

CHAPTER 17

PPP OPTIONS FOR TOLL ROAD DEVELOPMENT

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17.1 CONCEPTS OF PPP

17.1.1 Definition of PPP

While there is no widely accepted definition of Public-Private Partnerships (PPP), ADB introduce the following definition and concepts in the Public-Private Partnership Handbook, 2008.

The term “public-private partnership” (PPP) describes a range of possible relationship among public and private entities in the context of infrastructure and other services.

Other terms used for this type of activity include “private sector participation” (PSP) and privatization (PRV). While the three terms have often been used interchangeably, there are differences.

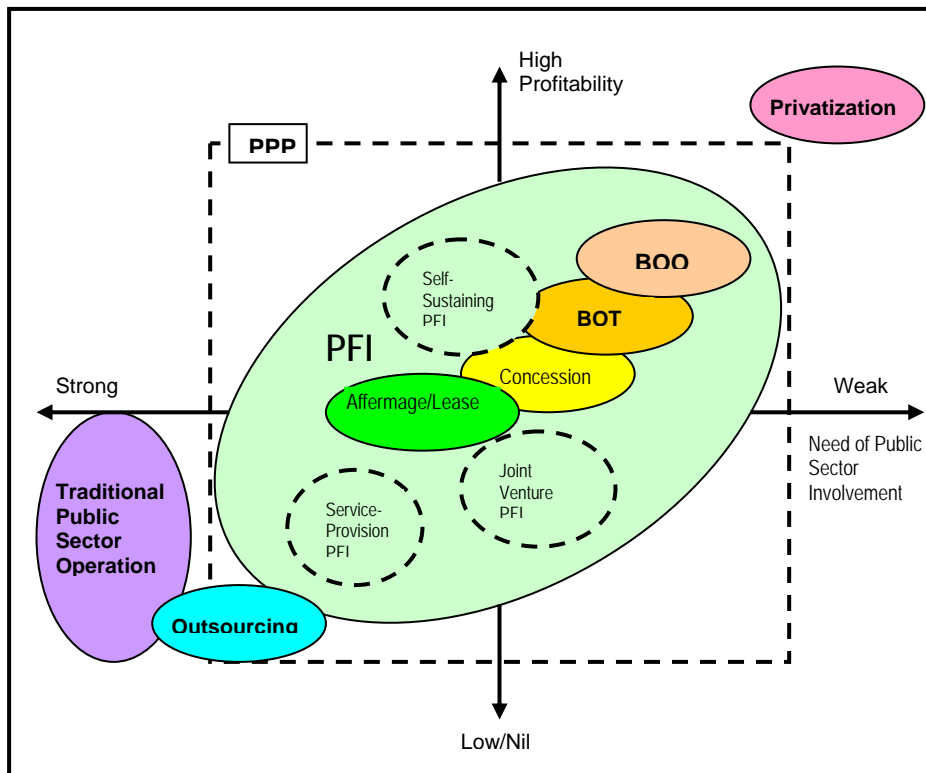
- PPPs present a framework that – while engaging the private sector – acknowledge and structure the role for government in ensuring that social obligations are met and successful sector reforms and public investments achieved.

A strong PPP allocates the tasks, obligations, and risks among the public and private partners in an optional way. The public partners in PPP are government entities, and the private partners may include businesses or investors with technical or financial expertise relevant to the project.

The private sector brings his capital and ability to deliver projects on time and to budget, while the public sector retains the responsibility to provide these services to the public in a way that benefits the public and delivers economic development and an improvement in the quality of life.

- PSP is a term often used interchangeably with PPPs. However contracts transfer obligation to the private sector rather than emphasizing the opportunity for partnership. The critical analysis of PSP experience has led to the design of a new generation of transactions, which are now more commonly known as PPPs.
- Privatization involves the sale of shares or ownership in a company or the sale of operating assets or services owned by the public sector. Privatization is most common and more widely accepted in sectors that are not traditionally considered public services, such as manufacturing, construction, etc.

PPPs structures shown in **Figure 17.1.1-1** indicates that PPPs fill a space between traditionally procured government projects and full privatization where government no longer has a direct role in on-going projects. PPP may enable to develop project, which do not have enough profitability with revenues and are not self-sustaining.



Source: Heather Skilling and Kathleen Booth, 2007.

FIGURE 17.1.1-1 PPP STRUCTURES

17.1.2 Objectives of PPPs

Governments recognize the indispensable role of the private sector as the main engine for national growth and development. Private sector resources shall be utilized for the purposes of providing services, financing and constructions, operation and maintenance of infrastructure projects.

There are ranges of reasons that governments enter into PPPs for infrastructures including the followings.

Mobilization of Private Capital

Governments face an-ever-increasing need to find sufficient financing to develop and maintain infrastructure required to support growing population. Combined with most governments' limited financial capacity, there is a desire to mobilize private sector capital and provide increased infrastructure provision and services.

The end of the private sector in entering into a PPP is to seek compensation for its services through fees for services rendered, resulting in an appropriate return on capital invested.

Tool for Greater Efficiency

The public sector has few incentives for efficiency structured into its organization and process and is thus poorly positioned to efficiently build and operate infrastructure. The private sector, however, enters into an investment with the clear goal of maximizing profits, by increased efficiency in investment and operations with full utilization of the private sector's skills.

17.1.3 Requirements of PPPs

PPPs aim at financing, designing, implementing public sector facilities and services. They refer to innovative methods used by the public sector to contract with the private sector to be followed by several requirements including the followings.

Key Characteristics in Contract

PPPs can follow a variety of structures and contractual formats, but shall incorporate three key characteristics.

- A contractual agreement defining the roles and responsibilities of the parties.
- Sensible risk-sharing among the public and the private sector partners, and
- Financial rewards to the private party commensurate with achievement of pre-specified output.

Government Commitment

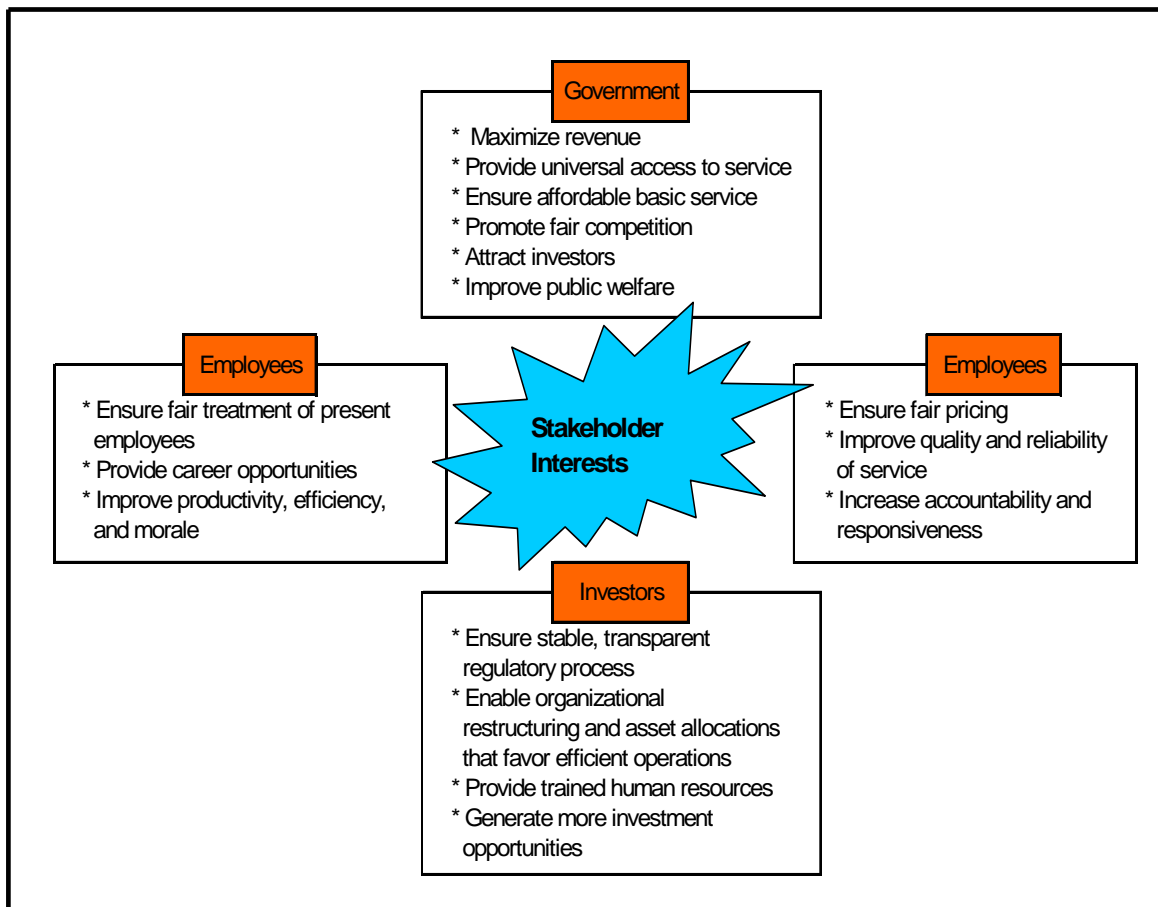
The private sector expects government to be a competent partner in discharging its obligations in terms of policy and reform planning, project development, and contract oversight. The government is also expected to establish the appropriate legal and other frameworks to set target, monitor progress, evaluate progress, report progress, enforce the contract provisions, and handle disputes.

The government's commitment to the strategy is demonstrated in several ways; through a public statement of the strategy and expectation of PPP; through stakeholder consultation and transparency of process; and through the provision of adequate funding and support for the process.

Stakeholder Consultation

Stakeholder consultation is increasingly seen as important for success of PPP projects. Inadequate consultation with stakeholders increases the danger of opposition, potentially late in the process, leading to delays or even cancellation. Furthermore, the stakeholders are critical to the sustainability of a PPP. Even if the contract is awarded despite opposition, the difficulty and risk of the project increase drastically if public support is not present.

There must be a consultation process to reconcile and prioritize issues in implementing PPP projects. The stakeholders have different roles and interests as shown in **Figure 17.1.3-1**.



Source: Heather Skilling and Kathleen Booth, 2007.

FIGURE 17.1.3-1 RANGE OF STAKEHOLDER INTERESTS IN PPPS

For stakeholders to play an active role in the PPP process, they must be given not only a forum for participation but also the information they need to participate effectively.

17.2 TYPES OF PPP

17.2.1 Available PPP Options

There are a range of PPP models that allocate responsibilities and risks between the public and private partners in different ways including the following basic PPP contract types. Refer to **Table 17.2.1-1**.

(1) Service Contracts

Under a service contract, the government hires a private company or entity to carry out one or more specific tasks or services for a period, typically 1-3 years. Service contracts are unsuitable if the main objective is to attract capital investment. The private company is not under an obligation to provide financing.

The government pays the private company a pre-determined fee for the service, which may be based on a one-time, unit cost, or other basis.

(2) Management Contracts

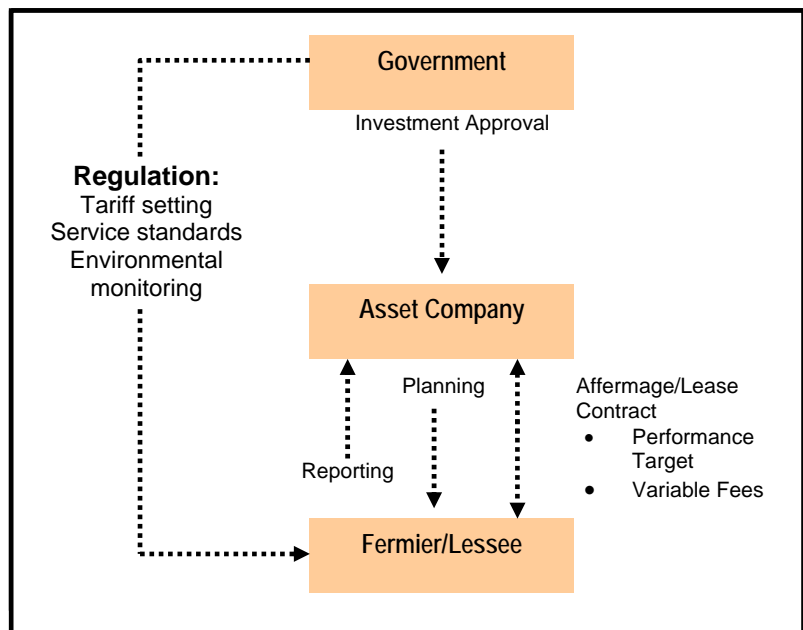
A management contract expands the services to be contracted out to include some or all of the management and operation of the public service. Although ultimate obligation for service provision remains in the public sector, daily management control and authority is assigned to the private contractor.

The private contractor is paid a pre-determined rate for the labor and other anticipated operating costs.

(3) Affermage or Lease Contracts

Under a lease contract, the private partner is responsible for the service in its entirety and undertakes obligations relating to quality and service standards. The private partner provides service at his expense and risk. The initial establishment of the system is financed by the public authority and contracted to a private company for operation and maintenance. Leases do not involve any sale of assets to the private sector.

The revenues for the private contractor are derived from customer payments; therefore the tariff level becomes increasingly sensitive. **Figure 17.2.1-1** shows the lease contract's typical structure.



Source: Heather Skilling and Kathleen Booth, 2007

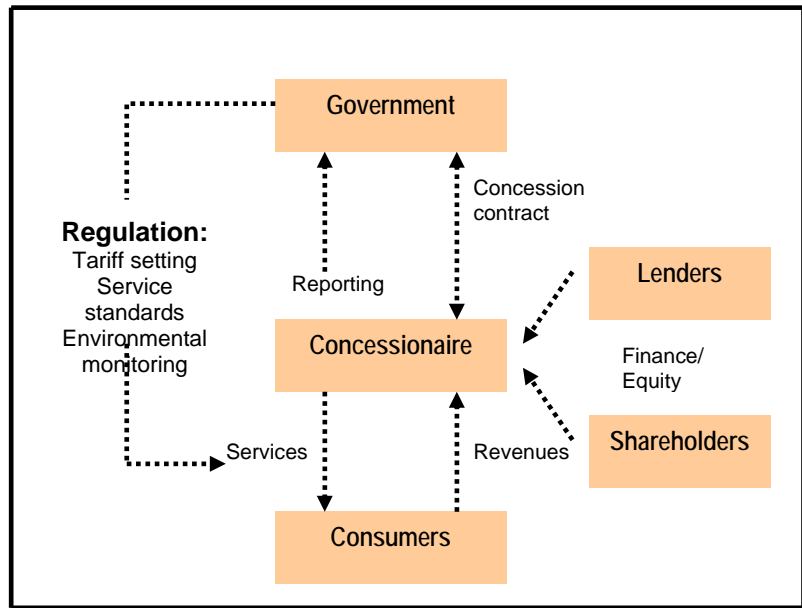
FIGURE 17.2.1-1 STRUCTURE OF LEASE CONTRACT

(4) Concessions

Under a concession, the private sector operator (concessionaire) is responsible for the full delivery of service in a specified area, including operation, maintenance, collection, management and construction and rehabilitation of system. The operator is responsible for all capital investment, and the public sector’s role shifts from being the service provider to regulating the price and quality of service.

The concessionaire collects the tariff directly from the system users, which is established by the concession contract.

A key advantage of the concession arrangement is that it provides incentives to the operator to achieve improved level of efficiency and effectiveness since gains in efficiency translate into increased profits and return to its concessionaire. But, there is a risk that the operator will only invest in new assets where it expects payback within the remaining period of the contract. A concession contract’s typical structure is shown in **Figure 17.2.1-2**.



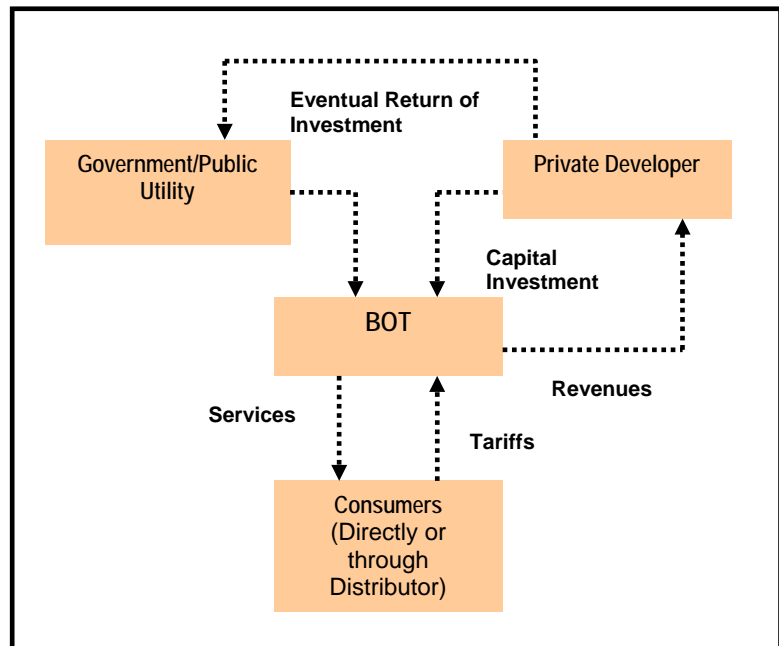
Source: Heather Skilling and Kathleen Booth, 2007

FIGURE 17.2.1-2 STRUCTURE OF CONCESSION CONTRACT

(5) BOT and Similar Arrangements

Build-Operate-Transfer (BOT) and similar arrangements are a kind of specialized concession in which a private firm or consortium finances and develops a new infrastructure project according to performance standards set by the government.

There are many variations on the basic BOT structure including build-transfer-operate (BTO), build-own-operate (BOO), design-build-operate (DBO), design-build-finance-operate (DBFO), and design build (DB).



Source: Heather Skilling and Kathleen Booth, 2007

FIGURE 17.2.1-3 STRUCTURE OF BOT CONTRACT

The distinction between a BOT type arrangement and a concession is that a concession generally involves extensions to and operation of existing systems, whereas a BOT generally involves Greenfield investments requiring substantial outside finance, for both equity and debt. **Figure 17.2.1-3** illustrates the BOT contract structure.

(6) Joint Venture

Joint ventures are alternatives to full privatization in which the infrastructure is co-owned and operated by the public and private operators. Under a joint venture, the public and private sector partners can either form a new company or assume joint ownership of an existing company through a sale of shares to one or several private investors.

Joint ventures are real partnership of the public and private sectors that match the advantages of the private sector with the social concerns and local knowledge of the public sector. Government’s dual roles as owner and regulator can lead to conflict of interest. Joint ventures also have a tendency to be directly negotiated or to follow a less formal procurement path, which can lead to concern for corruption. **Figure 17.2.1-4** is the typical joint venture contract’s structure.

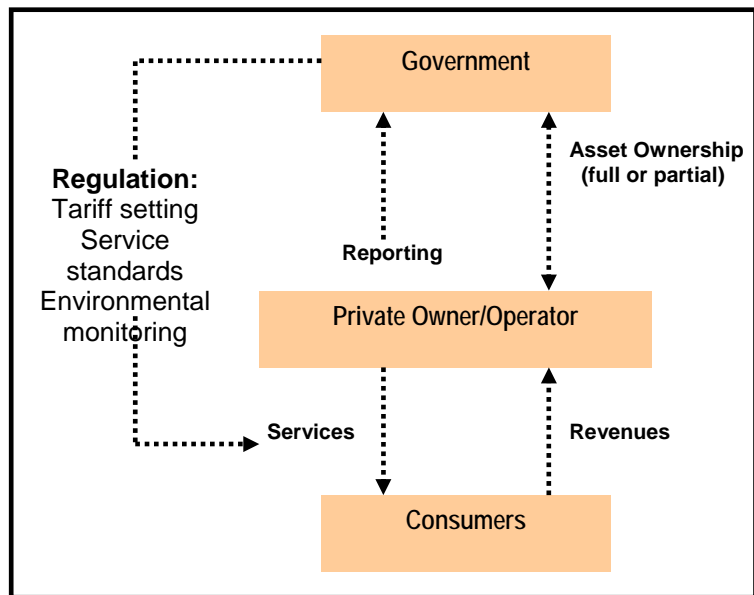


FIGURE 17.2.1-4 STRUCTURE OF JOINT VENTURE CONTRACT
Source: Federal Highway and Knowledge Book, 2001

TABLE 17.2.1-1 SUMMARY OF KEY FEATURES OF BASIC FORMS OF PUBLIC-PRIVATE PARTNERSHIP (PPP)

	SERVICE CONTRACTS	MANAGEMENT CONTRACTS	LEASE CONTRACTS	CONCESSION	BOT AND VARIATIONS
Scope	Multiple contracts for a variety of support services.	Management of entire operation or a major component	Responsibility for management, operations, and specific renewals	Responsibility for all operations and for financing and execution of specific investments	Investment in and operation of a specific major component
Asset Ownership	Public	Public	Public	Public/Private	Public/Private
Duration	1-3 years	2-5 years	10-15 years	25-30 years	Varies
O&M Responsibility	Public	Private	Private	Private	Private
Capital Investment	Public	Public	Public	Private	Private
Commercial Risk	Public	Public	Shared	Private	Private
Overall Level of Risk Assumed by Private Sector	Minimal	Minimal/moderate	Moderate	High	High
Compensation Terms	Unit prices	Fixed fee, preferably with performance incentives	Portion of tariff revenues	All or part of tariff revenues	Mostly fixed, part variable related to production parameters
Special Features	Useful as part of strategy for improving efficiency of public company; Promotes local private sector development	Interim solution during preparation for more intense private participation	Improves operational and commercial efficiency; Develops local staff	Improves operational and commercial efficiency; Mobilizes investment finance; Develops local staff	Mobilizes investment finance; Develops local staff
Problems and Challenges	Requires ability to administer multiple contracts and strong enforcement of contract laws	Management may not have adequate control over key elements, such as budgetary resources, staff policy, etc.	Potential conflicts between public body which is responsible for investments and the private operator	How to compensate investments and ensure good maintenance during last 5-10 years of contract	Does not necessarily improve efficiency of ongoing operations; May require guarantees

Note: BOT = build-operate-transfer, O&M = operation and maintenance

Source: Heather Skilling and Kathleen Booth, 2007

17.2.2 Contractual Arrangements in the Philippine BOT Law

The Revised IRR of the Philippine BOT Law prescribes the following contractual arrangements or schemes, as well as other variations thereof, as may be approved by the President, by which infrastructure and/or developments projects may be undertaken.

- Build-and-transfer (BT)
- Build-lease-and-transfer (BLT)
- Build-operate-and-transfer (BOT)
- Build-own-and-operate (BOO)
- Build-transfer-and-operate (BTO)
- Contract-add-and-operate (CAO)
- Develop-operate-and-transfer (DOT)
- Rehabilitate-Operate-and-Transfer (ROT)
- Rehabilitate-own-and-operate (ROO)

The BLT, BOT, BOO and BTO Arrangements are defined as follows. The major characteristics of agreements are summarized in **Table 17.2.2-1**.

Build-lease-and-transfer (BLT)

A contractual arrangement whereby a Project Proponent is authorized to finance and construct an infrastructure or development facility and upon its completion turns it over to the Agency/LGU concerned on a lease arrangement for a fixed period, after which ownership of the facility is automatically transferred to the Agency/LGU concerned.

Build-operate-and-transfer (BOT)

A contractual arrangement whereby the Project Proponent undertakes the Construction, including financing, of a given infrastructure facility, and the operation and maintenance thereof. The Project Proponent operates the facility over a fixed term during which it is allowed to charge facility users appropriate tolls, fees, rentals, and charges not exceeding those proposed in its bid or as negotiated and incorporated in the contract to enable the Project Proponent to recover its investment, and operating and maintenance expenses in the project. The Project Proponent transfers the facility to the Agency/LGU concerned at the end of the fixed term that shall not exceed fifty (50) years. This build-operate-and-transfer contractual arrangement shall include a supply-and-operate scheme which is a contractual arrangement whereby the supplier of equipment and machinery for a given infrastructure facility, at the interest of the Government so requires, operates the facility providing in the process technology transfer and training to Filipino nationals.

Build-own-and-operate (BOO)

A contractual arrangement whereby a Project Proponent is authorized to finance, construct, own, operate and maintain an infrastructure or development facility from which the Project Proponent is allowed to recover its total investment, operating and maintenance costs plus a reasonable return thereon by collecting tolls, fees, rentals, or other charges from facility users; provided, That all such projects upon recommendation of the Investment Coordination Committee (ICC) of the National Economic and Development Authority (NEDA), shall be approved by the President of the Philippines. Under this project the proponent who owns the assets of the facility may assign its operation and maintenance to a Facility operator.

Build-transfer-and-operate (BTO)

A contractual arrangement whereby the Agency/LGU contracts out the Construction of an infrastructure facility to a private entity such that the Contractor builds the facility on a turnkey basis, assuming cost overruns, delays, and specified performance risks. Once the facility is commissioned satisfactorily, title is transferred to the implementing Agency/LGU. The private entity however operates the facility on behalf of the implementing Agency/LGU under an agreement.

The Philippine BOT Law does not discuss the contractual arrangements of Design-Build-Operate (DBO) and Design-Build-Finance-Operate (DBFO).

TABLE 17.2.2-1 TYPICAL TYPES OF CONTRACTUAL AGREEMENTS IN THE PHILIPPINES BOT LAW

	Option	Type	Public Undertaking	Private Undertaking	Typical Applications	Major Risk Allocation
Public Project	Type 0	Conventional	<ul style="list-style-type: none"> • ROW Acquisition • Design & Construction • Operation & Maintenance • All Finances 	(Contract –out to consultant and contractor for design and construction, respectively)	<ul style="list-style-type: none"> • Economically feasible, but not financially. • Sensitive in natural and social environment 	<ul style="list-style-type: none"> • All risks with the government
PPP	Special Case	Type 1 Build-and-Transfer (BT)	<ul style="list-style-type: none"> • ROW Acquisition • Operation 	<ul style="list-style-type: none"> • Design & Construction and its Finance 	<ul style="list-style-type: none"> • Critical facilities with security or strategic reasons • Special Projects 	<ul style="list-style-type: none"> • After completion, turn it over to the government on Payment Schedule Agreement of total investment and reasonable return
	Transfer after Construction	Type 2 Build-Lease-and-Transfer (BLT)	<ul style="list-style-type: none"> • ROW Acquisition • (Operation) 	<ul style="list-style-type: none"> • Design & Construction and its Finance • (Operation) 	<ul style="list-style-type: none"> • Financially feasible with the government support. 	<ul style="list-style-type: none"> • After completion, turn it over to the government on Lease Agreement
		Type 3 Build-Transfer-and- Operate (BTO)	<ul style="list-style-type: none"> • ROW Acquisition 	<ul style="list-style-type: none"> • Design & Construction on Turnkey Basis • Operation & Maintenance 	<ul style="list-style-type: none"> • Financially feasible with the government support. 	<ul style="list-style-type: none"> • After completion, turn it over on Operation Agreement • Construction cost overruns, delays, and specified performance risks
	Transfer after Operation	Type 4 Build-Operate-and-Transfer (BOT)	<ul style="list-style-type: none"> • ROW Acquisition 	<ul style="list-style-type: none"> • Design & Construction and its Finance • Operation & Maintenance 	<ul style="list-style-type: none"> • Financially feasible with or without government support 	<ul style="list-style-type: none"> • Transfer at the End of Term • All Risks including Toll Revenue with Private Sector

17.3 IMPLEMENTATION OPTIONS THROUGH PPP SCHEMES

17.3.1 Expectations and Characteristics of Toll Road Projects

(1) Expectations in PPPs

As reviewed in Section 17.2, there are several types of contractual agreements under PPP schemes available for toll road development. The selection of PPP schemes and implementation arrangements is highly influenced by the government's specific objectives and targets envisaged in PPP projects.

Major concerns of the government's objectives are effective utilization of technical and financial expertise relevant to proposed projects. Private sector, however, enters into investment with the clear goal and expectations of maximizing profits, by increased efficiency in investments and operations.

The major concerns and expectations of both sectors in selecting PPP options are briefly discussed hereunder.

Public Sector

- Enormous financial requirements for provision of better services.
- Large financial shortfall in available public funds.
- Enhanced public management as regulators instead of management services.

Private Sector

- Reduced whole life costs (refer to Note below)
- Generation of additional revenues through expertise of private sector.
- Faster implementation with the allocation of design and construction responsibility to private sector.
- Better risk allocation for management of PPP at least cost.
- Improved quality of service with performance incentives and penalties included within a PPP contract.

International Interest

- Investment in infrastructure for economic growth of countries.
- Greater efficiency in the use of resources with the application of private sector management disciplines and competences.
- Generating commercial value from public sector assets.

[Note: Reduced Whole Life Costs]

PPP projects provide the private sector with strong incentives to minimize cost over the whole life of a project. PPPs should only be adopted as a procurement and implementation option if they are reasonably expected to minimize cost and to deliver enhanced value for money (VFM) over traditional methods.

A value for money (VFM) assessment comprises two key elements, monetary comparison and non-monetary comparison. A form of monetary comparison involves a comparison of the cost of the preferred PPP tender with the cost of delivering the project through traditional public sector procurement.

Factors determining value for money (VFM) include the followings:

- Reduced life cycle costs
- Generation of additional revenue.
- Better allocation of risk
- Faster implementation
- Improved service quality

(2) Characteristics of Toll Road Projects

The selection of a suitable PPP arrangement is a complex task and must be based on the need of infrastructure services, scale of projects and individual project characteristics.

Transport sector project such as toll road projects are quite different from projects of power and water sectors in terms of PPP schemes because of commercial viability.

Table 17.3.1-1 presents the characteristics of toll road projects comparing with projects in other sectors.

The remarkable characteristics and key issues of toll road projects are forecast of traffic demand and estimation of revenues, which largely depend on the following factors.

- Level of tariffs
- Willingness-to-pay tolls
- Integration with highway network
- Uncertainty and treatment of risk.

TABLE 17.3.1-1 CHARACTERISTICS OF TOLL ROAD PROJECTS

Items	Characteristics
Location	<ul style="list-style-type: none"> • In the middle of big cities, or major developed corridors.
Land Requirements	<ul style="list-style-type: none"> • Large and difficult acquisition. (often in central locations/continuous strip)
Environmental Impact	<ul style="list-style-type: none"> • Large for elevated structures and medium for others. • Extensive land acquisition/relocation involved.
Cost	<ul style="list-style-type: none"> • High and all up-front costs. • Operation and maintenance cost low.
Demand and Revenues	<ul style="list-style-type: none"> • Low in early years • Error in forecasting traffic demands • Uncertain in the future depending on external factors
Tariff Problems	<ul style="list-style-type: none"> • Huge, often subject to considerable political interference. • Sensitive for public acceptance.
Financial Viability	<ul style="list-style-type: none"> • Often not viable as a stand-alone project • Only a few projects commercially viable.
Number of Buyers	<ul style="list-style-type: none"> • Every vehicle
Need for Government Support <ul style="list-style-type: none"> • Implementation • Operation • Investment 	<ul style="list-style-type: none"> • Permissions, land acquisition, relocation. • Tariff increases • Often substantial.
Risks	<ul style="list-style-type: none"> • High and extensive implementation and cost problems • Very substantial traffic and revenue risk

17.3.2 Possible PPP Options

(1) Major Assumptions in Work Sharing

The present practice of toll road developments and issues in implementation through PPP schemes in the Philippines was reviewed and identified in Chapter 5. The concepts of available PPP options were discussed, and contractual agreement in the Philippines BOT Law were briefly reviewed in the previous sections.

In proposing possible implementation options; the following assumptions are made as mandatory and optional supports of government.

(a) Right of Way Acquisition

Right of way required for a project shall be closely defined and acquired on time, preferably prior to tendering or at least before the commencement of construction work.

The government is purely responsible for ROWA on time.

(b) Business Case Study and Feasibility Study

Business case study aims to assess the suitability of a proposed project to be implemented under PPP schemes for the official approval by the government approving bodies, while feasibility study intends to provide basis and parameters necessary for equitable tendering of a project such as design parameters, traffic forecast, analysis on initial toll rate and adjustment formula etc. to be presented in tendering documents.

The government is responsible for conducting business case study and feasibility study on time.

(c) Toll Level Risk due to Inflation

The toll level shall be adjusted in accordance with the inflation every three (3) years based on a pre-determined formula.

The government is responsible for accepting adjustment in accordance with the law and project contract.

(d) Traffic Volume Risk

The traffic volume level shall be maintained as assumed in the contract. As an alternative, a private entity shall bear the traffic risk. Thus, a private entity shall be responsible for reviewing, validating, accepting or changing traffic forecast in the feasibility study, and for making its own forecast.

The private entity shall take full responsibility over its traffic forecast, including the impact of any traffic shortfall on toll revenues.

(e) Financial Support

The followings are the optional financial support of the government.

- a. Up-front capital subsidy/share for construction
- b. Service payment subsidy during operation

c. Combination of up-front capital and service payment subsidy.

(2) Possible PPP Options

Based on the review and discussions mentioned above, implementation options through PPP schemes were developed and proposed for preliminary comparison, as shown in **Table 17.3.2-1**.

TABLE 17.3.2-1 IMPLEMENTATION OPTIONS THROUGH PPP SCHEMES

Options	Type	Work Sharing	
		Public Sector	Private Sector
0	Conventional Type	<ul style="list-style-type: none"> • ROWA • Design • Construction • O&M 	<ul style="list-style-type: none"> • Outsourcing of some portion of works
1	Role Sharing Type (Lease)	<ul style="list-style-type: none"> • ROWA • Design • Construction 	<ul style="list-style-type: none"> • O&M
2	Segment Dividing Type	<ul style="list-style-type: none"> • ROW of whole section • Construction and financing of certain segment 	<ul style="list-style-type: none"> • Construction and financing of remaining segment under BOT scheme • O&M of whole section
3	BOT Type with Government subsidy	<ul style="list-style-type: none"> • ROWA • Design • Upfront capital subsidy (Option 3-1) • Annual service payment subsidy (Option 3-2) 	<ul style="list-style-type: none"> • Construction and Financing of whole section under BOT scheme • O&M
4	BOT Type	<ul style="list-style-type: none"> • ROWA 	<ul style="list-style-type: none"> • Design and Construction including financing under BOT Scheme • O&M

Note:

ROWA: Right of Way Acquisition

O&M: Operation and Maintenance

17.3.3 Preliminary Evaluation of Possible PPP Options

Table 17.3.3-1 (1 to 5) graphically demonstrates the concepts of work sharing, financial arrangement, public sector expenditure and project structure including issues and comments and preliminary evaluation of each options.

Option 0 Conventional Type

This type is, not PPP options, the conventional method which the public sector is responsible for implementation of project including right of way acquisition (ROWA), design, construction, operation and maintenance and its financing. Under this method, some services and works are executed through simple outsourcing agreements (OA).

Option 1 Role Sharing Type (Lease)

The public sector is responsible for ROWA, design, construction and its financing for whole section. The private sector undertakes operation and maintenance under a lease contract (L.C.). The former leases toll road, and the latter pays lease fee which are derived from customer payments.

Option 2 Segment Dividing Type

Commercially viable segment will be selected to be implemented under BOT scheme by the private sector, and the remaining segment will be constructed by the public sector. Each sector is responsible for design, construction and its financing for each designated segment (BOT contract for private sector)

The public sector is responsible for ROWA for the whole section, and the private sector is in charge of operation and maintenance of whole section under an operation and maintenance contract (O&M contract).

Options 3 BOT Type with Government Subsidy

The private sector is responsible for design, construction, operation, maintenance and its financing based on a BOT contract. The public sector is in charge of ROWA.

The public sector provides initial upfront subsidy to reduce financing requirements for construction to the level affordable by toll revenues. **(Option 3-1, Upfront Subsidy)**

The public sector pledges annual service payment to the private sector during the operational period of facility to reduce financial requirement for operation to the level supportable by toll revenues. **(Option 3-2, Service Payment)**

The public sector provides both, upfront capital subsidy and annual service payment over the life of operation of facility to reduce financing requirements for construction and operation to the level affordable by toll revenues. **(Combination of Option 3-1 and 3-2)**

Option 4 BOT Scheme

The private sector undertakes design, construction, operation, maintenance and its financing under BOT contract.

The public sector is responsible for ROWA.

The private sector operates the facility over a fixed term during which it is allowed to charge facility users' appropriate tolls, fees, rentals and charges, and transfers the facility to the public sector at the end of the fixed term.

**FIGURE 17.3.3-1 (1) OPTION 1: ROLE SHARING TYPE
(LEASE/AFFERMAGE)**

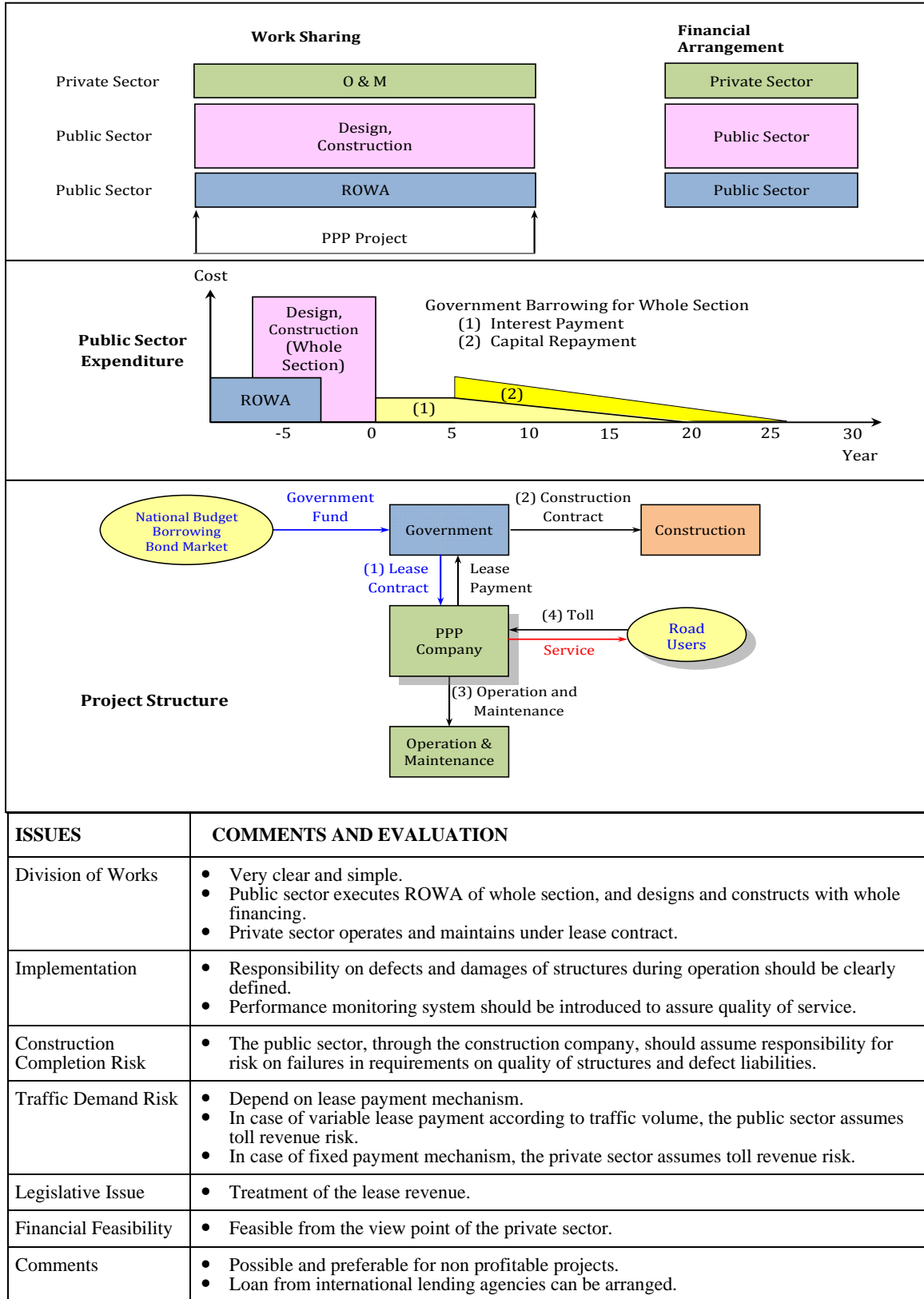


FIGURE 17.3.3-1 (2) OPTION 2: SEGMENT DIVIDING TYPE

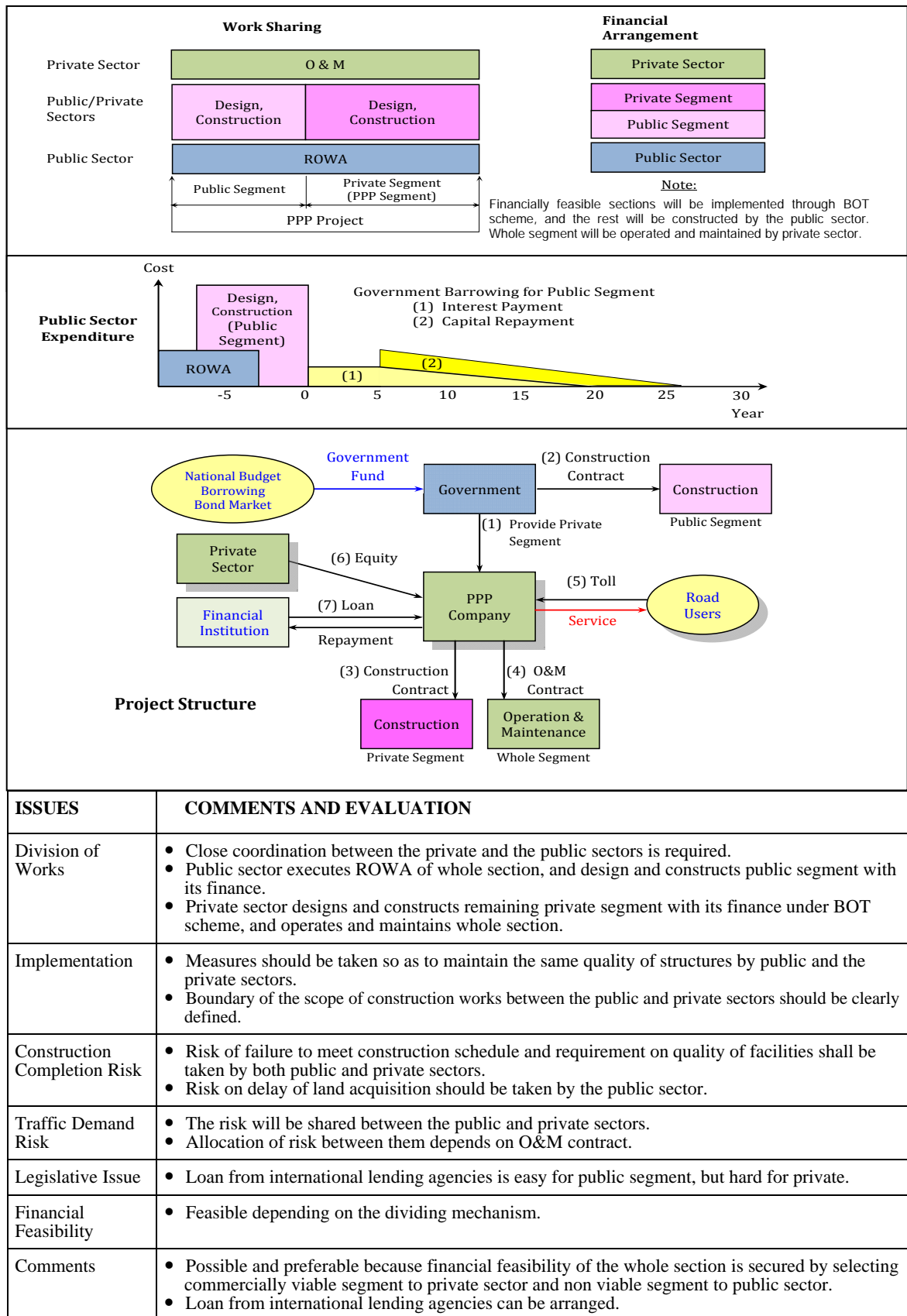


FIGURE 17.3.3-1 (3) OPTION 3-1: BOT TYPE WITH GOVERNMENT (UPFRONT) SUBSIDY

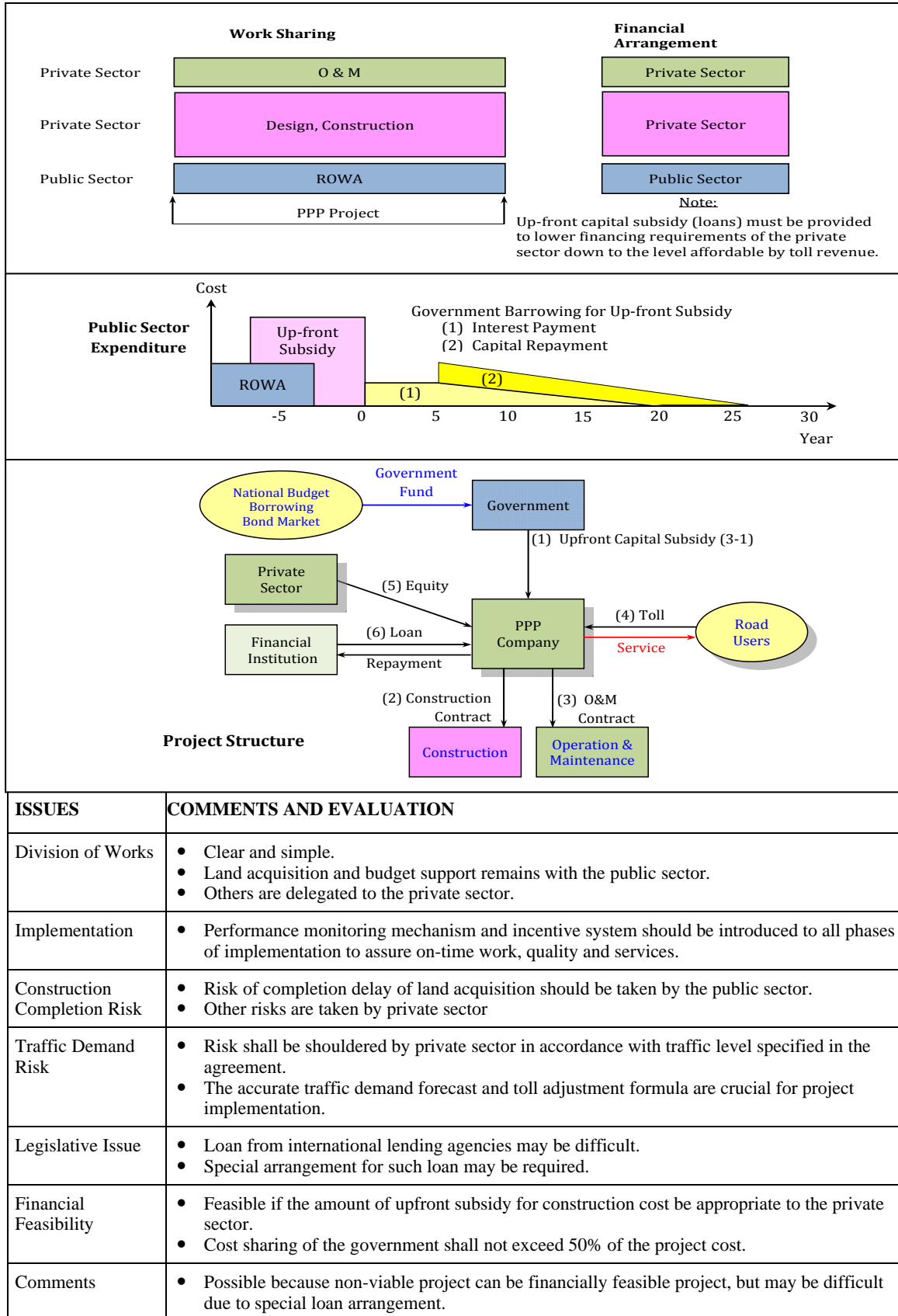


FIGURE 17.3.3-1 (4) OPTION 3-2: BOT TYPE WITH GOVERNMENT SUBSIDY (SERVICE PAYMENT)

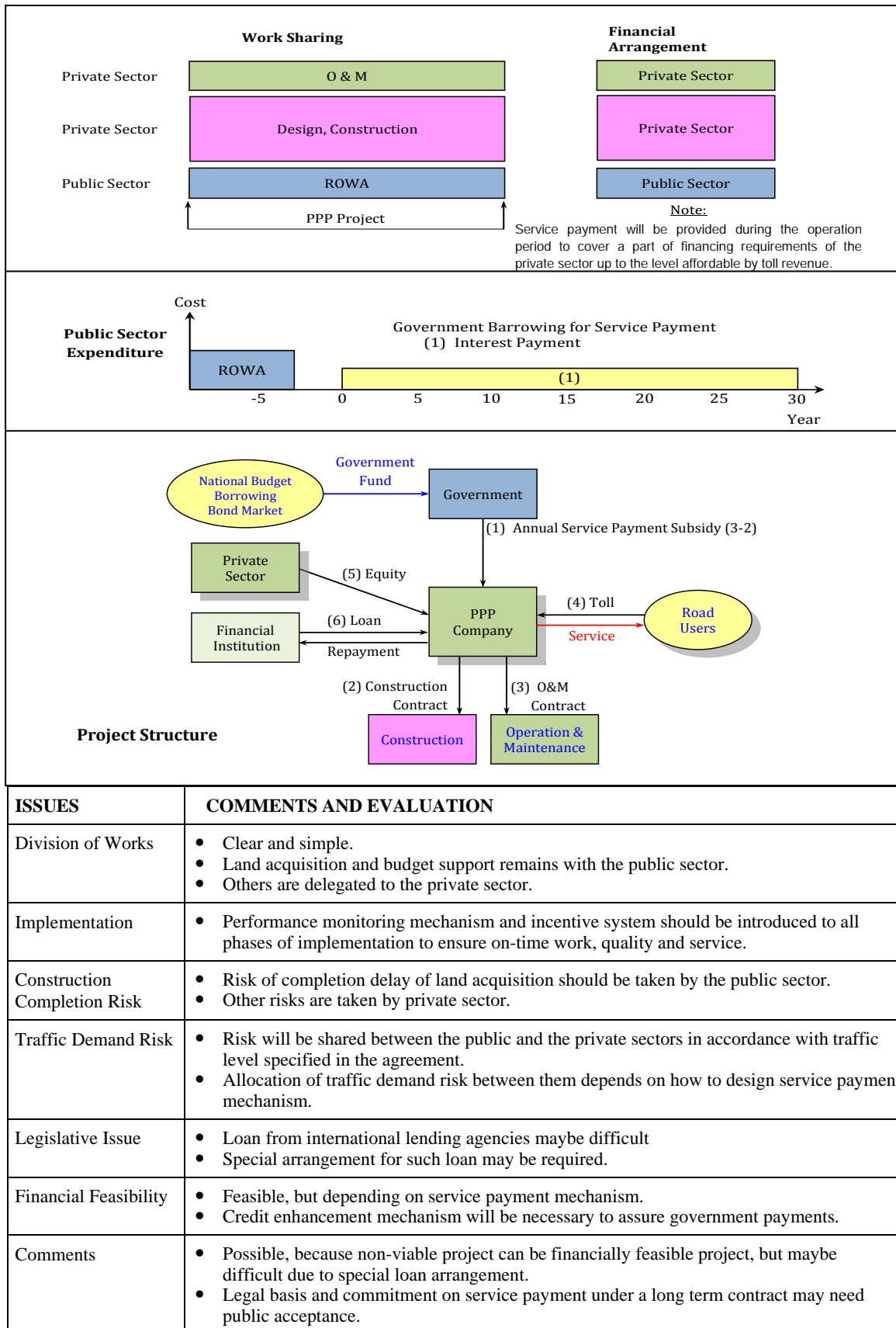
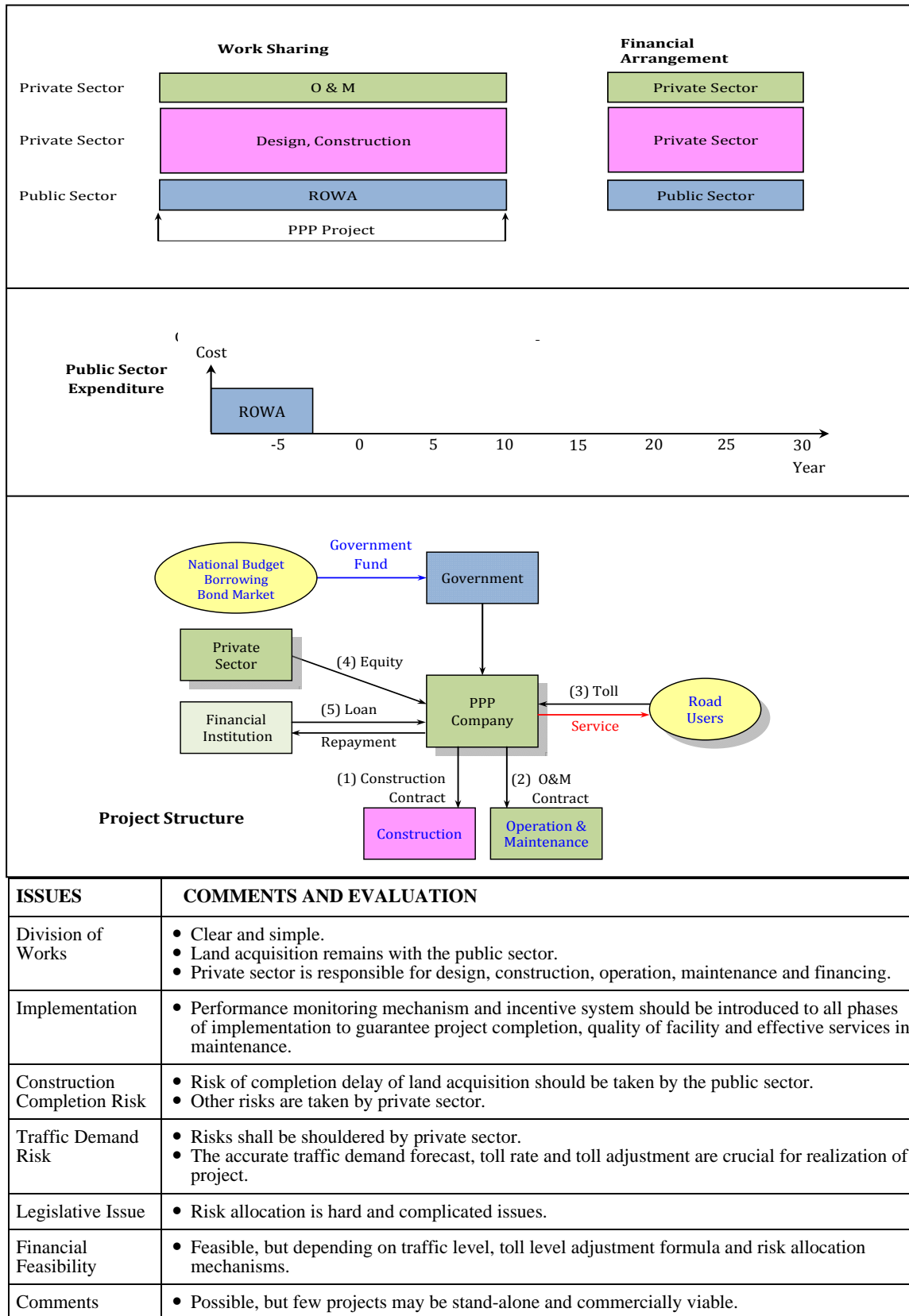


FIGURE 17.3.3-1 (5) OPTION 4: BOT TYPE



CHAPTER 18

IMPLEMENTATION ARRANGEMENT OF RECOMMENDED PPP

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IMPLEMENTATION ARRANGEMENT OF RECOMMENDED PPP SCHEMES

18.1 PPP OPTIONS RECOMMENDED FOR PRIORITY PROJECTS

18.1.1 Characteristics of Priority Projects

The proposed HSH development master plan identified 18 projects, among which 8 projects are proposed to be completed before year 2020, including the following projects, as discussed in Chapter 16.

- NLEx – SLEx Link Expressway
- NAIA Expressway (Phase-2)
- C-6 Expressway (South-East Section)
- C-6 Expressway (North Section)
- CALA Expressway
- Central Luzon Expressway
- Calamba-Los Baños Toll Expressway
- SLEx Extension

(1) Project Characteristics in terms of VFM

PPP projects may provide the private sector with strong incentives to minimize cost over the whole life of projects. PPPs should only be adopted as procurement and implementation option if they are reasonably expected to deliver enhanced value for money over traditional methods. Value for Money (VFM) assessment is therefore crucial to deciding the suitability of a project as PPP.

VFM assessment comprises two key elements, monetary comparison and non-monetary comparison. A form of monetary comparison involves a comparison of the cost of the preferred PPP tender with the cost of delivering the project through traditional public sector procurement. Factors determining value for money may obviously vary from projects to projects including the followings.

- Reduced life cycle cost
- Generation of additional revenue
- Faster implementation
- Improved service quality
- Better allocation of risk

The nature of the value for money assessment depends on the type of PPP project as described hereunder.

• Financially free-standing projects

For financially free-standing projects, the contractor is required to recover all costs through charges on the final users of the service (toll revenue). The public sector is required to play a facilitating role, but no public money is involved.

- **Public sector-support projects**

The public sector may be required to provide supports (grant financing and/or subventions) for this type of projects, but the revenues come principally from user charge. The public sector is a minority funder, but there is a need to ensure that the project represents the best use of the public funds since investment of public money is involved.

- **Public sector-main fund project**

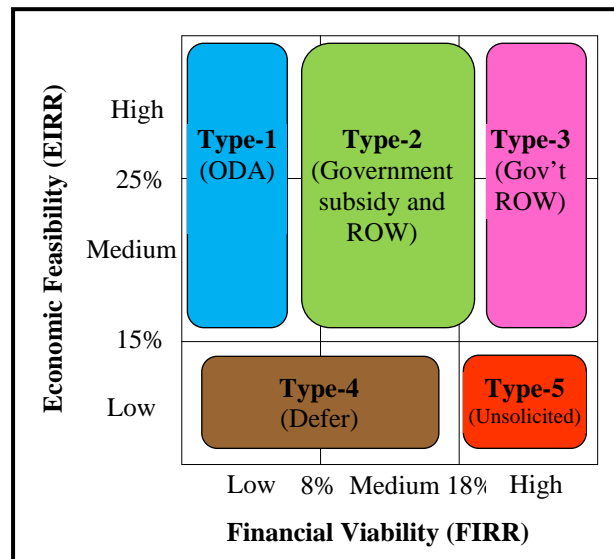
In the case of projects where the public sector is the main funder, a detailed value for money assessment is required to compare the cost and benefits of the preferred PPP tender with the costs and benefits of traditional procurement.

(2) Project Characteristics in terms of Viability

In view of project implementation through PPP Schemes, the characteristics of projects may be assessed based on such factors as project scale, location, land requirement, traffic level, as well as the need as public facilities and commercial profitability or viability.

More specifically, the primary characteristics of PPP projects may be simply categorized in terms of economic feasibility (the need as public facilities) and the financial viability (the profitability as private business) as conceptually presented in **Figure 18.1.1-1**.

The scales of figures (low, medium, and high) vary depending on the socio-economic condition of countries. In this country, 15% and 25% for the economic feasibility, and 8% and 18% for the financial viability are speculated taking into consideration the traditional practices and preliminary analysis of proposed projects, as an example.



This conceptual classification and value for money assessment method may suggest the nature of project to be implemented through PPP schemes as follows.

Source: Study Team

FIGURE 18.1.1-1 CONCEPTUAL CLASSIFICATION OF PPP PROJECTS

Type-1: Soft Loan (ODA) Project Type

EIRR is higher than the requirement level (higher than 15%), which justify the early implementation of projects, but FIRR is considerably low (lower than 8%). VFM assessment may indicate the traditional method of project implementation by the government utilizing the soft loan such as ODA from international lending agencies.

Type-2: PPP Project Type with the government support including ROW Acquisition

EIRR is the same level as Type-1, therefore the early implementation of project is acceptable. However, the medium level of FIRR (8~18%) indicates the fact that project is not financially viable. For those projects, project implementation through PPP schemes is highly recommended with the government financial support including ROW Acquisition.

Type-3: Free-standing Project Type with ROW Acquisition by the Government

This type is considered to be financially free-standing project because FIRR higher than 18% may be assessed commercially viable. The government participation of ROW acquisition may be justifiable because of higher level of EIRR more than 15% in order to provide the incentives to the private sector.

Type-4: Highly Commercial Project Type with Less Economic Justification

EIRR reveals the low level of economic feasibility (lower than 15%), which may imply an optimum timing of project implementation in the future. However, FIRR may be relatively high enough to attract a possible investor from the private sector.

In this case, the unsolicited proposals may be appreciated with the government incentives and undertakings except the direct government guarantees, direct government subsidy or equity and ROW acquisition.

Type-5: Second Priority Project Type

EIRR is estimated to be low, which suggests to defer a project implementation, and FIRR is low and medium which may invite no interest from the private sector.

18.1.2 PPP Options for Implementation

The implementation options through PPP schemes are discussed in Chapter 17, involving the following four (4) options.

- Option 0; Conventional Type
- Option 1; Role Sharing Type (Lease)
- Option 2; Segment Dividing Type
- Option 3; BOT Type with Government Subsidy
- Option 4; BOT Type

Based on the preliminary evaluation of possible PPP options, implementation options are recommended in accordance with the characteristics of PPP projects, namely Type 1, Type 2 and Type 3, as shown in **Table 18.1.2-1**.

TABLE 18.1.2-1 IMPLEMENTATION OPTIONS OF PPP SCHEMES

PPP Options		Work Sharing		Application
		Public	Private	
Option 0; Conventional Type		<ul style="list-style-type: none"> • ROWA • Design • Construction • O & M 	<ul style="list-style-type: none"> • Outsourcing of some portion of works • O & M of whole section 	Preferable for Type-1 Projects <ul style="list-style-type: none"> • Low financial viability • High/medium economic feasibility
Option 1; Role Sharing Type (Lease)		<ul style="list-style-type: none"> • ROWA • Design • Construction 	<ul style="list-style-type: none"> • Outsourcing of some portion of works • O & M of whole section 	Preferable for Type-1 Projects <ul style="list-style-type: none"> • Low financial viability • High/medium economic feasibility
Option 2; Segment Dividing Type		<ul style="list-style-type: none"> • ROW of whole section • Design • Construction and financing of public segment 	<ul style="list-style-type: none"> • Design • Construction & financing of private segment under BOT scheme • O & M of whole section 	Adoptable for Type-2 Projects <ul style="list-style-type: none"> • Medium financial viability • High/medium economic feasibility
Option 3; BOT Type With Government Subsidy		<ul style="list-style-type: none"> • ROWA • Upfront capital subsidy (Option 3-1) • Annual service payment subsidy (Option 3-2) 	<ul style="list-style-type: none"> • Design • Construction & financing of whole section under BOT scheme • O & M of whole section 	Adoptable for Type-2 Projects <ul style="list-style-type: none"> • Medium financial viability • High/medium economic feasibility
Option 4; BOT Type		<ul style="list-style-type: none"> • ROWA 	<ul style="list-style-type: none"> • Design and construction including financing under BOT scheme • O & M of whole section 	Applicable for Type-3 Projects <ul style="list-style-type: none"> • High financial viability • Medium/high economic feasibility

Note: Note: ROWA (Right of Way Acquisition)

18.2 GOVERNMENT SUPPORT

18.2.1 Conventional Arrangements

The government support usually focuses on the provision of services for the realization of infrastructure project for PPPs. The most common form is to make a project commercially viable from the perspective of the private sector by providing financial subsidy. This is most often the case for public infrastructure, which does not usually yield sufficient financial viability for commercial financing.

The government also provides support for social considerations. As for toll roads, the government typically provides subsidies to reduce tariff level for the purposes of helping the poor, addressing public health and environmental issues, and political constraints on raising tariffs.

The conventional arrangements of the government support include the followings.

- Providing ROW
- Providing existing infrastructure
The existing infrastructure may be provided and utilized under service contract, operation and management contract or lease contract for the private sector to participate in the maintenance, operation, management, improvements of the infrastructure and/or with related newly proposed PPP projects.
- Providing shadow toll payment
Shadow toll may be considered instead of real tolling if revenue do not cover some percentage of investment costs.

The financing subsidies of the government are generally applied in the following forms.

- Provision of regular, subsidy payments to operational costs.
This can be useful in the first year of operation when cash flow is not sufficient to cover all costs.
- Subsidy of revenue flows
This is particularly useful if a policy objective is to keep user charge low.
- Coverage of financial costs
 - Reducing the cost of borrowing by softening loans
 - Providing loan guarantee
 - Financing risk elements
 - Subsidizing taxation payments
 - Covering exchange rate losses

18.2.2 Possible Forms for Toll Road Development

(1) Provisions in Revised IRR of BOT Law of the Philippines

The Revised IRR of the BOT Law of the Philippines, as amended, defines the Government Undertaking, as follows.

(a) Cost Sharing

This shall refer to bearing a portion of capital expenses of an infrastructure development facility such as right of way, etc., which shall not exceed fifty percent (50%) of the project cost. Such government share may be financed from direct government appropriations and/or from ODA of foreign government or institutions.

(b) Credit Enhancement

This shall refer to direct and indirect support, the provision of which is contingent upon occurrence of certain events/risks. The credit enhancements are allocated to the party, public/private sector that is best able to manage and assure the consequences of the risk involved. This may include, but are not limited to, government guarantees or the performance or the obligation of the government.

(c) Direct Government Subsidy

This shall refer to an agreement whereby the government will;

- (i) Defray, pay or shoulder a portion of project cost and costs in operating or maintaining the project.
- (ii) Condone or postpone any payment due from the Project Proponent.
- (iii) Contribute any property or assets.
- (iv) Waive or grant special rates on real property taxes.
- (v) Waive charges or fees relative to business permits or licenses.

(d) Direct Government Equity

This shall refer to the subscription by the government of shares of stock, or other securities convertible to shares of stock, whether such subscription will be paid by the money or assets.

(e) Performance Undertaking

This shall refer to an undertaking of a department, etc., in assuming responsibility for the performance of the Agency obligation including the payment of monetary obligation. These undertakings may be subject to payment of risk premium.

(f) Legal Assistance

This shall refer to the extension of representation by government layers only in cases where the Agency and Project Proponent are partly-defendants.

(g) Security Assistance

This shall refer to the development of government security forces, in the vicinity of the project site to provide security during the implementation of the project to completion.

(2) Comments from the Private Sector on Government Support

The summary of Interviews with BOT Firms is attached as Annex 18-1. The comments and suggestions raised through the interviews regarding the government support are summarized as follows.

- The government financial support shall include the ROW acquisition cost and share/subsidy in construction cost (up to 50%) to make the project financially viable at affordable toll rates.
- A government bank could advance the government financial support to the proponent, as a loan of the government to be repaid through the annual General Appropriations Acts (GAAs).
- To facilitate the proponent's financial closure, the government should undertake the feasibility study and complete the ROW acquisition before the bidding, and should assure implementation of toll rates and adjustment formula.
- The government should also (a) guarantee the revenues based on the traffic forecast in the government feasibility study, and/or (b) compensate the proponent for its loss in revenue due to any government intervention which suppresses or defers the approved/adjusted toll rates provided in the contract.

(3) Possible Forms of Government Support for Toll Road Project

The possible forms of the government support for toll road projects through PPP schemes are examined and summarized as presented in **Table 18.2.2-1**, based on international practice, comments from the private sector of the country, and the Revised IRR of the BOT Law.

TABLE 18.2.2-1 POSSIBLE FORMS OF GOVERNMENT SUPPORT FOR TOLL ROAD PROJECTS THROUGH PPP

	Description	Advantages	Disadvantages
1. ROW Acquisition	<ul style="list-style-type: none"> The government has the right to acquire and expropriate land for public use and purposes. 	<ul style="list-style-type: none"> The government can start ROW acquisition before tendering, and complete before commencement of construction work. 	<ul style="list-style-type: none"> The organization and capacity of the government are not enough to expedite ROW acquisition on time.
2. Combination of New Facility with Existing Facility.	<ul style="list-style-type: none"> New projects will be implemented through PPP scheme, and combine with existing facility to enlarge tollway capacity. Toll fee will be collected over the combined assets. 	<ul style="list-style-type: none"> Reduce investment cost Increase toll revenue Foreseeable minimum traffic volume 	<ul style="list-style-type: none"> Existing facility associated/related with new PPP project shall exist.
3. Integration of Public and Private Facilities	<ul style="list-style-type: none"> A portion of the toll road shall be implemented through conventional public procedure by the government, while remaining shall be under PPP scheme by private sector Both shall be operated and maintained as one by the private sector 	<ul style="list-style-type: none"> Non-profitable project will become commercially viable. Clear definition of the responsibilities for both. Reduce total cost. Effective integration of public infrastructure to provide service. 	<ul style="list-style-type: none"> Public fund is required. Effective coordination in design, construction, implementation timing is vital.
4. Guarantee of Minimum Traffic and Revenues	<ul style="list-style-type: none"> The government guarantees a minimum traffic volume or minimum revenue if toll rate is justified in view of social, environmental, political aspects. 	<ul style="list-style-type: none"> Non-profitable project will become commercially viable. No serious risks to private sector. 	<ul style="list-style-type: none"> Incentive of private sector may become less. Serious risks to the government.
5. Provision of Financial Subsidy	<ul style="list-style-type: none"> The provisions of Revised IRR of the BOT Law are conformed. 	<ul style="list-style-type: none"> Fair to both, public and private sectors. 	<ul style="list-style-type: none"> Fair to both, public and private sectors.

18.3 WORK SHARING

18.3.1 Traditional Practices of Work Sharing

Traditionally, governments have relied on public procurement to develop infrastructure systems. Under the traditional public procurement method, government agencies vested with responsibility for implementing infrastructure projects can utilize the services of the private sectors for planning, design and construction selected through a competitive basis. Upon the completion of a project, it is operated and maintained by the agency.

A PPP is a partnership between the public and private sectors for the purpose of implementing a project or a service to develop infrastructure system under a project agreement. The main objectives of government are the effective utilization of technical expertise and financial resources of the private sector, while the expectations of private sector are to undertake commercially viable projects with the clear goal of maximizing profits.

The substance of such project agreement is found in defining work sharing and risk allocation between both sectors. The extent of work and risk sharing to the private sector is the principle criteria in forming a PPP structure. The commercial viability of a project is greatly influenced by such work and risk sharing.

In Section 17.3.2, the mandatory and optional support of the government are assumed in proposing possible PPP options. Such mandatory support of the government shall be considered as the works to be shouldered by the government.

Based on the mandatory obligations of the government and past practices of toll road development projects, the basic traditional practices of the work sharing between the public sector and private sectors, are presented in **Table 18.3.1-1**.

Among the work items, shown in the table, particularly of BOT scheme, the followings are key factors in discussing the work sharing.

- Business Case Study

The business case study aims to assess the unsuitability of a project as PPP project. A lengthy process is likely to be required to package and approve PPP projects after project identification.

Through a thorough business case study to be conducted by the government, the appraisal of a project as PPP project by the government shall be done immediately.

- Feasibility Study

The objectives of the feasibility study are to execute the design of PPP structure, traffic study, economic and financial analysis and establishment of bidding process including basic standards and parameters for bidding.

Moreover, the ROW required for the project shall be clearly defined with parcellary plan ; and the resettlement plan for PAPs shall be prepared during the feasibility study. Therefore, the government shall undertake and authorize the study on time.

- Right of Way Acquisition

Generally, the acquisition of right of way required for the project is the responsibility of the government. However, non-delivery or late delivery of ROW is one of the high risks for the project implementation, especially for the financial closure of contract, the commencement of construction work and start of operation of facility.

- Relocation of PAPs

The government shall be responsible for this special task, since the relocation of project-affected-persons (PAPs) is extremely serious issues that can hamper the implementation of projects.

- Toll Level Risk due to Inflation

The toll level shall be adjusted in accordance with the inflation based on a pre-determined formula.

The government is responsible for accepting adjustment in accordance with the law and project contract.

- Traffic Volume Risk

The traffic volume level shall be maintained as assumed in the contract. As an alternative, the private entity shall take full responsibility over its traffic forecast, including the impact of any traffic shortfall on toll revenues.

- Financial Support of the Government

The financial support of the government shall be considered as optional measures to support the private sector in forms of subsidy for construction cost and/or, operation cost of facility.

**TABLE 18.3.1-1 TRADITIONAL PRACTICE OF WORK SHARING
FOR TOLL ROAD DEVELOPMENT**

Work Items	Public Sector (Government/ Implementing Agency)	Private Sector (Project Proponent)	Remarks
1. Preparation of National Legislative and Regulatory Structures	○	-	<ul style="list-style-type: none"> • Political and government commitment on PPP project promotion.
2. Project Identification (Business Case Study)	○	-	<ul style="list-style-type: none"> • PPP Structure • Work/Risk Sharing • Government Support
3. Project Appraisal	○	-	<ul style="list-style-type: none"> • Strong commitment on project configuration and PPP modality.
4. Feasibility Study (PPP Design, Basic Parameter for Tendering)	○		<ul style="list-style-type: none"> • Delineation of ROW • Initial Toll Rate
5. Traffic Analysis	△ (Indicative)	○ (Own)	<ul style="list-style-type: none"> • Public sector conducts through F.S.
6. Environmental Impact Assessment	△ (Preliminary)	○ (Final)	<ul style="list-style-type: none"> • Public sector conducts through F.S.
7. Right of Way Acquisition	○ (Fund, Execution)	-	<ul style="list-style-type: none"> • Proper timing of ROW delivery, preferably before commencement of construction.
8. Relocation of PAPs	○ (Fund, Execution)	-	
9. Detailed Engineering	-	○	<ul style="list-style-type: none"> • Public sector renders the construction supervision.
10. Construction	-	○	<ul style="list-style-type: none"> • Public sector renders the construction supervision.
11. Operation and Maintenance	-	○	<ul style="list-style-type: none"> • Public sector administers and oversees O & M through monitoring.
12. Toll Rate Adjustment	○ (Approve)	○ (Apply)	<ul style="list-style-type: none"> • Private sector is responsible for initial toll rate.
13. Fund	○ (Counterpart Fund)	○ (All equity/ Debt)	
14. Financial Support	○ (Optional)		<ul style="list-style-type: none"> • Appropriateness of amount shall be justified.

Note: ○ Main Task
 △ Sub Task

18.3.2 An Example of Work Sharing for Toll Road Development

As an example of work sharing in the country, the contract agreement of Tarlac-La Union Toll Expressway (TLUTE) is reviewed with the focuses on work sharing and risk allocation, as summarized in **Table 18.3.2-1**.

(1) Project Background

The extension of the North Luzon Expressway (NLE) up to Laoag, Ilocos Norte was originally intended for progressive completion. In 2000, the Department of Public Works and Highways (the DPWH) proposed the North Luzon Expressway Extension (NLEE) Project Phase 1 (Tarlac to Rosario, La Union) with a proposed implementation period from 2003 to 2006. However, the DPWH budget hindered the implementation of the proposed NLEE.

The DPWH enjoined the private sector proponents, through international competitive bidding, to implement the project, to effectively address the public need, without incurring unnecessary debt on the part of the government.

(2) Project Scope

TLUTE starts near the terminus of the Subic-Clark-Tarlac Expressway in La Paz, Tarlac and terminates in Rosario, La Union, with a high speed facility, controlled access, divided highway on embankments with a 2-lanes (initial, Phase 1) and a 4-lanes (Phase 2 in the future).

Project Limit	La Paz, Tarlac to Rosario La Union
Number of Lanes	2 lanes (initial stage)
Lane width	3.65 meters
Shoulder (on both sides)	3.0 meters (50mm ACP)
No. of Interchange (min)	7
No. of Toll Plaza (Start/End)	2
Pavement	Asphalt Concrete Pavement
Embankment	Height to be determined based on minimum freeboard of 0.6 meter from the maximum flood level
Road Right-of-Way	32 meters (minimum)

(3) Contractual Framework

The contractual agreement for the project is the Build-Transfer-and-Operate (BTO) scheme under the BOT Law of the Philippines.

Under this agreement, the proponent takes full responsibility for design and construction of the project. Once the toll road is certified substantially completed, title is transferred to the DPWH, and the proponent will operate and maintain the tollway. At the end of the concession period, the proponent shall turn over the facility to the DPWH in good operating condition.

Contractor; Philippine Infrastructure Development Corporation (PLDC)

(4) Grant of Rights, Privilege and Recital Obligations

Major rights and obligation of both parties are as follows.

By the Grantor (Government)

- Grant of Rights and Privilege
- Obligations
 - Turn-over the possession of the facility to operate and maintain
 - Provide necessary road Right-of-Way
 - Ensure the allocation of the counterpart fund (subsidy)

By the Grantee (Contractor)

- Acceptance of Rights and Privilege
- Obligations
 - Design, construct, operate and maintain the TLUTE Project
 - Provide the Operation and Maintenance Center
 - Undertake all necessary activities for the satisfactory fulfillment of the Project

The special provisions are noticed in this contract agreement as summarized below, with the comments of the Study Team.

Provision 1: Government Financial Participation

The government has duly approved the implementation of the project of which P 3.7 Billion will be provided as its counterpart fund. P 793 Million will be used for the Right of Way acquisition and the remaining amount of P 2,907 Million in cash subsidy of the government for the civil works.

[Comments]

The appropriateness of the amount of cash subsidy should be justified by the government in views of technical, economical and financial aspects, exercising value for money assessment (VFM).

Provision 2: Right of Way Plan and Acquisition

The government shall be responsible for acquiring the road right of way. The Proponent shall survey and prepared the required ROW plans including the parcellary plans of affected lots and the required documentation for the acquisition of the ROW.

[Comments]

The government shall be unconditionally responsible for all activities of ROW acquisition. The ROW required for a project shall be clearly defined in a feasibility study which shall be undertaken by the government. The ROW acquisition shall be promptly started and completed before bidding. These activities shall not be managed by the private sector, especially by a winning bidder after a bidding.

Provision 3: Feasibility Study and Traffic Study

The bid will consist of the following documents: 1) Qualification Document; 2) Technical Proposal (Feasibility Study) and 3) Financial Proposal – all of which will be submitted simultaneously in three (3) separate envelopes.

The feasibility study must be undertaken in accordance with acceptable standards and must conclusively demonstrate the feasibility/viability of the project in the following terms; (included are Traffic Study, Economic Feasibility, Financial Requirements, among others).

[Comments]

A bidding shall be held with the transparent, fair and competitive manner in accordance with the rules and regulations and other requirements including engineering and financial requirements.

The standards and minimum requirements in engineering aspects, and traffic demand and financial analysis in financial aspects are the indispensable factors, among others, in bidding PPP project.

The feasibility study shall establish such indispensable factors as basic parameters for bidding, based on which the fair bidding will be ensured.

Provision 4: Material Adverse Grantor Action

Material Adverse Grantor Action means action of any national or local government unit, agency and/or authority action, representation or operation shown in **Table 18.3.2-1**.

The parties shall conduct negotiation in good faith for a period not exceeding one hundred twenty days from the date of the Grantee's notification.

[Comments]

When this provision will be observed in good faith, no issues during project implementation and operation may be broken out.

TABLE 18.3.2-1

**AN EXAMPLE OF WORKSHARING TARLAC-LA UNION
TOLL EXPRESSWAY (TLUTE)**

Items	Descriptions	
PPP Modality	<ul style="list-style-type: none"> • Build-Transfer-and-Operate (BOT) Scheme • Once the toll road is certified substantially completed, the title is transferred to the DPWH. • At the end of the concession period, it shall be turned over to the DPWH. 	
Government Financial Participation	<ul style="list-style-type: none"> • P 3,700 M in total <ul style="list-style-type: none"> - 793 M for ROW acquisition - 2,907 M as cash subsidy for the civil works 	
Right of Way Acquisition and Plan	<ul style="list-style-type: none"> • The Government shall be responsible for acquiring the road right of way. • The proponent shall survey and prepare the required ROW plan including the parcellary plan of affected lots and the required documentation for the acquisition of the ROW. • Prior to commencement of construction, the Independent Consultant shall confirm that there exists sufficient land for construction to proceed in the next six (6) months and at least six (6) months thereafter in terms of the Toll Concession Agreement. 	
Environmental Impact	<ul style="list-style-type: none"> • The proponent shall undertake a new Environmental Impact Assessment (EIA) and obtain an Environmental Clearance Certificate (ECC), if the Proponent introduces a new alignment. 	
Traffic Analysis	<ul style="list-style-type: none"> • Indicative traffic forecast by the DPWH. • The proponent is required to conduct own analysis. 	
Bid Information Requirements (to be submitted for bid)	<ul style="list-style-type: none"> • Technical Requirement 	1.1 Traffic Study 1.2 Engineering Design 1.3 Construction Execution Plan 1.4 Environmental Management
	<ul style="list-style-type: none"> • Operational and Maintenance Requirements 	2.1 Operational Plan 2.2 Maintenance Plan
	<ul style="list-style-type: none"> • Financial and Economic Requirements 	3.1 Economic Study (Feasibility) 3.2 Financial Viability (Requirements) 3.3 Toll Rates
Detailed Engineering, Construction, Operation & Maintenance	<ul style="list-style-type: none"> • All works shall be done by the proponent • All outputs shall be reviewed by the DPWH and Independent Consultant 	
Toll Rate Adjustment	(1) Periodic Adjustment <ul style="list-style-type: none"> • Calculated through the formula involving Consumer Price Index (CPI). (2) Interim Adjustments <ul style="list-style-type: none"> • Adjusted upon the occurrence of any of the following events; <ol style="list-style-type: none"> (i) In the event of Force Majeure. (ii) Additional costs of repair on works arising out of Force Majeure. 	
Hidden Defects	<ul style="list-style-type: none"> • The proponent shall, at its own cost, repair any damage, except any damage due to ordinary wear and tear. 	
Force Majeure	<ul style="list-style-type: none"> • The proponent shall be responsible for damages by utilizing any insurance proceeds. • Damages due to insufficiency of insurance shall be repaid by means of 1) toll rate increase and concession period extension. 	
Independent Consultant	<ul style="list-style-type: none"> • The DPWH shall submit a list of 10 candidates, and appointed and funded by the Proponent. • The Independent Consultant will be provided during preparation and review of the detailed engineering design and during construction of the project. 	
Material Adverse Grantor Action (Public Sectors)	Government units' actions on the following. <ul style="list-style-type: none"> • Any failure on adjustments of the authorized Toll Rate. • Non-delivery or late delivery of ROW. • Any failure to issue Toll Operation Permit/Certificate. • Any change in existing laws, rules or policies making the performance more difficult. • Any change in existing laws, rules, or policies making unlawful to freely convert Peso into other currencies. • Any act of the government, which adversely affects the feasibility of the project. 	

18.4 RISK ALLOCATION

18.4.1 General Principles

Risks in PPP projects are defined as any factor, event or influence that threatens the successful completion of projects in terms of time, cost or quality. A key principle of PPPs is that risks should be allocated to the sector best able to manage them.

The objectives of risk transfer include the followings, among others.

- To reduce long term cost of a project by allocating risks in a most cost effective manner.
- To improve the quality of service and increase revenue through more efficient operation.
- To provide a more consistent and predictable profits of expenditure for more sustainable management.

Risks discussed below are the extracts from Guidelines for successful Public-Private-Partnerships published by the European Commission and Legislative Guide on Privately financed Infrastructure by the United Nations Commission on International Trade Law.

(1) Political/Regulatory Risk

The long duration of most concession agreements and the common aversion to user fee increases make PPP projects especially susceptible to political risk. This is aggravated when unpopular projects are overseen by the government. A private sector entity also faces the risk that project execution may be negatively affected by the contracting authority of the government. Such risks are often referred to as political risks which may include three types; traditional political risks (e.g. nationalization of the project company's assets), regulatory risks (e.g. introduction of more stringent standard of service delivery, and quasi-commercial risks (breaches due to change in the government's priority).

The private entity may be able to mitigate such risks through forms of political insurance. Bilateral agencies are known to provide political risk guarantees to private entities from aligned countries.

(2) Revenue Risk (Traffic Demand and Toll Revenue Risks)

In order to arrange project financing, certain assumptions regarding usage and revenue levels must be made. These are always significant residual risks on the traffic levels that projects will actually attract, due to forecasts of future growth potential and surveys of people's willingness to pay tolls.

With unforeseen future event that may have dramatic impacts on toll revenue, the possibility that the project can not generate the expected revenue may seriously impair the private entity's capacity to provide acceptable services and efficient operation of facility.

The careful and thorough analysis on the adequate level of traffic risks to be transferred to the private sector shall be undertaken. Share toll or availability payment mechanisms should be considered instead of real tolling, which does not yield enough revenue to cover a significant percentage of investment costs.

(3) Construction Risk

The financial feasibility of a concession can be jeopardized when cost overruns of capital construction cost are incurred due to poor project plan and definition, unknown geological condition, and loosely defined specification item.

Construction delay also have detrimental effects on capital costs while some delays can be minimized through construction management, there are often external factors, such as timely delivery of right of way which is difficult to manage.

Construction risk is always assigned to the private entity, which in turn to include strong incentives for on-time completion of works, if right of way will be provided on-time.

(4) Foreign Exchange Risk

Prices and user fees charged to local users or customers will most likely be paid for in local currency, while loan facilities and equipment and fuel costs may be denominated in foreign currency.

In addition to exchange rate fluctuation, the private entity may face the risk that foreign exchange control may limit the availability of foreign currency in the local market needed to repay the original investment.

Foreign currency risk can be assumed, in certain cases, by sovereign government or international financial institutions.

(5) Environmental Risk

Citizen groups are increasingly concerned on environmental impacts of infrastructure projects, and vigilant to mitigate political impacts. Environmental issues can increase capital costs considerably and result in serious delays.

Environmental risk is usually assumed by the private entity so that thorough environmental assessment shall be undertaken to assess any environmental impacts, identify mitigation programs and estimate associated mitigation costs.

(6) Public Acceptance Risk

Infrastructure projects have the potential to provoke serious protests among local communities, which can cancel projects.

Public consultation meetings or stakeholder meetings shall be held during planning phase of projects or before deciding to invest, to assess public approvals as well as public sentiment towards the projects.

(7) Force Majeure

Both parties, the government and private entities, face the risk that project may be disrupted by unforeseen or extraordinary events outside their controls, which may be of a physical nature such as natural disaster (floods, storms, or earthquakes) or the result of human action such as war, riots, or terrorist attacks.

Such unforeseen or extraordinary events may cause a temporary interruption of the project execution or operation of facility, resulting in construction delay, loss of revenue and other losses. Severe events may cause physical damage to the facility.

Neither government nor the private entity cannot control this risk since the private entity will not be able to manage, the government often takes the risk. However, both parties may jointly integrate damages against human actions through some form of political insurance.

(8) Land Availability Risk

The land acquisition and availability for the project is the responsibility of the government for ensuring ownership rights and giving possession without any incumbency for land required for the project.

The risk is that the project land is not available and has not been acquired. If the land has not been acquired, the risk is compounded by construction delay and associated uncertainty on costs.

The government shall make available the land required for the project, preferably at the point of bidding, or before the signing of contract with the private entity.

It shall be noted that the feasibility study for the project to be undertaken by the government should define the right of way so that the government can promptly start the actual work of right of way acquisition simultaneously with the feasibility study, and be completed before bidding or commencement of construction activities.

Based on the discussion and international practices, the typical form of risk allocation is prepared as shown in **Table 18.4.1-1**.

TABLE 18.4.1-1 TYPICAL FORM OF RISK ALLOCATION

Risks	Government	Project Proponent
1. Political Risk Changes in Policy/Strategy Vulnerability of political support	○ ○	
2. Legislative and Regulatory Risk Unclear demarcation of related agencies' responsibilities. Non-compliance of rules and regulations. Changes in legislations and regulations	○ ○ ○	
3. Administrative Risk Lack of road network planning Lengthy process in project appraisal Delay in contract approval Insufficient capacity in man-power/organization.	○ ○ ○ ○	△ △ △
4. Social Risk Poor public relation/awareness Inadequate assessment on stakeholders/affected parties Inefficient grievance mechanism	○ ○ ○	△ △
5. Environmental Risk Adverse impact on natural environment (ecology, erosion) Unfavorable issues on landscape, aesthetic, historical heritage. Delay in issuance of environmental compliance certificate (ECC)	△ ○ ○	○ △
6. ROW Risk Protest on ROW acquisition due to unrealistic land price. Resistance due to non-resettlement action plan (RAP). Public Opposition due to poor acquisition procedures.	○ ○ ○	
7. Economic and Financial Risks Inflation Foreign exchange rate Interest Rate		○ ○ ○
8. Tendering Risk Lengthy/delayed procurement process Unclear engineering standards on design for tendering Unclear criteria on evaluation of tender	○ ○ ○	
9. Engineering Risk Inadequate survey data (Topography, Geotechnical) Design issues (mistake, errors) Design change Defects liability	○ (FS) ○ (FS)	○ (DE) ○ (DE) ○ (DE) ○ (DE)
10. Construction Risk Delay in delivery of ROW Cost overrun Delay in construction Delay in material procurement	○	○ ○ ○
11. Traffic Risk Traffic Volume Toll Rate	○ (BT, BLT) ○	
12. Operation and Maintenance Risks Conflict with other projects O&M system and cost	○ ○ (BT, BLT)	○ (BOT, BTO)
13. Force Majeures	△	○

Note: ○ Main, △ Sub
FS; Feasibility Study, DE; Detailed Engineering

18.4.2 Key Risks in Toll Road Development

(1) Key Risks and Issues through International Practices

The international experiences have revealed the following three (3) reasons as key issues and risks in practicing toll road projects through PPP schemes.

- (a) The government has not defined the policy with the sound political support and stability. (Political and Administrative Risk)
- (b) Toll road projects have been expected to be profitable without the government support, which are rare cases. (Toll Rate Risk)
- (c) Commercially viable tariffs and tariffs adjustment have been difficult to introduce due to public interest (Viability/Public Accessibility Gap)

(2) Key Risks and Issues for Private Sector

The major issues as well as comments and suggestion raised by BOT Firms in the country are summarized in Chapter 4. The firms commits their willingness to assume financing and construction risks in undertaking toll road projects through PPP mechanism providing that the government can handle the obligations specified in the contract agreement.

The private sector assures that key issues and risks on the part of private sector are likely to be certain issues which the private sector cannot manage or deal with. Through the discussions with the public and private sectors as well as review of experiences in PPP projects implementation in the country key issues and risks are identified as shown in **Table 18.4.2-1**.

Based on the analysis on risks raised by BOT Firms and key risks noticed through international practices , key risks and issues and mitigation measures in undertaking toll road projects through PPP mechanism in the country are summarized as listed in **Table 18.4.2-2**; and briefly discussed hereunder.

(a) Political Risk

Toll road development through PPP schemes shall be launched by the government with people's acceptance and as the political commitment. It shall be noted that as political risk raises, the cost of obtaining financing increases, and process in packaging project become lengthy and bureaucratic.

(b) Administrative Risk

The efficient and capable man-power and organization to undertake PPP projects are vital in administrating and implementing PPP toll road projects. Particularly, at the project planning stage, identification of projects, execution of feasibility study, timely preparation and approval of document shall be done smoothly and effectively.

To mitigate such risk, thorough Business Case Study and Feasibility Study for a proposed PPP project shall be conducted.

TABLE 18.4.2-1 RISKS RAISED BY BOT FIRMS IN THE PHILIPPINES

Risks	
1. Political Risk	1.1 Franchise and grant of right for linkaged roads 1.2 Lengthy process to package and approve BOT projects
2. Legislative and Regulatory Risk	2.1 Unclear demarcation of agencies, responsibilities 2.2 Delay in issuing ECC, TOC, etc. 2.3 Issuance of building permits within ROW
3. Administrative Risk	3.1 Delay of government approval necessary before bidding 3.2 In-sufficient capacity for BOT group in DPWH 3.3 Non-assertive action of TRB
4. Social Risk	4.1 None
5. Environmental Risk	5.1 Delay in issuing ECC, etc
6. ROW Risk	6.1 No defining of ROW in Feasibility Study 6.2 No ROW acquisition before bidding 6.3 Non/delayed delivery of ROW before construction 6.4 No realistic BIR zonal valuation 6.5 No full-time group for ROW acquisition in DPWH 6.6 No effective Implementation Rules for ROW acquisition 6.7 Non-special ROW courts for expropriation cases
7. Economic and Financial Risk	7.1 Not sufficient GFS including ROW and subsidy in construction cost 7.2 Inadequate and non-timely GFS 7.3 Delay in the proponent's financial closure 7.4 Foreign exchange risk (loan should be in pesos)
8. Bidding Risk	8.1 Required preparation of feasibility study 8.2 Non-clear evaluation criteria (should be toll rate)
9. Engineering Risk	9.1 Non-clear standards, specifications and parameters for DE
10. Construction Risk	10.1 No enforcement of time limits/milestones of construction 10.2 Impeded construction due to non-delivery of ROW
11. Toll Rate Risk	11.1 Unreliable traffic forecasts done by the government 11.2 Non-approval of toll rate and adjustment formula before bidding 11.3 Shortfalls in traffic volumes 11.4 Shortfalls in revenues 11.5 Disallowing the agreed adjustment of toll rate
12. Operation and Maintenance Risk	12.1 Automatic grant of franchise after contract award
13. Force Majeures	13.1 None

(c) ROW Risk

Untimely delivery of ROW is one of the most crucial problems, involving innumerable complications, such as delay in design, construction and operation resulting in unnecessary cost increases. Moreover, banks will not release funds until land is available. Banks also required a high level of diligence on legal documents, as well as economic feasibility, commercial viability, cash flow schedule and financial requirements as the condition of financial closure..

To address such risks, the in-depth feasibility study can provide the solution on such risks, including defining ROW required for projects, and preparing a practical implementation schedule of ROW acquisition.

(d) Bidding Risk

In some projects, the government does not prepare a complete business case study and feasibility study, and bidders are required to submit their own feasibility study including traffic study, engineering design, economic feasibility study and financial viability study and financial requirements, among others.

(e) Financial Risk

Some of toll road projects may not be implemented by the finance by commercial sources alone because those projects do not usually provide sufficient financial viability for commercial financing.

To attract the investment from private sector for these projects as PPP projects, the government's financial participation must be inevitably required in terms of the grant, loan, or guarantee mechanism. This critical requirement shall be thoroughly analyzed in a feasibility study and clearly specified in the Terms of Reference of bidding.

(f) Toll Rate Risk

Traffic volume and toll rate levels are the key elements of toll road projects as sources of revenues so that traffic analysis submitted by bidders as one of bidding requirements shall be carefully evaluated through comparison with traffic analysis made by the government during the feasibility study stage.

To mitigate the toll rate risk, the introduction of initial toll rate and toll rate adjustment provided in the contract agreement mutually accepted through bid negotiation shall be systematically and automatically enforced.

TABLE 18.4.2-2 MAIN RISKS AND MITIGATION MEASURES FOR TOLL ROAD DEVELOPMENT IN THE PHILIPPINES

Risks	Proposed Mitigation Measures
<p>1. Political Risk</p> <p>1.1 Unstable political support and commitment</p> <p>1.2 Lengthy process in packaging BOT project</p>	<p>1.1 - Firm and strong commitment from politics, government and public.</p> <p>- Agreement from related agencies including LGU.</p> <p>- Close consultation with stakeholder.</p> <p>1.2 - Master Plan to justify Effective Road Network including Toll Road Development</p> <p>- Business Case Study to warrant appropriate PPP modality, legal context. Financial aspects and willingness from private sector.</p>
<p>2. Administration Risk</p> <p>2.1 Inefficient capacity of DPWH BOT Group</p> <p>2.2 Delay in approval/issuance of required documents.</p>	<p>2.1 - Capacity development for PPP project identification and Formulation including PPP structure, business case study, feasibility study.</p> <p>- Capacity development for PPP project implementation including bidding, contract, supervision on operation and maintenance..</p> <p>- Capacity development to prepare Feasibility Study with more emphasis on the financial and legal aspects, realistic traffic forecast, and defining of required ROW.</p> <p>2.2 - Clear work delineation of government operational responsibilities.</p> <p>- Approval of necessary documents/conditions by the government before bidding including development permits by LGUs, initial toll rate and adjustment formula by TRB, ECC by DENR, etc.</p>
<p>3. ROW Risk</p> <p>3.1 Non-proper process for defining ROW</p> <p>3.2 Non-realistic zonal value</p> <p>3.3 Non/delayed delivery of ROW before construction</p>	<p>3.1 - Preparation of reliable Feasibility Study defining required ROW And authorization thereof by all related government agencies.</p> <p>- Preparation of resettlement action plan for PAPs including informal settlers.</p> <p>- Preparation of relocation plan of public utilities.</p> <p>3.2 - More realistic BIR zonal valuation approximating market prices.</p> <p>3.3 - Organize full-time DPWH ROW group.</p> <p>- Timely provision of fund for Row acquisition.</p> <p>- Work commencement for ROW acquisition immediately after authorization of Feasibility Study.</p>
<p>4. Bidding Risk</p> <p>4.1 Required preparation of bid proposals.</p> <p>4.2 Non-clear standard, specification and parameters for detailed engineering and required level of operation and maintenance.</p>	<p>4.1 - Proper advisement for local and international.</p> <p>- Availability of all data, analysis, and studies undertaken by government including traffic data, financial analysis and action plan for ROW acquisition.</p> <p>- Reasonable timing and duration for preparation of bid proposals.</p> <p>4.2 - Preparation of complete and reliable Feasibility Study.</p>
<p>5. Financial Risk</p> <p>5.1 Non-sufficient GFS</p> <p>5.2 Foreign Exchange Risk</p>	<p>5.1 - Preparation of financial analysis to justify GFS.</p> <p>5.2 - Maximum utilization of local financial system.</p>
<p>6. Toll Rate Risk</p> <p>6.1 Delay in TOC approval (Toll Operation Certificate)</p> <p>6.2 Unreliable traffic forecast done by the government</p> <p>6.3 Shortfalls in traffic volumes and revenues</p> <p>6.4 Delay in implementation of toll rate adjustment</p>	<p>6.1 - Approval before bidding by TRB and automatic approval after TCA (Toll Concession Agreement).</p> <p>6.2 - Preparation of reliable traffic analysis during Feasibility Study.</p> <p>6.3 - Realistic toll rate and adjustment formula with GFS if necessary.</p> <p>6.4 - Provision of Material Adverse Grantor Action including</p> <ul style="list-style-type: none"> ➤ Any failure on adjustments of the authorized toll rate. ➤ Non-delivery or late delivery of ROW ➤ Any change in existing laws, rules or policies. ➤ Any act of the government, which adversely affect the feasibility of the project.

18.5 IMPLEMENTATION PLAN

18.5.1 Project Processes and Key Issues

(1) PPP Project Processes

The road map for the successful implementation of PPP projects can be visualized through the development of the effective framework including the development of supporting national and local legislation and regulations, the development of institutional capabilities, and creation of effective management on PPP project cycle.

The Guideline for Successful Public-Private-Partnerships by the European Commission suggests the following PPP project cycle.

- Preliminary stage (Preparation)
- Project identification (Business Case Study)
- Project appraisal
- PPP design and agreement (Feasibility Study)
- Procurement (Tendering)
- Implementation

The Best Practices for Promoting Private Sector Investment in Infrastructure recommended by the ADB proposes the following steps.

- Preparation of PPP environment (Preparation)
- Identification of PPP projects
- Preparation of Business Case Study
- Securing of competitive bids, negotiation and award (Tendering)
- Implementation and Operation

It is noted that both Reports underline the necessity of preparation of PPP environment, identification of PPP projects, and preparation of business case study and PPP design and structure (feasibility study) as the key issues for the successful implementation of PPP projects.

(2) Implementation Process in Revised IRR

The Revised IRR of the BOT Law of the Philippines prescribes the fifteen (15) rules covering all stages of project implementation including the followings.

- Project identification and approval
- Bidding and contract approval
- Detailed Engineering
- Construction
- Operation and Maintenance
- Coordination and Monitoring

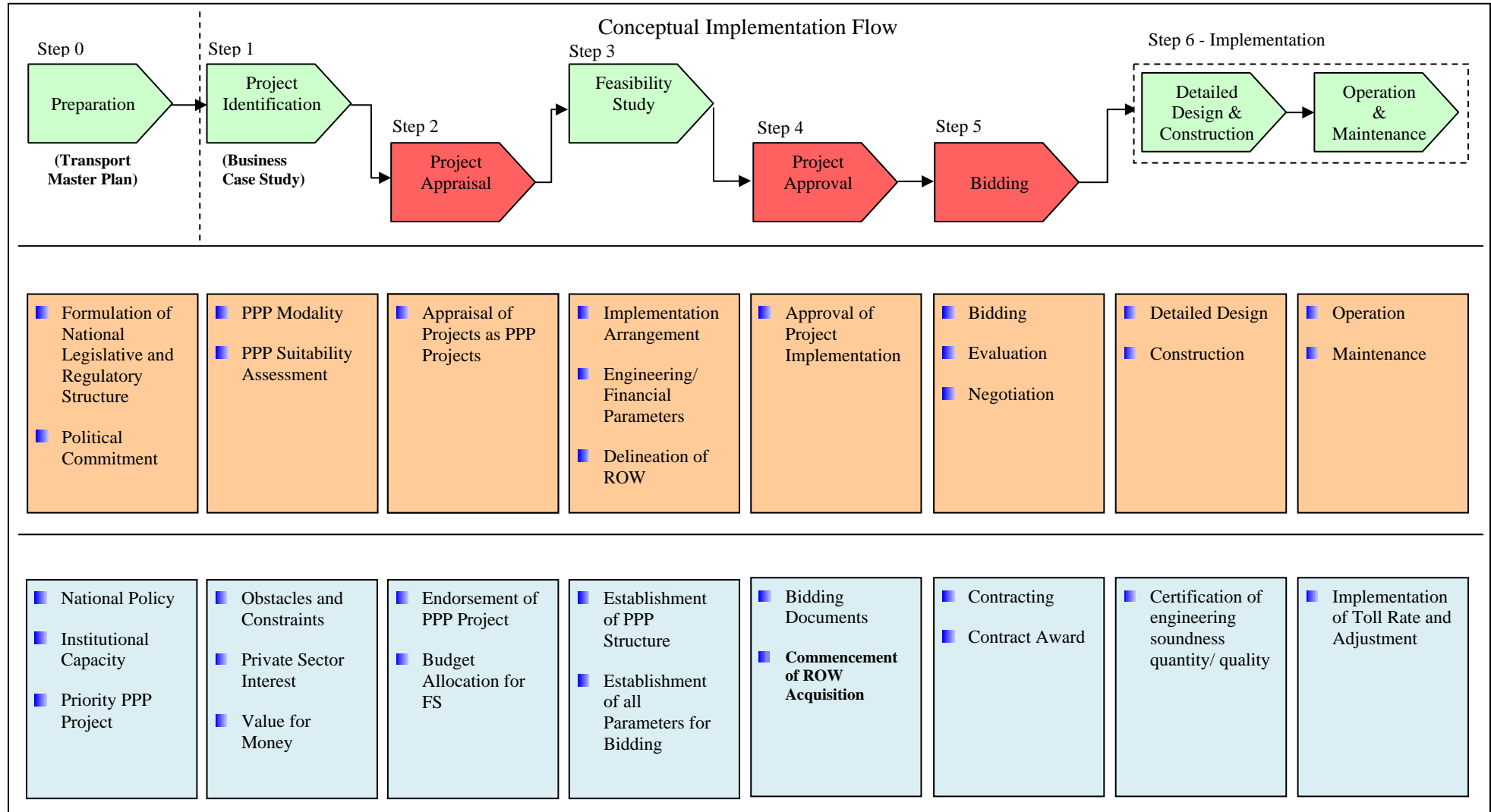
The lessons learned from the experience of implementation of PPP toll roads projects in the country reveal the following key issues in developing PPP road projects.

- Preparation of sector policy
- Legal and regulatory framework for PPP
- Identification of projects for priority implementation
- Design of PPP modality
- Preparation of business case to establish the basis for bidding
- Preparation of feasibility study
- Transparent process of tendering and bid evaluation
- Specification of detailed engineering
- Completion of ROW acquisition.

18.5.2 PPP Project Cycle

Based on examination of PPP project implementation processes and key issues, the PPP Project cycle is prepared for recommendation as shown in **Table 18.5.2-1**. The typical timeframe of each step is assumed as graphically presented in **Figure 18.5.2-1**. The scope and activities of main step are briefly discussed hereunder.

TABLE 18.5.2-1 PPP PROJECT CYCLE



Note: ■ ; Tasks to be undertaken by the government
■ ; Tasks to be carried out by the professionals

FIGURE 18.5.1-1 TYPICAL IMPLEMENTATION SCHEDULE OF PPP PROJECT

	Pre Project	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	Remarks
Step 0: Preliminary	■									
Step 1: Business Case Study		■								■ Outsourcing to Consultant
Step 2: Project Appraisal			■							■ By related Agencies
Step 3: Feasibility Study			■							■ Outsourcing to Consultant
Step 4: Project Approval				■						■ By Approving Body
Step 5: Bidding					■					
Step 6: Implementation										■ By private sector
6.1 Detailed Engineering							■			
6.2 Construction								■		
6.3 Operation & Maintenance										
Step A1: ODA Arrangement					■					■ By public sector
Step A2: ROW Acquisition					■					■ By public sector

Note: ■ ; Tasks to be undertaken by the government
 ■ ; Tasks to be carried out by the professionals

Step 0: Preparation Stage

Prior to the decision process, a number of pre-condition shall be preliminary arranged within the government as defined in the Preparation Stage. The development of an acceptable PPP legal framework, regulatory structures and institutional capacity for its implementation is the mandatory requirements for the successful implementation of PPP projects. These include the followings.

- National legislative and regulatory structures
- Political leadership and commitment to PPP policy
- Political stability

Step 1: Project Identification

The objective of this step is to assess whether a PPP approach is suitable for a proposed project. The desirability and suitability of implementing a project as a PPP shall be assessed as a business case study. Crucial to the selection process of a PPP is whether it will provide value for money and above all additional value than the traditional public procurement method.

The scopes of the business case study is less than the feasibility study standard and is aimed to evaluate technical feasibility and socio-economic acceptability, and economical and commercial viability to put forward as a toll road project.

Table 18.5.2-2 presents main scopes of business case study for PPP projects.

TABLE 18.5.2-2 MAIN SCOPES OF BUSINESS CASE STUDY FOR PPP PROJECTS

Activities	Outputs
1. Suitability Assessment	<ul style="list-style-type: none">• Legal and institutional aspects• Obstacles and constraints• Potential PPP modality• Preliminary risk assessment• Market analysis and private sector interest
2. Traffic Study	<ul style="list-style-type: none">• Network analysis• Traffic demand forecast
3. Engineering Design	<ul style="list-style-type: none">• Project Configuration• Project Scope• Minimum Design Preparation• Preliminary cost
4. Environmental Impact Assessment	<ul style="list-style-type: none">• Initial environmental examination• Assessment of land acquisition issues
5. Operation and Maintenance	<ul style="list-style-type: none">• Operation plan• Maintenance plan
6. Economic Feasibility	<ul style="list-style-type: none">• Analysis of economic parameters
7. Financial Evaluation	<ul style="list-style-type: none">• Analysis of financial parameters• Preliminary toll rates• Analysis on value for money

Step 2: Project Appraisal

The business case study is to be presented to related agencies of the government for the appraisal. Upon the appraisal of the case study, the project is proceeds to a detailed feasibility study with a fund arrangement for a feasibility study.

The project appraisal shall focus on selection of PPP type and defining of PPP structure with the consideration of the followings.

- Project Priority ; Master Plan, PPP Modality
- Need assessment ; Objectives and needs of service.
- Design Standard ; Engineering/environment
- Financial Parameter ; Economic/financial Evaluation
- Risk allocation ; risk allocation in most cost effective manner, obstacles/constraints.
- PPP components ; procurement, financing and ownership
- Budget refinement ; significant improvement in service or cost savings.
- Expectation on PPP ; roles of public and interest of private sector.
- Budget for F.S.

Step 3: Feasibility Study

The objectives of this step are to prepare project PPP design and agreement relative to PPP structure, design of tendering process and implementation conditions. A PPP structure entails technical performance standards and financial assessment to ensure the project viability including risk assessment.

The feasibility study is recommended to be prepared by the public sector because this study aims to develop the minimum technical performance standards and specifications and other significant basic parameters to be used as the basis of tendering and tender evaluation.

Main scopes of feasibility study for PPP projects are presented in **Table 18.5.2-3**

TABLE 18.5.2-3 MAIN SCOPES OF FEASIBILITY STUDY FOR PPP PROJECTS

Technical Aspect <ul style="list-style-type: none">- Project configuration, including alternatives- Minimum design parameters- Performance standards/specifications/level of improvement- Construction method, cost and schedule- Environmental impact assessment/Resettlement action plan- Right-of-way acquisition plan and schedule
Economic/Financial Aspect <ul style="list-style-type: none">- Traffic demand forecast over the concession period- Economic analysis (economic costs and benefits, EIRR, ENPV, etc.)- Financial model and analysis (discount rate, foreign exchange rate, inflation factor, financial viability indicators such as FIRR, FNPV, etc.)- Proposed tolls- Proposed formula and price indices to be used in the adjustment of toll rates- Proposed Government financial support (GFS)
Operation and Maintenance Aspect <ul style="list-style-type: none">- Operation and maintenance system- Operation and maintenance cost- Traffic management including overloading- Routine, periodic and emergency maintenance plan- Monitoring plan
Contract Aspect <ul style="list-style-type: none">- Assessment and selection of PPP modality]- Work sharing- Risk allocation- Pre-qualification requirements- Parameters and criterion for evaluating project proposals- Investment incentives and government undertakings- Bidding Documents- Contract terms and conditions

Step 4: Project Approval

The feasibility study shall be utilized and approved by the Approving Body (ICC, NEDA Board, Local Sanggunians) for the project implementation through PPP schemes.

The project approval shall include all output of the feasibility study including the followings.

- Implementation option
- Implementation arrangement
- Engineering parameters
- Financial parameters
- ROW acquisition plan
- Bidding documents

Step 5: Bidding

The Revised Implementing Rules and Regulations (IRR) of the BOT Law of the Philippines prescribes the bidding process for toll road projects covering two (2) methods; the public bidding process and process for unsolicited proposals, which shall be observed for a PPP project.

The key in tender process selection lies in the degree to which it is possible to define a project. The followings shall be clearly defined.

- Project requirements to ensure equitable evaluation of bids.
- Government support for private sector to prepare realistic bids.
- Simple evaluation criteria
- Open and transparent tender process
- Detailed recordings of tender process and evaluation

Step 6: Implementation

The implementation of public sector infrastructure project requires a significant level of proactive management of the interface between the public sector/government and private sector/contractor in order to ensure that the service is provided in accordance with the precise requirements.

In implementation of PPP project, two (2) separate management process must be considered.

- Project management to deal with development of a project.
- Contract management to ensure the procedures and organization required.

In parallel with this feasibility study, the following two (2) special activities shall be performed by the public sector.

Special Activity 1: ODA Arrangement/Budget Allocation

The budget allocation in conformance with the project cost plan, the government subsidy arrangement, right of way acquisition plan and other costs required for project implementation shall be undertaken. When the official development aid (ODA) from international lending agencies is expected, the arrangement shall be commenced in parallel with the feasibility study.

Special Activity 2: ROW Acquisition

The feasibility study shall clearly delineate the road right of way (ROW) required for a project. The acquisition of ROW, therefore, shall be commenced almost simultaneously with the feasibility study, and shall be completed prior to the tendering or before the actual start of construction activities of projects.

18.6 OPERATION AND MAINTENANCE PLAN

18.6.1 Scope of Toll Road Management

Under PPP schemes, the project proponent shall perform the toll road management involving toll road operation and maintenance in accordance with the terms and conditions agreed between the government and the project proponent, maintaining the order and safety of traffic and ensuring the well being of the toll road users.

The toll road management includes the operation and maintenance activities as shown in **Figure 18.6.1-1**.

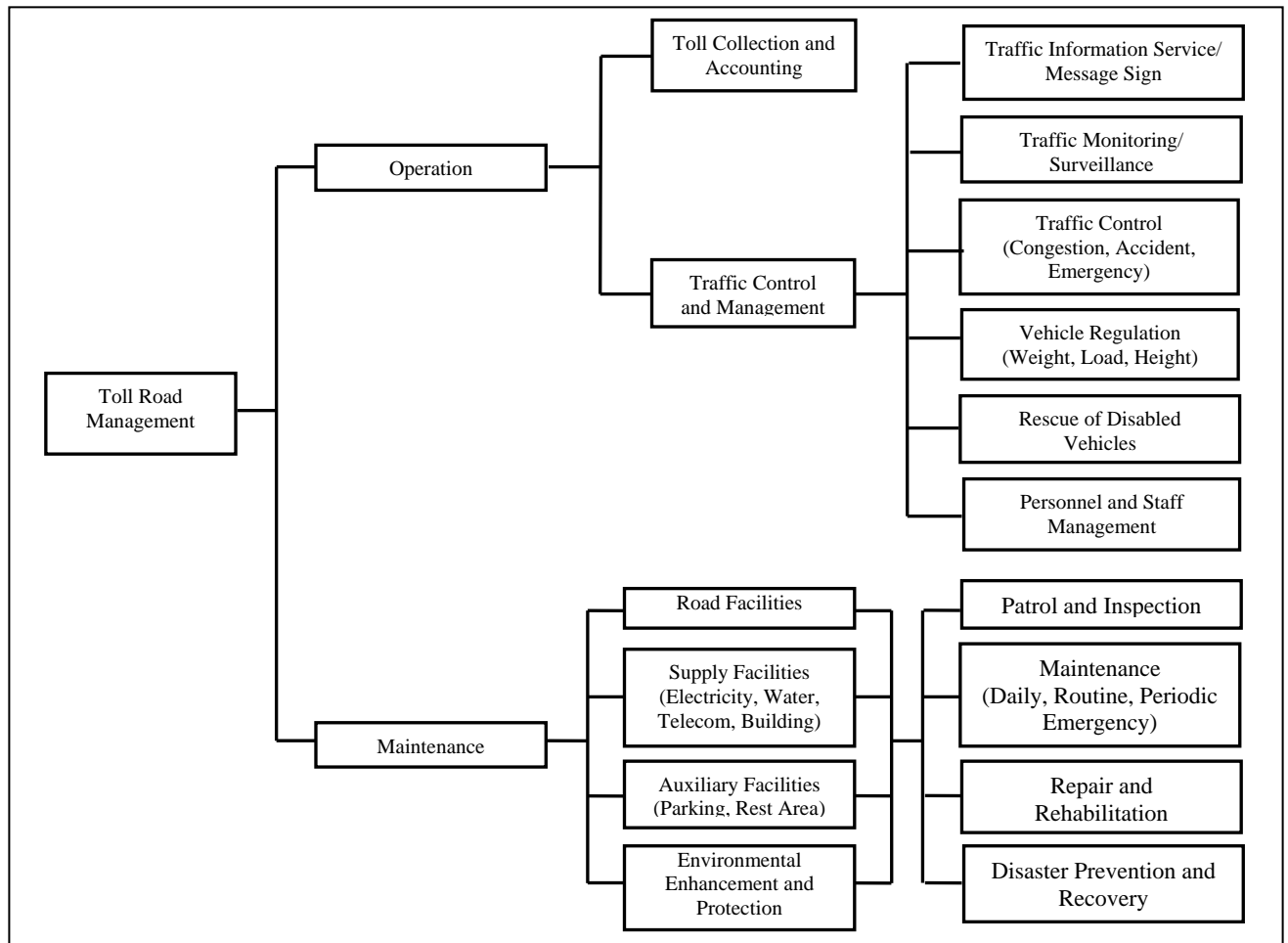


FIGURE 18.6.1-1 SCOPE OF TOLL ROAD MANAGEMENT

18.6.2 Toll Road Operation System

The major tasks of toll road operation which PPP company is obliged to undertake include the followings.

- Toll collection and accounting
- Traffic control and maintenance

(1) Toll Collection and Accounting

Toll System

There are two types of toll systems; namely “flat toll system” (open toll system) and “distance-dependent system” (closed toll system) where flat toll system is adopted, toll is collected according to vehicle classification by the toll collector with manual collection.

Electronic Toll Collection (ETC)

If distance-dependent toll system is selected, Electronic Toll Collection (ETC) is recommended to be introduced because of the calculation of tolls. The ETC system is a system that automatically collects toll from vehicle passing in a toll road without stopping and paying cash at a toll booth. The ETC system can eliminate queuing at toll gates by providing exclusive lanes for ETC-equipped vehicles, and transaction time is much faster. CO₂ emissions are also expected to be reduced at ETC toll booths.

There are two types of system, namely “on-board unit type” and “prepaid card type”. In the on-board unit system, vehicles do not need to stop at tollbooth, while in the pre-paid card system, prepaid card is inserted in the reading machine. The latter does not need to equip high-cost device on road users, but vehicles have to stop at toll gate.

(2) Traffic Control and Management

Traffic control is defined as the actions of traffic controllers/regulators to enforce legislations on road traffic such as regulations on speed, overtaking, stopping and parking and traffic control in emergency. On the other hand, traffic management involves the deeds of road administrators to secure safe, smooth and comfortable traffic condition.

Traffic Information System (TIS)

The objectives of traffic information system (TIS) for toll roads are to enhance the safety and comfort of road users, ensure fast and smooth traffic flow, maximize efficiency of operation, and minimize adverse effect of incidents, through various functions as listed below; among others.

- Information Service
- Traffic monitoring/surveillance
- Traffic condition and incident detection
- Information dissemination

The system is an integrated system consisting of several subsystem with respective functions including vehicle detector system, closed circuit television system (CCTV), graphic display panel, highway radio system, sign boards, etc.

Intelligent Transport System

The intelligent transport system (ITS) is an information technology system to link people, vehicles and roads to reduce accidents, increase safety, and reduced congestion, which has been used in Japan.

Other Traffic Management Activities

The following services shall be included as traffic management activities of toll roads.

- Vehicle regulation (weight, load, height)
- Rescue of disable vehicles
- Clearance of accident site
- Rescue of injured persons in accident
- Management of personnel and staff in traffic control and management

18.6.3 Toll Road Maintenance System

(1) Maintenance Activities

Maintenance Work

The objectives of toll road maintenance are to maintain the acceptable level of function of the road and related facilities including the followings.

- Road facilities
- Supply facilities (electricity, water, telecom, building, etc.)
- Auxiliary facilities (parking, rest area, etc.)
- Environmental enhancement and protection

The activities of toll road maintenance encompass the followings.

- Patrol and inspection
- Maintenance (daily, routine, periodic, emergency)
- Repair and rehabilitation
- Disaster prevention and recovery

Preventive Maintenance Measures

It shall be noted that preventive measures be actively employed before any deteriorations become critical. If deterioration is left, the cost of repair work greatly increase, and the life cycle cost of facilities also increase.

Inspection and diagnostic technologies are of the essence for conducting efficient maintenance. Also, inspection data management system and bridge management system shall be developed.

(2) Maintenance Criteria and Performance

Maintenance Criteria and Quality Assurance

Maintenance criteria and specification for each road facility should be clearly prepared in bidding documents.

The quality assurance shall be performed through monitoring and inspection on the maintenance works which should be ensured to be executed in accordance with the criteria and specifications.

The following maintenance reports are recommended to be prepared;

- Inspection and maintenance activity (quarterly)
- Road condition inspection report (annual)
(pavement flatness, undulation and serviceability survey)
- Facilities condition report (annual)
- Environmental enhancement and protection report (annual)

Performance based Contract

The performance based contract on maintenance of toll road may be recommended to maintain the safety and comfort of road users with the minimum maintenance cost.

This type of contract specifies the results or performance of the maintenance work required and the method of maintenance work can be adopted by a contractor. The contractor can select his special maintenance technique resulting in the good performance and cost reduction.

(3) Asset Management

The objectives of maintenance of toll roads are to keep in functional condition and to preserve the values of road facilities with the minimum expenditure at appropriate timings.

Management of road assets shall be exercised through the proper maintenance works based on an accurate inventory survey and the asset management plan including the followings.

- **Planning asset management**
The asset management plan shall be designed in consideration of the characteristics of each facility such as facility type, required inspection, level of safety and life cycle cost, etc.
- **Identification of field works**
The field works including daily, routine, repair works shall be identified through the patrols and inspection activities.
- **Allocation of maintenance and rehabilitation costs**
The asset management aims to minimize the life cycle cost of road facilities. The maintenance and rehabilitation cost shall be allotted at the proper timing with appropriate amount.
- **Establishment of Organization**
The organizational structure for asset management shall be established. The financial resources for asset management activities are recommended to be arranged separately from the ordinary maintenance works.

18.7 BIDDING PROCEDURE

(1) Pre-requisite Requirements for Fair Bidding

The success in implementation of toll road development through PPP Scheme is extremely affected by the bidding procedure which shall be executed in compliance with the relevant rules and regulations. To ensure the strict and efficient bidding, the followings shall be noted and observed as the pre-requisite condition required for the accomplishment of fair bidding.

Specific Bid Documents

The clear and specific bid documents shall be provided to stipulate the condition and requirements for bidding including the followings. These documents shall be prepared through business case study and detailed feasibility study discussed in Section 18.5.

- Instruction to Bidders
- Minimum design, Performance Standards/Specifications, and Economic Parameters such as discount rate, inflation factor and foreign exchange rate, where applicable among others.
- Draft Contract reflecting the contractual agreement
- Bid Form

Securing of Transparency in Bidding

The rules and procedures to be followed in bidding by the government and bidders shall be fully disclosed. It is very important to secure transparency, accountability and fairness to the public in the procurement process of public infrastructures implementation. In light of this, pre-qualification criteria and bid evaluation method should be transparent and fair.

Ensuring of Competitiveness in Bidding

The objective of public bidding is the selection of a project proponent who shall be capable of performing works and delivering services required at the desired quality level and at the most economical price. To encourage prospective bidders to participate in the bidding, ambiguous condition, unfair provisions and abuse of rules shall be eliminated.

(2) Types of Bidding Process

In Chapter 4, the bidding processes prescribed in the Revised IRR, R.A. 7718, are briefly discussed including the following two (2) processes.

Method 1: Public Bidding Process

- Option 1: Pre-qualification undertaken prior to Issuance of Request for Proposals
- Option 2: Qualification incorporated in the Bidding Process

The public bidding process is understood as the conventional and solicited approach which has two (2) Options. Under Option 1, upon the approval of the project, the agency publishes the invitation to apply for pre-qualification (PQ) and to bid within a certain period. Interested bidders submit PQ documents. After evaluation of PQ documents, bidders are pre-qualified /disqualified and pre-qualified bidders are requested to submit technical and financial proposals including the bid security. Under Option 2, the qualification process is incorporated in the bidding process so

that interested bidders submit their proposals in three envelopes, qualification documents, technical proposal and financial proposal.

Method 2: Process for Unsolicited Proposal

A Project Proponent prepares and submits to the Agency a complete proposal, consisting of at least a feasibility study, company profile, and a draft contract. Unsolicited Proposals may be accepted by the Agency on a negotiated basis provided that all the following conditions are met.

- The project involves a new concept or technology and/or is not part of the List of Priority Projects,
- No Direct Government Guarantee, subsidy or equity is required, and
- The Agency has invited by publication, for three (3) consecutive weeks, in a newspaper of general circulation comparative or competitive proposals and no other proposal is received for a period of sixty (60) working days.

Prior to bidding, the Agency shall secure either the advice of the regulator or the approval of the Approving Body or both, for the pre-determined formula and official price indices for the adjustment of the tolls that may be granted during contract implementation.

“List of Priority Projects” are defined that concerned agencies are tasked to prepare their infrastructure or development programs and to identify specific priority projects that may be financed, constructed, operated and maintained by the private sector through the Contract Agreements or schemes authorized under these Revised IRR and to submit for the approval by the Approving Body.

The DPWH has established through experience of toll road implementation through PPP schemes the following policies.

- Future PPP projects are being planned to be undertaken through the solicited mode of the BOT Law. The unsolicited mode will be adopted for exceptional or rare cases, if at all.
- As future Preparatory studies Business Case/Feasibility Studies with more emphasis on financial (including GFS) and legal and institutional aspects are conducted.
- Financing/Government Financial Support (GFS)





















Top management of the DPWH has given top priority to the allocation of funds for ROW acquisition and subsidy dealing construction for PPP projects.



(3) Timeframe Required for Bidding Process

The Revised IRR clearly stipulates the detailed activity and timescale required for each step to be followed during bidding process. **Figure 4.1.3-1** graphically shows the bidding process of Public Bidding Option 1 and Unsolicited Proposals in the form of flow chart.

Table 18.7.1-1 demonstrates the activity of each step and days allowed to carry out each step.

**TABLE 18.7.1-1 TIMELINES REQUIRED FOR BIDDING PROCESS UNDER R.A. 7718
(BOT LAW)**

Activities	Agency	Required Days	Before Bidding	1 st Year	2 nd Year	Remarks
Public Bidding; Prequalification undertaken Prior to Issuance of Request for Proposals (Option 1 Case)						
Step 01: Project Identification and Preparation	Agency	Indefinite	 FS			Feasibility Study
Step 02: Approval by Approving Body	A.B.	30				A.B. (ICC, NEDA)
Step 1: Advertisement/Invitation to Pre-qualify and Bid	Agency	21				P.Q. Invitation
Step 2: Preparation of P.Q. Documents	Bidders	45 (30)				(Less than Php 300M)
Step 3: P.Q. of Bidders and informing	Agency	30 + 7				Pre/disqualification
Step 4: Issuance of Request for Proposal/Bid Preparation	Agencies/ Bidders	120 (90)		 223 days		Pre-bid conference
Step 5: Bid Submission and Evaluation	Agency	30 + 15				Two Envelopes (Technical/Financial)
Step 6: Approval of Contract Award	Agency	7 + 7		 282 days		PBAC, Head
Step 7	Issuance of Notice of Award	Agency	Indef. + 7			Notification
	Compliance of Conditions and Requirement	Winning Proponent	30			Requirement for Contract Award
Step 8: Execution /Approval of Contract	Agency	Indef. 7 + 7				Compliance of all conditions
Step 9: Issuance of Notice to commence implementation & Contract Implementation	Agency	7				Financial Closure
Total		340 + Indefinite duration (2 Times); Estimated total Duration 15 months after Step 1.				
Process for Unsolicited Proposals						
Step 01: Submission of Complete Proposal	Proponent	7				F.S. Draft Contract Company Profile
Step 02: Evaluation of Proposal	Agency	30				If complete proposal Reasonable Rate of Return
Step 03: Negotiation with Original Proponent	Agency	Indef. + 90				After commencement of negotiation
Step 04: Approval of Project Proposal	AB	Indef. + 30				After receipt of endorsement
Step 1: Adjustment of Tolls/Fee	Agency	Indefinite				Approval by Regulator & AB
Step 2: Acceptance of Terms and Conditions	Proponent	45				After receipt of Notice of Approval
Step 3: Issuance of Invitation for Comparative Proposals	Agency	21				After acceptance of all Terms and Conditions
Step 4: Preparation and Submission of Comparative Proposals	Comp. Proponent	60				3 envelopes (Qualification,

Note:  : Activities before PQ Process/Approval of Project
 : Indefinite Duration

Process for Public Bidding (Option 1 Case)

Step 01, 02; Project Identification and Approval by Approving Body

Agency prepares the feasibility study and the contract including all necessary documents and submits to the Approving Body (ICC, NEDA Board, Local Sanggunians) for proposal.

Step 1, 2, and 3; Pre-Qualification (PQ)

The Head of the Agency shall create a BOT Pre-qualification, Bids and Awards Committee (PBAC).

For pre-qualification, a prospective Project Proponent must comply with the following requirements.

- Legal Requirements
- Experience or Track record (Firm Experience, Key Personal Experience)
- Financial Capability (Capability in terms of Equity and Debt)

Step 4 and 5; Bid Preparation and Evaluation

Pre-qualified bidders shall submit their proposal in two envelopes.

- First Envelope – Technical Proposal including Bid Security, and
- Second Envelope – Financial Proposal

Only those bidders whose technical proposal passed the evaluation criteria as prescribed shall have their financial proposal opened for further evaluation.

Step 6, 7, 8 and 9; Approval of Contract Award and Notice to Commence Implementation

The technical proposals of the bidder shall be evaluated in accordance with the following criteria.

- Technical Soundness; preliminary/basic engineering design, construction method and schedule.
- Operational Feasibility; organization, methods and procedures for operation and maintenance.
- Environmental Standards; design in accordance with environmental standards.
- Project Financing; financing plan meeting project cost requirements
- Enhancements; offering terms more attractive to the government.

The evaluation on second envelope shall involve the assessment and comparison of the financial proposal of the bidders.

The notice to commence implementation and contract implementation shall be issued after approval of contract award, issuance of notice of award, compliance of conditions and requirement by a winning project proponent, execution or approval of contract and compliance with conditions precedent for contract implementation (usually include financial closure).

(a) Process for Unsolicited Proposal

Step 01, 02, 03 and 04; Submission and Approval of Proposal

Proponent prepares and submits to the agency a complete proposal, consisting of at least a feasibility study, company profile, and the draft contract. The initial evaluation of the proposal shall include to, (1) appraise the merit of the project, (2) qualify the proponent, (3) assess the appropriateness of the contractual arrangement and reasonableness of the risk allocation. The indicative Reasonable Rate of Return shall be confirmed by the Approving Body prior to negotiation. The Agency shall submit the evaluation/appraisal of the merits of the project as justification for accepting the project to the Approving Body.

Step 1 and 2; Adjustment of Toll and Acceptance of Terms and Conditions

Prior to bidding, the Agency shall secure either the advice of the Regulator or the approval of the Approving Body or both, for the pre-determined formula and official price indices for the adjustment of toll, which shall be accepted including all the terms and conditions by the original proponent.

Step 3, 4 and 5; Invitation for Comparative Proposals and Evaluation

Proposals of Comparative Proponents shall be prepared and submitted in three (3) envelopes.

- First Envelope; qualification documents
- Second Envelope; technical proposal
- Third Envelope; financial proposal

The criteria for evaluation will follow the same as public bidding.

Step 6; Determination of Winning Proponent

If the price of the winning comparative proponent is not matched, the winning comparative proponent shall be considered for award.

The original proponent shall again be given the right to match the comparative proponents bid.

Step 7, 8, 9 and 10; Approval of Contract Award and Notice to Commence Implementation

Same process as Public Bidding.

(4) Estimated Timeframe Required for Bidding Process

Table 18.7.1-2 summarizes the estimated timeframe required for bidding process of public bidding (Option 1) and unsolicited proposal as shown in **Table 18.7.1-1**.

The timeframe required for public bidding may be estimated to be 15 months (specified duration 12 months plus indefinite duration 3 months) after publishing of the advertisement and invitation to pre-qualify and bid.

The process for unsolicited proposals may be presumed to consume 20 months (specified duration 9 months plus indefinite duration 11 months).

TABLE 18.7.1-2 ESTIMATED TIMEFRAME REQUIRED FOR BIDDING PROCESS

Steps	Activities	Estimated Months before Bidding	Estimated Months before Commencement of Work		
			Specified Months (days)	Estimated Indefinite Months	Estimated Total Months
Public Bidding					
Step 01, 02	Project Identification/Approval	18 mos.	-	-	-
Step 1, 2, 3	Pre-Qualification		2.2 (66)	-	2.5
Step 4, 5	Bid Preparation/Evaluation		6.7 (202)	-	7.0
Step 6, 7, 8, 9	Contract Approval/Notice to Commence Implementation		2.4 (72)	3.0	5.5
Total		18 mos.	11.3 (340)	3.0	15 mos.
Unsolicited Proposal					
Step 01, 02, 03	Submission/Approval of Proposal	22 mos.	-	-	-
Step 1, 2	Acceptance of Terms/Conditions		1.5 (45)	4.0	5.5
Step 3, 4, 5	Comparative Proposals/Evaluation		5.2 (156)	-	5.0
Step 6	Determination of Winning Proponent		-	4.0	4.0
Step 7, 8, 9, 10	Contract Approval/Notice to Commence Implementation		2.4 (72)	3.0	5.5
Total		22 mos.	9.1 (273)	11.0	20 mos.

18.8 ROADMAP FOR TOLL ROAD PROJECT IMPLEMENTATION THROUGH PPP SCHEME

(1) Practices Recommended through PPP Experiences

It is widely acknowledged through worldwide PPP experiences that reasons for limited progress in toll road development through PPP schemes are;

- Non-initiatives of the Government.
Governments have not initiated their specific policy, resulting in project preparation and identification by the private sector.
- Over-expectation on PPP
Toll road projects have been overestimated to be profitable without government support.
- Gap on Toll Level between Business Level and Public Acceptability
Toll rate and its adjustment acceptable for the business level have been proved difficult to be introduced because of public acceptability.
- Professional Ethics and Approach
Transparency and competition has been verified to be crucial and indispensable for successful implementation.

The best practices suggested by the ADB Report “Developing Best Practices for Promoting Private Sector Investment in Infrastructure, Roads, include the followings.

Preparation of PPP Environment

- Soundness of political leadership
- Initiatives of the government
- Creating independent regulator
- Developing an acceptable PPP legal framework
- Securing competition for the market
- Project identification and preparation by the government, and
- Competitive bidding for implementation by the private sector where unsolicited bids are accepted, they should be subject to realistic competition.

Identification of PPP Projects

The government shall prepare a Transport Master Plan focusing on the followings.

- Preparation of transport development strategy.
- Identification of priority PPP projects
The potential projects in promoting economic development and social and environmental objectives should be addressed.
- Focus on implementability and financing.
- Implementing capacity of the government.

Preparation of Business Case Study

The business case study shall be conducted with the in-depth analysis of the followings.

- PPP modality and suitability assessment.
- Economic/financial analysis defining the government support and provision.
- Identification of obstacles and constraints identifying the nature and scale of all the project risks.
- Assessment on private sector interest and potential investors.

Securing of Competitive Bids, Negotiation and Award

The competitive bidding can be secured with establishment of a clear bidding, evaluation, negotiation and award process, through maximizing market interest.

- Implementation arrangement (work sharing, risk management)
- Financial parameters (government support)
- Simple evaluation criteria
- Bidding documents

Supporting of Implementation and Operation

The government should be proactive during this period to administer and regulate the provisions prescribed in the concession agreement, on the agreed basis for the public interest.

(2) Project Implementation Timeframe

Figure 18.8.1-1 graphically shows the conceptual implementation flow of toll road project through PPP Scheme with the critical milestones in implementation as well as DPWH organization and capacity strengthening.

The implementation timeframe of toll road through PPP scheme can be staged as follows.

Step 0:	Preparation Stage	;	Preparation of Transport Master Plan
Step 1:	Project Identification Stage	;	Preparation of Business Case Study (PPP Study)
Step 2:	Project Appraisal Stage	;	Appraisal of project as PPP project by related Agencies.
Step 3:	Feasibility Study Stage	;	- PPP options and implementation arrangement - Engineering/economic/financial parameters - ROW acquisition/resettlement plan - Bid documents
Step 4:	Project Approval Stage	;	Approval of PPP design by approving body
Step 5:	Bidding Stage	;	- Selection of PPP Project Proponent - Notice to Commence Implementation
Step 6:	Implementation Stage	;	- Detailed Design - Construction - Operation - Maintenance

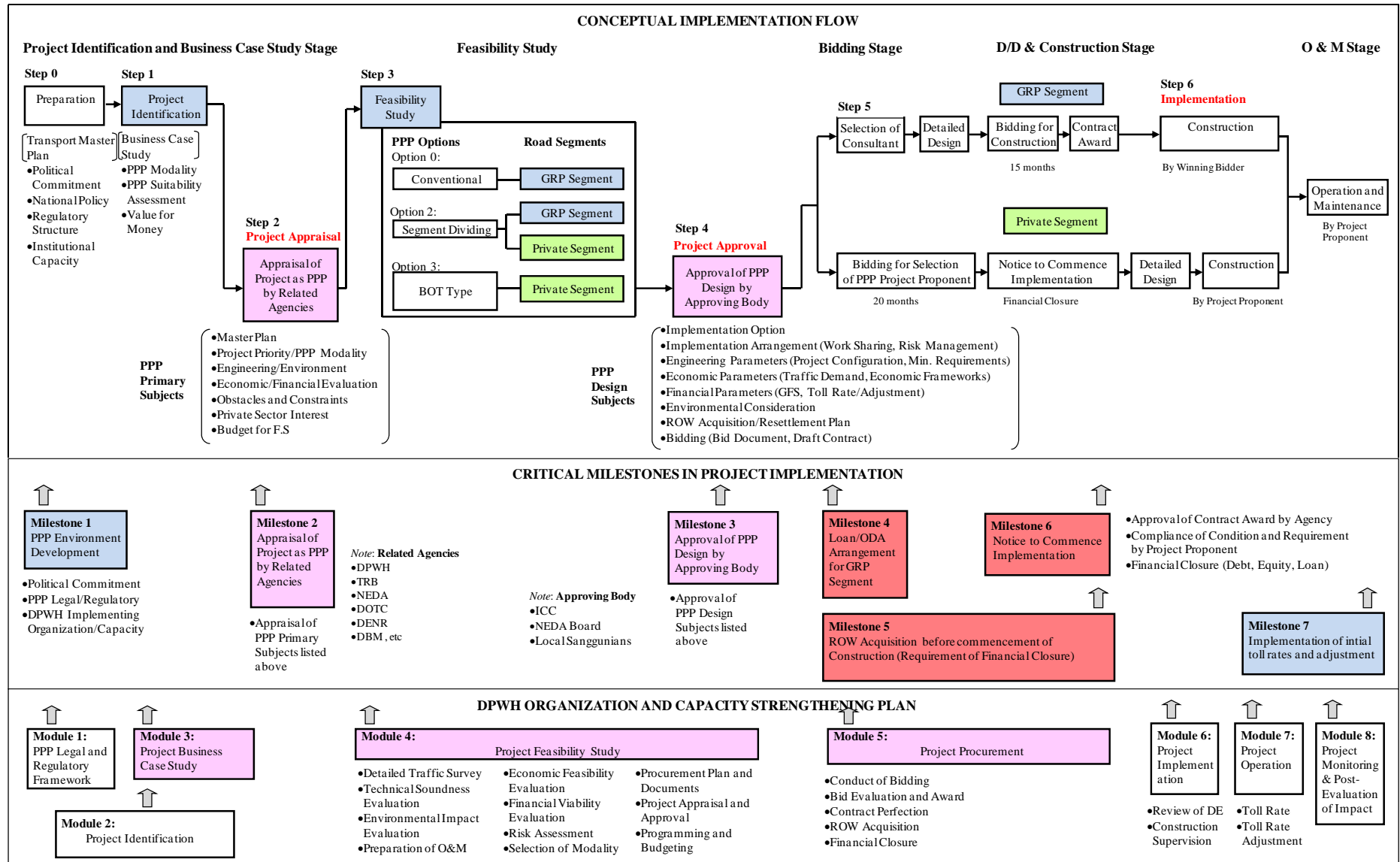


FIGURE 18.8.1-1 ROADMAP FOR REALIZATION OF TOLL ROAD PROJECT THROUGH PPP SCHEMES

(3) Critical Milestones in Project Implementation

Figure 18.8.1-1 also demonstrates potential critical milestones in project implementation in line with the project implementation timeframe as summarized hereunder.

Milestone 1; PPP Environment Development (Step 0)

The PPP environment involving the national transport policy, political stability and commitment as well as legal and regulatory structure shall be developed, which is the most vital key for the success of toll road implementation under PPP scheme.

The organization and capacity of PPP related agencies, especially DPWH, shall be strengthened since DPWH is the sole entry point for toll road projects and tasked to oversee the design, Row acquisition, bidding, construction, financing, operation and maintenance of toll roads.

Milestone 2; Appraisal of Projects as PPP by related agencies (Step 2)

The comprehensive Business Case Study shall be conducted before undertaking a feasibility study. The Business Case Study shall consider all funding options including PPP modality exercising the value for money concept, and assess the suitability of PPP scheme for a project.

These PPP primary issues and subjects identified in the Business Case Study including PPP modality and suitability assessment shall be appraised by PPP related agencies such as DPWH, TRB, NEDA, DOTC, DENR, DBM, LGU, etc.

Milestone 3; Approval on PPP Design by Approving Body (Step 4)

Upon the appraisal of project as PPP project through Business Case Study, the detailed Feasibility Study shall be conducted to recommend the most appropriate implementation option and arrangement of PPP structure. The Feasibility Study shall also conduct the traffic analysis and establish the economic and financial parameters to provide the clear and fair bases for bidding. Bid document and draft contract required for selection of PPP project proponent shall also be prepared.

It shall be noted that the ROW required for the project be clearly defined in the Feasibility Study, and the resettlement action plan for project affected people (PAP) be prepared.

Therefore, the PPP design issues and subjects identified through the Feasibility study shall be promptly approved by the Approving Body (ICC, NEDA Board, Sanggunians). The prompt approval of the Feasibility Study shall be recognized to be the most critical milestone because of the followings.

- Justification of the government support, if necessary
- Preparation of the clear and competing bidding documents.
- Delineation of ROW to be acquired and preparation of resettlement action plan.
- Commencement of loan (ODA) arrangement if necessary.

Milestone 4; Loan (ODA) Arrangement for GRP Segment (Step 4)

The loan (ODA) arrangement shall be started after the project approval by the approving Body, and be preferably concluded before selection of consultants for the detailed design. The duration for this activity is very limited.

Milestone 5; ROW Acquisition

(Step 4 & 5)

The Row acquisition and resettlement of PAPs are undoubtedly the most serious obstacle and risk in project implementation. These activities shall, therefore, be commenced immediately after the approval of project and shall be completed preferably before bidding or at the latest before start of construction. It shall be noted that the clear construction area or availability of ROW is one of the compulsory conditions for the financial closure of the project.

Milestone 6; Notice to Commence Implementation

(Step 5)

The lengthy process flow is required after bid evaluation to the issuance of notice to commence implementation and contract implementation, involving the approval of contract award, issuance of notice of award, compliance of conditions and requirement by winning proponent, execution/approval of contract, and the financial closure. The timely actions and approval by the related agencies on these matters shall be highly appreciated for the smooth implementation of the project.

Milestone 7; Implementation of Initial Toll Rate and Adjustment

(Step 6)

The implementation of initial toll rate and timely toll adjustment agreed in the concession agreement may encounter with the difficulty because of public acceptance and political sensitiveness.

(4) DPWH Organization and Capacity Strengthening Plan

Figure 18.8.1-1 also presents the DPWH organization and capacity strengthening plan for PPP project implementation. The modules are shown in accordance with the project implementation timeframe as summarized hereunder. Refer to Chapter 31 for the detailed discussion.

Module 1: PPP Legal and Regulatory Framework

Module 2: Project Identification

Module 3: Project Business Case Study

Module 4: Project Feasibility Study

Module 5: Project Procurement

Module 6: Project Implementation

Module 7: Project Operation

Module 8: Project Monitoring and Post Evaluation of Impact

PART III

METRO CEBU

CHAPTER 19

GENERAL PROFILE OF METRO CEBU

CHAPTER 19

GENERAL PROFILE OF METRO CEBU

19.1 PHYSICAL PROFILE

19.1.1 Geophysical Characteristics

The Philippine Archipelago is situated in Southeast Asia between 4°23'N to 21°25'N latitude and between 116°E to 127°E longitude. It consists of 7,100 islands with a total land area of 300,000 km². The Study Area is located in the Visayas, the third largest (56,607 km²) in terms of total land areas, of three (3) island groups that comprise the archipelago. The other island groups are namely Luzon, the largest with 138,703 km², and Mindanao, with 102,003 km².

(1) Location of Metro Cebu

Metro Cebu consists of five cities (Danao, Cebu city, Lapu-lapu, Mandaue, Talisay) and eight municipalities (Compostela, Loan, Consolacion, Cordova, Minglanila, Naga, San Fernando, and Carcar). Metro Cebu HSH (proposed) is stretching out on the central east coast of Cebu Island, through most of Metro Cebu, except those locating on Mactan island. **Figure 19.1.1-1** shows a relative location of Cebu Island (Region VII).

(2) Topography

The study area starts from Danao City (10°31'N latitude, 124°E 00'E longitude) and ends at Carcar (10°31'N latitude, 124°E 00'E longitude) and runs from northeast to southwest.

Its terrain is relatively flat on the narrow coastal plain and becomes rolling and hilly at elevations of 40 to 200 meters, then generally rugged and mountainous at elevation of 200 to almost 800 meters above sea level. The slopes vary from 0 to 60 degrees. Its relatively flat terrain is only approximately 15% of the total land area. The mountain areas have become generally unproductive due to the adverse effects of deforestation and poor soil condition; and, the inadequacy of feeder roads has limited the use of the land for agricultural purposes.

Total of 80% of Cebu City is mountains with slope up to 60 degree and elevation between 40 to 800 meters. This topography forces to form a belt of built up commercial and residential areas right on the coast line.

In terms of effective land use, Cebu City has very unfavorable topography, since 80% of its total land area is mountainous. This situation also holds true for the adjoining municipalities, thereby limiting growth to the linear or ribbon type of development along the coastal plains. Cebu City's scarce land for urban development is the rationale behind the reclamation of foreshore lands. Land use for the relatively flat area of Cebu City, considered as the urban core within the Metropolitan Cebu Area, is rapidly being intensified, with the old districts becoming high density areas including the Central Business District (CBD).



FIGURE 19.1.1-1 MAP OF REGION VII



FIGURE 19.1.1-2 TOPOGRAPHICAL MAP OF METRO CEBU

(3) Geologic fault lines

Known active faults in Region 7 are shown in **Figure 19.1.1-3**.

19.1.2 Meteorology

Precipitation data were collected at Mactan international airport (10 °17'48'' N latitude, 123 °57'48'' E longitude, and 12.8m elevation) in Cebu for last three decays, from 1972 to 2000. The collected data were processed by Philippine Atmospheric, Geophysical and Astronomical Service Administration (PAGASA) of the Department of Science and Technology. Averaged amount of rain fall and temperature are summarized in **Table 19.1.2-1**

most intense, 13mm per day of a rain event. June, July, and October show high amount of precipitation with high numbers of thunders and lightings events reported, compare to the rest of a year due to frequent occurring of typhoons.

TABLE 19.1.2-1 AVERAGE PRECIPITATION AND TEMPERATURE (1972-2000)

		Month												Annual	
		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Cum.	Ave.
Temp.	Max (C)	29.8	30.1	31	32.1	32.8	32	31.6	31.8	31.9	31.4	31	30.3	N/A	31.3
	Min(C)	23.8	23.9	24.4	25.4	25.8	25.3	24.9	25.1	24.9	24.8	24.7	24.2	N/A	24.8
	Mean(C)	26.8	27	27.7	28.8	29.3	28.7	28.3	28.5	28.4	28.1	27.9	27.3	N/A	28.0
Precipitation	Amount (mm)	108.9	77.8	56.7	48.9	78.8	183.1	181.3	144.7	168.8	182.2	155	133.2	1519	126.6
	Event (days/mo)	11	9	7	5	7	14	15	12	14	15	13	13	135	11
	Intensity (mm/event)	10	9	8	10	11	13	12	12	12	12	12	10	N/A	11

Source: PAGASA

19.1.3 Watershed and Flood

(1) Watershed

There are five major watershed systems in Cebu City area (**Table 19.1.3-1**).

TABLE 19.1.3-1 LIST OF WATERSHEDS IN CEBU CITY AREA

	Legal Mandate	Area Covered (ha.)	Barangays Covered
Buhisan Watershed Forest Reserve	E.O. No. dated July 13, 1991	631	Buhisan, Tisa Pardo, Toong, Pamutan, Guadalupe, Sapangdaku
Mananga Watershed Forest Reserve	Presidential Proclamation 681	6,325	Buot-Taup, Sinsin, Bonbon, Pamutan & Pungol-Sibugay
Kot-kot Lusaran Watershed Forest Reserve	Presidential Proclamation 932 amended by 1074	14,220	Taptap, Guba, Agsungot, Paril, Lusaran, Adlaon, Sudlon I & II
Sudlon National Park	Presidential Proclamation 56	896	Sudlon I & II part of Sinsin
Central Cebu National Park	Presidential Proclamation 202 amended by 835-A	11,893.58	Balamban, Sudlon I & II, Tagbao, Lusaran , part of Cambinocot & Adlaon

Sources : DENR and Cebu City GIS, 1998 in City of Cebu Comprehensive land use plan

Especially Manakan and Kotkot-Lusaran watersheds are proclaimed as major watersheds of the country by Pursuant to Presidential Proclamation of 932 and 581, thus these areas are considered to be environment protected zone. However, regardless of the presidential act, these areas are occupied by settlers which potentially damage natural habitats and causes soil erosion. Almost one fourth of the population in the said watershed failed the slope requirements needed to have a safe settlement, especially those situated in the restoration zone¹. Barangay Sinsin that incurred landslide in 2008 is located in Mananga Watershed Forest Reserve and Sudlon National Park.

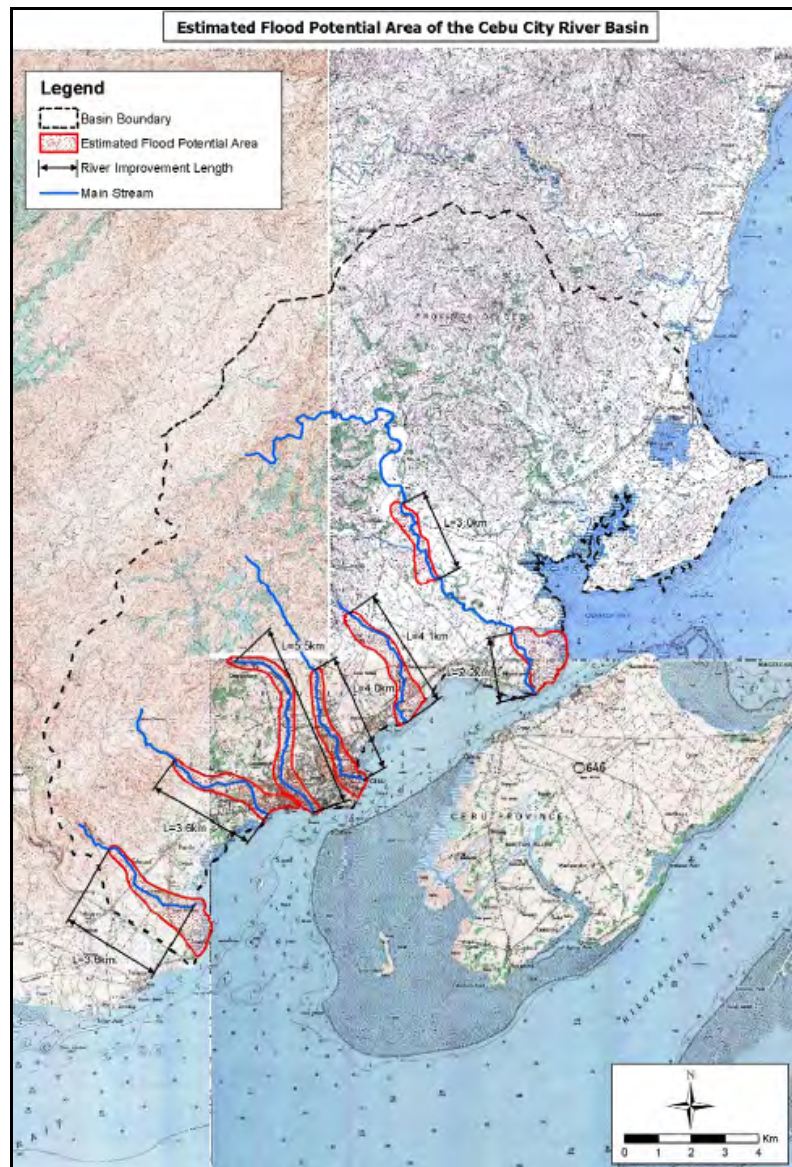
¹ E.A.L. Salas, S. Arguillas, R.J. Cua Ho, H.L. Torres. A situational report on the human settlement suitability in Cebu Watersheds. at <http://www.gisdevelopment.net/application/urban/overview/ma0546pf.htm>

(2) Flood prone area

Steep mountains locating close to each other which allow to funnel large amount of water into the rivers in short time. Cebu City contains 6 major rivers with high flood probability within 16km of coast line. **Figure 19.1.3-1** shows river systems and flood model prediction. The red patches around rivers in the figure indicate flood prone areas. Buildup areas and poor settlers tends to locate in the red zones.

19.1.4 Environmentally Protected Area

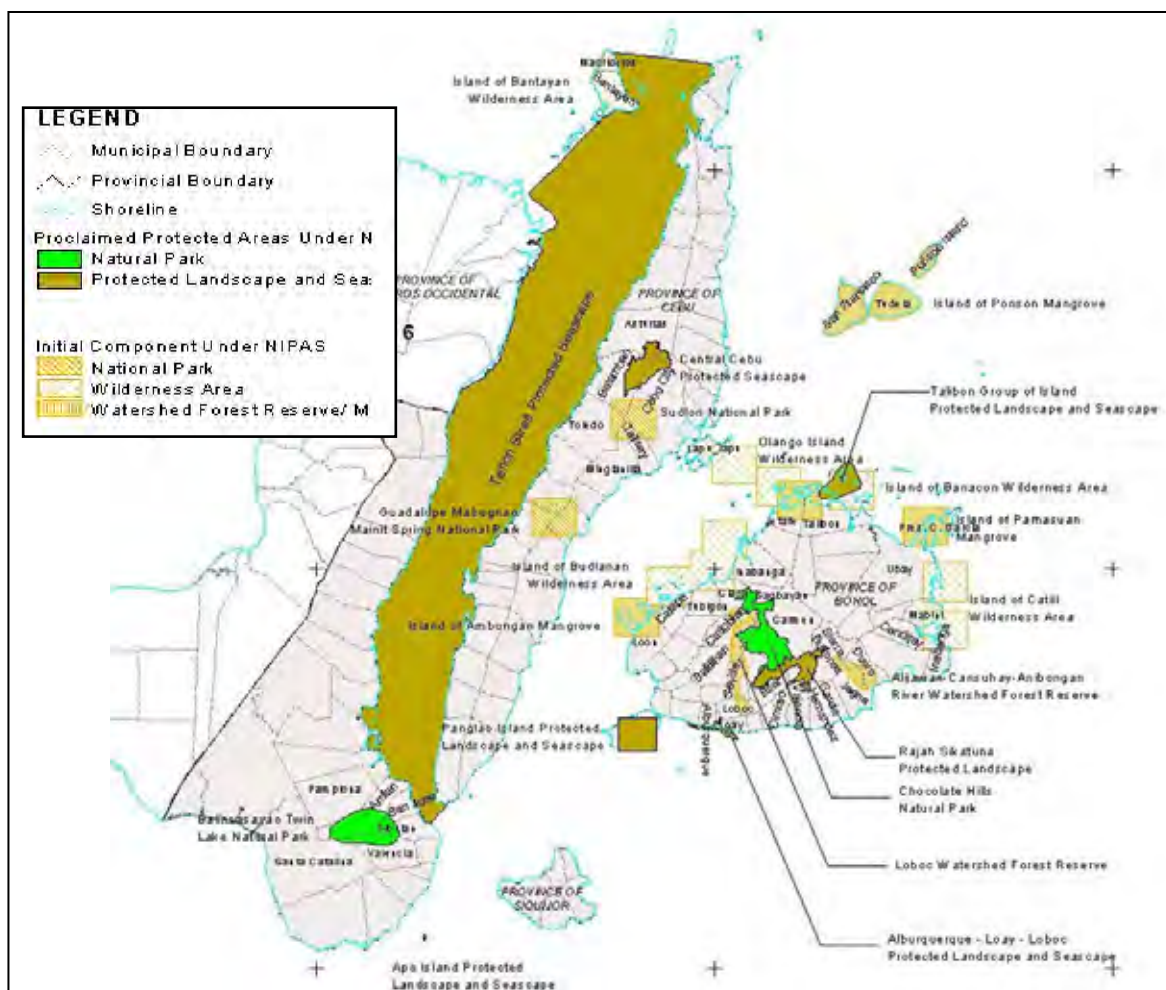
Four national parks, one game refuge and bird sanctuary, four wildness areas, four watershed forest reserves, and five mangrove swamp forests reserves locate in the region VII as shown in **Figure 19.1.4-1**. Out of those protected areas, four national parks, one game refuge and bird sanctuary, two wildness areas, and three watershed forest reserves are locating in the Metro Cebu area. The wildness areas are located in islands and shorelines.



Source: Study Team

FIGURE 19.1.3-1 FLOOD PRONE AREAS

the Metro Cebu area. The wildness areas are located in islands and shorelines.



Source: Map Showing protected areas In Region 7. The Department of Environment and Natural Resources

FIGURE 19.1.4-1 ENVIRONMENTALLY PROTECTED AREA IN REGION VII 19.2

19.2 PRESENT REGIONAL AND URBAN DEVELOPMENT

The Study Area in Visayas is Metro Cebu situated in Central Visayas (Region VII), which is considered to be part of the Central Philippines Super Region. Metro Cebu is the regional center of Region VII and among the main economic hubs of the country. Similar to Metro Manila, Metro Cebu is currently described as not only the service and institutional core of Region VII but also the industrial and tourism core in the Visayas. A number of industrial and economic zones and parks are situated in the region. It is also considered as among the agricultural regions of the country.

Similarly, the region is identified as tourism destination and as such it is the international gateway for the Visayas. The principal tourism products of Metro Cebu and its environs are coastal and aquatic in nature. Furthermore, the proximity of Bohol, which is among the tourism destinations in the country, to Metro Cebu adds to the tourism development not only of Cebu but also of Region VII.

The current development planning approach in Central Visayas, same in Luzon, follows the cluster development approach and the provision of appropriate strategic infrastructure facilities in support of the development plan.

The clustering of commercial, industrial and institutional land uses in Cebu City justify the presence of metropolitan arrangements, thus the presence of Metro Cebu. Tourism development is concentrated in the environment of Cebu City and its adjacent areas, such as Mactan, Lapulapu and Cordova, among others. Tourism is predominantly coastal and aquatic.

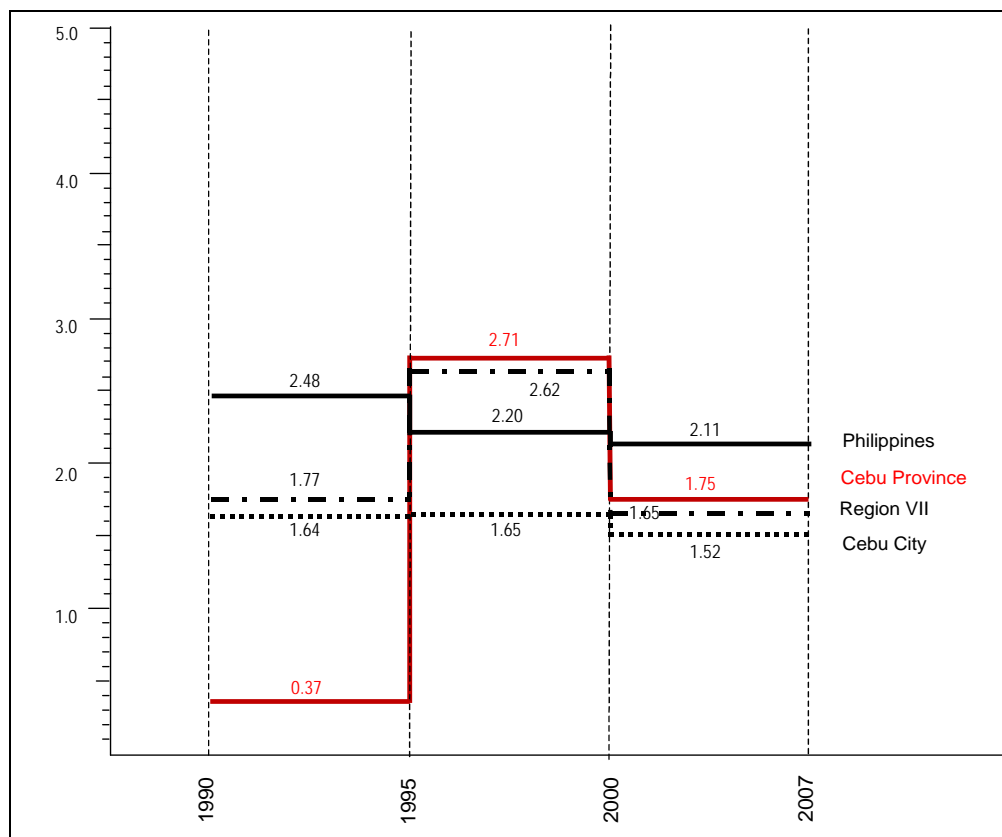
19.3 SOCIO-ECONOMIC PROFILE

19.3.1 Demographic Trend

Past demographic trend is shown in **Table 19.3.1-1**. Average annual population growth rate of Region VII, Cebu Province and Cebu City between census years is shown in **Figure 19.3.1-1**.

Population of Region VII was 6.4 million in 2007, which is about 7% of the country's population. Population of Cebu Province, Cebu City, Lapu-lapu City and Mandaue City in 2007 was 2.4 million, 0.8 million, 0.3 million and 0.3 million, respectively.

Population growth rate of Region VII, Cebu Province, and Cebu City from 2000 to 2007 was 1.65, 1.75 and 1.52% respectively, all of which were lower than the national average. Lapu-lapu City recorded high population growth rate for the said period at 4.36%. Mandaue City recorded 2.96% of population growth rate for the said period.



Source: NSO (2008)

FIGURE 19.3.1-1 PAST POPULATION GROWTH RATE: REGION VII

TABLE 19.3.1-1 PAST DEMOGRAPHIC TREND: REGION VII

Region	Province	Actual Population			Land Area (sq km)	Density (persons/sq km)			Past Annual PGR			
		1990	1995	2000		2007	1990	1995	2000	2007	1990-1995	1995-2000
	Philippines	60,703,206	68,616,536	76,504,077	88,574,614	178	201	225	260	2.48	2.20	2.11
7	Central Visayas	4,594,124	5,014,588	5,706,953	6,398,628	289	316	359	403	1.77	2.62	1.65
	Bohol	948,403	994,440	1,139,130	1,230,110	197	206	236	255	0.95	2.75	1.10
	Cebu	1,855,815	1,890,357	2,160,569	2,439,005	347	354	404	457	0.37	2.71	1.75
	Negros Oriental	925,272	1,025,247	1,130,088	1,231,904	172	190	210	229	2.07	1.97	1.24
	Siquijor	73,932	73,756	81,598	87,695	219	219	242	260	-0.05	2.04	1.03
	Cebu City	610,417	662,299	718,821	798,809	2,173	2,358	2,559	2,844	1.64	1.65	1.52
	Lapu-lapu City	*	173,744	217,019	292,530	*	2,990	3,735	5,035	*	4.55	4.36
	Mandaue City	180,285	194,745	259,728	318,575	15,409	16,645	22,199	27,229	1.56	5.93	2.96

Source: National Statistics Office

19.3.2 Economic Trend

GDP and GRDP of Region VII and industrial structure of Region VII is shown in **Table 19.3.2-1** and **19.3.2-2**, respectively, Region VII's GRDP and Sectoral growth rate is shown in **Figure 19.3.2-1** to **19.3.2-4**.

- Region VII shares about 7.0% of the country's economic output.
- The Region's economic growth more or less followed that of the country.
- Economic structure of the Region is as follows:

Primary Sector	-----	10%
Secondary Sector	-----	29%
Tertiary Sector	-----	61%

- Primary sector economic growth rate was lower than that of the country for the period from 2003 to 2007.
- Secondary sector economic growth rate more or less followed that of the country with slightly higher level.
- Tertiary sector also recorded similar growth rate of the country with slightly higher level.

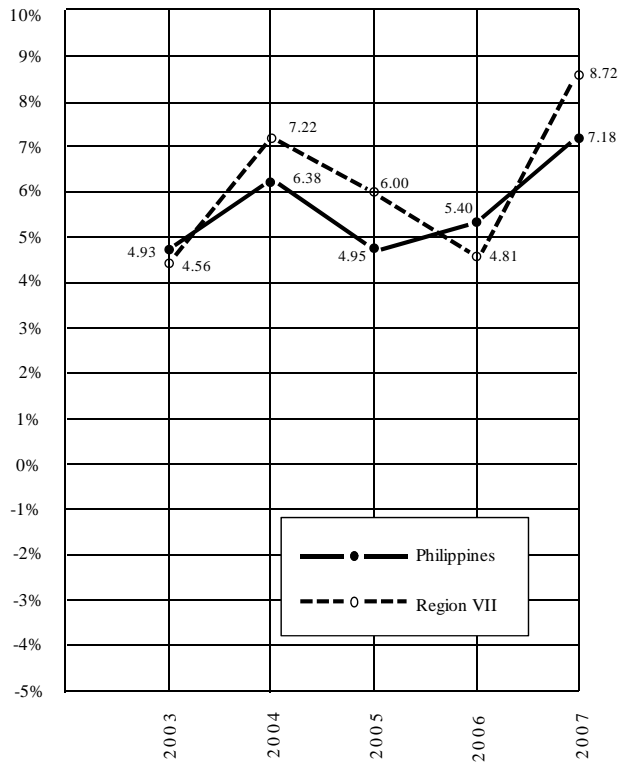


FIGURE 19.3.2-1 GDP AND GRDP (REGION VII) GROWTH RATE

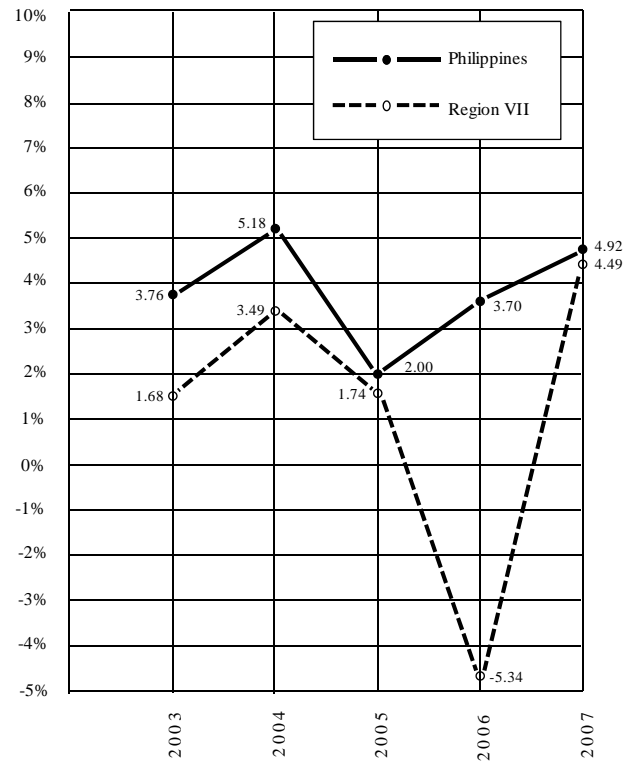


FIGURE 19.3.2-2 PRIMARY SECTOR GROWTH RATE (REGION VII)

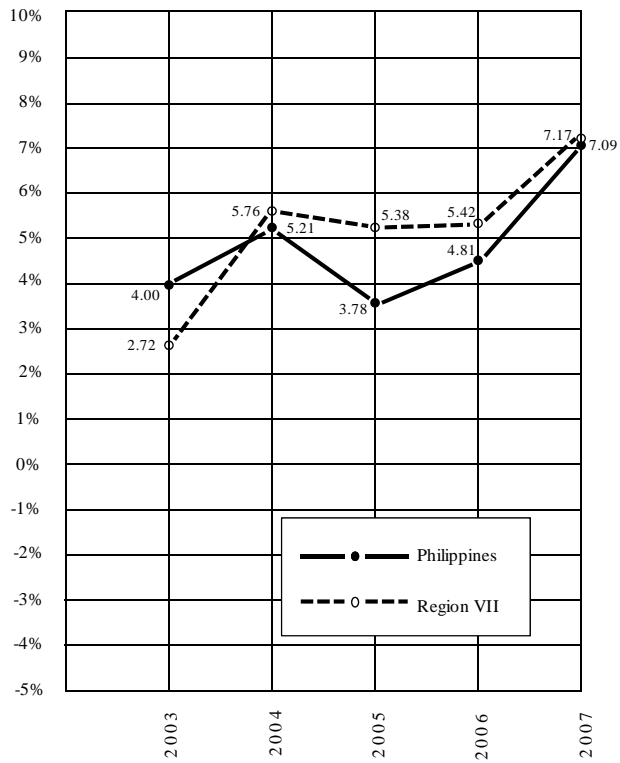


FIGURE 19.3.2-3 SECONDARY SECTOR GROWTH RATE (REGION VII)

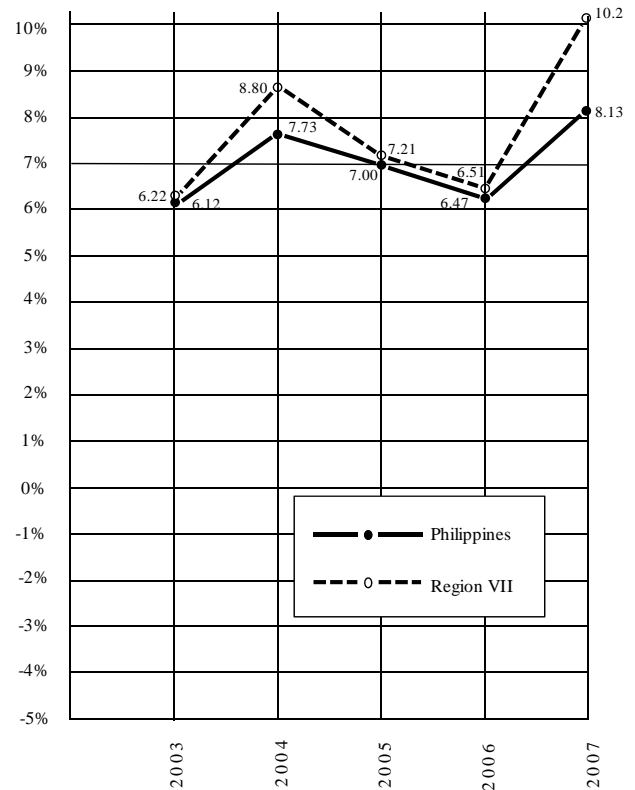


FIGURE 19.3.2-4 TERTIARY SECTOR GROWTH RATE (REGION VII)

Source: All data of the above figures are taken from NSCB, 2008

TABLE 19.3.2-1 GDP AND GRDP : REGION VII

	GDP & GRDP in Billion Pesos at Current Price							Regional Share (%)				
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007		
GDP	4,316.4	4,871.6	5,444.0	6,032.8	6,648.2	100%	100%	100%	100%	100%		
GRDP	296.5	337.8	378.5	416.9	462.0	6.9%	6.9%	7.0%	6.9%	6.9%		

SOURCE: 2008 Philippine Statistical Yearbook

TABLE 19.3.2-2 INDUSTRIAL STRUCTURE AND GROWTH RATE

Region	Sector	Sectoral GRDP (Billion Pesos at Constant Price)					Sectoral Economic Growth Rate				
		2003	2004	2005	2006	2007	2002-03	2003-04	2004-05	2005-06	2006-07
Region VII	Total	75.8 (100%)	81.3 (100%)	86.2 (100%)	90.3 (100%)	98.2 (100%)	4.56	7.22	6.00	4.81	8.92
	Primary Sector	9.6 (12.7%)	9.9 (12.2%)	10.1 (11.7%)	9.5 (10.5%)	10.0 (10.2%)	1.68	3.49	1.74	-5.34	4.49
	Secondary Sector	22.7 (29.9%)	24.1 (29.6%)	25.4 (29.5%)	26.7 (29.6%)	28.6 (29.1%)	2.72	5.76	5.38	5.42	7.17
	Tertiary Sector	43.5 (57.4%)	47.3 (58.2%)	50.7 (58.8%)	54.0 (59.8%)	59.6 (60.7%)	6.22	8.80	7.21	6.51	10.24

19.3.3 Employment

(1) Employed Persons by Major Industrial Group

Employed persons by major industrial group is shown in **Table 19.3.3-1** and summarized in **Table 19.3.3-2**.

TABLE 19.3.3-1 EMPLOYED PERSONS BY MAJOR INDUSTRY (REGION VII)

Major Industry	Year 2007		Year 2005	
	Philippines	Region VII	Philippines	Region VII
Industry	33,672	2,588	32,875	2,422
Agriculture, Hunting and Forestry	10,768	765	10,763	688
Fishing	1,393	107	1,408	129
Sub - Total (Primary)	12,161	872	12,171	817
Mining and Quarrying	135	12	116	15
Manufacturing	3,060	339	3,043	331
Electricity, Gas and Water	141	8	108	5
Construction	1,740	156	1,616	136
Sub - Total (Secondary)	5,076	515	4,883	487
Wholesale and Retail, Repair of Motor Vehicles, *	6,176	423	6,215	450
Hotel and Restaurants	907	70	871	57
Transport, Storage and Communication	2,600	161	2,471	158
Financial Intermediation	384	29	337	26
Real Estate, Renting and Business Activities	881	75	736	29
Public Administration & Defense, Compulsory Social Security	1,569	113	1,494	107
Education	1,043	80	989	65
Health & Social Work	396	24	362	26
Other Community, Social & Personal Service Activities	779	53	781	54
Private Household With Employed Persons	1,699	173	1,561	147
Extraterritorial Organizations & Bodies	3	-	3	*
Sub - Total (Tertiary)	16,437	1,201	15,820	1,119

Source: National Statistics Office, 2008

**TABLE 19.3.3-2 SUMMARY OF EMPLOYED PERSONS
BY MAJOR INDUSTRIAL GROUP**

Unit: 1,000 persons

	Philippines		Region VII	
	2005	2007	2005	2007
Primary Sector	12,171 (1.00)	12,161 (1.00)	817 (1.00)	872 (1.07)
Secondary Sector	4,883 (1.00)	5,076 (1.04)	487 (1.00)	515 (1.06)
Tertiary Sector	15,820 (1.00)	16,437 (1.04)	1,119 (1.00)	1,201 (1.07)
Total	32,875 (1.00)	33,672 (1.02)	2,422 (1.00)	2,588 (1.07)

Source: National Statistics Office, 2008

(2) Number of Establishments

Table 19.3.3-3 shows number of establishments and number of employed at establishments.

**TABLE 19.3.3-3 NUMBER OF ESTABLISHMENTS AND EMPLOYMENTS:
REGION VII**

REGION/PROVINCE	No. of Establishments			No. of Employments		
	2005	2006	2007	2005	2006	2007
PHILIPPINES	782,980	783,065	783,869	5,479,297	4,984,883	5,187,793
7 CENTRAL VISAYAS	44,379	44,367	44,459	403,308	378,447	396,742
BOHOL	6,095	6,089	6,084	28,192	24,909	24,685
CEBU	28,560	28,556	28,651	328,564	312,178	330,071
NEGROS ORIENTAL	9,106	9,104	9,103	44,585	39,831	40,315
SIQUIJOR	618	618	621	1,967	1,529	1,671

Source :
NATIONAL STATISTICS OFFICE
Industry and Trade Statistics Department
Statistical Sampling and Operations Division
2000 List of Establishments

19.3.4 Per Capita GDP and GRDP

Per capita GDP and GRDP at current price and constant price is shown in Table 19.3.4-1 and 19.3.4-2, respectively.

TABLE 19.3.4-1 PER CAPITA GRDP IN CURRENT PRICE: 2003 – 2007

unit: Peso

Region	2003	2004	2005	2006	2007		
Philippines	52,718	58,149	63,556	69,365	74,947	1.00	
NCR	National Capital Region	148,743	165,814	184,758	205,117	223,332	2.98
CAR	Cordillera Administrative	66,749	71,247	75,556	82,523	85,319	1.14
Region I	Ilocos	27,943	30,725	33,405	35,996	38,063	0.51
Region II	Cagayan Valley	26,829	30,474	30,369	33,799	36,605	0.49
Region III	Central Luzon	39,407	42,256	45,789	49,469	52,351	0.70
Region IV-A	CALABARZON	50,997	55,213	59,320	63,640	67,466	0.90
Region IV-B	MIMAROPA	36,538	38,710	43,406	45,420	49,331	0.66
Region V	Bicol	21,991	24,277	26,316	27,983	31,314	0.42
Region VI	Western Visayas	42,556	46,875	51,872	56,523	61,382	0.82
Region VII	Central Visayas	48,573	54,008	59,272	64,261	69,797	0.93
Region VIII	Eastern Visayas	25,743	29,225	31,223	33,480	33,645	0.45
Region IX	Zamboanga Peninsula	31,946	34,678	38,386	41,899	45,864	0.61
Region X	Northern Mindanao	52,436	58,329	62,850	69,197	75,883	1.01
Region XI	Davao Region	48,176	54,419	59,971	64,520	71,100	0.95
Region XII	SOCCSKSARGEN	39,960	45,019	47,826	52,384	57,708	0.77
Region XIII	Caraga	12,193	14,050	15,161	32,493	40,012	0.53
ARMM	Muslim Mindanao	24,531	26,449	28,194	16,303	16,829	0.22

Source: National Statistical Coordination Board.

TABLE 19.3.4-2 PER CAPITA GRDP IN CONSTANT PRICE: 2003 – 2007

unit: Peso

Region		Per Capita GRDP					Growth Rate 2003-2007
		2003	2004	2005	2006	2007	
Philippines		13,252	13,789	14,186	14,681	15,429	3.87
NCR	National Capital Region	31,730	33,867	35,742	37,856	40,252	6.13
CAR	Cordillera Administrative	17,848	18,111	17,919	18,208	19,120	1.74
Region I	Ilocos	7,209	7,442	7,727	7,988	8,286	3.54
Region II	Cagayan Valley	7,590	8,228	7,649	8,122	8,511	2.91
Region III	Central Luzon	11,092	11,054	11,142	11,448	11,904	1.78
Region IV-A	CALABARZON	13,853	14,068	14,159	14,439	14,891	1.82
Region IV-B	MIMAROPA	12,120	12,284	12,735	12,603	13,431	2.60
Region V	Bicol	6,214	6,442	6,632	6,691	7,067	3.27
Region VI	Western Visayas	11,699	12,347	12,825	13,100	13,842	4.29
Region VII	Central Visayas	12,419	13,010	13,518	13,917	14,829	4.54
Region VIII	Eastern Visayas	6,362	6,555	6,678	6,846	6,922	2.13
Region IX	Zamboanga Peninsula	9,482	9,672	10,159	10,147	10,679	3.02
Region X	Northern Mindanao	13,904	14,587	14,829	15,651	16,537	4.43
Region XI	Davao Region	12,842	13,455	13,892	14,157	14,866	3.73
Region XII	SOCCSKSARGEN	11,112	11,487	11,477	11,982	12,505	3.00
Region XIII	Caraga	6,516	6,589	6,690	6,994	7,452	3.41
ARMM	Muslim Mindanao	3,290	3,382	3,433	3,479	3,582	2.15

Source: National Statistical Coordination Board.

Region VII's per capita GRDP is slightly lower (90%) than that of the country. Region VII recorded higher per capita GRDP growth rate than the country.

19.3.5 Tourism

A report indicated that international tourist arrivals to the Philippines had increased from approximately 2.0 million in 2000 to 2.84 million in 2006, indicating an annual rate of roughly 6% (JBIC 2007). Department of Tourism noted that majority of these tourist arrivals come from Korea, USA and Japan followed by China, Taiwan, Australia, Hong Kong then Singapore, Canada, UK, Germany and Malaysia.

The main tourism destinations in Central Philippines for foreign and domestic tourists in Central Philippines are Cebu, Boracay, Palawan, Bohol, Iloilo, and the two Negros Provinces, as shown in **Table 19.3.5-1**

**TABLE 19.3.5-1 DISTRIBUTION OF TOURIST ARRIVALS
IN CENTRAL PHILIPPINES, 2006**

Destination	Tourist Arrivals ('000s)*			
	Foreign	Overseas Filipino	Domestic	Total
Cebu	480,000	3,000	770,000	1,253,000
Boracay	200,000	30,000	220,000	450,000
Palawan	50,000	n/a	150,000	200,000
Bohol	45,000	5,000	170,000	220,000
Iloilo	40,000	30,000	300,000	370,000
Negro Occidental	30,000	15,000	380,000	370,000
Negros Oriental	20,000	1,000	135,000	151,000

Source: JBIC 2007 tourism study

*figures rounded

Table 19.3.5-1 shows that the premier destination is Cebu, where its main tourism products are: high quality beaches, dive sites, cultural heritage, among others. These are supplemented by good quality facilities including top-end resorts, located mainly at the island of Mactan. Albeit this note, although transport infrastructure is reasonable there are still some infrastructure facilities and services gaps like utilities, notably access to potable water. This further validates that coastal eco-tourism is the main tourism products in the region.

A significant factor believed to contribute in the development of tourism in Central Visayas is the involvement of communities in tourism. Communities are hosts and direct providers of tourism services and local products and goods. Services are in the forms of provision of public transport services, lodging houses and tourism group guidance. Through small and medium enterprises (SMEs), communities provide local native goods and cultural entertainments.

Another positive feature of tourism in the Central Visayas is the promotion of complementing tourism guides either between or among provinces or within the respective provinces. This is notably observed between Cebu and Bohol and in the latter. In this aspect, provision of efficient transport system and the availability of intermodal transport are keys to this feature.

Coastal eco-tourism, forest and mountain tourism products and cultural and heritage sites are the main tourism products in the region. This is notably true in Cebu and Bohol.

The nautical highway system, notably with the presence of the Roll-on, Roll-off (Ro-Ro) intermodal transport system, is an important ingredient in the development of tourism not only in Central Visayas but in the country. The introduction of the nautical highway system indeed showed the relevance of the former to tourism, where tourists can visit more than one destination. As such, the provision of an efficient highway system is crucial in the accessibility and mobility of tourists in the region. Likewise, from the viewpoint of intermodal transport development, integration of airport and seaport to the road network system is a focal point for the development of tourism in the region.

CHAPTER 20

PRESENT TRAFFIC CONDITIONS OF METRO CEBU

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20.1 DISTRIBUTION OF TRAFFIC GENERATION SOURCES

20.1.1 Distribution of Population

Figure 20.1.1-1 shows the distribution of population in Metro Cebu and surrounding cities and municipalities. As seen in the figure, most of the settlements are dotted along the North and South coastal roads.

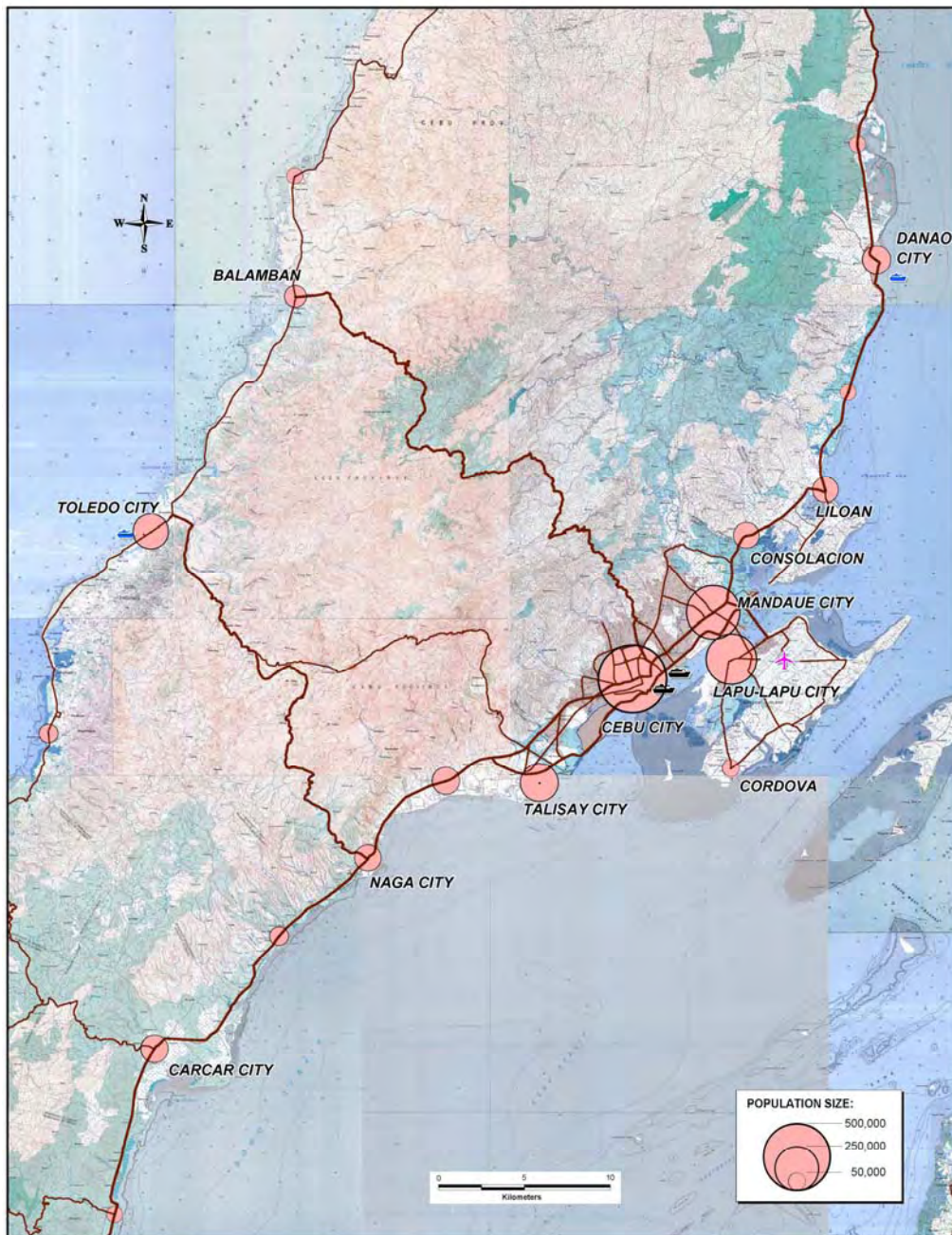


FIGURE 20.1.1-1 DISTRIBUTION OF POPULATION

20.1.2 Major Transport Facilities

(1) Ports

There are two (2) ports within the Study Area, namely Cebu Base Port and Danao Port. Number of ship calls and cargo traffic are presented in **Table 20.1.2-1** and graphical in **Figure 20.1.2.1** and **Figure 20.1.2.2** respectively.

TABLE 20.1.2-1 PORT STATISTICS (YEAR 2008)

		Cebu Base Port	Danao Port
No. of Ship calls	Domestic	68,959	N.A.
	Foreign	757	N.A.
	Total	69,716	N.A.
Cargo Traffic (1,000 M.T.)	Domestic	10,700	70
	Foreign	3,690	38
	Total	14,390	108
Number of Passengers		N.A.	N.A.

Source: Port Interview by JICA Study Team

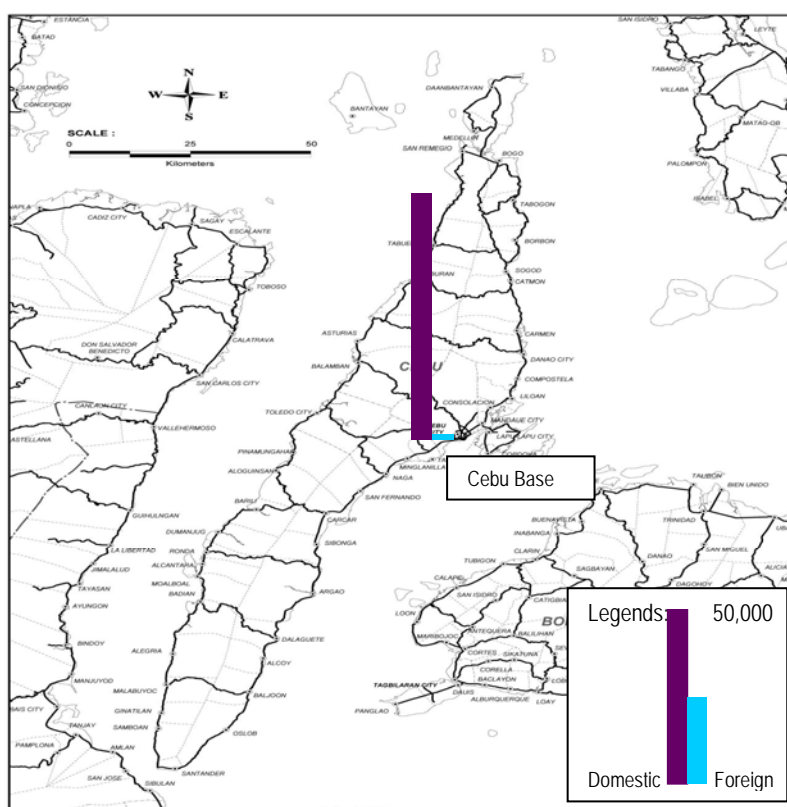


FIGURE 20.1.2-1 NUMBER OF SHIP CALLS

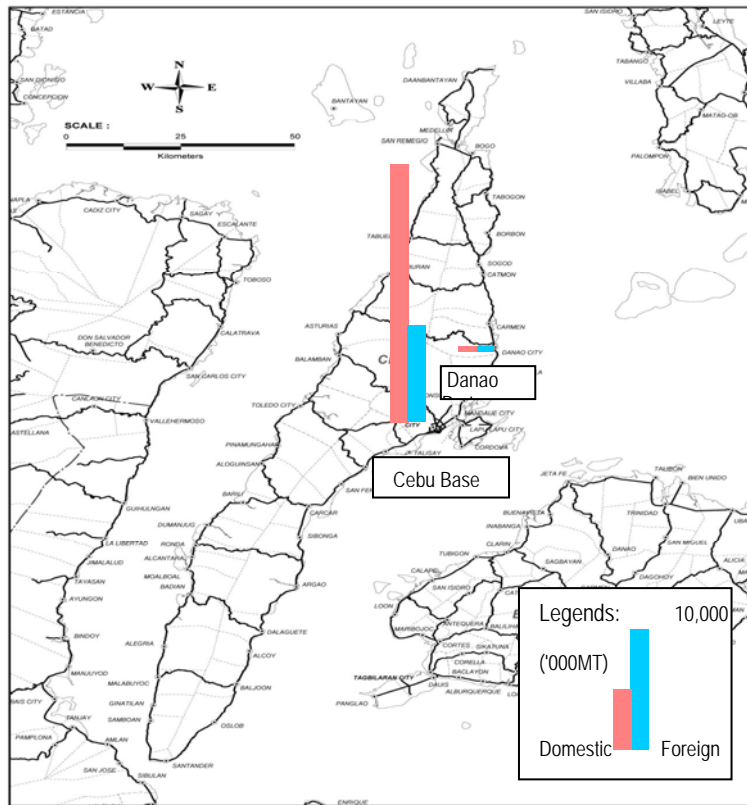


FIGURE 20.1.2-2 CARGO TRAFFIC

(2) International Airport

There is only one (1) international airport which is Cebu International Airport located in Mactan Island. Airport statistics (such as number of flight, number of passenger and cargo traffic) of the said airport are shown in **Table 20.1.2-2** and illustrated in **Figure 20.1.2.3**, **Figure 20.1.2-4**, and **Figure 20.1.2-5**.

TABLE 20.1.2-2 CEBU INTERNATIONAL AIRPORT STATISTICS (2007)

	Domestic	Foreign	Total
No. of Flight	12,006	3,692	15,698
No. of Passengers (1,000)	2,778	966	3,774
Cargo Traffic (M.T.)	170,468	91,775	262,243

Source: Airport Interview by JICA Study Team

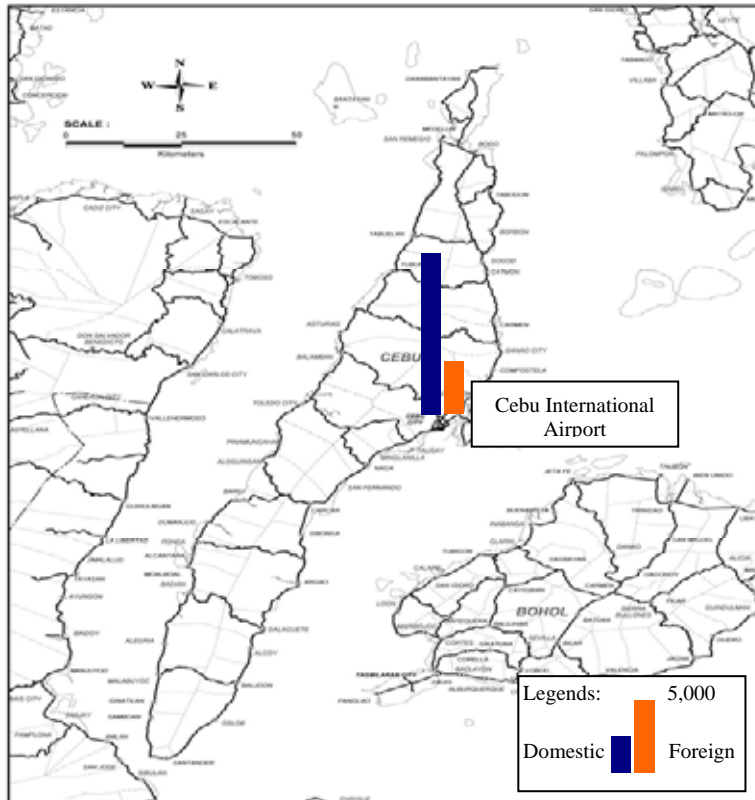


FIGURE 20.1.2-3 NUMBER OF FLIGHTS

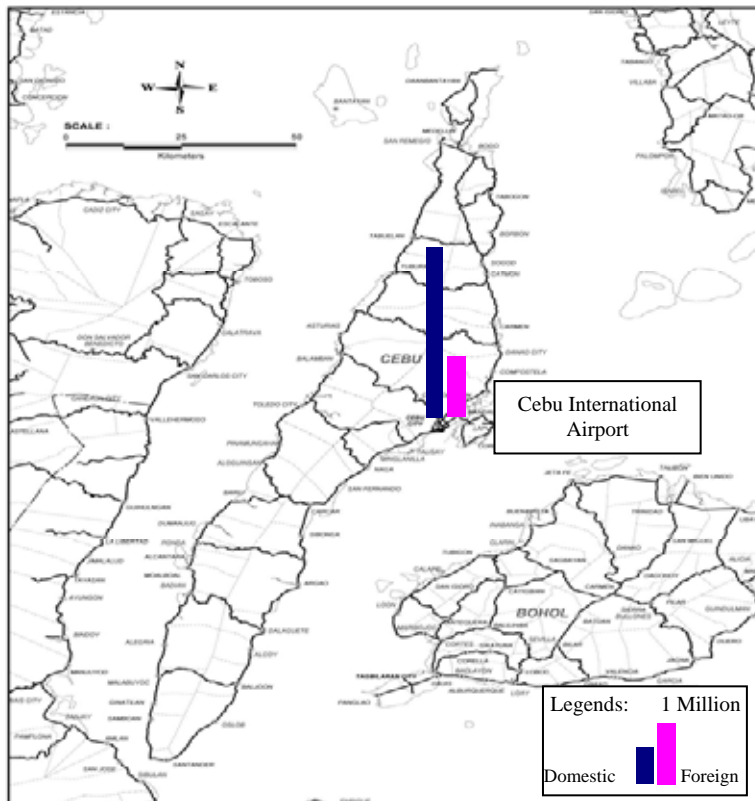


FIGURE 20.1.2-4 NUMBER OF PASSENGERS

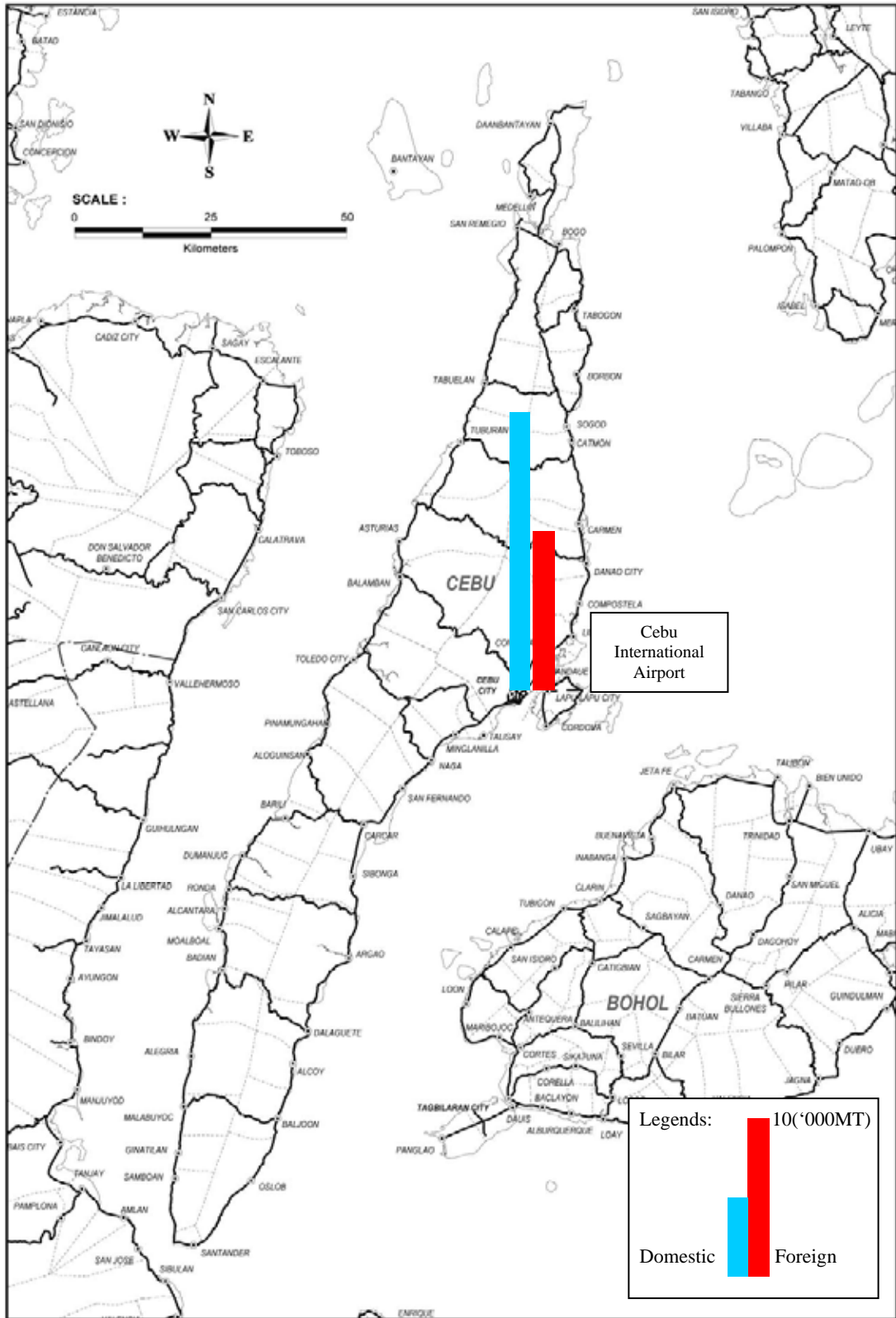


FIGURE 20.1.2-5 CARGO TRAFFIC

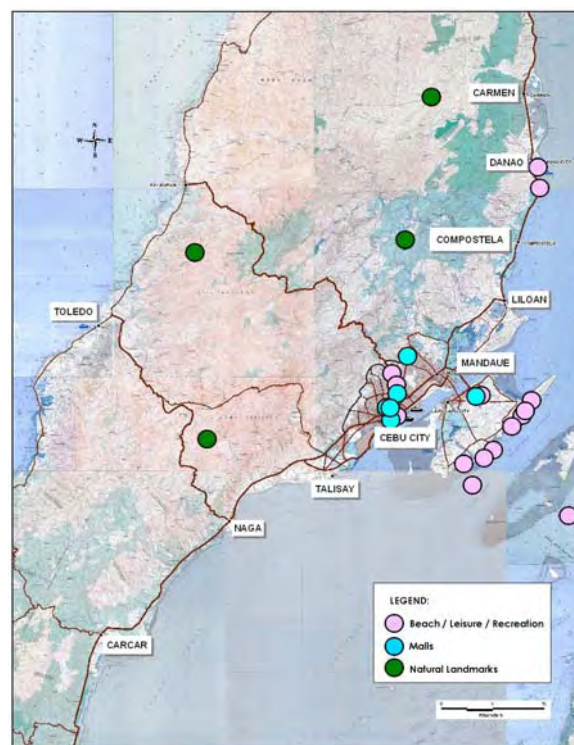
20.1.3 Location of Economic Zones, Major Shopping Malls, and Interest Spots

The distribution of the economic zones in the study area is shown in **Figure 20.1.3-1**. Majority of the economic zones are clustered in Metro Cebu area. The same is true for shopping malls and interest spots which are concentrated within Metro Cebu as illustrated by **Figure 20.1.4-1**.



Source: Prepared by the Study Team based on the data of Philippine Economic Zone Authority (PEZA), 2008

FIGURE 20.1.3-1 ECONOMIC ZONES / INDUSTRIAL PARKS IN THE STUDY AREA



Source: Various maps and Department of Tourism (DOT) data

FIGURE 20.1.3-2 DISTRIBUTION OF INTEREST SPOTS

20.2 ROAD TRAFFIC CONDITIONS

20.2.1 Road Conditions

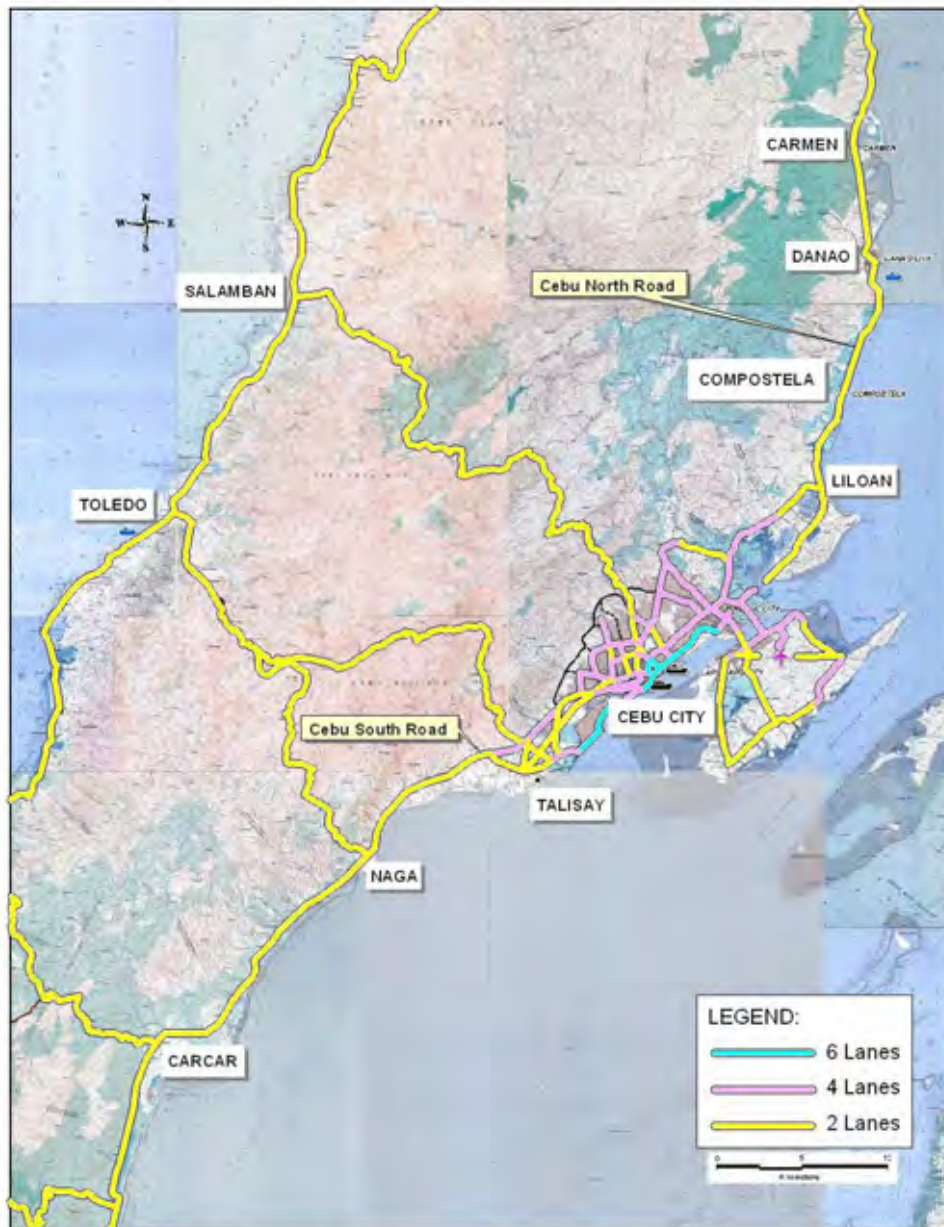
Figure 20.2.1-1 shows the number of lanes of existing major roads in the study area. It can be seen from the figure that most roads connecting cities and municipalities have only two-lane (one-lane per direction). Six-lane roads are only visible at the two coastal roads on the reclamation areas. It should be noted that most roads inside the cities of Cebu and Mandaue are very difficult to expand further due to lack of space (build-up area).

20.2.2 Traffic Conditions

(a) Traffic Volume

The traffic volume on the road network of Metro Cebu is shown in **Figure 20.2.2-1**. Sections of Cebu North Road passing the towns of Compostela and Consolacion have registered high number of vehicular movements. For the Cebu South Road, observed high volume of traffic is located at the municipality of Minglanilla.

Taking into account the traffic inside the cities of Cebu, Mandaue and Lapu-lapu, it is observed that the highest number of traffic is registered at the M. Cuenco Avenue. Aside from being the main access road to Ayala Center, this road is also the main corridor of the upper settlements like Talamban. There is also high traffic volume observed at the two Mactan bridges which can be partly attributed to presence of ecozone and international airport at the Mactan Island.



Source: DPWH Atlas, 2007

FIGURE 20.2.1-1 ROAD'S NUMBER OF LANES

(b) Hourly Variation of Traffic

The hourly variation of traffic is presented from **Figure 20.2.2-2** to **Figure 20.2.2-4** (see Annex 20.1 for the figures of other traffic survey sites). Inside the Mandaue City and Cebu City, it is rather difficult to discern the impact of a particular group – say office worker commuters – due to proximity of their locations. As a result, traffics generated by schools, offices, shopping malls,

ports and airports tend to mix. This is perhaps the reason on why the normal peak hour in the morning (7AM to 9AM) and afternoon (5PM to 7PM) is not recognizable as shown in hourly variation of traffic taken inside the city (Figure 20.2.2-2, Figure 20.2.2-3 and Figure 20.2.2-4)

For the traffics observed at the “gate” of the city, traffic entering the city is higher than those leaving in the morning (7AM to 8PM) indicating that most part of this trip is “to work”. Peak hour of Talisay – Cebu section is from 4PM to 5PM where traffic leaving the city has high number. On the other hand, the Consolacion – Mandaue section has their highest observed volume of vehicle from 2PM to 3PM where most of the traffic is entering the city. Traffic leaving Mandaue city turns higher than those entering at 4PM .



FIGURE 20.2.2-1. TRAFFIC VOLUME IN METRO CEBU

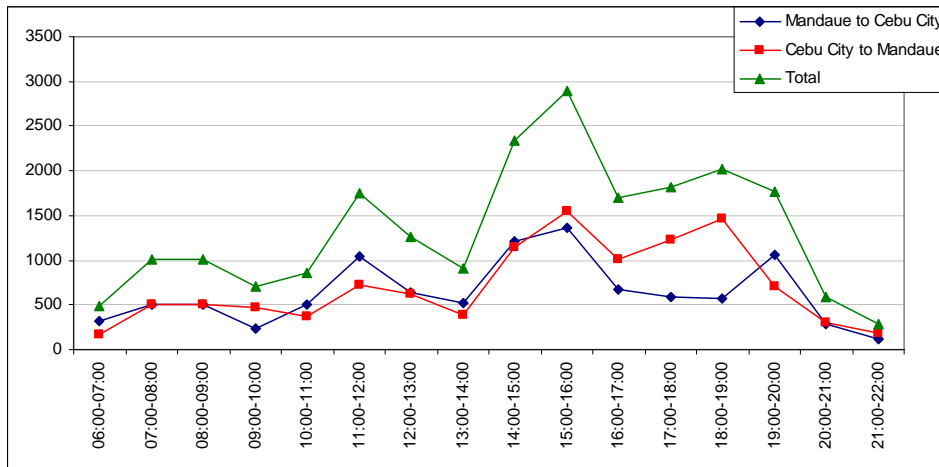


FIGURE 20.2.2-2 HOURLY TRAFFIC VOLUME ALONG MJ CUENCO AVENUE

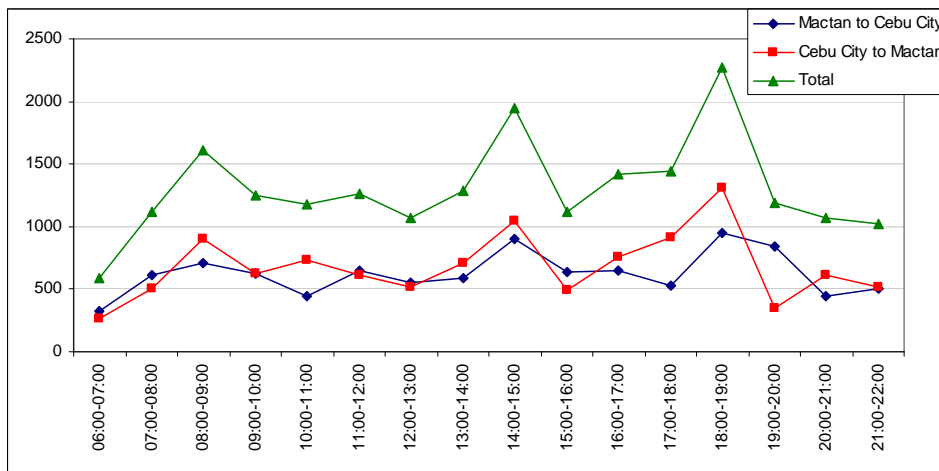


FIGURE 20.2.2-3 HOURLY TRAFFIC VOLUME ALONG MARCELO FERNAN BRIDGE (2ND MACTAN BRIDGE)

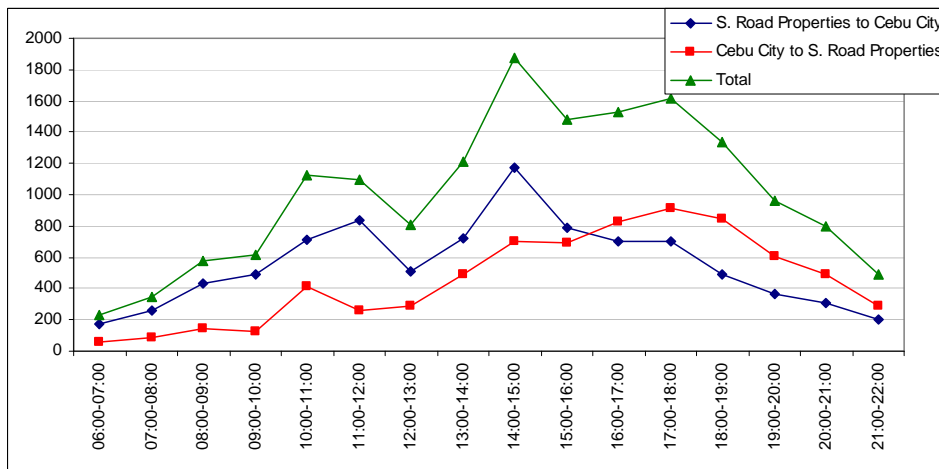


FIGURE 20.2.2-4 HOURLY TRAFFIC VOLUME ALONG SOUTH COASTAL ROAD

(c) Travel Time

The travel times of Cebu North and South Roads are presented in **Figure 20.2.2-5**. Selected routes inside the cities of Cebu, Mandaue and Lapu-lapu are available in **Figure 20.2.2-6**. Travel speed on each route is discussed below:

- Route 1 – Motorists moving into the direction of Cebu City experienced traffic congestion as soon as they approach the sharp curve where the Liloan church stands. This congestion is experienced until they reach UN Avenue (junction to the 2nd Mactan Bridge). Travel speed per section is as follow: 19.16 km/hr for Liloan church – Liloan and Consolacion boundary, 15.58 km/hr for Liloan and Consolacion boundary - H. Abellana section and 7.01 km/hr for H. Abellana – UN Avenue section. Traffic moving away from Mandaue is again slowed down from the boundary of Cosolacion/Liloan until to the Liloan church.
- Route 2 – Travelers of Cebu South Road entering Cebu City are exposed to heavy traffic from the junction of Cebu South Coastal Road until they reached the city center. Likewise, vehicles moving on the opposite direction are not spare with the traffic congestion where travel speed ranges from 15 km/hr to 19 km/hr.
- Route 3 – Traffic moving from Lapu-lapu City to Mandaue City and then to Cebu City are experiencing congestion in the following sections: Plaridel St – UN Avenue, AC Cortes Ave. and Gen. Maxilom Ave. – D. Jakosalem St. Vehicles moving into opposite direction have their movement hampered in the following sections: South Road – V. Rama St., Osmena Boulevard – Logarta Ave., AS Fortuna to AC Fortona, and UN Avenue – 2nd Mactan Bridge.
- Route 4 – Congested sections of this route are the following (H. Abellan to Pres. Osmena Boulevard): Cebu Country Club – Juan Luan Ave., Arch. Reyes Avenue – Gorodo Ave., Gen. Maxilom St. - Osmena Boulevard, and Colon St. – Plaza Independencia. Congested sections for reverse directions are the following: Plaza Independencia – Osmena Boulevard, Osmena Boulevard – Gen. Maxilom Street. The long stretch from Canduman Road Extention up to the exit to Cebu North road is also having a serious traffic problem where traffic speed is just around 10 km/hr.
- Route 5 - Vehicles moving in the direction of Mandaue City are expected to experience slow movement at the following section: Plaridel St. – S. Cabahug St. and Hernan Cortes St. – junction of Gov. M. Cuenco Ave and M.L. Quezon Highway. Moving vehicles to opposite direction would also experience traffic congestions on the same sections.

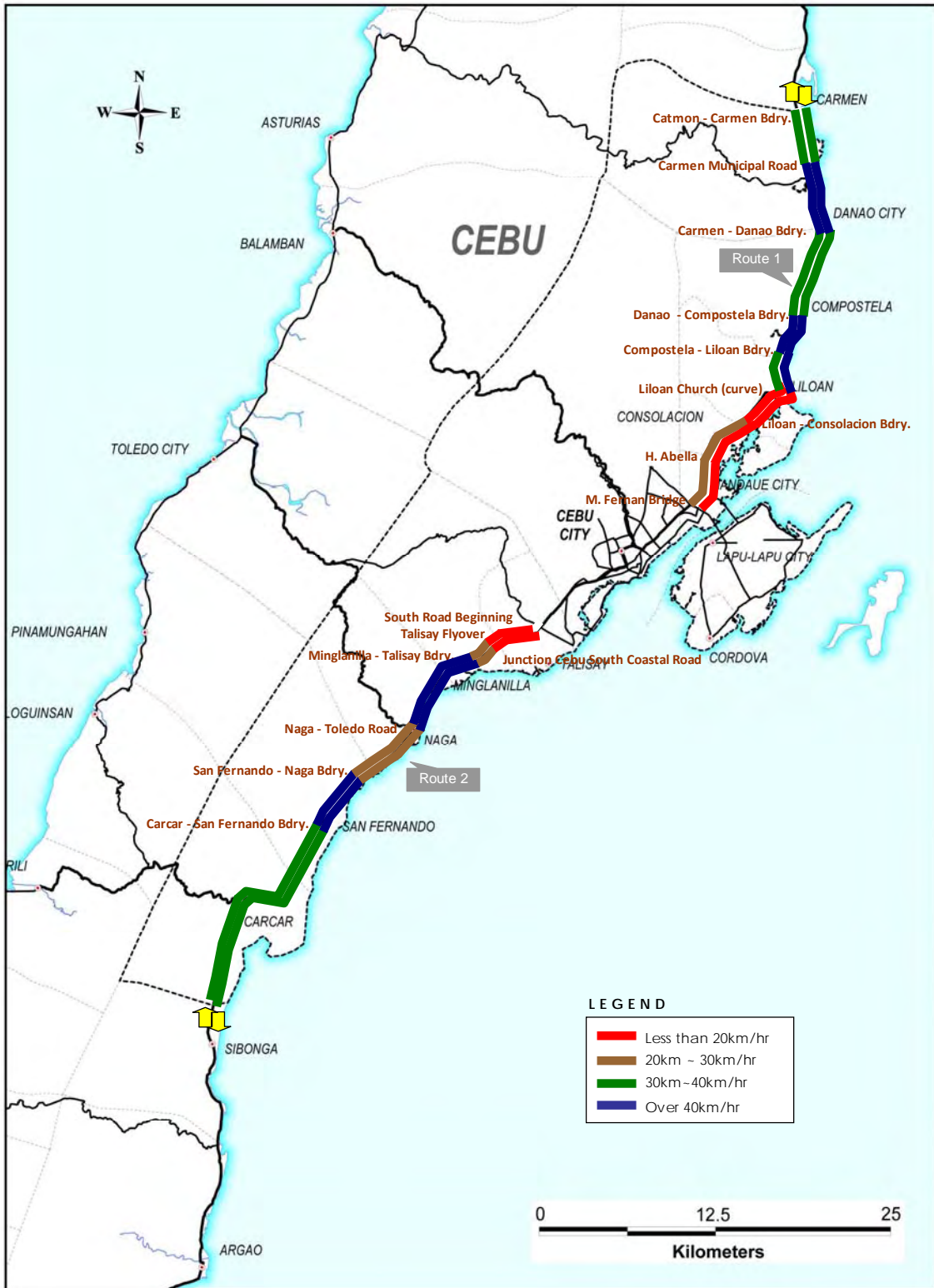


FIGURE 20.2.2-5 TRAVEL SPEED IN METRO CEBU

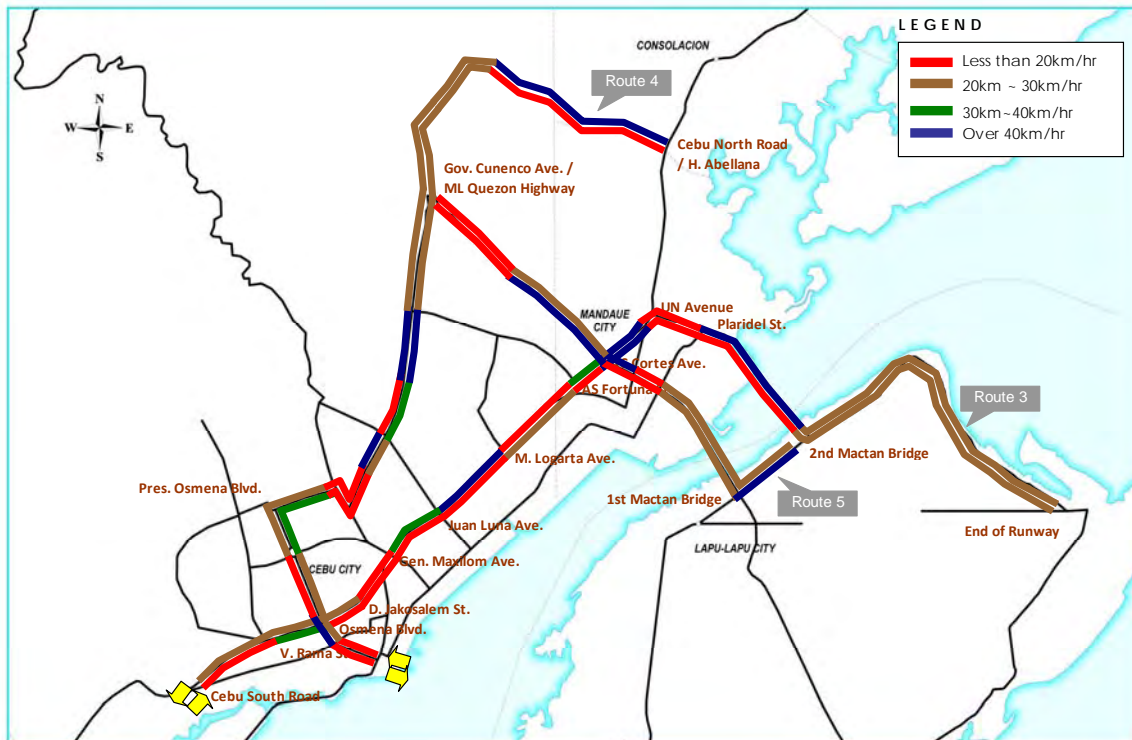


FIGURE 20.2.2-6 TRAVEL SPEED IN LAPU-LAPU CITY, MANDAUE CITY, CEBU CITY

20.2.3 Traffic Demand Management (Metro Cebu)

Metro Cebu, particularly Mandaue City and Cebu City have been experiencing traffic related problems as early as late 80s. Cebu City responded to this problem by creating the Cebu City Traffic Management Coordination Committee (CITOM). The following are traffic demand management measures currently implemented in Metro Cebu:

Urban Traffic Control System utilizing the “Sydney Coordinated Adaptive Traffic System” (SCATS)

- A total of 68 intersections in Metro Cebu were being signalized for Phase I project, wherein sixty-five (65) intersections are located within Cebu City. In 1993, all intersections and the Traffic Control Center were activated. Presently, there are 80 signalized intersections operating at its optimum level.

Truck Ban

- Since the experimental scheme was started on March 9, 2009, large vehicles were banned, from 6 a.m. to 8:30 a.m. and 4 p.m. to 8:30 p.m., from passing through Lopez Jaena Street, M.C. Briones Street, J. Rizal Street along the national highway; U.N. Avenue leading to the Marcelo Fernan Bridge; A.C. Cortes Avenue, J. Briones Street, and Plaridel Street leading to the old Mactan Bridge; and, Ouano Avenue and A. Soriano Street at the Mandaue Reclamation Area.

Pay Parking

- To address the need to rationalize the use of the on-street parking in Cebu City, the Sangguniang Panlungsod institutionalized Pay Parking in 1988. Since parking meters equipment is expensive, parking aides were hired by the city. At present, there are one hundred (100) parking aides employed by the City for this purpose. Pay Parking is also implemented in Lapu-lapu City since 2005.

Establishment of Public Transport Terminals

- Cebu South Bus Terminal (CSBT), 1992
- Cebu North Bus Terminal, 1994

Ordinance on Designation of Travel Lines for Public Transport Vehicles

- Enactment of local ordinances on “travel lines” for public utility vehicles traveling in Cebu City and Lapu-lapu City.

20.3 FREIGHT MOVEMENT AND LOGISTIC CORRIDORS

20.3.1 Port/Airport Related Freight Movement

The truck OD survey was carried-out at the international ports and a lone airport. Based on the survey results, desire line map was prepared as shown in **Figure 20.3.1-1** (see Annex 20.2 for individual desire line of port and airport). The major freight movements are between;

- Cebu City – Mandaue City
- Cebu City – Lapu-Lapu City
- Cebu City – Talisay City
- Cebu City – Naga City

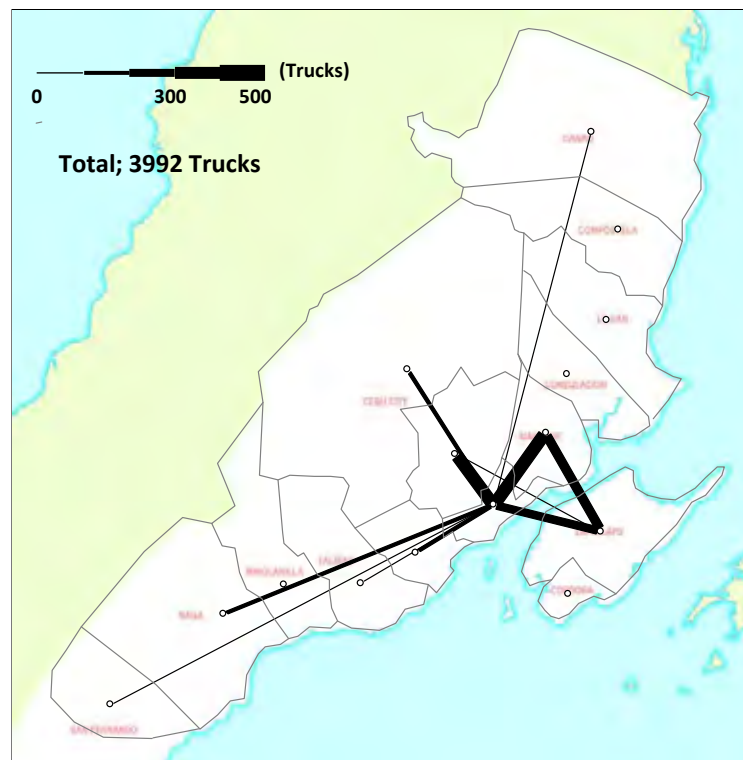


FIGURE 20.3.1-1 FREIGHT MOVEMENT RELATED TO CEBU PORTS AND AIRPORT

20.3.2 Logistic Corridors of Economic-zones

Three (3) Eco-zones are located around Cebu International Airport in Mactan Island. Location of Eco-zones and their logistics routes are shown in **Figure 20.3.2-1**. Freight movement is rather simple - from Eco-zone to either Cebu Port or Cebu International Airport. There are two (2) bridges connecting Cebu Island and Mactan Island. Most trucks use the First Mandaue-Mactan Bridge (2-lane bridge). Although the Second Mandaue-Mactan Bridge has 4-lanes, it is not frequently used by trucks.

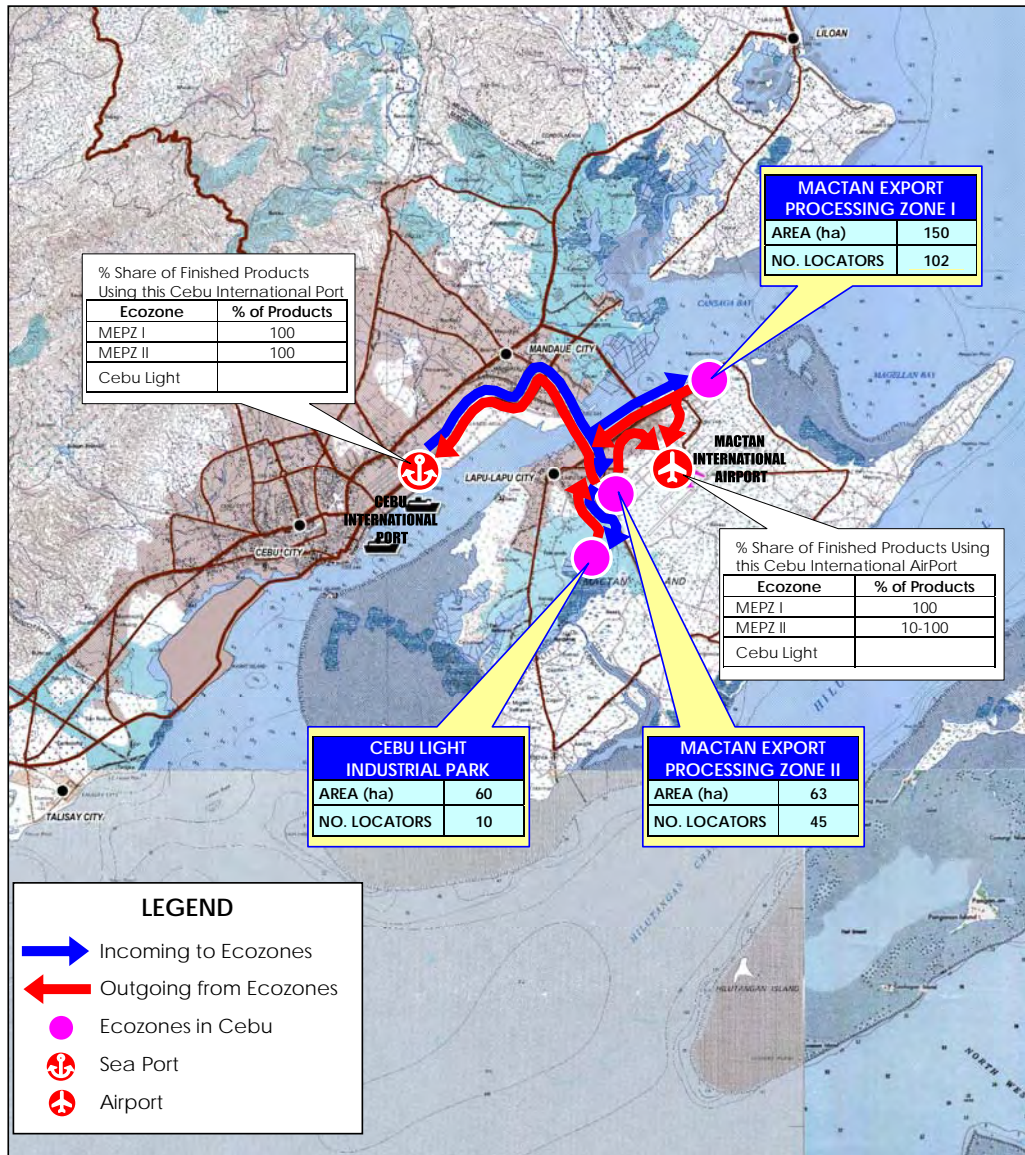


FIGURE 20.3.2-1 ECONOMIC ZONES INTERVIEWED IN CEBU AREA

20.3.3 Comments on Problems Made by Economic-zones Locators

The problems identified by interviewed ecozones, manufacturing companies and trucking companies related to transportation are summarized below:

- Poor traffic management right outside the Mactan Export Processing Zone (MEPZ) area.
- Traffic congestions due to limited capacity of the road networks
- Narrow roads within city proper which easily build up heavy traffic.
- Heavy traffic is encountered at MEPZ Gate 3 that causes delay in route to airport.
- Generally, road transportation capacity is sufficient but tends to congest during early morning hours when commuters report to work.
- Quality of transportation needs upgrading. Multicabs are not safe for open highway use so they should not be allowed to operate. Tricycles also congest narrow streets which causes traffic problem.
- One of our market is Europe and currently there is only limited flights to Europe
- Unloading of cargoes inside the port takes time due to other port activities.
- Access road leading to the factory is narrow and congested.
- Electrical wires in some sections of the road are very low which affect our transportation of cargoes.
- Port area is usually crowded of other trucking services which could jeopardize safety considering the danger of petroleum products.
- Truck ban imposition hampers hauling operation. This cause delay on the delivery of our cargoes.
- Roads are mostly not well-maintained and pot holes are abundant especially on the national roads

CHAPTER 21

FUTURE SOCIO-ECONOMIC FRAMEWOK AND REGIONAL DEVELOPMENT SCENARIO OF METRO CEBU

CHAPTER 21 FUTURE SOCIO-ECONOMIC FRAMEWORK AND REGIONAL DEVELOPMENT SCENARIO OF METRO CEBU

21.1 FUTURE SOCIO-ECONOMIC FRAMEWORK

21.1.1 Future Population

The same methodology as described in Section 10.1.1 was adopted.

Population growth rate adopted is shown in **Figure 21.1.1-1**, and projected population is shown in **Table 21.1.1-1**.

TABLE 21.1.1-1 POPULATION PROJECTION: REGION VII

Region/Province		Population Projection					(thousands)	
		2009	2010	2015	2020	2025	2030	2030/2009
Philippines		92,171	94,024	103,201	112,276	121,013	129,213	1.40
Region 7 Central Visayas		6,611	6,711	7,245	7,792	8,346	8,904	1.35
Province	BOHOL	1,256	1,266	1,320	1,370	1,416	1,455	1.16
	CEBU	2,525	2,569	2,795	3,034	3,284	3,547	1.40
	NEGROS ORIENTAL	1,262	1,275	1,343	1,408	1,469	1,525	1.21
	SIQUIJOR	89	90	94	97	100	103	1.15
City	Cebu City	823	835	900	969	1,042	1,119	1.36
	Lapu-lapu City	316	329	391	453	513	566	1.79
	Mandaue City	338	348	401	460	523	589	1.75

Source: JICA Study Team.

21.1.2 Economic Framework

Discussed in Section 10.1.2 of Chapter 10.

21.1.3 Employment at Job Site

The same methodology as described in Section 10.1.3 of Chapter 10 was adopted.

Projected employment at job site is shown in **Table 21.1.3-1**.

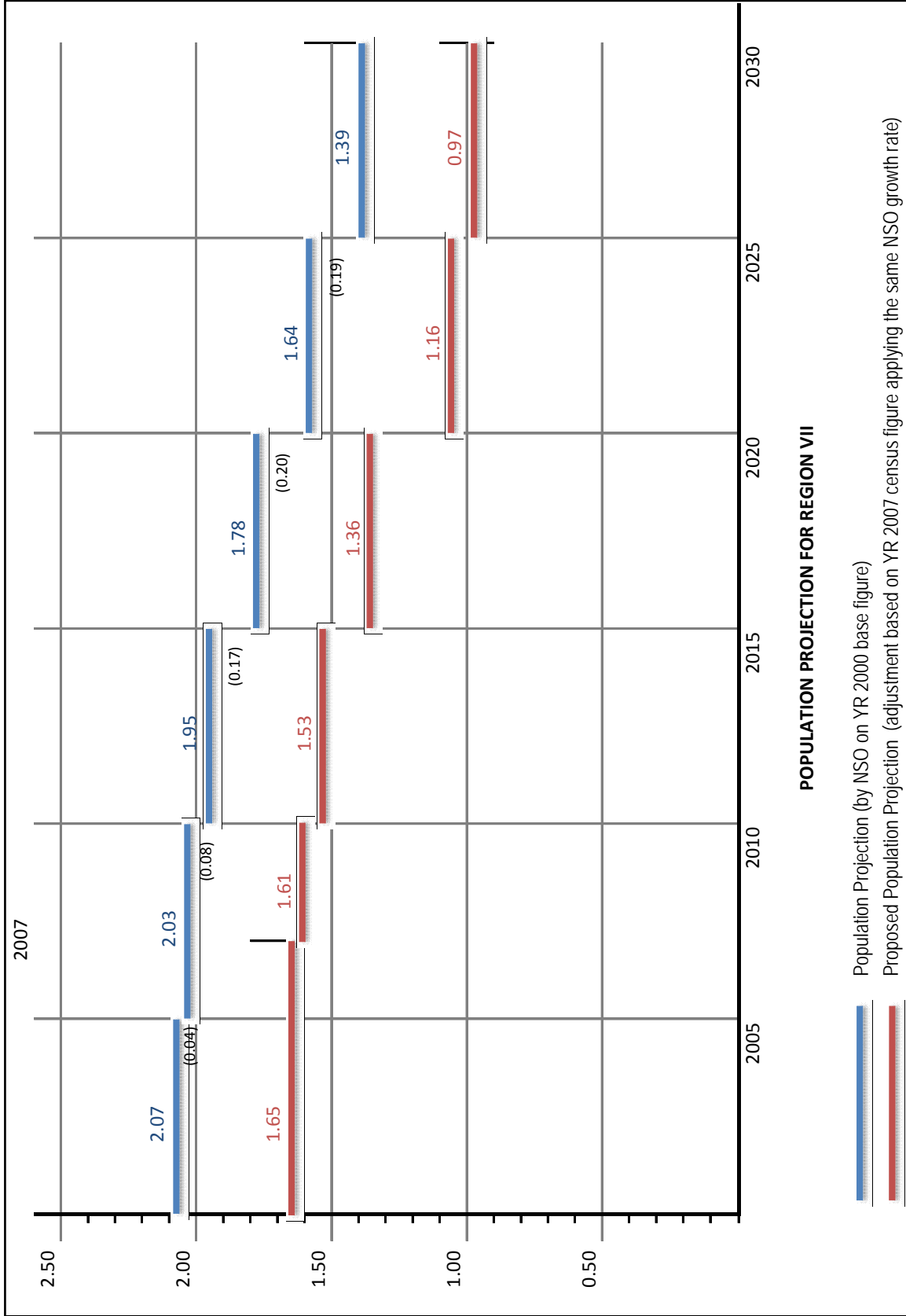


FIGURE 21.1.1-1 POPULATION GROWTH RATE PROJECTION: REGION VII

TABLE 21.1.3-1 PROJECTED EMPLOYMENT AT JOB SITE: REGION VII

Region/City/Municipality		Employment Projection (thousands)					2030/2009	
		2009	2010	2015	2020	2025		2030
PHILIPPINES		22,881	23,443	26,524	29,645	32,730	35,696	1.56
Region 7 CENTRAL VISAYAS		1,866	1,917	2,235	2,556	2,874	3,161	1.69
Province	BOHOL	114	117	139	158	175	190	1.67
	CEBU	1,566	1,613	1,886	2,164	2,440	2,973	1.90
	NEGROS ORIENTAL	177	182	206	233	259	281	1.59
	SIQUIJOR	9	8	9	8	9	9	1.02
City	CEBU CITY (Capital)	494	508	595	683	772	853	1.73
	LAPU-LAPU CITY (OPON)	164	169	198	227	255	281	1.71
	MANDAUE CITY	174	179	209	239	270	298	1.71

Source: JICA Study Team

21.2 REGIONAL DEVELOPMENT SCENARIO

21.2.1 Trends and Directions of Regional Development

Chapter 19 showed the current land use and regional development of Region VII, particularly Metro Cebu. Given the present trend and shown by the economic indicators in Chapter 19, there will be no major deviation in the direction of regional development in Region VI. The region will continue to be the premier driving force in Central Philippines in terms in economic growth.

Regional efforts will still be focused on improving the economic services and infrastructure support to enhance the driving forces of regional development. Improvement of the level of services of the region's infrastructure facilities, notably in the transport system, will continue. Likewise, strengthening of the tourism services and improvement of facilities is seen to be a fundamental in the comprehensive planning of the region.

21.2.2 Regional Development Scenario

Characteristics of Metro Cebu can be summarized as follows:

- Metro Cebu has been developed at the narrow coastal plain. Topographical constraints force the concentration of socio-economic activities at the narrow coastal area.
- Metro Cebu is the hub of people and cargo transportation not only of the Visayas Regions but also of the country as well as international transportation being situated at the center of the Philippines.
- Metro Cebu is the core area for business, commercial and industrial development of the Central Philippines.
- With the plentiful tourist attraction resources, Metro Cebu is the core area for the tourism development.

Based on the above characteristics of Metro Cebu, the development strategy was established as shown in **Figure 21.2.2-1**.

- Metro Cebu, particularly Cebu City, Mandaue City, Lapu-Lapu City and Talisay City shall grow as the business, commercial and industrial core of the Central Philippines.
- The function of international and domestic transportation hub shall be further strengthened.

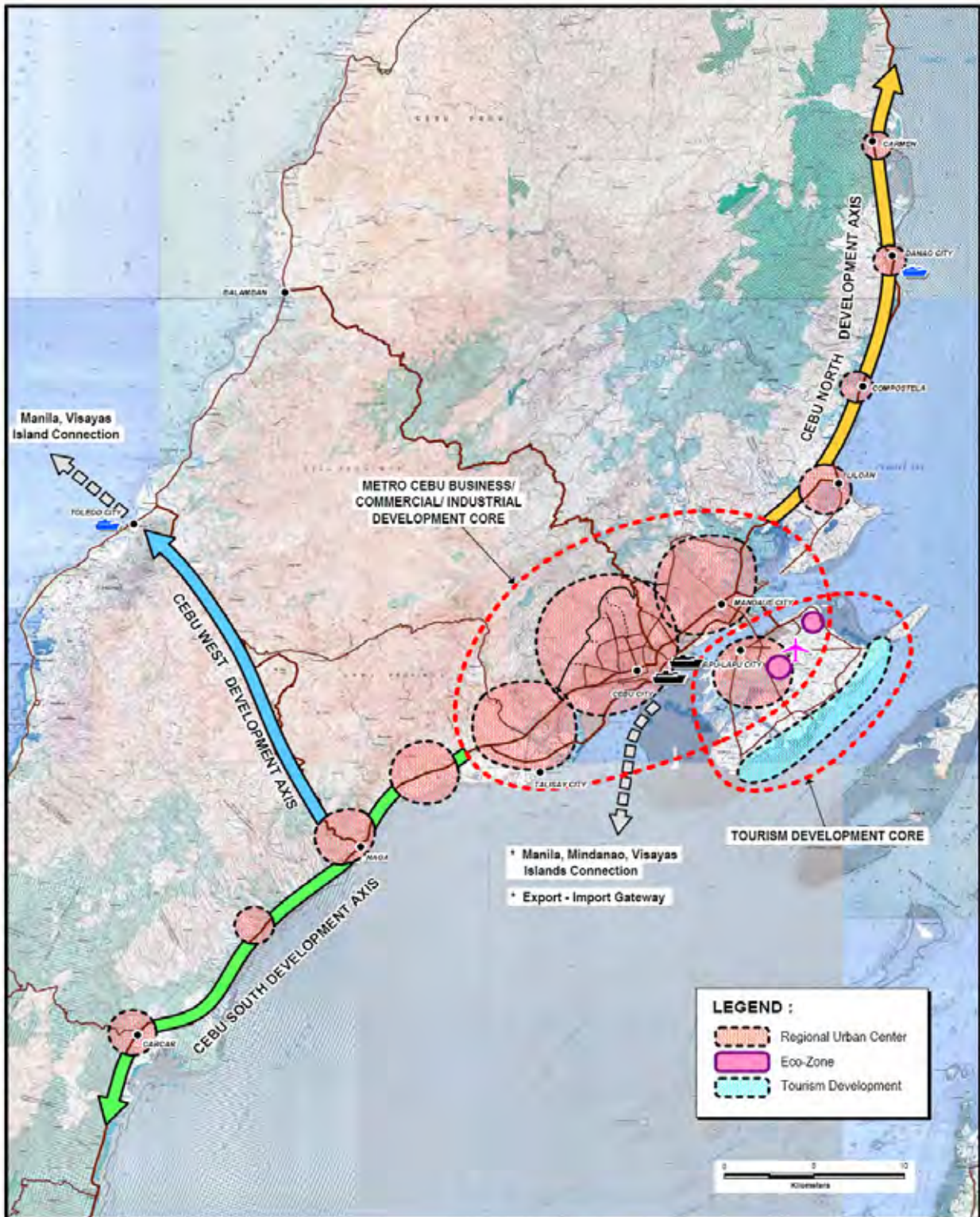


FIGURE 21.2.2-1 DEVELOPMENT STRATEGY: METRO CEBU

CHAPTER 22

FUTURE TRAFFIC DEMAND FORECAST FOR METRO CEBU

CHAPTER 22 FUTURE TRAFFIC DEMAND FORECAST FOR METRO CEBU

22.1 ANALYSES OF TRAFFIC SURVEY RESULTS

This chapter describes the OD survey results. Other survey results were discussed in Chapter 20.

22.1.1 Traffic Characteristics

(1) General

Roadside OD survey was conducted at six (6) stations. A number of samples and sample rate is shown in **Table 22.1-1**.

TABLE 22.1-1 ROADSIDE OD SURVEY STATION AND SAMPLE RATE

No.	Road Name	Location	No. of Sample	AADT	Sample Rate
1	Cebu North Road	Near Carmen Port	1267	5307	23.9%
2	Cebu North Road	Liloan & Consolacion	2216	27677	8.0%
3	Quezon National	Near 2 nd Mactan	2956	52822	5.2%
4	Cebu South Road	Cebu & Talisay	2856	36594	7.8%
5	Naga-Toledo Road	Naga & Toledo	1623	4310	37.7%
6	Cebu South Road	Carcar & Silonga	960	3554	27.0%
Average			1946	21710	9.0%

(2) Traffic by Trip Purpose

Trip purpose is estimated through the OD data as illustrated in **Figure 22.1.1-1**. Of the total car trips 41% were 'Private' trips, 30% were 'Business' trips.

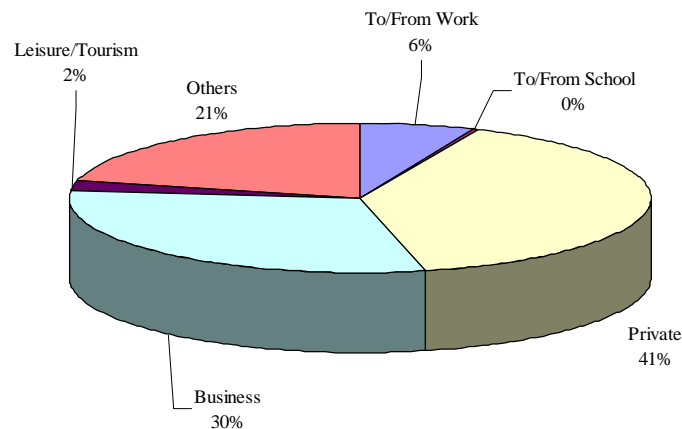


FIGURE 22.1.1-1 TRIP PURPOSE

(3) Average Number of Passengers by Vehicle Category

Vehicle OD is linked to passenger OD through the average number of passenger on board by type of vehicles as the vehicle occupancy rate. **Table 22.1.1-2** shows the average number of passenger on board by type of vehicles.

TABLE 22.1.1-2 AVERAGE NUMBER OF PASSENGERS BY VEHICLE CATEGORY AND BY ROAD

(Person/vehicle, including Driver)

Station	Car/ Taxi/ Van	Jeepney	Mini- bus	Large Bus	2-Axle Truck	3-Axle Truck	Truck- Trailer	Delivery Van
Cebu North Rd. Near Carmen Port	4.0	6.5	26.6	38.3	3.7	2.6	3.5	2.7
Cebu North Rd. Liloan & Consolacion	3.3	8.6	28.3	50.1	3.4	2.7	3.1	2.4
Quezon National Near 2 nd Mactan,	3.0	7.2	9.3	14.0	2.9	2.5	2.3	2.2
Cebu South Rd. Cebu & Talisay	3.2	7.4	26.4	43.8	3.6	2.7	2.6	2.8
Naga-Toledo Rd. Naga & Toledo	4.1	9.5	46.3	44.1	2.9	2.7	2.7	2.4
Cebu South Rd. Carcar & Sibonga	4.1	8.9	23.8	41.8	4.3	2.7	3.2	2.3
Average	3.6	7.6	26.6	42.4	3.4	2.6	3.1	2.5

The survey results of 3.6 passengers for Car and 7.6 passengers for Jeepney, 34.3 passengers for Bus are used in this study (see **Table 22.1.1-3**).

TABLE 22.1.1-3 AVERAGE NUMBER OF PASSENGERS ON BOARD BY VEHICLE CATEGORY

Vehicle Category	Type of Vehicles	Average No. of Passengers (Person / veh.)
Car	Car/Taxi/Van	3.6
Jeepney	Jeepney	7.6
Bus	Mini-Bus, Large-Bus	34.3
Truck	2-Axle Truck, 3-Axle Truck, Truck- Trailer, Delivery Van	3.0

(4) Traffic Type of Commodity

Three representative commodity items were selected in this study. They are Agri./ Fishery / Forestry Sectors, Mining/Construction Sectors, and Manufacturing Sectors. Others commodities not included in the first two categories are considered to include in the third. The results of total commodity volume by road are summarized in **Table 22.1.1-4**.

TABLE 22.1.1-4 TRAFFIC BY COMMODITY TYPE BY ROAD

(ton/day)

Station	Agri./ Fishery / Forestry	Mining/ Construction	Manufacturing	Total
1. Cebu North Rd. Near Carmen Port	545,757	90,214	324,827	960,798
2. Cebu North Rd. Liloan & Consolacion	1,245,730	243,930	316,780	1,806,440
3. Quezon National Near 2 nd Mactan,	48,251	126,654	410	175,315
4. Cebu South Rd. Cebu & Talisay	194,083	-	19,315	213,398
5. Naga-Toledo Rd. Naga & Toledo	240,437	503,576	229,800	973,813
6. Cebu South Rd. Carcar & Sibonga	598,265	201,360	40,800	840,425
Total	2,872,522	1,165,734	931,932	4,970,188
Share (%)	49.4%	34.6%	16.0%	100.0%

(5) Average Loading by Type of Truck

Vehicle OD is linked to commodity OD through the average weight loaded by type of truck. **Table 22.1.1-5** shows the average weight loaded by type of truck.

TABLE 22.1.1-5 AVERAGE LOADING BY TYPE OF TRUCK

(unit:kg)

	Agri./ Fishery / Forestry	Mining/ Construction	Manufacturing	Gross Average Loading*	Net Average Loading**
2-AXLE TRUCK	4,499	7,146	1,236	4,415	2,055
3-AXLE TRUCK	14,260	13,491	15,704	14,363	5,961
TRUCK-TRAILER	12,666	12,778	9,386	11,920	4,883
DELIVERY VAN	3,466	1,000	4,330	3,679	1,266
Weighted Mean TRUCK	8,088	11,217	8,177	8,654	3,600

* Empty trucks are excluded.

** Empty trucks are included.

The average loaded volume by 2-AXLE TRUCK is 2.1 tons, by 3-AXLE TRUCK 6.0 tons, by Trailer 4.9 tons and by Delivery Van 1.3 tons. The survey results, 3.6 tons for truck, are used in this study.

22.1.2 Present OD Table**(1) Procedure of Estimating the Present OD Tables**

- (a) The maximum entropy method was applied to obtain the OD tables of aggregated 4 vehicle types. For the application of the maximum entropy method, it is necessary to utilize the traffic volumes by type of vehicle crossing the zones of the network.
- (b) The traffic volumes crossing zone border were obtained from the traffic counting survey results and supplemented by DPWH survey records.

- (c) Under the process described above, the maximum entropy method was applied and the OD tables by vehicle category (Car, Jeepney, Bus and Truck) were produced. All Vehicle OD, Passenger car (including Jeepney and Bus) OD and Truck OD (large zone) are shown in **Tables 22.1.2-1, 22.1.2-2 and 22.1.2-3.**
- (d) The average vehicle passenger occupancy rates and loading rates by commodity category obtained from the roadside interview survey were then applied to each OD pair by vehicle classification, and the passengers and commodity for the OD pairs were obtained.
- (e) Passenger OD of large zoning is shown in **Table 22.1.2-4** and total commodity trips in **Table 22.1.2-5.**
- (f) For the examination of the accuracy of OD tables, the established All vehicle OD was assigned on the present road network. **Figure 22.1.2-1** shows the traffic volumes which resulted through traffic assignment procedure of the OD tables in the road network. The differences between surveyed traffic volumes and assigned volumes are presented in **Figures 22.1.2-2.** The assigned volumes in this manner show good consistency to the observed traffic.

(2) OD Tables and Traffic Flow

The concluded OD trips are presented in tables and the corresponding traffic flow is shown in figures. All of OD tables were obtained on small zoning base, and aggregated to large zoning base. Traffic zoning system is shown in **Table 22.2.1-1.** ODs trips presented in the report are those of All vehicles, Passenger Car, Truck and each of them is assigned graphically on the road network as traffic flow.

TABLE 22.1.2-1 ALL VEHICLES OD (LARGE ZONES)

	CEBU CITY (Central)	CEBU CITY (South)	CEBU CITY (North)	CEBU CITY (West)	LAPU-LAPU CITY	CORDOBA	CITY OF TALISAY	MINGLANILLA	CITY OF NAGA	MANDAUE CITY	CONSO LACION	LILOAN	COMPOSTELA	DANA O CITY	CITY OF CARCAR	Outside of Metro Cebu	Total
CEBU CITY (Central)	17,371	10,194	36,951	1,025	4,327	37	5,131	3,769	1,495	5,322	1,543	1,513	586	403	767	3,001	93,435
CEBU CITY (South)	12,149	4,113	4,186	163	1,110	201	4,960	2,228	2,662	2,611	121	141	7	58	259	323	35,292
CEBU CITY (North)	14,624	8,837	3,827	39	1,712	17	896	579	237	1,357	101	582	35	92	102	394	33,431
CEBU CITY (West)	128	147	23	371	504	11	93	69	150	125	28	84	0	4	4	258	1,999
LAPU-LAPU CITY	8,022	1,003	2,700	1,492	39,706	1,458	644	606	303	13,001	2,804	831	46	278	64	703	73,461
CORDOBA	45	14	17	7	907	557	39	13	203	229	91	4	0	0	0	0	2,126
CITY OF TALISAY	6,263	4,096	1,096	159	532	33	3,441	353	1,134	684	85	73	0	0	84	259	18,292
MINGLANILLA	4,620	1,881	474	63	494	11	301	1,660	489	213	183	74	1	2	0	142	10,608
CITY OF NAGA	975	2,639	206	110	382	193	695	480	5,702	452	41	55	2	10	32	200	12,174
MANDAUE CITY	5,798	2,474	1,419	153	12,312	205	667	449	624	20,541	2,701	3,376	236	525	47	1,152	52,679
CONSO LACION	1,518	38	271	41	2,372	73	55	44	37	3,106	937	1,255	246	47	35	155	10,230
LILOAN	1,378	127	304	85	1,555	1	28	107	54	3,898	1,386	1,061	1	72	42	163	10,262
COMPOSTELA	233	1	179	5	121	0	37	1	6	492	100	3	141	0	0	43	1,362
DANA O CITY	619	29	86	24	245	0	10	6	1	565	14	0	0	8	0	372	1,979
CITY OF CARCAR	510	139	64	44	0	0	86	0	26	35	2	7	0	1	83	391	1,388
Outside of Metro Cebu	2,376	609	451	265	442	0	288	194	210	1,103	118	117	52	574	563	1,260	8,622
Total	76,629	36,341	52,254	4,046	66,721	2,797	17,371	10,558	13,333	53,734	10,055	9,176	1,353	2,074	2,082	8,816	367,340

TABLE 22.1.2-2 PASSENGER CAR (INCLUDING JEEPNEY & BUS) OD (LARGE ZONES)

	CEBU CITY (Central)	CEBU CITY (South)	CEBU CITY (North)	CEBU CITY (West)	LAPU-LAPU CITY	CORDOBA	CITY OF TALISAY	MINGLANILLA	CITY OF NAGA	MANDAUE CITY	CONSO LACION	LILOAN	COMPOSTELA	DANA O CITY	CITY OF CARCAR	Outside of Metro Cebu	Total
CEBU CITY (Central)	15,838	9,815	36,560	1,023	4,034	37	4,367	2,884	1,300	4,255	1,371	1,427	558	371	754	2,706	87,300
CEBU CITY (South)	11,751	3,789	4,182	158	1,048	184	4,854	2,203	2,632	2,178	120	141	2	58	256	287	33,843
CEBU CITY (North)	14,074	8,823	3,388	35	1,668	17	860	544	220	1,155	90	539	34	85	102	328	31,962
CEBU CITY (West)	122	143	21	342	498	11	84	67	133	111	24	84	0	0	4	215	1,859
LAPU-LAPU CITY	7,655	949	2,628	1,440	38,070	1,419	594	553	283	11,900	2,384	717	25	258	64	619	69,558
CORDOBA	44	14	17	7	877	499	39	13	180	226	89	4	0	0	0	0	2,009
CITY OF TALISAY	5,686	3,992	1,069	142	528	33	3,348	339	1,054	625	83	73	0	0	84	176	17,232
MINGLANILLA	3,482	1,847	468	63	443	11	294	1,479	256	209	174	58	1	0	0	77	8,862
CITY OF NAGA	751	2,615	195	101	346	172	569	296	5,122	409	41	45	2	0	11	138	10,813
MANDAUE CITY	4,497	2,123	1,318	136	11,449	203	587	442	602	18,310	2,128	3,052	200	459	34	818	46,358
CONSO LACION	1,315	30	270	17	2,188	72	48	44	33	2,375	840	1,153	246	36	35	99	8,801
LILOAN	1,250	126	267	85	1,456	1	20	95	37	3,489	1,185	977	0	67	42	110	9,207
COMPOSTELA	188	1	158	0	105	0	37	1	1	430	100	0	128	0	0	33	1,182
DANA O CITY	577	24	82	24	206	0	0	0	0	462	0	0	0	8	0	323	1,706
CITY OF CARCAR	502	135	64	44	0	0	86	0	17	31	0	0	0	0	69	305	1,253
Outside of Metro Cebu	2,049	518	381	228	362	0	159	162	136	685	71	74	48	522	490	1,133	7,018
Total	69,781	34,944	51,068	3,845	63,278	2,659	15,946	9,122	12,006	46,850	8,700	8,344	1,244	1,864	1,945	7,367	338,963

TABLE 22.1.2-3 TRUCK OD (LARGE ZONES)

(Vehicle)

	CEBU CITY (Central)	CEBU CITY (South)	CEBU CITY (North)	CEBU CITY (West)	LAPU-LAPU CITY	CORDOBA	CITY OF TALISAY	MINGLANILLA	CITY OF NAGA	MANDAUE CITY	CONSO LACION	LILOAN	COMPO STELA	DANA O CITY	CITY OF CARCAR	Outside of Metro Cebu	Total
CEBU CITY (Central)	1,533	379	391	2	293	0	764	885	195	1,067	172	86	28	32	13	295	6,135
CEBU CITY (South)	398	324	4	5	62	17	106	25	30	433	1	0	5	0	3	36	1,449
CEBU CITY (North)	550	14	439	4	44	0	36	35	17	202	11	43	1	7	0	66	1,469
CEBU CITY (West)	6	4	2	29	6	0	9	2	17	14	4	0	0	4	0	43	140
LAPU-LAPU CITY	367	54	72	52	1,636	39	50	53	20	1,101	220	114	21	20	0	84	3,903
CORDOBA	1	0	0	0	30	58	0	0	23	3	2	0	0	0	0	0	117
CITY OF TALISAY	577	104	27	17	4	0	93	14	80	59	2	0	0	0	0	83	1,060
MINGLANILLA	1,138	34	6	0	51	0	7	181	233	4	9	16	0	2	0	65	1,746
CITY OF NAGA	224	24	11	9	36	21	126	184	580	43	0	10	0	10	21	62	1,361
MANDAUE CITY	1,301	351	101	17	863	2	80	7	22	2,231	573	324	36	66	13	334	6,321
CONSO LACION	203	8	1	24	184	1	7	0	4	731	97	102	0	11	0	56	1,429
LILOAN	128	1	37	0	99	0	8	12	17	409	201	84	1	5	0	53	1,055
COMPOSTELA	45	0	21	5	16	0	0	0	5	62	0	3	13	0	0	10	180
DANA O CITY	42	5	4	0	39	0	10	6	1	103	14	0	0	0	0	49	273
CITY OF CARCAR	8	4	0	0	0	0	0	0	9	4	2	7	0	1	14	86	135
Outside of Metro Cebu	327	91	70	37	80	0	129	32	74	418	47	43	4	52	73	127	1,604
Total	6,848	1,397	1,186	201	3,443	138	1,425	1,436	1,327	6,884	1,355	832	109	210	137	1,449	28,377

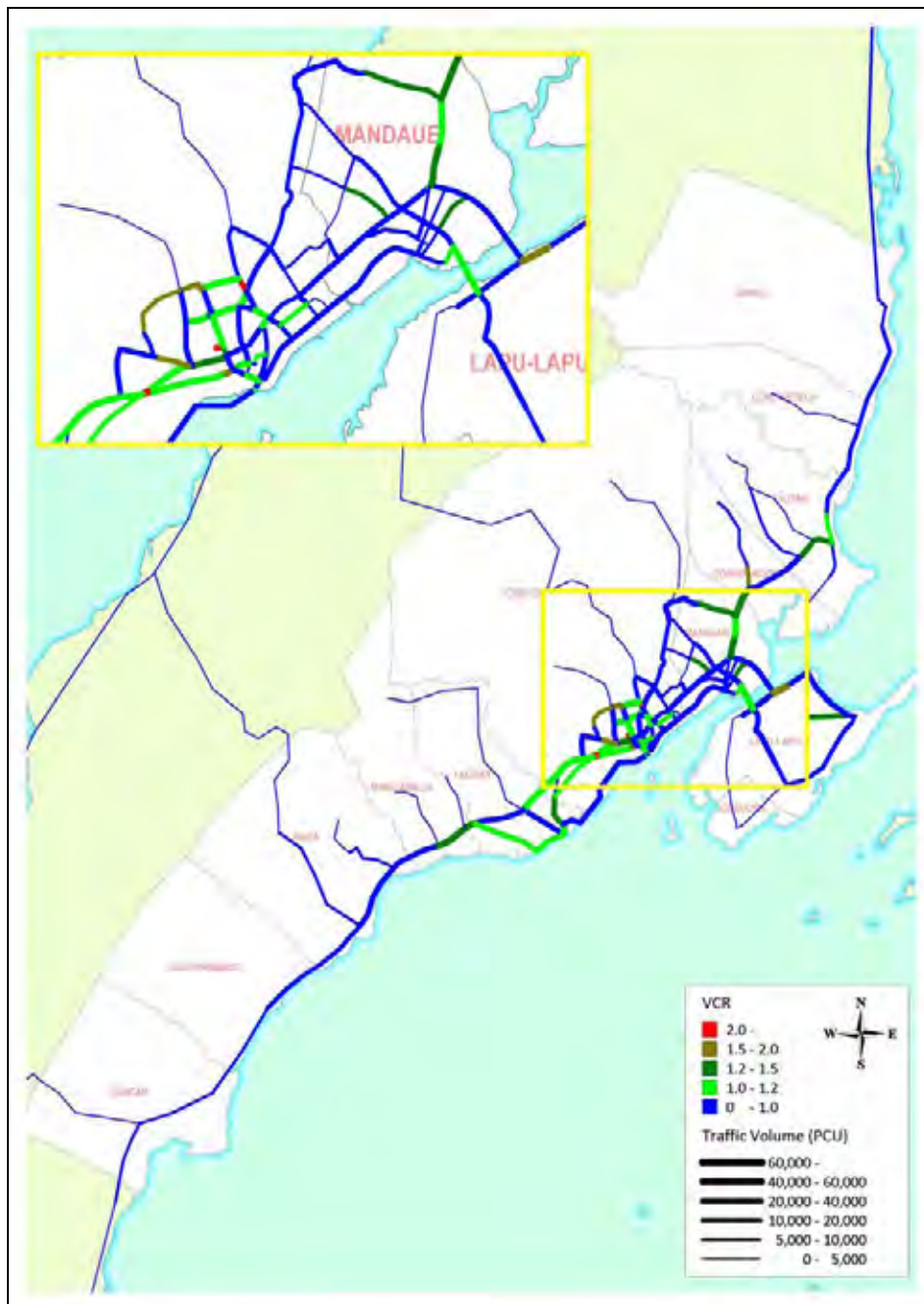


FIGURE 22.1.2-1 PRESENT TRAFFIC FLOW (YEAR 2009)

TABLE 22.1.2-4 PASSENGER OD (LARGE ZONES)

(Person)

	CEBU CITY (Central)	CEBU CITY (South)	CEBU CITY (North)	CEBU CITY (West)	LAPU-LAPU CITY	CORDOBA	CITY OF TALISAY	MINGLANILLA	CITY OF NAGA	MANDAUE CITY	CONSO LACION	LILOAN	COMPO STELA	DANA O CITY	CITY OF CARCAR	Outside of Metro Cebu	Total
CEBU CITY (Central)	88,176	72,514	197,730	7,250	15,774	161	21,768	11,862	7,175	21,541	6,714	9,098	3,564	3,019	15,209	48,982	530,537
CEBU CITY (South)	80,765	22,644	26,464	1,328	4,169	662	26,119	14,901	18,611	10,260	468	524	7	209	1,538	1,249	209,918
CEBU CITY (North)	73,278	47,900	16,194	326	6,569	97	3,547	2,210	932	5,714	364	2,908	122	306	367	1,469	162,305
CEBU CITY (West)	814	1,521	92	2,254	2,081	52	350	265	487	408	217	429	0	0	14	2,257	11,241
LAPU-LAPU CITY	36,606	3,548	10,574	7,016	229,904	8,966	2,146	2,035	1,047	60,948	13,376	4,613	94	1,197	230	3,033	385,333
CORDOBA	194	50	89	25	5,402	2,577	140	47	648	942	344	14	0	0	0	0	10,473
CITY OF TALISAY	32,742	23,806	5,367	855	2,081	119	27,345	2,796	7,039	2,845	299	263	0	0	606	678	106,841
MINGLANILLA	13,177	11,376	2,257	231	1,635	40	2,615	11,074	1,036	756	1,026	209	4	0	0	277	45,713
CITY OF NAGA	3,652	17,627	714	449	1,270	619	2,897	1,192	31,921	1,480	148	162	7	0	40	1,396	63,574
MANDAUE CITY	23,423	10,393	6,297	510	62,694	955	2,121	2,219	3,435	86,018	18,259	18,555	1,032	2,814	122	13,628	252,476
CONSOLACION	7,412	140	1,632	131	12,278	259	173	158	119	17,732	4,748	4,459	1,082	130	126	380	50,958
LILOAN	6,016	462	1,353	433	8,812	4	72	342	133	20,112	5,281	4,873	0	509	151	1,410	49,962
COMPOSTELA	1,196	4	1,201	0	382	0	133	4	4	2,776	360	0	590	0	0	119	6,767
DANA O CITY	3,208	86	295	86	742	0	0	0	0	2,623	0	0	0	45	0	1,587	8,672
CITY OF CARCAR	8,913	642	230	158	0	0	654	0	93	449	0	0	0	0	1,151	2,363	14,654
Outside of Metro Cebu	26,288	2,196	1,756	3,141	2,050	0	600	599	538	4,733	256	620	189	2,519	2,228	8,968	56,680
Total	405,860	214,907	272,245	24,193	355,842	14,510	90,682	49,705	73,217	239,338	51,859	46,726	6,691	10,747	21,783	87,796	1,966,102

TABLE 22.1.2-5 COMMODITY OD (LARGE ZONES)

(Tons)

	CEBU CITY (Central)	CEBU CITY (South)	CEBU CITY (North)	CEBU CITY (West)	LAPU-LAPU CITY	CORDOBA	CITY OF TALISAY	MINGLANILLA	CITY OF NAGA	MANDAUE CITY	CONSO LACION	LILOAN	COMPO STELA	DANA O CITY	CITY OF CARCAR	Outside of Metro Cebu	Total
CEBU CITY (Central)	5,519	1,364	1,408	7	1,055	0	2,750	3,186	702	3,841	619	310	101	115	47	1,062	22,086
CEBU CITY (South)	1,433	1,166	14	18	223	61	382	90	108	1,559	4	0	18	0	11	130	5,216
CEBU CITY (North)	1,980	50	1,580	14	158	0	130	126	61	727	40	155	4	25	0	238	5,285
CEBU CITY (West)	22	14	7	104	22	0	32	7	61	50	14	0	0	14	0	155	504
LAPU-LAPU CITY	1,321	194	259	187	5,890	140	180	191	72	3,964	792	410	76	72	0	302	14,051
CORDOBA	4	0	0	0	108	209	0	0	83	11	7	0	0	0	0	0	421
CITY OF TALISAY	2,077	374	97	61	14	0	335	50	288	212	7	0	0	0	0	299	3,816
MINGLANILLA	4,097	122	22	0	184	0	25	652	839	14	32	58	0	7	0	234	6,286
CITY OF NAGA	806	86	40	32	130	76	454	662	2,088	155	0	36	0	36	76	223	4,900
MANDAUE CITY	4,684	1,264	364	61	3,107	7	288	25	79	8,032	2,063	1,166	130	238	47	1,202	22,756
CONSOLACION	731	29	4	86	662	4	25	0	14	2,632	349	367	0	40	0	202	5,144
LILOAN	461	4	133	0	356	0	29	43	61	1,472	724	302	4	18	0	191	3,798
COMPOSTELA	162	0	76	18	58	0	0	0	18	223	0	11	47	0	0	36	648
DANA O CITY	151	18	14	0	140	0	36	22	4	371	50	0	0	0	0	176	983
CITY OF CARCAR	29	14	0	0	0	0	0	0	32	14	7	25	0	4	50	310	486
Outside of Metro Cebu	1,177	328	252	133	288	0	464	115	266	1,505	169	155	14	187	263	457	5,774
Total	24,653	5,029	4,270	724	12,395	497	5,130	5,170	4,777	24,782	4,878	2,995	392	756	493	5,216	102,157

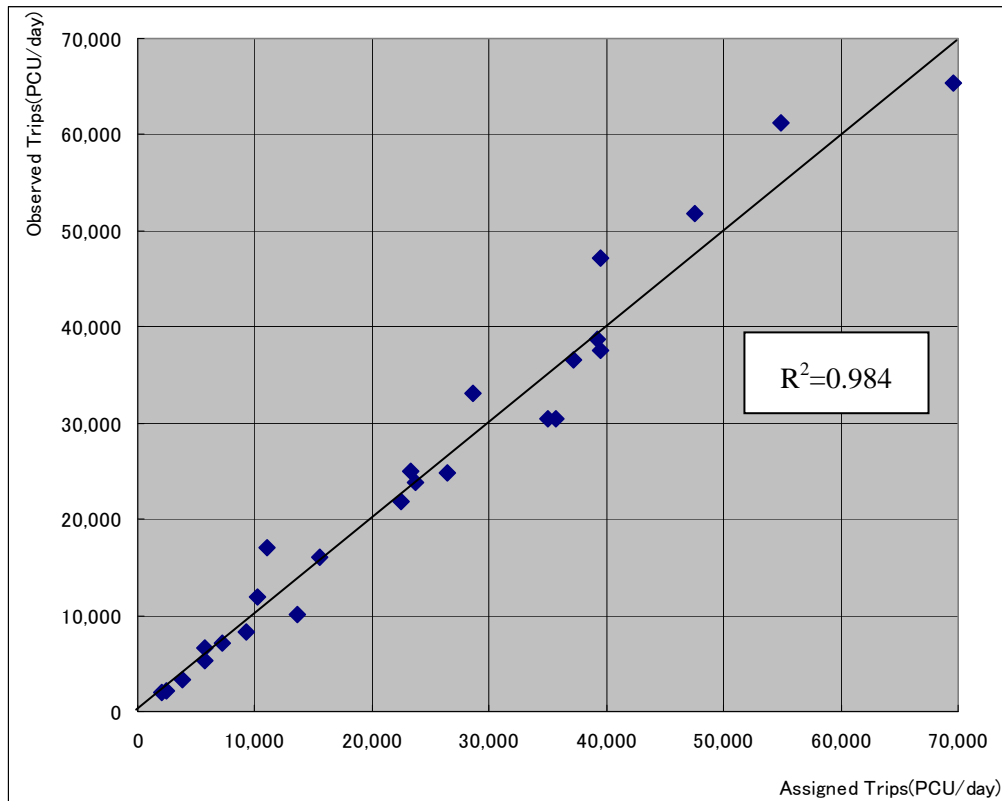


FIGURE 22.1.2-2 ASSIGNED AND OBSERVED TRIPS

22.1.3 Desire Line

Desire line of all vehicles, Passenger Car, Public Transport (Jeepney and Bus) and Truck are illustrated in **Figure 22.1.3-1**.

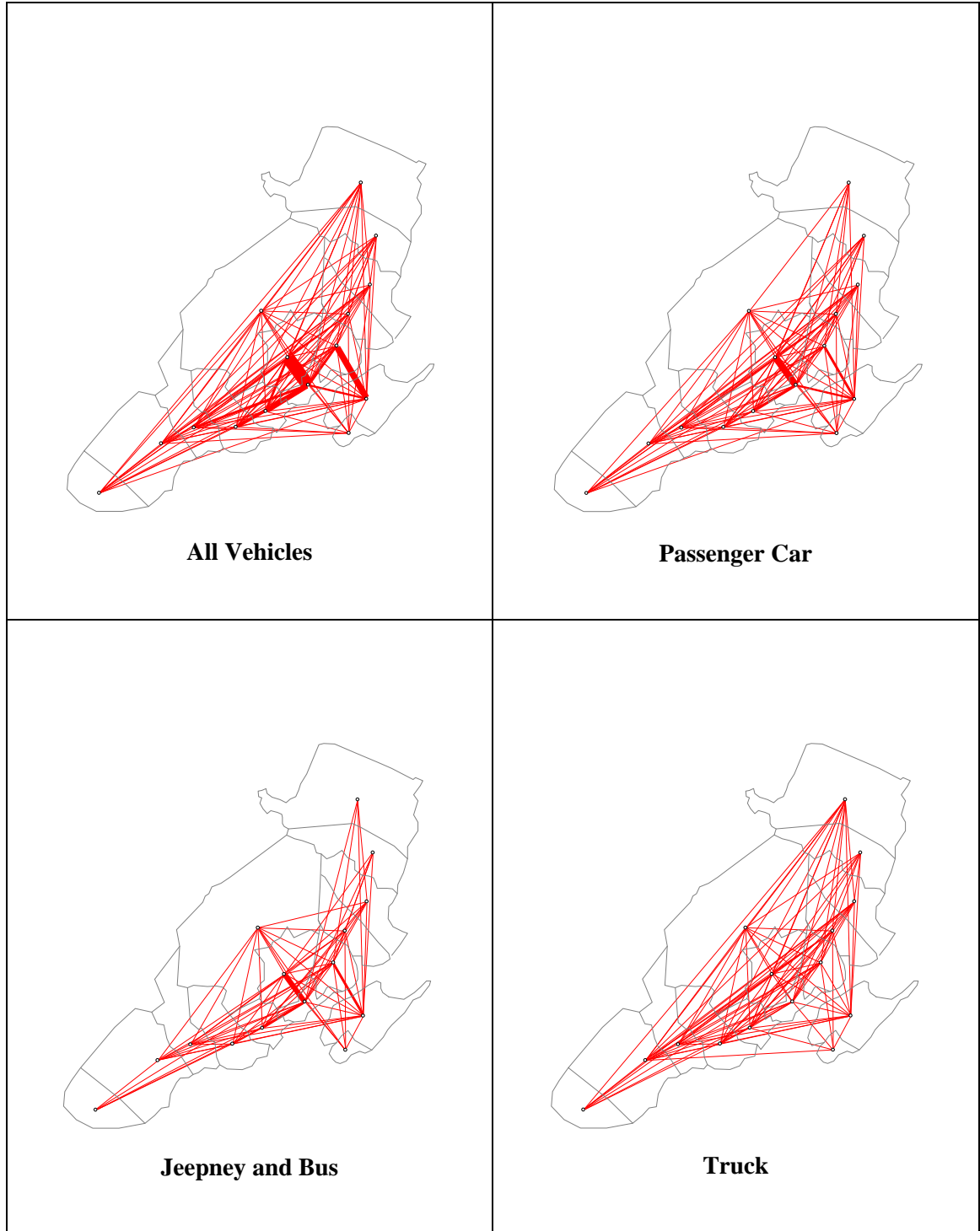


FIGURE 22.1.3-1 DESIRE LINE (YEAR 2009)

22.2 TRAFFIC DEMAND FORECAST

22.2.1 Development of Demand Model

(1) Basic Idea of Model Development

Basic idea for the development of forecasting models is as follows:

- The forecast of future traffic demand is done by applying the conventional four-step methodology; namely: trip generation and attraction model, trip distribution model, modal split model, and traffic assignment model.
- However, modal split model is not applied because it is not necessary to consider transferring between modes in Metro Cebu.
- Trip generation and attraction model, and trip distribution model should be developed for vehicle trips corresponding to the type of vehicle: passenger car, jeepney, bus and truck. Therefore, four different OD matrices will be separately estimated for the future.
- The target year of future traffic demand forecast is the year of 2030, and the forecast at 2020 is also carried out.

The model development procedure is shown in the following **Figure 22.2.1-1**.

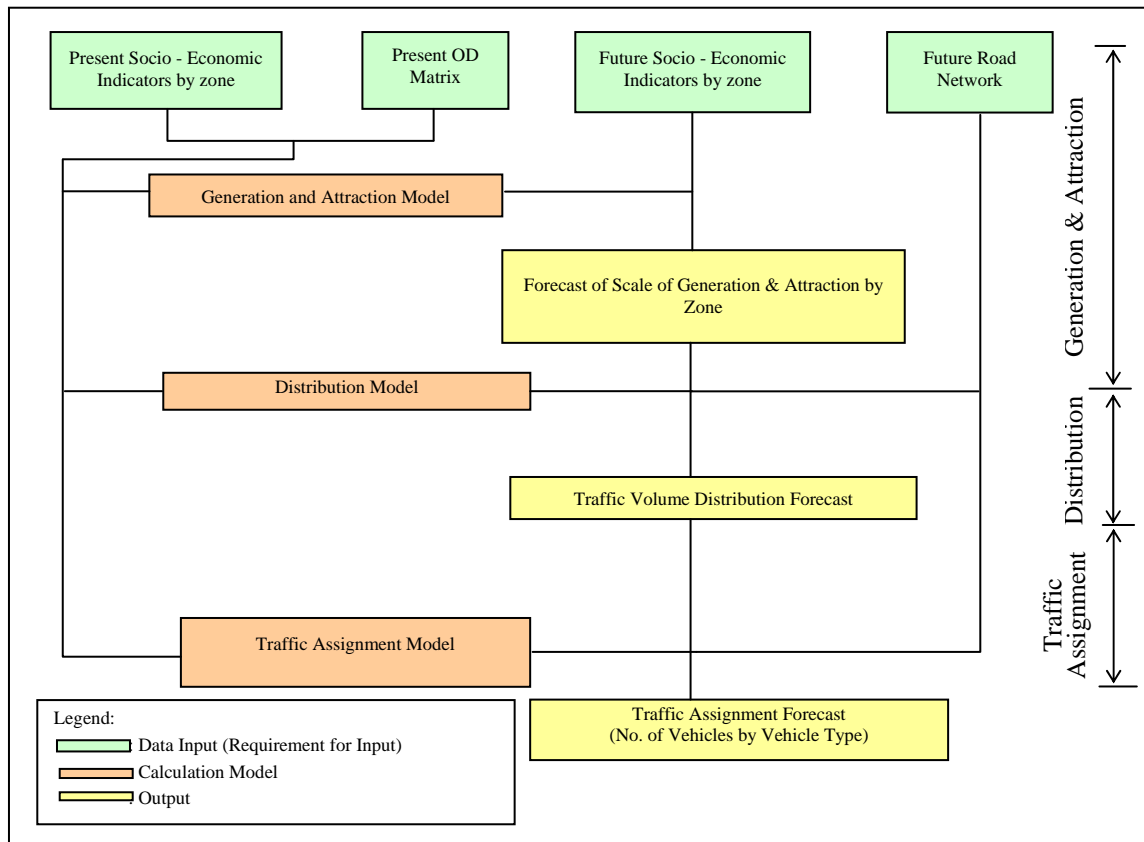


FIGURE 22.2.1-1 TRAFFIC DEMAND FORECAST PROCEDURE

(2) Zone System in the Study Area

The model predicts trips over the road network based on the attributes of traffic analysis zones (TAZ). Zonal Attributes used in trip generation including population and employment. A key component of the model development process was the development of zone system to cover the Study Area.

The study area is defined from zone 1 to 73, Metro Cebu (1~23), other area (24~73) in traffic zoning system, outside the study area is defined from zone 74 and 92. (See **Table 22.2.1-1** and **Figure 22.2.1-2**)

TABLE 22.2.1-1(1) TRAFFIC ZONING SYSTEM

No.	Zone Code	Name	City/Municipality	Province	
1	1201	Ermita, Pahina - San Nicilas, Pahina Central	Cebu City	Metro Cebu	
2	1202	Central Proper, San Roque, Tinago, Parian			
3	1203	Sambag 1, Sambag 2			
4	1204	Calamba, Labangon			
5	1205	Sta. Cruz, Cogon - Ramos, Lorega-San Miguel, Tejero			
6	1206	Inayawan			
7	1207	Basak-Pardo, Kinasang-an			
8	1208	Basak-San Nicolas, Duljo			
9	1209	Capitol Site, Kamputihaw			
10	1210	Hippodromo, Carreta 1, Carreta 2			
11	1211	Kasambagan			
12	1212	Banilad			
13	1213	Lahug			
14	1214	Guadalupe			
15	1215	Tisa			
16	1216	Bulacao			
17	1217	Toong, Buhisan			
18	1218	Kalunasan			
19	1219	Busay, Budla-an			
20	1401	Bacayan			Lapu-lapu
21	1402	Adlaon			
22	1403	Buot-taup			
23	1404	Binaliw			
24	1407	Poblacion, Pajo			
25	1408	Pusok, Ibo			
26	1409	Bangkal			
27	1410	Basak, Gun-ob, Babag			
28	1601	Looc, Canumlao	Cordova		
29	1602	Agus, Suba Basbas			
30	1603	Maribago, Mactan			
31	1604	Alegria, Buagsong			
32	1605	Dapitan	Talisay		
33	1606	Poblacion			
34	1607	Cansojong, Dumlog			
35	1608	Bulacao, San Isidro			
36	1609	Linao, Lawaan			
37	1610	Maghaway			
38	1801	Jaclupan	Minglanilla		
39	1802	Pakigne, Calajoan			
40	1803	Tulay			
41	1804	Tunggaan, Candulawan			
42	1805	Cuanos, Manduang			
43	1806	Camp 8, Camp 7			
44	1807	Inayagan, Tangke, Central Poblacion	Naga		
45	1808	Cantao-an			
46	1809	Inoburan, Bairan			
47	1810	Cabungahan, Jaguimit, Alfaco			
48	2001	Cogon			
49	2002	Subangdaku, Bakilid	Mandaue		
50	2003	Cambaro, Guizo			
51	2004	Opao			
52	2005	Alang-alang			
53	2006	Banilad, Cabancalan			
54	2007	Pagsabongan, Basak			
55	2008	Labogon			
56	2009	Canduman			

TABLE 22.2.1-1(2) TRAFFIC ZONING SYSTEM

No.	Zone Code	Name	City/Municipality	Province
57	2010	Casili, Lamac, Pulpogan	Consolacion	Metro Cebu
58	2201	Cansaga, Nangka, Jugan		
59	2202	Tayud		
60	2203	Cabangahan		
61	2204	Calero, Catarman	Liloan	
62	2205	Yati, Poblacion		
63	2206	San Vicente, Cotcot		
64	2207	Cabadiangan		
65	2208	Garing	Consolacion	
66	2209	Estaca, Cogon, Canamucan	Compostela	
67	2210	Cabadiangan, Buluang		
68	2201	Bagalinga		
71	71101		DANAO CITY	Outside of Metro Cebu
72	71201		CARCAR	
73	71301		SAN FERNANDO	
74	72001		SIBONGA	
75	72101		ARGAO / DLAGUETE	
76	72201		ALCOY / BALJOON	
77	72301		OSLOB / SANTANDER	
78	72401		CARMEN	
79	72501		CATMON / SOGOD	
80	72601		BOGO / BORBON / TABOGON	
81	72701		DAANBANTAYAN / MEDELLIN	
82	72801		SAN REMEGIO / TABUELAN	
83	72901		TUBURAN	
84	73001		ASTURIAS	
85	73101		BALAMBAN	
86	73201		TOLEDO CITY	
87	73301		PINAMUNGAHAN	
88	73401		ALOGUINSAN	
89	73501		BARILI	
90	73601		DUMANJUG / RONDA	
91	73701		ALCANTARA / BADIAN / MOALBOAL	
92	73801		ALEGRIA/GINATILAN/MALABUYOG/SAMBOAN	

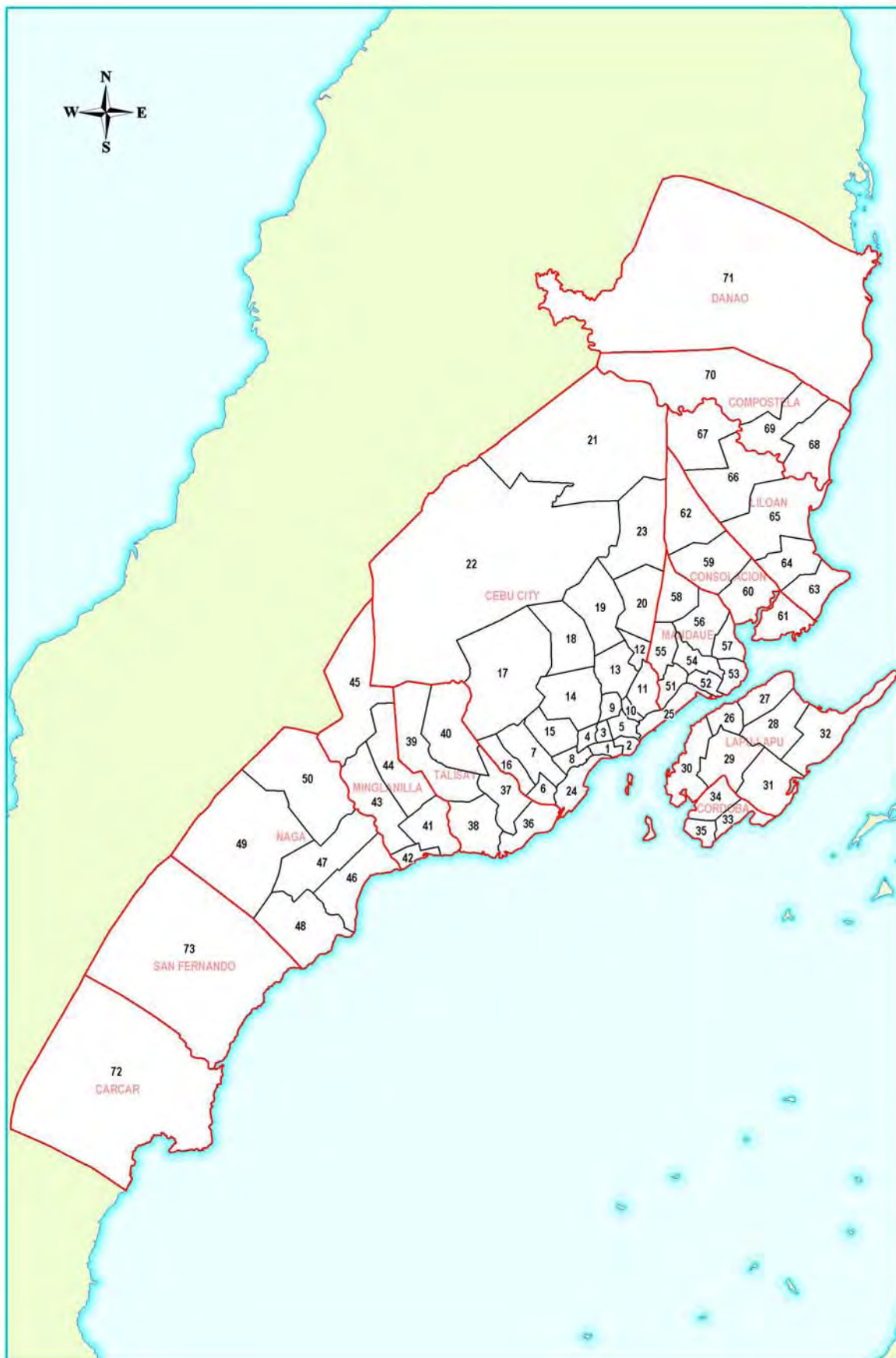


FIGURE 22.2.1-2 ZONING MAP – METRO CEBU

22.2.2 Model Description

(1) Trip Generation Model

Trip generation and attraction models are to estimate the number of trips generated from and attracted to each zone. The linear regression models are adopted in the Study. The model parameters are calibrated in **Table 22.2.2-1**.

$$G_i = a_i * X_{1i} + b_i * X_{2i} + c_i * D_i + C$$

$$A_j = a_j * X_{1j} + b_j * X_{2j} + c_j * D_j + C$$

Where,

G_i – Trip Generation in zone i

A_j – Trip Attraction in zone j

X_{1i}, X_{2j} – Attributes in zone i, j

D_i, D_j – Dummy Variables

a_i, a_j, b_i, b_j – Coefficients

C – Constant

TABLE 22.2.2-1 GENERATION/ATTRACTION MODELS

Model Type	Vehicle Type	Attributes		Dummy Variables	Constant	R ² Multiple Correlation Coefficient
		Population	Employee			
Trip Generation	Passenger car	-	162.87	7978.70	-	0.899
	Jeepney	31.05	-	6677.19	203.73	0.757
	Bus	1.31	4.82	461.97	-	0.731
	Truck	-	14.03	690.01	-	0.807
Trip Attraction	Passenger car	12.76	128.40	8160.32	-	0.901
	Jeepney	9.65	78.16	5730.90	-	0.820
	Bus	1.74	3.05	337.55	-	0.780
	Truck	-	15.64	694.55	-	0.820

(2) Trip Distribution Model

A trip distribution model is to estimate the number of distributed trips by the combination of origin and destination (OD) zones, i.e., OD matrices, based on the trip generation and attraction by zone, which are described in the previous section.

The most widely used model for trip distribution is a Gravity model, which aims to estimate travel demand based on the relationship between trip generation, trip attraction, and impedance function between zones such as a travel distance. This analysis resulted in the following formulas as a trip distribution model.

$$T_{ij} = K \cdot \frac{G_i^\alpha \cdot A_j^\beta}{D_{ij}^\gamma}$$

Where,

T_{ij} : inter zonal trip distribution from zone i to j

G_i : trip generation in zone i

A_j : trip attraction in zone j

D_{ij} : travel length from zone i to j

K, α, β, γ : model parameters

TABLE 22.2.2-2 TRIP DISTRIBUTION MODEL

Vehicle Type	Parameter				R ² Multiple Correlation Coefficient
	α	β	γ	K	
Passenger car	0.26962	0.26265	0.16356	2.78774	0.849
Jeepney	0.34197	0.30590	0.39635	0.30395	0.806
Bus	0.22205	0.20014	0.03576	5.80972	0.819
Truck	0.33677	0.31783	0.27748	0.34480	0.872

Calibration of the Gravity model is accomplished by developing adjustment factors. The adjustment factors can be determined by comparing model output and observed data. The model formula is shown as follows.

$$T_{ij} = G_i \cdot \frac{A_j K_{ij} D_{ij}}{\sum_n A_n K_{in} D_{in}}$$

Where, K_{ij} : Adjustment factor between existing and model value for the zone pair of i and j

The output of a distribution model is a set of elements that show the travel flow between each pair of zones. However, the row totals of distribution elements do not match with trip generations and the column totals of distribution elements do not match with trip attractions. Therefore, an iteration is done until satisfied that the row totals match trip generations and the column totals match trip attractions.

(3) Assignment Model

JICA STRADA, which was developed by JICA, is used for traffic assignment simulation. This system provides two major types of highway assignment model, namely, incremental assignment and user equilibrium assignment. For this Study, the incremental assignment is employed.

The incremental assignment divides the input OD matrix data into several increments and assigns each increment to the shortest route where the generalized cost is the least. Once the increments are assigned, link cost of each link is re-calculated and the shortest route is found again for the next increments. This calculation is repeated until the number of designated times.

22.2.3 Future Travel Demand Forecast

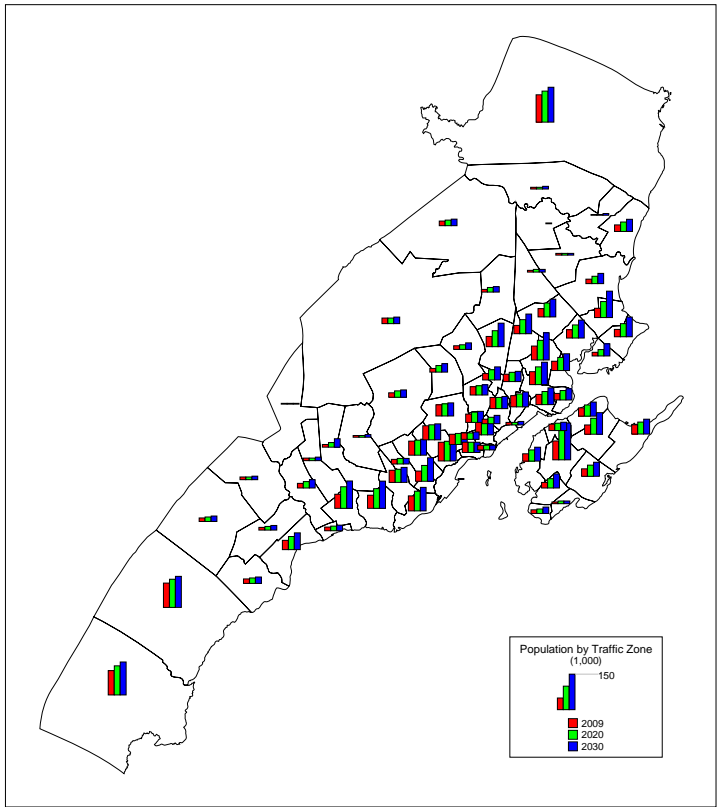
(1) Socio-economic Data for Demand Forecast

Based on the existing socio-economic data, the future value by traffic zone for the development of trip production and attraction model is prepared. **Table 22.2.3-1** summarizes the projection of population and employment in the future by area only for Cebu Province. The total population of Cebu Province is 4.9 million in 2020 and 5.8 million in 2030, while the number of employees is 2.2 million in 2020 and 2.7 million in 2030.

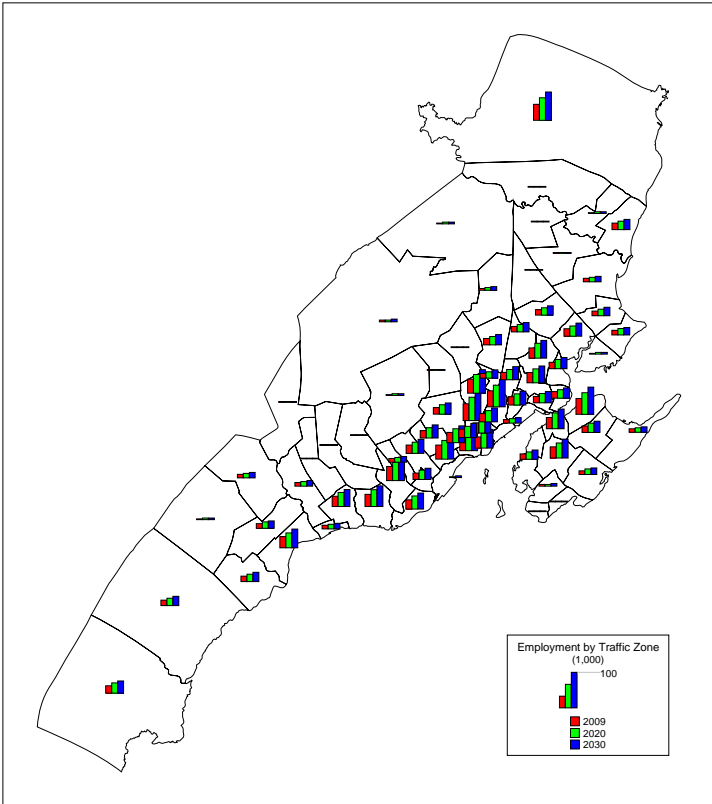
TABLE 22.2.3-1 SOCIO-ECONOMIC DATA FOR FUTURE DEMAND FORECAST

Region	Province	City/Municipality	Population Projection (thousands)			Employment Projection (thousands)		
			2009	2020	2030	2009	2020	2030
Region VII	CEBU	CEBU CITY (Capital)	823.5	968.5	1,119.3	494.0	683.4	852.7
		LAPU-LAPU CITY (OPON) 5	285.6	415.3	522.4	162.8	224.4	278.8
		CORDOBA	48.8	72.3	99.6	7.8	10.8	13.4
		CITY OF TALISAY 4	189.5	252.3	322.3	103.3	142.4	176.9
		MINGLANILLA	109.7	156.4	195.8	50.1	69.0	85.8
		CITY OF NAGA 3	99.9	128.0	158.0	72.0	99.2	123.3
		MANDAUE CITY	337.9	460.5	588.9	173.7	239.5	297.6
		CONSOLACION	96.4	154.2	214.8	42.3	58.2	72.4
		LILOAN	101.7	165.7	248.5	39.1	53.9	67.0
		COMPOSTELA	41.6	56.5	68.8	21.9	30.2	37.5
		DANAOS CITY	112.5	129.4	145.4	45.4	62.6	77.7
		CITY OF CARCAR 2	104.0	121.9	138.0	20.3	28.0	34.8
		SAN FERNANDO	102.4	117.5	131.1	15.7	21.6	26.8
		SIBONGA	41.5	45.8	50.1	9.4	12.9	16.1
		ARGAO	125.1	133.6	141.9	23.5	32.4	40.2
		ALCOY	30.2	33.9	36.9	6.3	8.6	10.7
		OSLOB	38.5	41.1	43.6	7.8	10.8	13.4
		CARMEN	42.4	48.3	53.0	7.8	10.8	13.4
		CATMON	57.4	64.1	70.8	11.0	15.1	18.8
		CITY OF BOGO 1	137.1	156.2	170.9	23.5	32.4	40.2
		BANTAYAN	296.4	318.6	334.9	47.0	64.7	80.4
		SAN REMIGIO	70.9	80.9	89.3	14.1	19.4	24.1
		TUBURAN	54.2	57.3	60.2	11.0	15.1	18.8
		ASTURIAS	41.5	43.6	44.9	7.8	10.8	13.4
		BALAMBAN	68.1	78.3	88.2	15.7	21.6	26.8
		TOLEDO CITY	156.0	174.1	192.3	62.6	86.3	107.2
		PINAMUNGAHAN	55.7	60.8	65.9	11.0	15.1	18.8
		ALOGUINSAN b	26.7	29.6	32.1	4.7	6.5	8.0
		BARILI	61.2	65.7	70.1	11.0	15.1	18.8
		DUMANJUG	63.6	72.4	80.3	12.5	17.3	21.4
		ALCANTARA	79.7	98.5	117.2	15.7	21.6	26.8
		ALEGRIA	72.5	77.4	82.2	14.1	19.4	24.1
Total			3,972.5	4,878.6	5,777.6	1,564.6	2,159.0	2,686.3

The increase of population and employment by traffic zone is displayed in **Figure 22.2.3-1**. The increase of these socio-economic values can be considered to affect the increase of trip production and attraction at each zone.



Population



Employment

FIGURE 22.2.3-1 SOCIO-ECONOMIC DATA BY TRAFFIC ZONE

(2) Total Number of Generated Vehicle Trips

The first step of forecasting procedure is to estimate the number of total trip generated in the Study Area. The number of generated trips by passenger vehicles such as passenger car, jeepney, and bus, is estimated by using the growth rate of population, while the number of generated cargo trips by truck is by the growth rate of employment. The result of estimation is shown in **Table 22.2.3-2**. The total number of vehicle trips in 2030 can be estimated at 628 thousand and that is 1.47 times of the number in 2009.

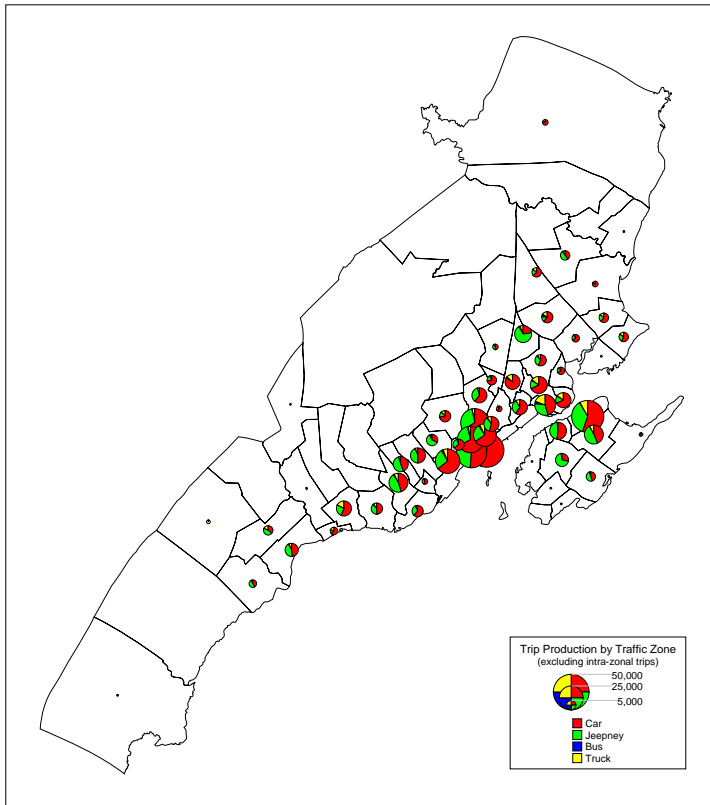
TABLE 22.2.3-2 TOTAL NUMBER OF VEHICLE TRIPS ESTIMATED

Year	Passenger Car	Jeepney	Bus	Truck	Total	Growth Ratio	Population Yearly Growth Rate (%)	Employment Yearly Growth Rate (%)
2009	243,000	142,100	9,500	31,500	426,100	1.00		
2010	247,700	144,800	9,700	32,400	434,600	1.02	1.93	2.86
2015	272,400	159,200	10,700	37,900	480,200	1.13	1.92	3.18
2020	298,400	174,400	11,700	43,500	528,000	1.24	1.84	2.78
2025	325,500	190,200	12,800	49,100	577,600	1.36	1.75	2.44
2030	353,400	206,500	13,900	54,200	628,000	1.47	1.66	1.98
2030/2009	1.45	1.45	1.46	1.72	1.47		1.45	1.72

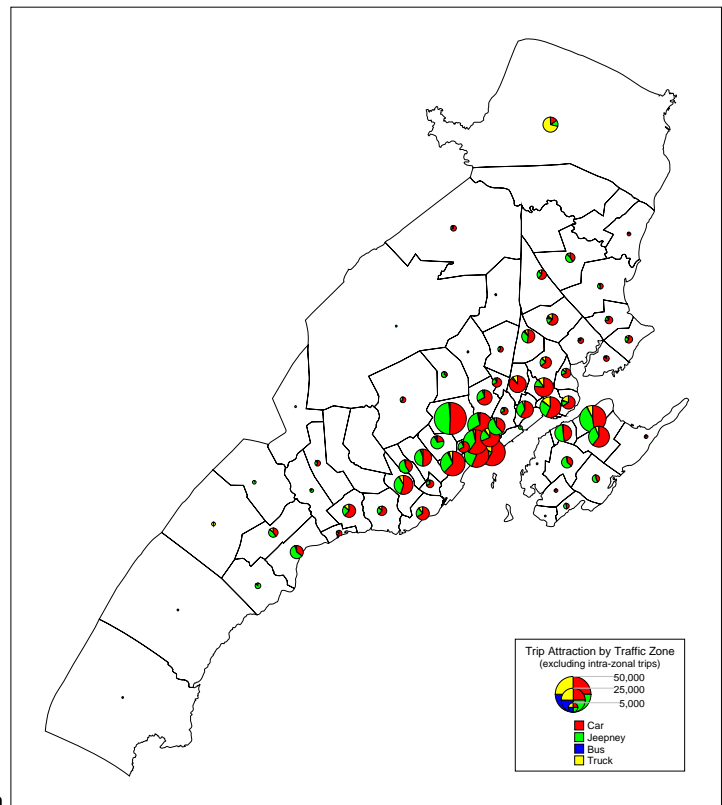
(3) Trip Generation by Traffic Zone

Next, the trip generation and attraction of each traffic zone are calculated by using the models described in the previous section, and the above total number of trip generation is distributed into each traffic zone in proportion with the model value for the trip generation and attraction.

Figures 22.2.3-2 illustrates the number of vehicle trip generation and attraction, but excluding intra-zonal trips, in the year of 2030. The size of pi indicates the number of trips and colors indicate by mode: red is passenger car, green jeepney, blue bus, and yellow truck.



Trip Generation



Trip Attraction

FIGURE 22.2.3-2 TRIP GENERATION AND ATTRACTION IN 2030 BY TRAFFIC ZONE

(4) Trip Distribution

The trip generation and attraction distributed to each TAZ are next distributed into the elements of the OD matrix by using the trip distribution model.

The OD matrix is shown in the following **Table 22.2.3-3**.

TABLE 22.2.3-3 OD MATRIX OF ALL VEHICLES IN 2030

No.	City/Municipality	1	2	3	4	5	6	7	8	9	10	11	Total
1	Cebu City (capital)	180,556	28,456	1,834	16,245	7,744	8,574	39,123	6,693	6,269	999	7,420	303,913
2	Lapu-Lapu City (opon) 5	34,295	48,152	1,568	1,979	903	266	15,029	4,175	3,045	22	3,631	113,065
3	Cordoba	0	840	542	0	0	0	0	0	0	0	0	1,382
4	City of Talisay 4	16,214	1,808	0	5,934	1,751	2,242	3,312	170	0	0	93	31,524
5	Minglanilla	6,845	948	0	1,709	3,022	2,024	1,321	0	0	0	513	16,382
6	City of Naga 3	9,275	507	0	2,209	1,266	5,354	1,089	0	0	0	474	20,174
7	Mandaue City	38,764	11,981	40	3,098	1,071	746	26,863	3,512	3,328	28	4,242	93,673
8	Consolacion	6,269	2,975	0	290	0	29	3,981	1,938	407	0	1,281	17,170
9	Liloan	5,013	3,621	0	0	0	0	6,023	491	2,193	0	291	17,632
10	Compostela	168	0	0	0	0	0	0	0	0	219	0	387
11	Others	7,082	536	0	53	79	0	1,045	0	0	0	4,000	12,795
Total		304,481	99,824	3,984	31,517	15,836	19,235	97,786	16,979	15,242	1,268	21,945	628,098

22.3 “DO NOTHING” CASE TRAFFIC ASSIGNMENT

The following figures illustrate the result of traffic assignment in cases of “Do-Nothing” case. **Figures 22.3-1** shows the result of traffic assignment in the year of 2020 and **Figures 22.3-2** shows the result in the year 2030.

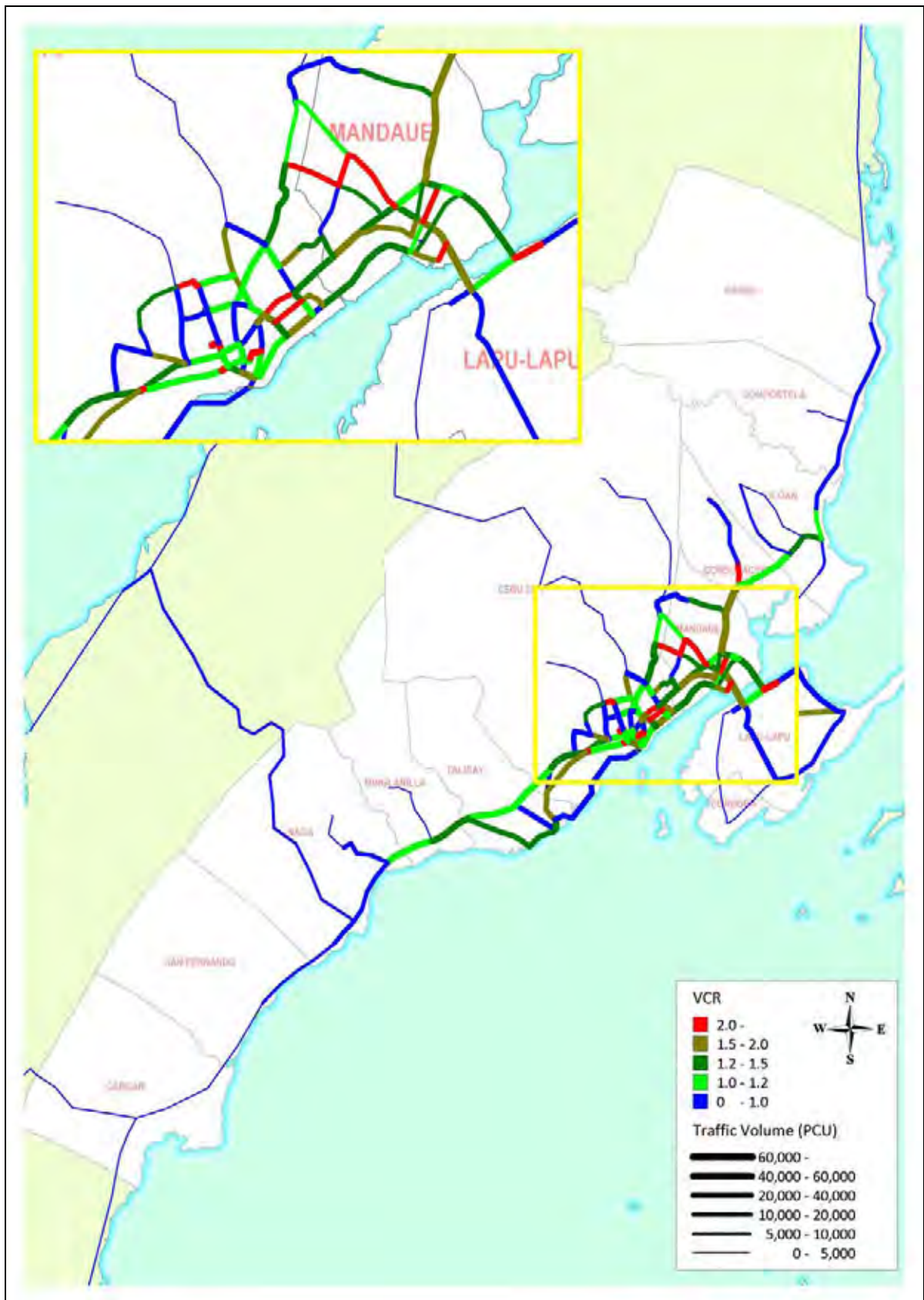


FIGURE 22.3-1 TRAFFIC ASSIGNMENT RESULT OF “DO-NOTHING” CASE IN 2020

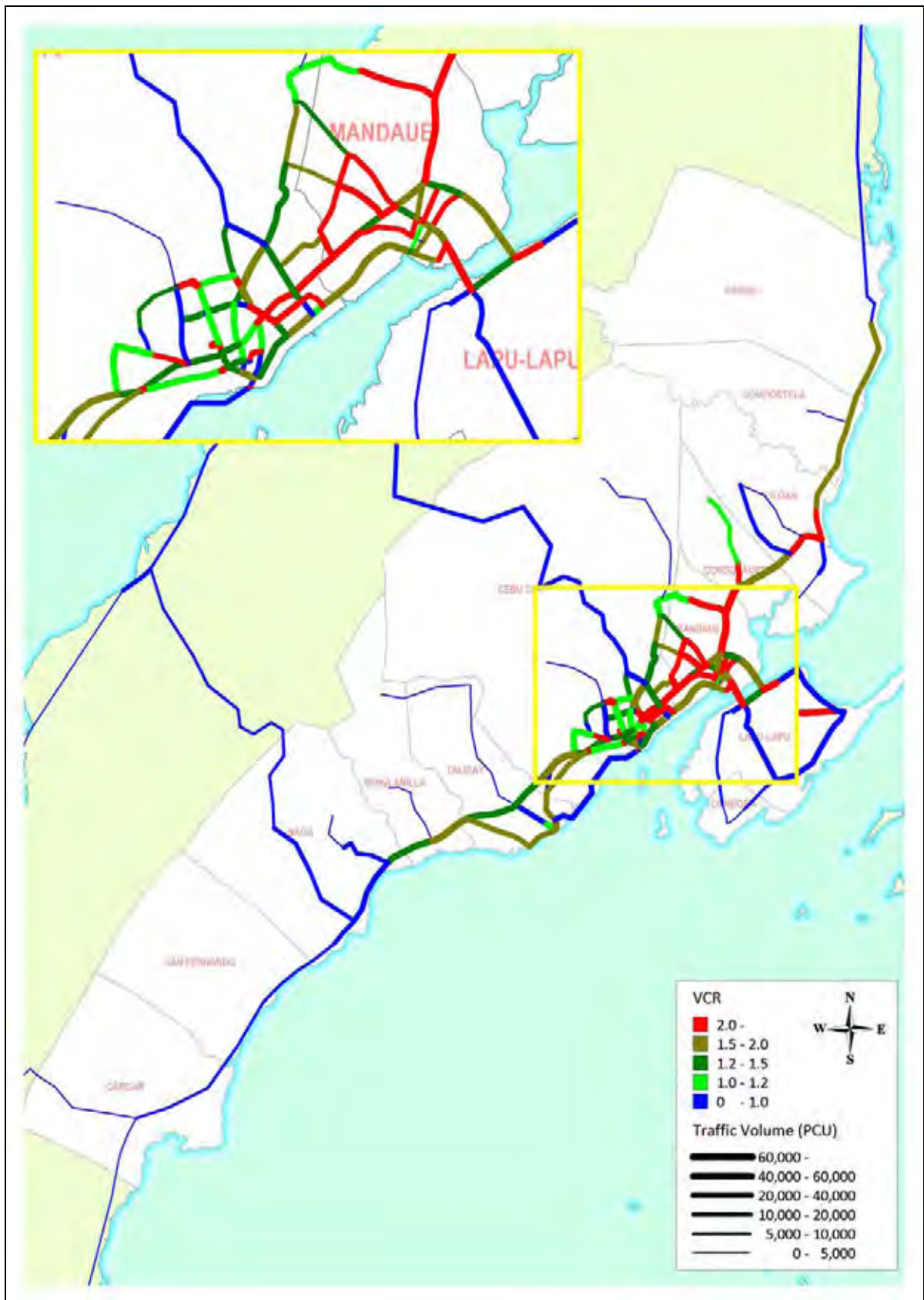


FIGURE 22.3-2 TRAFFIC ASSIGNMENT RESULT OF "DO-NOTHING" CASE IN 2030

CHAPTER 23

ENVIRONMENTAL AND SOCIAL CONSIDERATIONS FOR METRO CEBU

CHAPTER 23

ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

FOR METRO CEBU

23.1 NATURAL CONDITION AND URBAN DEVELOPMENT OF THE STUDY AREA

Natural conditions of the Study Area such as topographic, geological, meteorological conditions, flood prone areas and environmentally protected areas were discussed in Section 19.1 of Chapter 19.

Urban development has been concentrated at narrow coastal plain areas, and it is now expanding towards the hill-sides. Road network development must be implemented under above natural conditions and urban development trends in due consideration of minimization of adverse impacts on environmental and social conditions.

23.2 HIGHWAY PLANNING TO MINIMIZE ADVERSE IMPACTS OF ENVIRONMENTAL AND SOCIAL CONDITIONS

The widening of the existing roads and construction of new roads were proposed in Chapter 24. The following environmental and social considerations must be exercised;

(1) Widening of the Existing Roads

- Widening of existing roads should be planned within the existing road ROW. If necessary, the design standards may be relaxed to achieve these objectives.
- In many cases, a part of a house, shanties, fences are encroaching the existing road ROW, DPWH should properly consult with such owners and compensate at a reasonable price.
- In case new ROW acquisition is inevitable, consultation meetings with the affected people should be held to explain why land acquisition is needed and how the Government would compensate their properties, then the consent of the affected people should be obtained.

(2) New Road Construction

- Most proposed roads are planned in the rapidly urbanizing areas and topographically difficult locations.
- Alignment selection must be done carefully. Several alternative alignments should be studied to select an optimum alignment.
- In order to select an optimum alignment, all critical areas in terms of natural and social conditions must be identified. Latest satellite photos should be utilized to achieve these objectives. Alignments should be studied to avoid or not to hit the identified critical areas. An alignment that minimizes adverse environmental and social impacts should be selected as an optimum alignment.
- In order to minimize environmental and social impacts, appropriate design standards should be selected.
- Consultation meetings with the concerned people should be held from the stage of planning up to the detailed design and construction stage. Constant dialogue with the concerned people should be made for the successful implementation of the project.
- For new road construction, DPWH needs to undertake detailed feasibility study including EIA study of which recommended TOR is shown in Annex 13.2.

CHAPTER 24

HSH DEVELOPMENT STRATEGY FOR METRO CEBU

CHAPTER 24

HSR DEVELOPMENT STRATEGY FOR METRO CEBU

24.1 IDENTIFIED ISSUES

Identified issues are as follows;

ARTERIAL ROAD NETWORK

- Existing arterial road network is rather simple except highly urbanized areas of Cebu, Talisay, Mandaue Cities, and served by Cebu North Road in the Northern area and Cebu South Road in the southern area.
- Above network implies that there is no alternative route, thus, when Cebu North Road or Cebu South Road becomes impassable due to natural calamity or a bridge collapse, the hinterland area becomes totally isolated.
- In the highly urbanized area, two transport corridors are formed.
 - Central transport corridor (Cebu North Road and Cebu South Road)
 - Coastal transport corridor, which is about to be completed (Cebu South Coastal Road and S. Osmeña Blvd.)
- All roads in the highly urbanized area are narrow. Most of roads are 4-lane undivided. Though several roads are 6-lane divided. Widening of those roads is extremely difficult due to heavy roadside development.
- Urbanization is expanding towards hilly area, since narrow coastal plain is highly urbanized. However, road development along the hillside is not achieved yet.

TRAFFIC CONDITIONS

- Cebu North Road from Liloan towards Cebu City is experiencing traffic congestion.
- Cebu South Road from Minglanilla towards Cebu City also suffers traffic congestion.
- Most roads within Cebu, Mandaue and Talisay Cities are experiencing traffic congestion.
- Travel speed of above roads is less than 20 km/hr.

CURRENT MEASURES

- To cope up with above problems, CEBU CITY is studying the introduction of Bus Rapid Transport (BRT) system, and Cebu Province is studying the introduction of Light Rail Transit (LRT) system.

24.2 POLICY AND STRATEGY FOR DEVELOPMENT OF HSH

24.2.1 HSH Development Objectives

HSH development objectives are established as follows;

HSH DEVELOPMENT OBJECTIVES

- To decongest traffic on arterial roads of Metro Cebu.
- To achieve integration of socio-economic activities of Metro Cebu.
- To enhance the tourism industry.
- To recover international competitiveness of industries.
- To promote sound urban expansion.

24.2.2 HSH Development Strategy

HSH development strategies are established as follows;

DEVELOPMENT OBJECTIVES

- To decongest of traffic on arterial roads.
- To achieve integration of socio-economic activities of Metro Cebu.
- To enhance the tourism industry.
- To recover international competitiveness of industries.
- To promote sound urban expansion.



DEVELOPMENT STRATEGY

- To promote transport facilities with higher service level.
- To provide alternative transport routes.
- To provide high standard transportation access to tourism zones.
- To improve modal linkage.
- To provide transport facilities which guide sound urban expansion.



STRATEGY TO FORMULATE HSH NETWORK

- HSH network shall be limited to HSH-2, since formation of HSH-1 is difficult due to the following reasons;
 - Traffic demand from outside the highly urbanized area is still low to require HSH-1.
 - In the highly urbanized area, roads are too narrow to accommodate HSH-1.
 - One candidate for HSH-1 is a new hillside road. This road must be connected by interchanges to existing radical roads at a short interval in order to attract enough traffic on this road, however, construction of interchanges is quite difficult due to topographical constraints.