14,802	15,395	16,010	16,651	17,317	18,009
Total Outflows	71,984,502	1,644,915	1,381,728	1,436,998	1,494,477	1,554,256	1,616,427	1,681,084	1,748,327	1,818,260	1,890,991
Net cashflow, all capital	(71,984,502)	4,962,645	6,735,888	8,358,686	9,235,668	10,158,145	18,276,676	20,027,144	21,951,809	24,069,148	26,397,952
RORO Terminal Operation Cashflow, Equity-Owner's Viewpoir	-	-	-	329,585	439,762	945,833	3,772,937	4,582,147	5,468,710	6,440,415	7,505,313
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net cashflow, all capital	(71,984,502)	4,962,645	6,735,888	8,358,686	9,235,668	10,158,145	18,276,676	20,027,144	21,951,809	24,069,148	26,397,952
Loan proceeds from DBP	57,587,602										
Debt service	-	(4,319,070)	(4,319,070)	(4,319,070)	(11,084,238)	(11,084,238)	(11,084,238)	(11,084,238)	(11,084,238)	(11,084,238)	(11,084,238)
Income tax liability	-	-	(201,717)	(721,180)	(859,797)	(1,330,751)	(4,119,691)	(4,887,424)	(5,728,909)	(6,651,624)	(7,663,279)
Net Cashflow before Tax	(14,396,900)	643,575	2,416,818	4,039,616	(1,848,570)	(926,092)	7,192,438	8,942,907	10,867,572	12,984,911	15,313,715
Net Cashflow after Tax	(14,396,900)	643,575	2,215,101	3,318,435	(2,708,367)	(2,256,844)	3,072,747	4,055,483	5,138,662	6,333,287	7,650,436
Memo:											
Earnings before Income Taxes (EBIT)	-	5,291,628	6,749,047	8,372,372	9,249,901	10,172,948	18,292,070	20,043,155	21,968,460	24,086,465	26,415,962
EBIT less: Depreciation		1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613
Interest expense	-	4,319,070	4,319,070	4,319,070	4,763,424	4,214,738	3,618,422	2,970,343	2,266,006	1,500,528	668,602
= Taxable income	-	(827,054)	630,364	2,253,689	2,686,865	4,158,597	12,874,036	15,273,200	17,902,842	20,786,325	23,947,747

Integrated RORO Vessel and RORO Terminal Operation										
Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net cashflow, all capital, before tax	(128,339,502)	(12,762,881)	23,466,212	44,279,074	54,438,366	64,797,982	75,102,106	79,125,592	83,414,195	87,990,030	92,875,669
Net Cashflow, equity, before tax	(31,391,900)	(20,033,951)	16,195,141	37,008,004	35,778,268	46,137,885	56,442,009	60,465,495	64,754,098	69,329,932	74,215,571
Vessel	(16,995,000)	(20,677,526)	13,778,324	32,968,388	37,626,838	47,063,978	49,249,571	51,522,588	53,886,526	56,345,022	58,901,857
RORO terminal	(14,396,900)	643,575	2,416,818	4,039,616	(1,848,570)	(926,092)	7,192,438	8,942,907	10,867,572	12,984,911	15,313,715
Income tax liability	-	-	4,055,129	10,724,675	13,746,076	17,366,938	20,996,109	22,643,786	24,407,049	26,295,622	28,319,606
Net Cashflow, equity, after tax	(31,391,900)	(20,033,951)	12,140,013	26,283,329	22,032,192	28,770,947	35,445,900	37,821,709	40,347,049	43,034,311	45,895,966
Memo:											
Taxable income, vessel	-	(5,047,816)	12,041,912	31,260,920	40,269,624	50,113,085	52,738,806	55,488,633	58,369,185	61,387,493	64,551,021
Taxable income, terminal	-	(827,054)	630,364	2,253,689	2,686,865	4,158,597	12,874,036	15,273,200	17,902,842	20,786,325	23,947,747
Taxable income, combined	-	(5,874,870)	12,672,277	33,514,609	42,956,489	54,271,683	65,612,842	70,761,832	76,272,027	82,173,817	88,498,768

If all capital is equity capital:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Vessel operations											
Net Cashflow before tax	(56,355,000)	(17,725,526)	16,730,324	35,920,388	45,202,698	54,639,837	56,825,431	59,098,448	61,462,386	63,920,881	66,477,717
Taxable income	-	(2,095,816)	14,993,912	34,212,920	43,525,331	52,993,776	55,211,927	57,518,804	59,917,956	62,413,074	65,007,997
Income tax	-	-	4,798,052	10,948,134	13,928,106	16,958,008	17,667,817	18,406,017	19,173,746	19,972,184	20,802,559
Net Cashflow after tax	(56,355,000)	(17,725,526)	11,932,272	24,972,254	31,274,592	37,681,829	39,157,614	40,692,431	42,288,640	43,948,698	45,675,157
RORO terminal operations											
Net Cashflow before tax	(71,984,502)	4,962,645	6,735,888	8,358,686	9,235,668	10,158,145	18,276,676	20,027,144	21,951,809	24,069,148	26,397,952
Taxable income	-	3,492,016	4,949,434	6,572,759	7,450,288	8,373,335	16,492,458	18,243,542	20,168,848	22,286,853	24,616,349
Income tax	-	1,117,445	1,583,819	2,103,283	2,384,092	2,679,467	5,277,586	5,837,933	6,454,031	7,131,793	7,877,232
Net Cashflow after tax	(71,984,502)	3,845,200	5,152,069	6,255,403	6,851,576	7,478,678	12,999,089	14,189,211	15,497,778	16,937,356	18,520,720
Integrated operations											
Net Cashflow before tax	(128,339,502)	(12,762,881)	23,466,212	44,279,074	54,438,366	64,797,982	75,102,106	79,125,592	83,414,195	87,990,030	92,875,669
Taxable income	-	1,396,200	19,943,347	40,785,679	50,975,620	61,367,111	71,704,384	75,762,346	80,086,804	84,699,927	89,624,346
Income tax	-	446,784	6,381,871	13,051,417	16,312,198	19,637,475	22,945,403	24,243,951	25,627,777	27,103,977	28,679,791
Net Cashflow after tax	(128,339,502)	(13,209,665)	17,084,341	31,227,657	38,126,168	45,160,507	52,156,703	54,881,642	57,786,418	60,886,053	64,195,878

Projected Cash Flows – Cawayan-Daan Bantayan (4)

RORO Terminal Operation Cashflow, All Capital Viewpoint											
			Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Terminal Fees:												
Passengers			14.80	15.39	16.01	16.65	17.32	18.01	18.73	19.48	20.26	21.07
Vehicles (per lane meter)			47.37	49.26	51.23	53.28	55.41	57.63	59.94	62.33	64.83	67.42
Local business revenue/pax			14.80	15.39	16.01	16.65	17.32	18.01	18.73	19.48	20.26	21.07
Inflows												
Terminal Fee Revenues:												
Passengers, 1st RORO vessel			3,419,364	3,556,139	3,698,384	3,846,320	4,000,173	4,160,179	4,326,587	4,499,650	4,679,636	4,866,822
Passengers, 2nd RORO vessel			1,488,341	1,855,119	2,268,086	2,732,336	3,253,474	3,837,721	4,491,933	5,223,685	6,041,349	6,954,182
Vehicles, 1st RORO vessel			5,502,246	5,722,335	5,951,229	6,189,278	6,436,849	6,694,323	6,962,096	7,240,580	7,530,203	7,831,411
Vehicles, 2nd RORO vessel			11,213,194	12,707,762	14,370,250	16,217,177	18,268,272	20,545,855	23,073,031	25,876,160	28,985,059	32,429,499
Berthing Fee Revenues, 1st RORO vessel			1,953,922	2,032,079	2,113,363	2,197,897	2,285,813	2,377,245	2,472,335	2,571,229	2,674,078	2,781,041
Berthing Fee Revenues, 2nd RORO vessel			1,953,922	2,032,079	2,113,363	2,197,897	2,285,813	2,377,245	2,472,335	2,571,229	2,674,078	2,781,041
Miscellaneous port revenues			488,481	508,020	528,341	549,474	571,453	594,311	618,084	642,807	668,519	695,260
Local business revenues			4,907,706	5,411,258	5,966,471	6,578,655	7,253,646	7,997,900	8,818,520	9,723,335	10,720,986	11,821,004
Recovery of working capital												693,117
Selling value of depreciated port/terminal												35,992,251
Total Inflows			30,927,176	33,824,792	37,009,486	40,509,034	44,355,493	48,584,781	53,234,922	58,348,674	63,973,908	106,845,629
Outflows												
Development cost, Pilar & Aroroy												
O&M cost			1,947,900	2,025,817	2,106,849	2,191,123	2,278,768	2,369,919	2,464,716	2,563,304	2,665,836	2,772,470
Change in working capital			18,730	19,479	20,258	21,068	21,911	22,788	23,699	24,647	25,633	26,658
Total Outflows			1,966,630	2,045,296	2,127,107	2,212,192	2,300,679	2,392,706	2,488,415	2,587,951	2,691,469	2,799,128
Net cashflow, all capital			28,960,546	31,779,497	34,882,379	38,296,842	42,054,814	46,192,074	50,746,507	55,760,722	61,282,439	104,046,500
RORO Terminal Operation Cashflow, Equity-Owner's Viewpoint			8,582,317	9,484,621	10,477,793	11,570,680	12,773,501	14,097,705	15,555,415	17,160,267	18,927,532	20,873,042
			Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Net cashflow, all capital			28,960,546	31,779,497	34,882,379	38,296,842	42,054,814	46,192,074	50,746,507	55,760,722	61,282,439	104,046,500
Loan proceeds from DBP												
Debt service			-	-	-	-	-	-	-	-	-	-
Income tax liability			(8,697,492)	(9,599,796)	(10,592,968)	(11,685,855)	(12,888,676)	(14,212,880)	(15,670,590)	(17,275,442)	(19,042,707)	(20,988,217)
Net Cashflow before Tax			28,960,546	31,779,497	34,882,379	38,296,842	42,054,814	46,192,074	50,746,507	55,760,722	61,282,439	104,046,500
Net Cashflow after Tax			20,263,054	22,179,700	24,289,411	26,610,987	29,166,138	31,979,194	35,075,917	38,485,280	42,239,732	83,058,284
Memo:												
Earnings before Income Taxes (EBIT)			28,979,276	31,798,976	34,902,637	38,317,911	42,076,725	46,214,862	50,770,206	55,785,370	61,308,072	67,387,790
EBIT less: Depreciation			1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613	1,799,613
Interest expense			-	-	-	-	-	-	-	-	-	-
= Taxable income			27,179,663	29,999,363	33,103,025	36,518,298	40,277,112	44,415,249	48,970,594	53,985,757	59,508,459	65,588,178
Integrated RORO Vessel and RORO Terminal Operation												
			Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Net cashflow, all capital, before tax			98,097,371	103,681,795	109,660,769	116,066,368	122,935,121	130,307,593	138,226,647	146,740,068	155,900,958	240,562,051
Net Cashflow, equity, before tax			98,097,371	103,681,795	109,660,769	116,066,368	122,935,121	130,307,593	138,226,647	146,740,068	155,900,958	240,562,051
Vessel			69,136,825	71,902,298	74,778,390	77,769,526	80,880,307	84,115,519	87,480,140	90,979,346	94,618,519	136,515,551
RORO terminal			28,960,546	31,779,497	34,882,379	38,296,842	42,054,814	46,192,074	50,746,507	55,760,722	61,282,439	104,046,500
Income tax liability			30,363,642	32,164,080	34,091,311	36,155,620	38,368,719	40,743,613	43,294,040	46,035,318	48,984,466	52,159,135
Net Cashflow, equity, after tax			67,733,729	71,517,715	75,569,459	79,910,748	84,566,402	89,563,981	94,932,607	100,704,749	106,916,492	188,402,917
Memo:												
Taxable income, vessel			67,706,717	70,513,386	73,432,321	76,468,014	79,625,135	82,908,540	86,323,282	89,874,613	93,567,998	97,409,117
Taxable income, terminal			27,179,663	29,999,363	33,103,025	36,518,298	40,277,112	44,415,249	48,970,594	53,985,757	59,508,459	65,588,178
Taxable income, combined			94,886,380	100,512,749	106,535,346	112,986,312	119,902,247	127,323,789	135,293,876	143,860,370	153,076,457	162,997,295
If all capital is equity capital:			Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Vessel operations												
Net Cashflow before tax			69,136,825	71,902,298	74,778,390	77,769,526	80,880,307	84,115,519	87,480,140	90,979,346	94,618,519	136,515,551
Taxable income			67,706,717	70,513,386	73,432,321	76,468,014	79,625,135	82,908,540	86,323,282	89,874,613	93,567,998	97,409,117
Income tax			21,666,150	22,564,283	23,498,343	24,469,765	25,480,043	26,530,733	27,623,450	28,759,876	29,941,759	31,170,918
Net Cashflow after tax			47,470,676	49,338,015	51,280,047	53,299,761	55,400,264	57,584,786	59,856,690	62,219,469	64,676,760	105,344,633
RORO terminal operations												
Net Cashflow before tax			28,960,546	31,779,497	34,882,379	38,296,842	42,054,814	46,192,074	50,746,507	55,760,722	61,282,439	104,046,500
Taxable income			27,179,663	29,999,363	33,103,025	36,518,298	40,277,112	44,415,249	48,970,594	53,985,757	59,508,459	65,588,178
Income tax			8,697,492	9,599,796	10,592,968	11,685,855	12,888,676	14,212,880	15,670,590	17,275,442	19,042,707	20,988,217
Net Cashflow after tax			20,263,054	22,179,700	24,289,411	26,610,987	29,166,138	31,979,194	35,075,917	38,485,280	42,239,732	83,058,284
Integrated operations												
Net Cashflow before tax			98,097,371	103,681,795	109,660,769	116,066,368	122,935,121	130,307,593	138,226,647	146,740,068	155,900,958	240,562,051
Taxable income			94,886,380	100,512,749	106,535,346	112,986,312	119,902,247	127,323,789	135,293,876	143,860,370	153,076,457	162,997,295
Income tax			30,363,642	32,164,080	34,091,311	36,155,620	38,368,719	40,743,613	43,294,040	46,035,318	48,984,466	52,159,135
Net Cashflow after tax			67,733,729	71,517,715	75,569,459	79,910,748	84,566,402	89,563,981	94,932,607	100,704,749	106,916,492	188,402,917