7. FUTURE SOCIO-ECONOMIC FRAMEWORK

7.1 Future Population

The projected population as well as annual growth rate is shown in the table below. The projected annual growth rate will be less than 2% which is lower than the present rate. Region IV-A will have the highest growth rate, followed by Region III and then Metro Manila.

Past Population Annual Growth Rate

Area	Annual Growth Rate (%)		
	1990-1995	1995-2000	2000-2007
Philippines	2.48	2.2	2.11
NCR	3.53	0.99	2.18
Region III	2.27	2.96	2.45
Region IV-A	4.07	3.76	3.36

Source: NSO, 2008

Future Population

Area	Projected Population ('000)			2030/ 2009 Ratio
	2015	2020	2030	
Philippines	103,201	112,276	129,321	1.40
NCR	13,331	14,362	15,810	1.32
Region III	11,748	13,085	15,860	1.52
Region IV-A	15,143	17,534	22,283	1.78

Source: Study Team

7.2 GDP and GRDP Growth Rate

The study assumed that economic recovery will be achieved in year 2012 and economic growth rate between 5 to 6 percent until 2030 will be attained.

7.3 Employment at Job Site

Employment at job site is used as an index to reflect traffic generation and attraction. Total number of employment was estimated from the projected population and growth rate of GDP.

Projected Employment

Area	Projected Employment ('000)			2030 / 2009 Ratio
	2015	2020	2030	
Philippines	26,524	32,730	35,696	1.56
NCR	5,422	6,105	7,380	1.61
Region III	3,205	3,708	4,187	1.78
Region VII-A	4,364	5,018	6,330	1.74

Source: Study Team

7.4 Future Socio-economic Framework

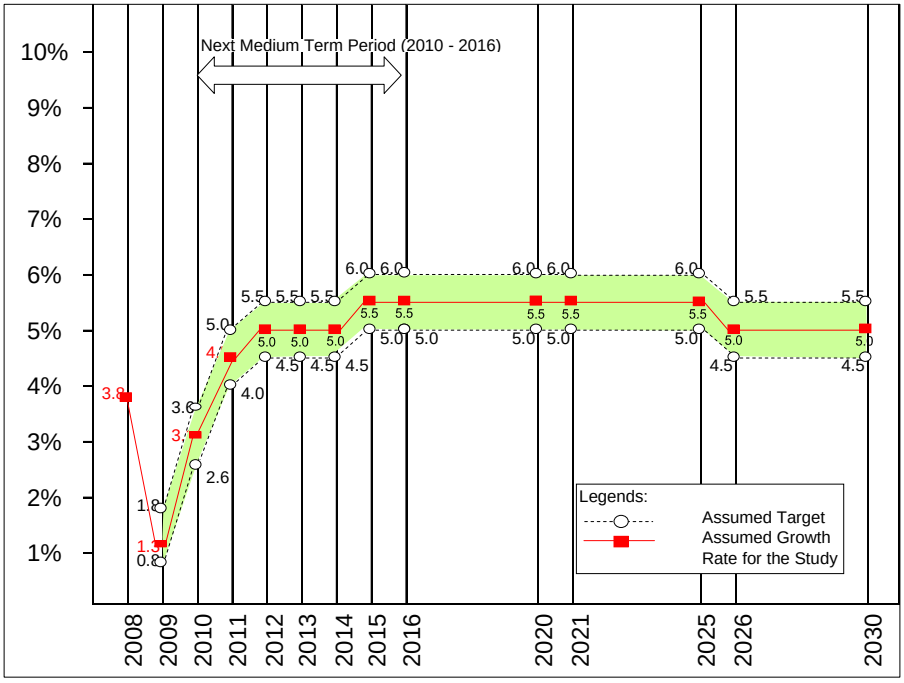
The table below shows the summary of future socio-economic framework.

Future Socio-economic Framework

	Increase 2030/2009	Average Growth Rate (%)
Population Growth	1.5	1.8%
Economic Growth	3.6	6.0%
Employment Growth	1.7	2.4%

Source: Study Team

GDP and GRDP Growth Rate



Source: Study Team

7.5 Regional Development Scenario

National Development Policy

- Promotion of decentralization through infrastructure development.
- To decongest Metro Manila.
- To develop Clark and Subic corridor as International Logistics Center.

Regional Development Scenario

1) Study Area as a whole

- Metro Manila together with Region III and Region IV-A will continue to propel the country's economy.
- To promote decentralization and to mitigate overconcentration of Metro Manila, regional urban centers outside Metro Manila will be developed.
- Strategic areas along the Pacific coast shall be designated as the core development areas for universal development and accessibility to those areas shall be strengthened.
- In order to support tourism development, the tourism development axes will be developed for the strategic areas of tourism development.

2) Metro Manila and its suburbs

- Due to accumulation of infrastructure of expressways, international airports and ports and economic zones along the north-south direction, the north-south industrial development beltway which connects Batangas-Metro Manila-Clark-Tarlac will be the key axis for the development of the Metropolitan areas and the country as a whole.
- Sound urbanization of Metro Manila and its suburbs will be achieved.

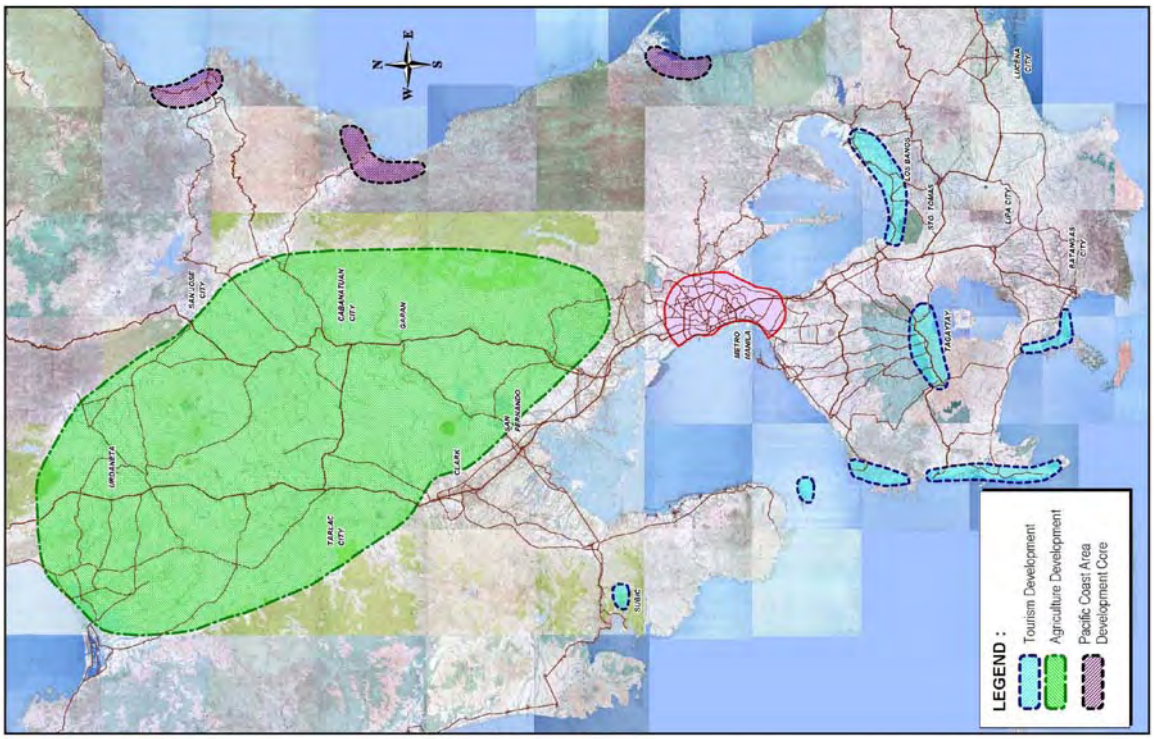
North of Metro Manila

- Clark-Subic corridor will be developed as a logistic axis not only for the country but also for the southeast and ASEAN countries.
- To support the development of CAR and Region I, the North-West Luzon development axis will be developed.
- For the development of Region II, the North-East Luzon development axis will be developed.

4) South of Metro Manila

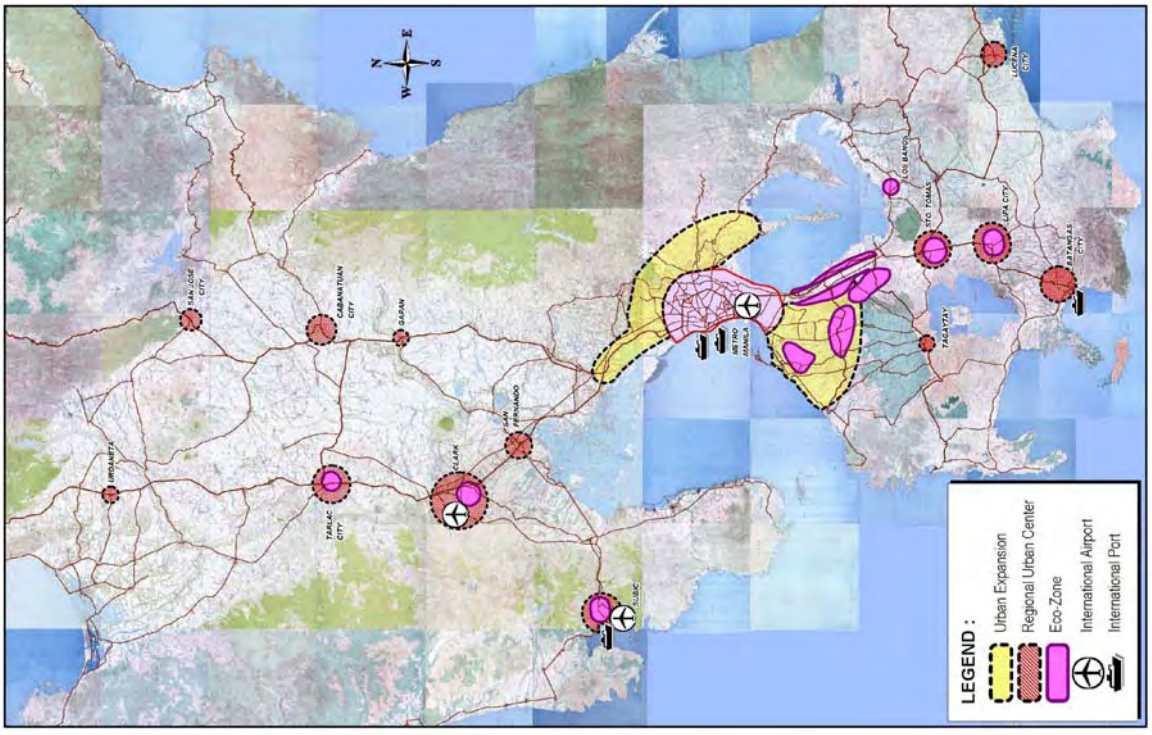
- To support the development of Region V, the South-Luzon development axis will be developed

Agriculture and Tourism Development and Pacific Coast Development



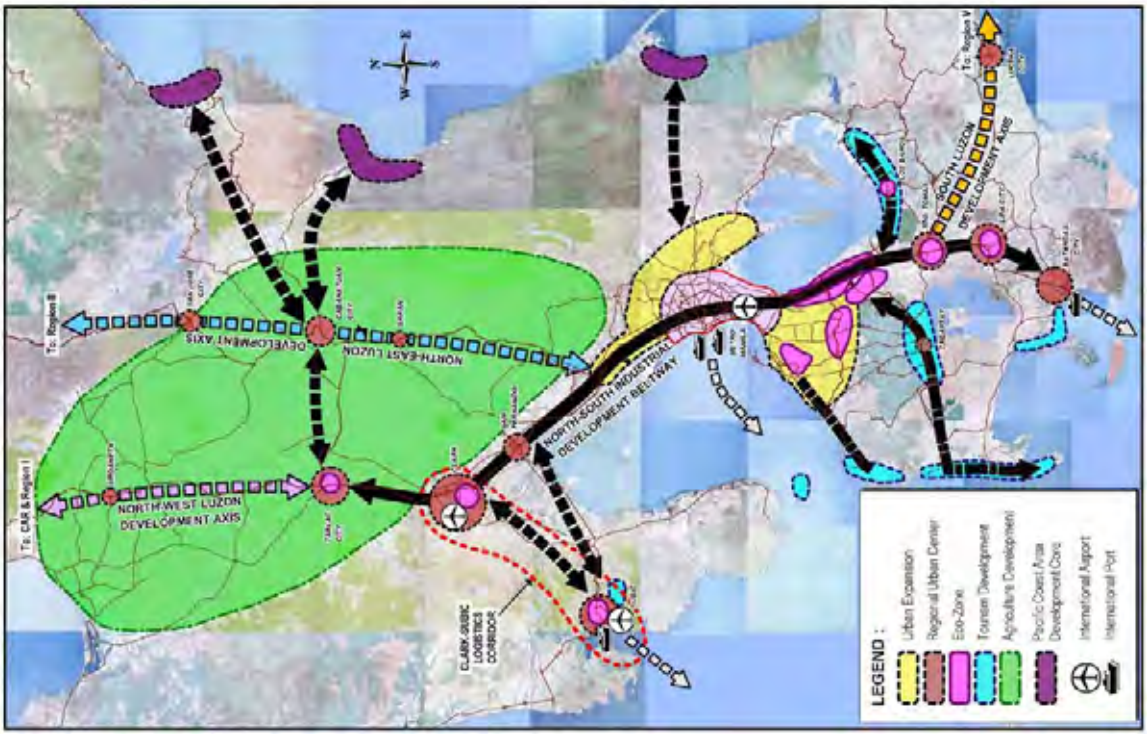
Source: Study Team

Urban Development Structure



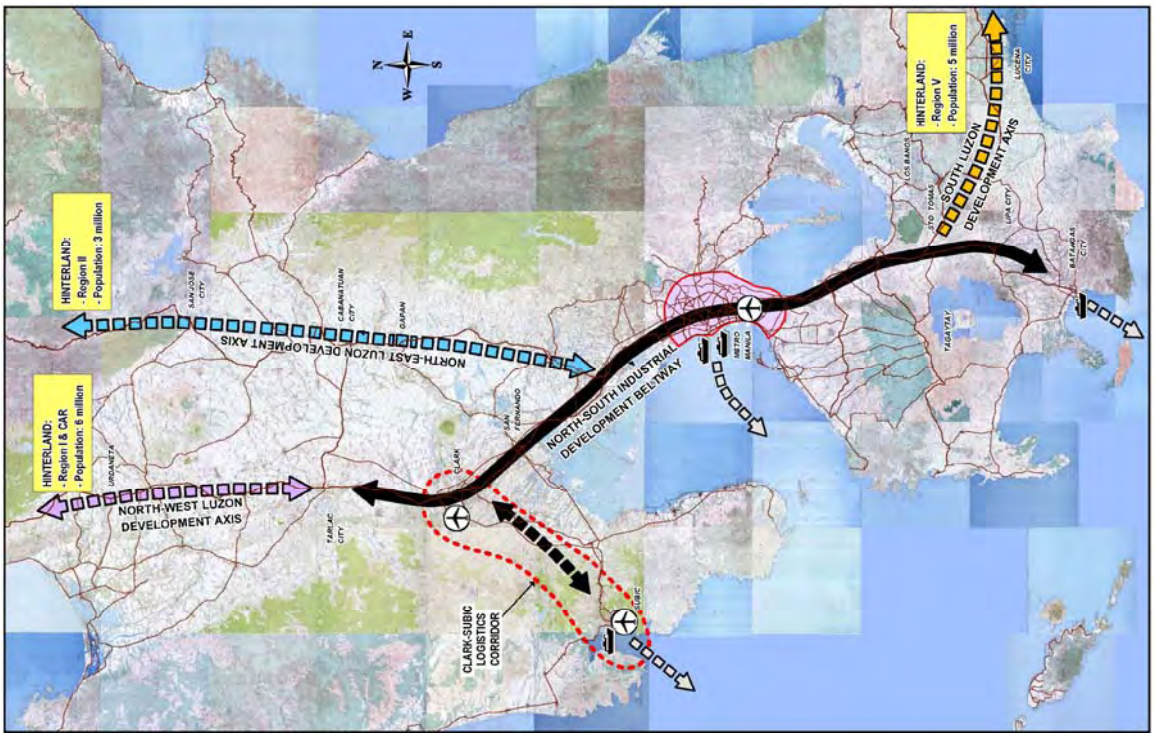
Source: Study Team

Development Strategy: 200 Km Radius Sphere of Metro Manila



Source: Study Team

Development Axes



Source: Study Team

8. FUTURE TRAFFIC DEMAND FORECAST

8.1 Future Trip Generation and Attraction

Number of passenger trips is related with the increase of population and employment. Passenger trips will increase by 1.54 times in year 2030 compared to the recorded trips in 2009. The growth rate of cargo demand is higher than that of passenger trips (1.67 times in year 2030 compared to 2009).

8.2 Future Trip Distribution

- High demand of inter-regional trips are: Metro Manila-Cavite; Metro Manila-Rizal, Metro Manila-Laguna; and Metro Manila-Bulacan. Trip distribution trend in the future will be almost the same as present.
- Regarding cargo demand desire line, the highest demand is Metro Manila – Laguna. Second corridor with high demand is Metro Manila - Bulacan.

Passenger Trips

Area	Passenger Trips (1000 Person Trips)			Increase (30/09)	Avg. Growth Rate (30/09)
	2009	2020	2030		
M. Manila	22,206	27,141	30,330	1.37	1.4%
*Neighboring of MM	12,323	17,777	22,781	1.85	2.8%
Other Study Area	929	1,134	1,341	1.44	1.7%
Total	35,278	46,052	54,452	1.54	2.0%

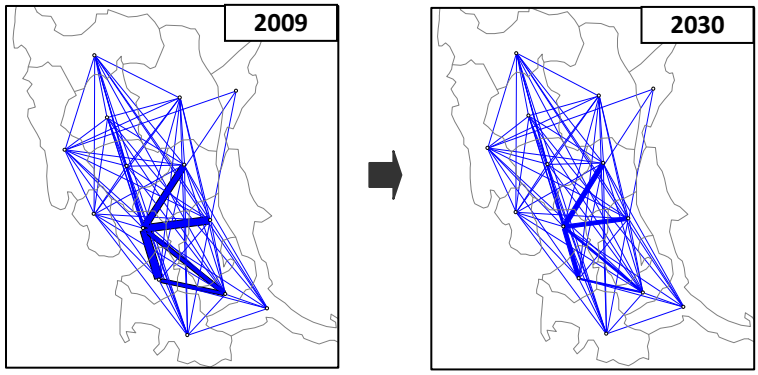
*Source: Study Team; Note: *Cavite, Bulacan, Rizal, Laguna*

Cargo Demand

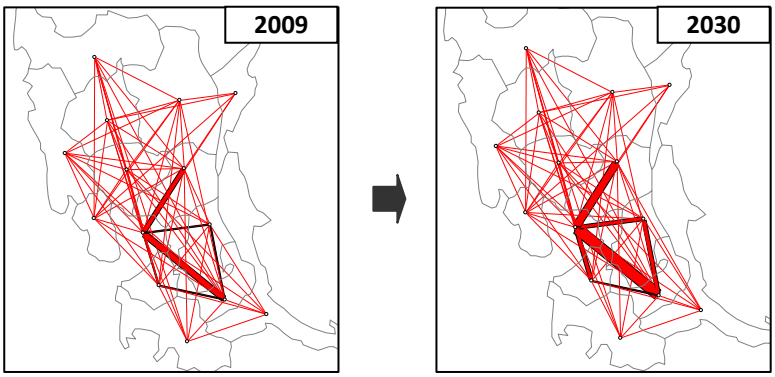
Area	Cargo Demand (1000 tons/day)			Increase (30/09)	Avg. Growth Rate (30/09)
	2009	2020	2030		
Metro Manila	1,603	2,138	2,584	1.61	2.2%
*Neighboring of MM	878	1,228	1,548	1.76	2.6%
Other Study Area	84	113	139	1.65	2.3%
Total	2,566	3,479	4,293	1.67	2.4%

*Source: Study Team; Note: *Cavite, Bulacan, Rizal, Laguna*

Desire Line of Passenger Trips



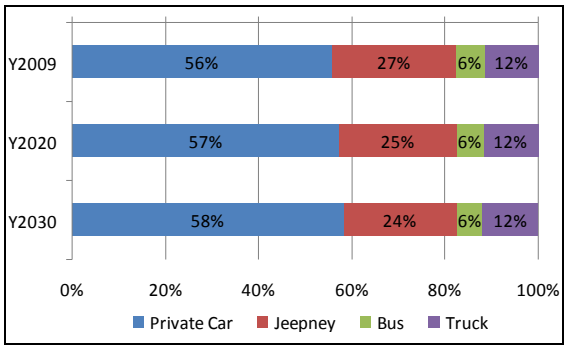
Desire Line of Cargo Demand



8.3 Future Modal Share

Modal share is estimated from the trend of vehicle registration. The number of private cars will increase more than other vehicles. In year 2030, share of passenger cars will reach 58% and the share of jeepneys will decrease by around 3%.

Modal Share



Source: Study Team

8.4 Future Traffic Demand

Many sections of the network will experience heavy traffic congestion in 2030 even if all the on-going projects are completed. Do-nothing case traffic assignment indicates the following:

Indication of "Do-Nothing Scenario"

Metro Manila

- Traffic condition of all Metro Manila roads will be further aggravated. Some drastic measures need to be employed; however, ROW acquisition is a serious problem.
- Outskirts of Metro Manila are rapidly developing in disorderly manner. Road network to guide orderly urban development is needed.
- An expressway, which functions as a traffic distributor of expressways, from the North and the South is needed.

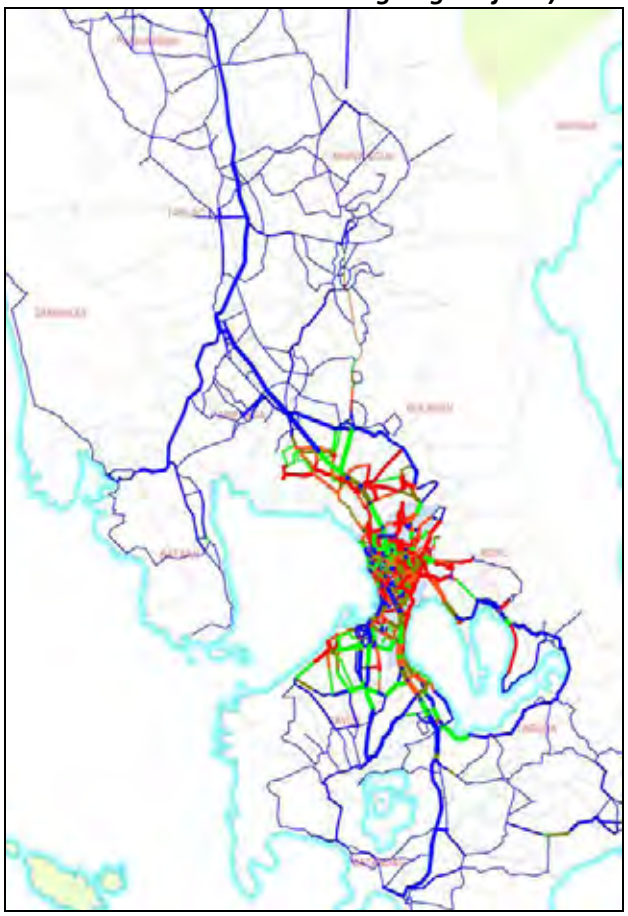
North of Metro Manila

- NLEx will soon be congested. Another expressway is needed. North of Manila is served by NLEx (8 lanes) and South of Manila is served by SLEx, Skyway, and Manila-Cavite (20 lanes in total)
- Pan-Philippine Highway (Daang Maharlika) will be further congested. Alternative highway is needed.
- Connector expressway(s) to link expressways in the direction of E-W will be needed to improve flexibility of expressway network.

South of Metro Manila

- Roads in Cavite and Laguna Provinces will be seriously congested like the present condition of Metro Manila's road.
- Existing expressways (SLEx, Skyway, and Manila-Cavite Coastal Expressway) will also be congested. More expressways and a distributor of traffic on these expressways will be needed.

Do-Nothing Case (Traffic Demand 2030, Network 2009 + on-going Projects)



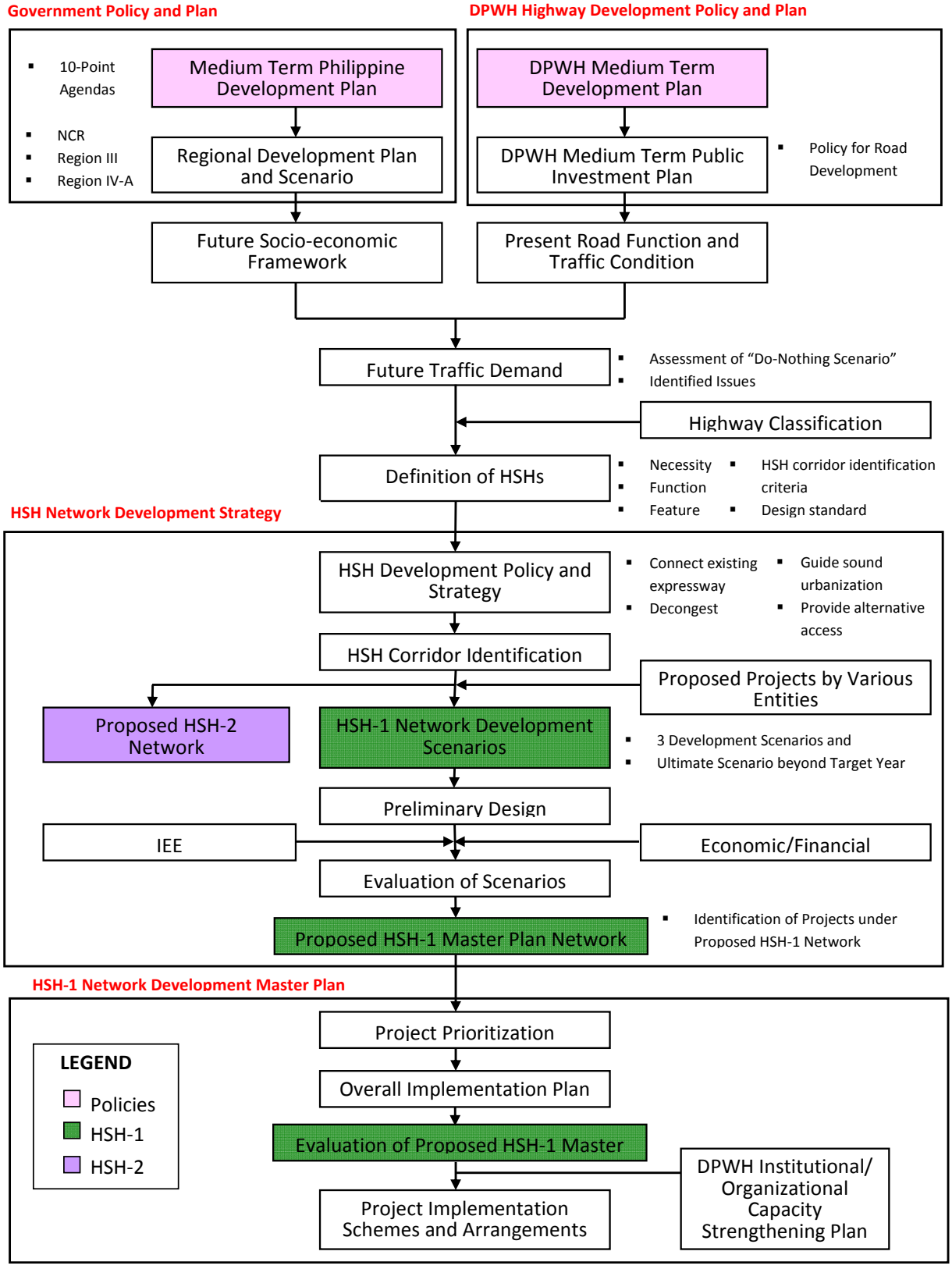
Source: Study Team

9. HSH DEVELOPMENT STRATEGY

9.1 Procedure

Procedure to formulate HSH-1 Network Development Master Plan is shown below:

Procedure of HSH-1 Network Development Master Plan



9.2 Identified Issues

METRO MANILA

Arterial Road Network

- Arterial road network composed of 6 circumferential and 10 radial roads were proposed in the late 1960's. All radial roads were already completed; however, development of circumferential roads is still incomplete.
- Road network development has been focused on (i) widening of a road within an available road ROW, and (ii) construction of grade separation of at-grade intersection.
- Due to ROW acquisition problems, new road construction was rarely implemented since the completion of C-5 from SLEx to Pasig River which was built about 15 years ago.

Expressway Network

- Three expressways, namely NLEx, SLEx with Skyway over it and the Manila-Cavite Toll Expressway, are presently functioning individually and expressways are not formed as a network yet.
- There are many proposals to construct expressways, however, there is no indication of their priority due to lack of Master Plan.
- Due to the difficulty of ROW acquisition and relocation of project affected persons (PAPs), most proposals need to be planned along the existing ROW of rail, road, river, etc. However, additional ROW is usually required at interchange location, on-off ramps and toll gates. Therefore, how to minimize additional ROW acquisition is one of the key factors for smooth implementation of expressway projects.

NORTH OF METRO MANILA

Arterial Road and Expressway Network

- All mega urban, primary urban and secondary urban centers are connected by arterial roads (North-South Backbone, East-West Lateral and Other Road of Strategic Importance). Thus, the arterial road network is well formed.

- There are three (3) expressways, namely North Luzon Expressway (NLEx), Subic-Clark-Tarlac Expressway (SCTEx), and Tipo Expressway. NLEx and SCTEx is connected by a connector road. SCTEx and Tipo Expressway is also connected by a connector road. Construction of extension of SCTEx which runs parallel to Manila North Road has started.

SOUTH OF METRO MANILA

Arterial Road and Expressway Network

- All mega urban, primary urban and secondary urban centers are connected by arterial roads. The arterial road network is well formed.
- There are two (2) expressways, namely South Luzon Expressway (SLEx) and Southern Tagalog Arterial Road (STAR) and effort to connect the two is on-going.
- There are many Eco-zones/parks in the area. Many of them are served by SLEx and STAR, however, those located in northern and middle of Cavite Province are not served by an Expressway.

9.3 Policy and Strategy for Development of HSH

HSH development objectives and strategies are established as follows;

DEVELOPMENT OBJECTIVES

- To achieve national integration of socio-economic activities
- To decongest traffic along arterial roads
- To actively support development of international logistic bases.
- To promote sound urban expansion
- To improve accessibility to main tourist spots

DEVELOPMENT STRATEGY

- To form backbone transport axes
- To decongest traffic in Metro Manila and its suburbs
- To provide efficient transport facilities for logistic corridors
- To provide transport facilities for sound urban expansion

9.4 HSH-1 Development Scenarios

Development scenarios are shown in the table below while policies and strategies are summarized in the succeeding page.

The following four (4) development scenarios were prepared:

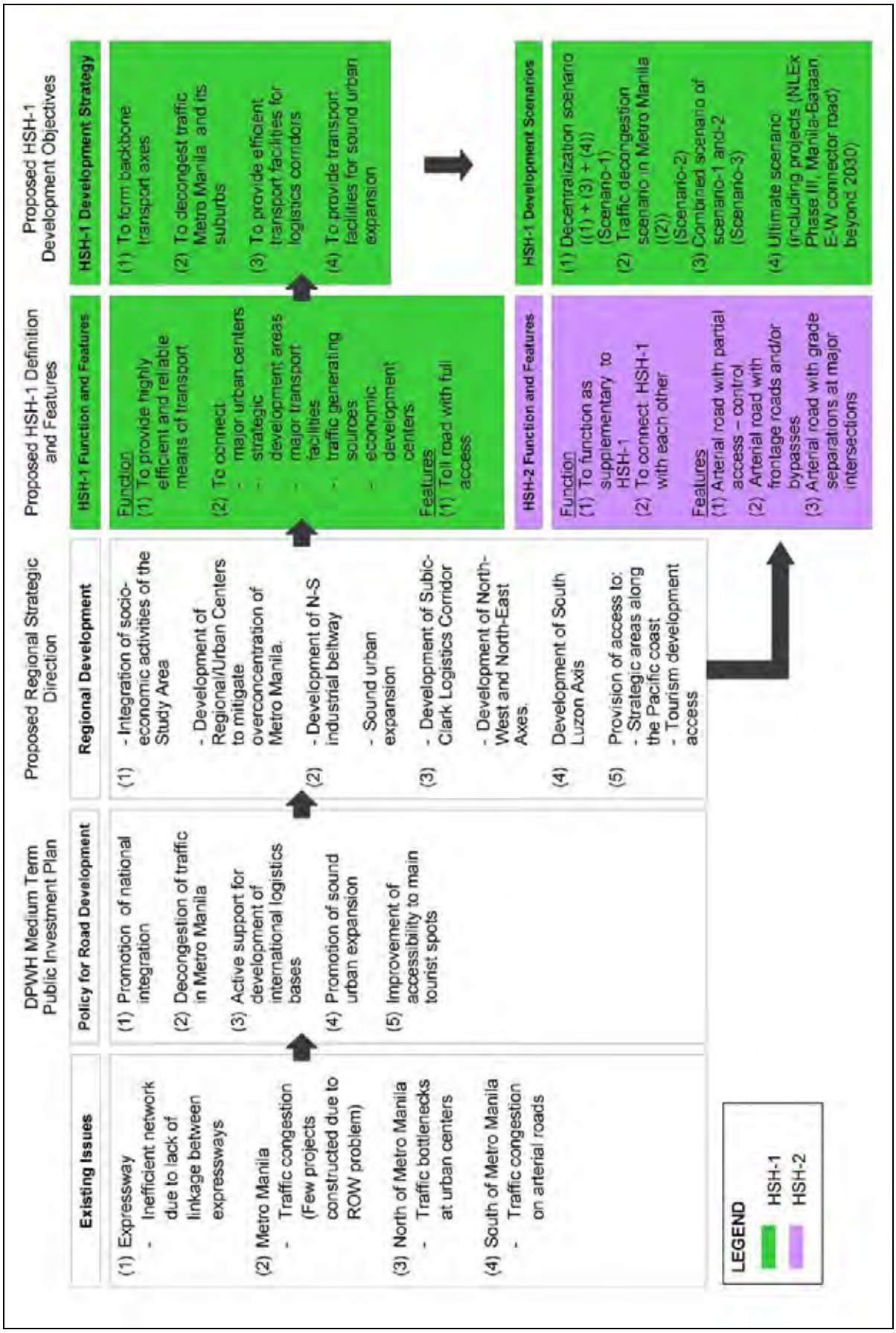
- Scenario 1: Decentralization Scenario to mitigate over concentration in Metro Manila
- Scenario 2: Metro Manila's Traffic Decongetion Scenario
- Scenario 3: Balanced Development Scenario (Scenario 1 + Scenario 2)
- Scenario 4: Do Max Scenario

HSH-1 Development Scenarios

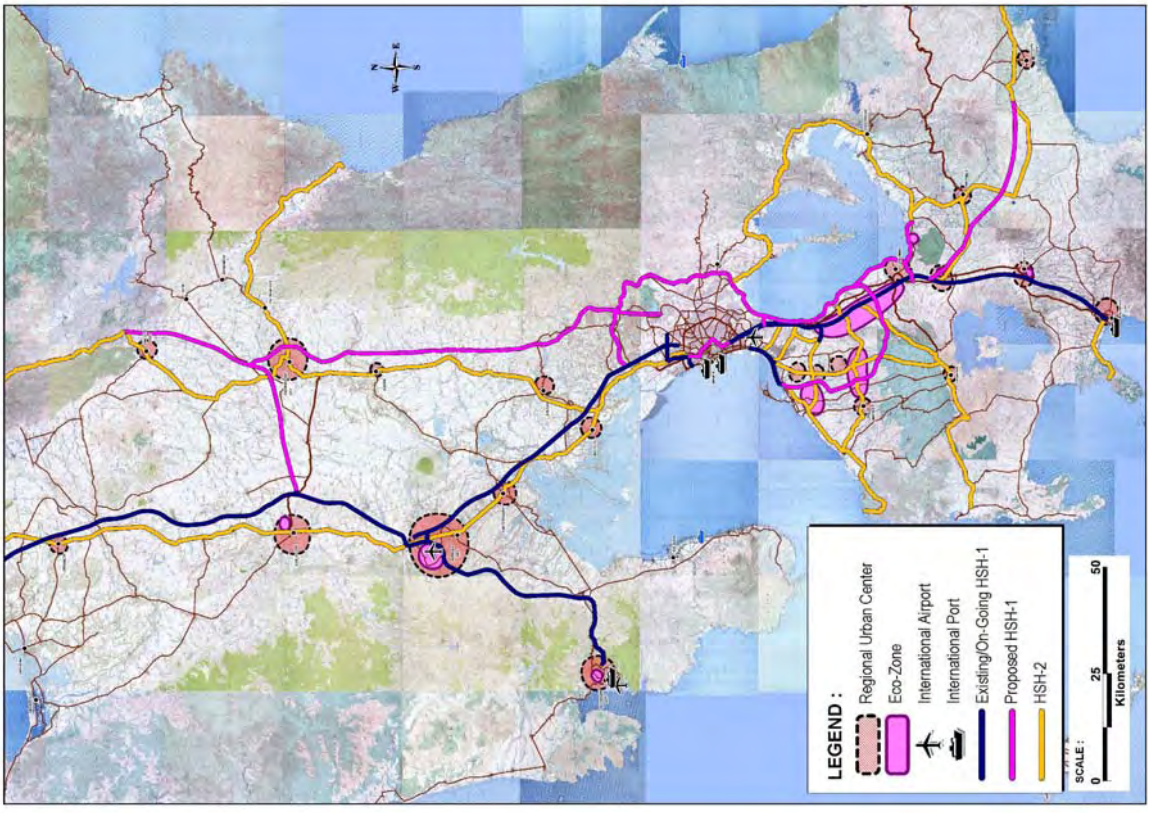
Basic Network	▪ Existing and on-going expressways ▪ NLEx-SLEx Link Expressway – Missing link of N-S Backbone – Basic Link to form expressway network ▪ C-6 Expressway – Basic Link to form expressway network – Distribute traffic from various expressways to destinations in Metro Manila – Guide sound urban expansion				
Development Scenario	**HSH Development Policies**				
	(1) Promotion of National Integration and Decentralization	(2) Decongestion of Metro Manila Traffic / Securing high mobility	(3) Active Support for Development of International Logistics Bases	(4) Promotion of Sound Urban Expansion	(5) Improvement of Accessibility to Main Tourist Spots
Scenario-1: Decentralization Scenario to mitigate over-concentration in Metro Manila	○	-	○	○	○
Scenario-2: Metro Manila Traffic Decongestion Scenario	-	○	○	○	-
Scenario-3: Balanced Development Scenario (Scenarios 1+2)	○	○	○	○	○
Scenario-4: Do Max Plan	◎	○	◎	○	○

Note: ◎ *Policy particularly focused in a scenario*
○ *Policy incorporated in a scenario*

HSH-1 Development Policy and Strategy

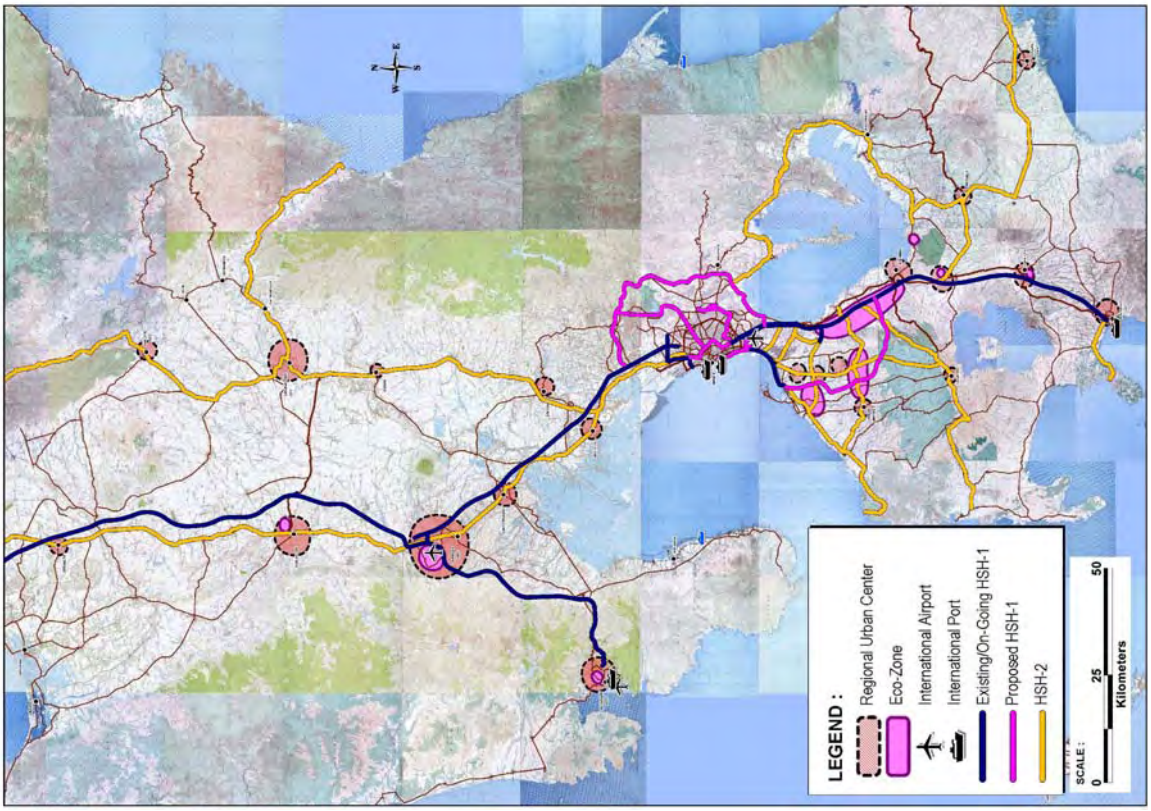


HSH-1 Development Scenario-1: Decentralization Scenario



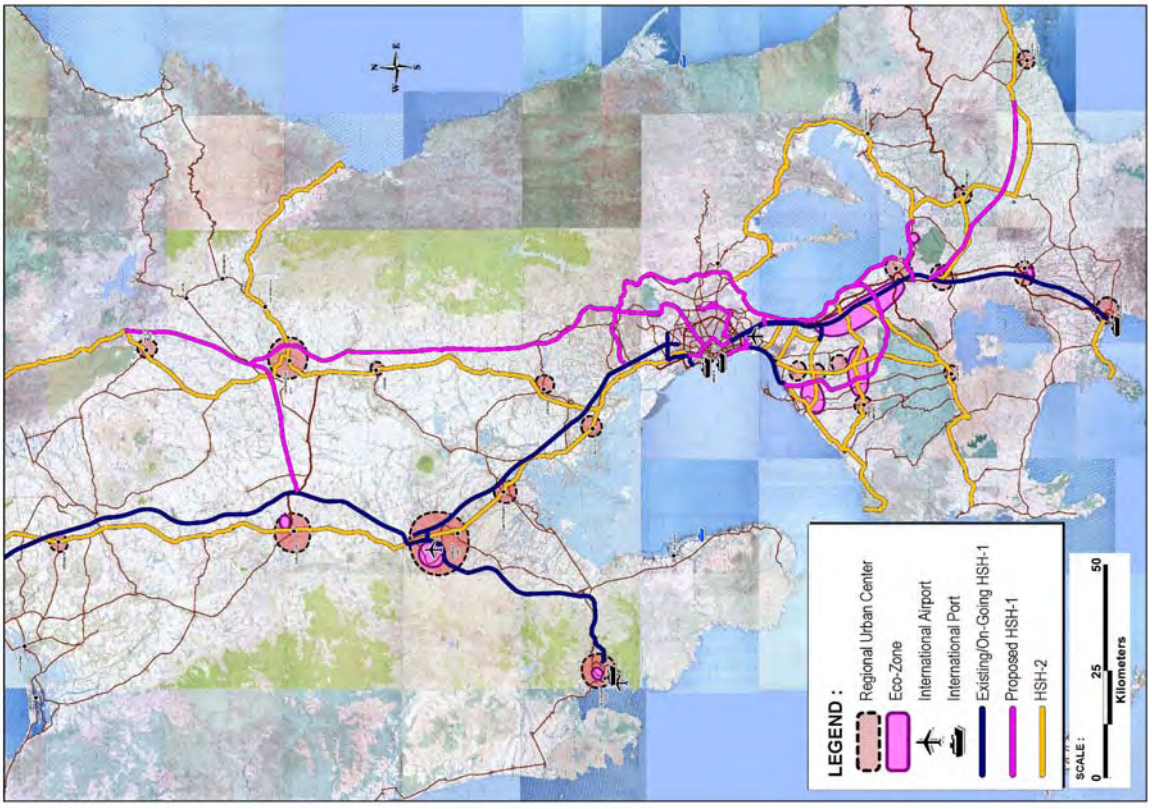
Source: Study Team

HSH-1 Development Scenario-2: Metro Manila Traffic Deconaestion Scenario



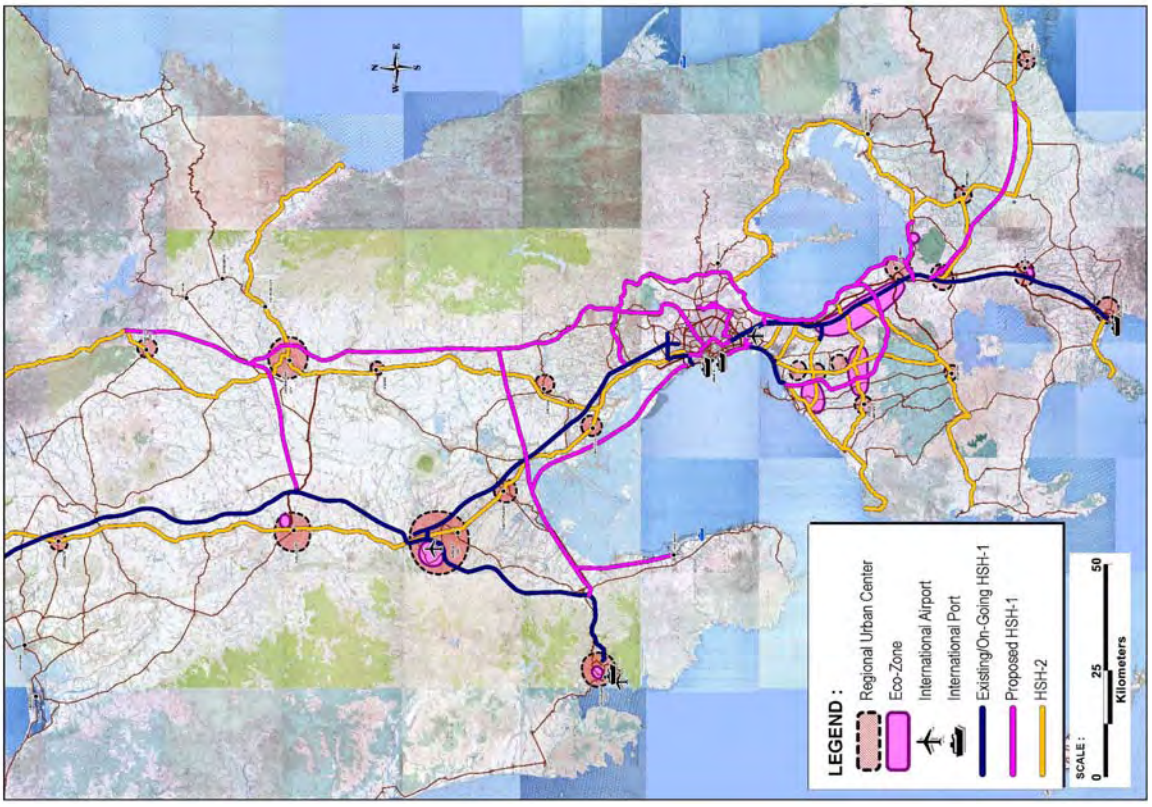
Source: Study Team

HSH-1 Development Scenario-3: Balanced Development SCENARIO (Scenario-1 + Scenario-2)



Source: Study Team

HSH-1 Development Scenario-4: Do Max. Scenario



Source: Study Team

9.5 Evaluation of Development Scenario

Results of evaluation are shown in the table below:

Evaluation of Development Scenario

			DEVELOPMENT SCENARIO			
			(1)Decentralization	(2) Decongestion of M.M. Traffic	(3) Balanced Development	(4) Do Max
Expressway Length			394 km	179 km	443 km	576 km
EVALUATION ITEMS	Conformity with National Dev't Policy	Decentralization	◎	X	◎	◎
		Decongest Metro Manila Traffic	X	◎	◎	◎
	Transport Efficiency	Travel Time (1,000 pcu.hour per day)	△	△	◎	◎
		V/C Ratio inside Metro Manila	△	◎	◎	◎
		V/C Ratio outside Metro Manila	◎	X	◎	◎
		Average Travel Speed (km/hr)	△	△	◎	◎
	Required Investment (Billion Pesos)		213.2 (1.00) ◎	238.1 (1.12) ◎	343.1 (1.61) △	467.8 (2.19) X
	EIRR		◎ 22.3%	△ 20.3	△ 20.8	X 17.9
Overall Evaluation			• Does not achieve "Decongestion of Metro Manila Traffic" policy. • Travel time reduced, but not so much. • V/C ratio in Metro Manila not improved • Travel Speed outside Metro Manila improved • Requires minimum investment. • Highest economic return due mainly to less investment cost than others	• Does not achieve "Decentralizatio n policy. • Travel time reduced, but not so much • V/C ratio in Metro Manila improved. • V/C ratio outside Metro Manila not improved. • Travel speed inside Metro Manila improved, but same level as Scenario-1 • Requires almost same investment as Scenario1 but less than ½ of expressways constructed due to high cost of construction. • Medium economic return	• Conforms to National Policy. • Travel time reduced about 20% • V/C ratio both inside and outside Metro Manila improved. • Travel speed both inside and outside Metro Manila improved. • Medium investment among 4 scenarios • Medium economic return	• Conforms to National Policy. • Travel time is reduced about 20% • V/C ratio both inside and outside Metro Manila improved. • Travel speed both inside and outside Metro Manila improved. • Requires highest investment. • Lowest economic return due mainly to high investment required.
			X	X	◎	X
Recommendation			-	-	Recommended	-

Note: Metro Manila includes its suburbs of Cavite, Laguna, Bulacan and Rizal
(1) V/C ratio = Volume/Capacity Ratio
(2) Evaluation

◎ Best achievement, or improvement

△ Medium achievement, or improvement

X Low achievement, or improvement

Evaluation of Transport Efficiency of Development Scenario

			Present Status (Do Nothing Case)	DEVELOPMENT SCENARIO							
				(1) Decentralization Scenario to mitigate overconcentration in Metro Manila		(2) Decongestion Metro Manila Traffic Scenario		(3) Balanced Development Scenario (Scenario 1+2)		(4) Do Max Scenario	
Transport Efficiency	Travel Time (1,000 pcu.hour per day)		6,475 (1.00)	△ 5,547 (0.86)		△ 5,618 (0.87)		◎ 5,246 (0.81)		◎ 5,098 (0.79)	
	V/C Ratio inside Metro Manila	Over 1.5	774 km (42%)	595 km (30%)		565 km (28%)		542 km (26%)		514 km (25%)	
		1.0 - 1.5	661 km (35%)	671 km (34%)	△	742 km (37%)	◎	690 km (33%)	◎	674 km (33%)	◎
		Less 1.0	434 km (23%)	703 km (36%)		713 km (35%)		837 km (41%)		881 km (42%)	
	V/C Ratio outside Metro Manila	Over 1.5	15 km (0.4%)	13 km (-)		15 km (-)		12 km (-)		10 km (-)	
		1.0 - 1.5	49 km (1.3%)	37 km (1%)	◎	49 km (1.3%)	X	35 km (1%)	◎	30 km (1%)	◎
		Less 1.0	3,623 km (98.3%)	3,767 km (99%)		3,623 km (98.3%)		3,769 km (99%)		3,876 km (99%)	
	Average Travel Speed (km/hr)	Inside Metro Manila	18.6 (1.00)	22.2 (1.19)		22.8 (1.23)		23.7 (1.27)		24.8 (1.33)	
		Outside Metro Manila	35.2 (1.00)	42.9 (1.22)	△	34.8 (0.99)	△	43.0 (1.22)	◎	43.2 (1.22)	◎
		Study Area	21.0 (1.00)	25.0 (1.19)		24.7 (1.18)		26.5 (1.26)		27.2 (1.30)	

Note: Metro Manila includes its suburbs of Cavite, Laguna, Bulacan and Rizal
(1) V/C ratio = Volume/Capacity Ratio
(2) Evaluation

◎ Best achievement, or improvement
△ Medium achievement, or improvement
X Low achievement, or improvement

9.6 Selection of Development Scenario

Scenario-1
- Does not achieve "Decongestion of Metro Manila Traffic" policy.
- Does not reduce traffic problems in Metro Manila.
- Not recommended.

Scenario-2
- Does not achieve "Decentralization to mitigate overconcentration in Metro Manila" policy.
- Does not reduce traffic problems in outside Metro Manila Area.
- Not recommended.

Scenario-3
- Achieve both national policies.
- Mitigate traffic problems of both inside and outside Metro Manila areas.
- Can be expected relatively high economic return.
- Though huge investment is required, investment level is still within DPWH's financial capacity
- Recommended.

Scenario-4
- Almost same performance as Scenario-3, except this scenario requires the highest investment, thus economic return is lower than Scenario-3.
- This scenario includes the following additional three (3) projects to Scenario-3, but these projects can be deferred due to the following reasons;

- **Manila-Bataan Coastal Road**
  - There is no major regional urban centers along the corridor, thus it will function as an alternative route of NLEx.
  - When NLEx-East which is more important than this road is formed, some of NLEx traffic will be diverted to NLEx-East, therefore above function of this road will not be so significant, thus this road can be deferred.
  - This road passes through wide flood-prone areas, thus quite costly and roadside development of the areas near interchanges will not be expected.

- **NLEx (Phase III)**
  - Major function of this road is to serve traffic between Subic and Metro Manila, of which traffic demand is not so high yet.
  - Above function is being served by the existing SCTEX, thus this road can be deferred.

- **East-West Connection Expressway**
  - The function of the expressway is to distribute traffic on NLEx and NLEx-East at a balanced manner.
  - Development of NLEx-East will take a lengthy time, therefore, this expressway can be deferred until such time that NLEx-East is formed.

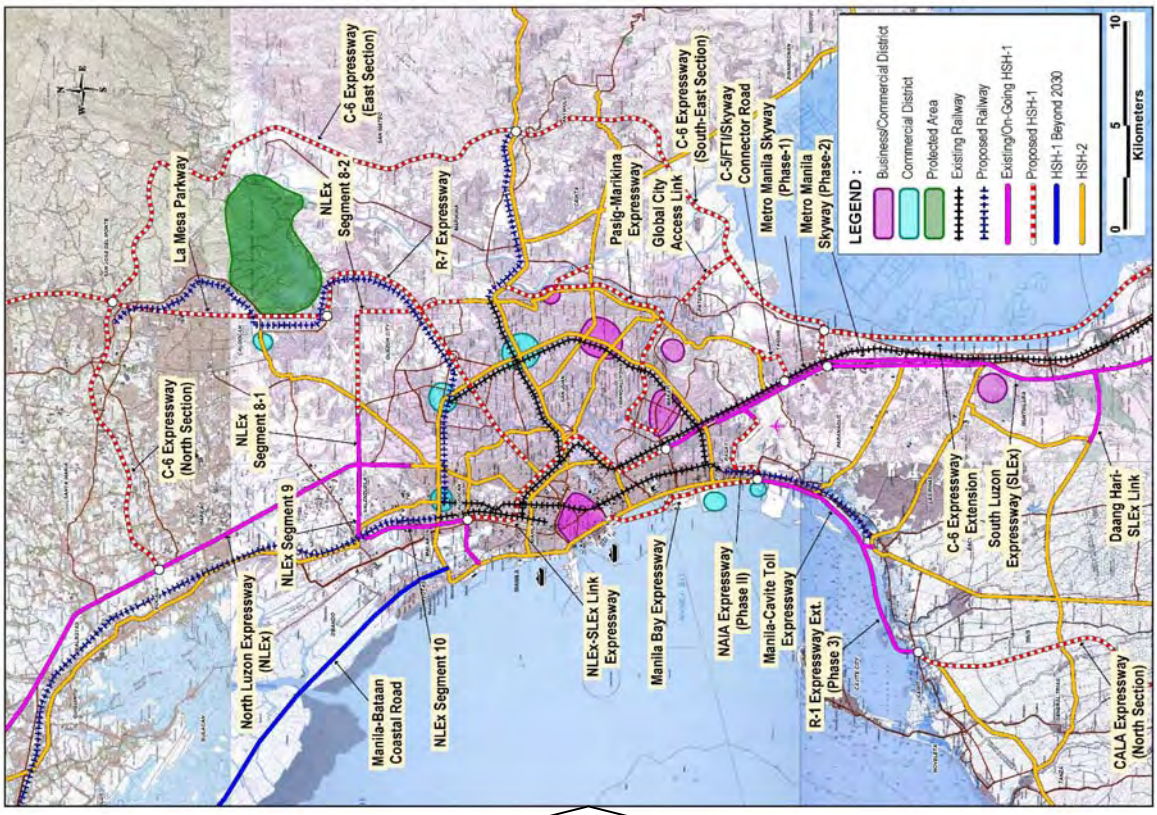
Characteristics of Development Scenario

- To conform with the national policies of (1) decentralization to mitigate overconcentration in Metro Manila and (2) decongest Metro Manila traffic.
- All regional urban centers are connected by HSH-1.
- All international ports and airports are connected by HSH-1 to actively support development of international logistics bases.
- Sound urban expansion is supported.
- Accessibility to main tourist spots is improved.
- Overall travel hours in pcu-hour/day will be reduced to 81% or 1,229 thousand pcu-hours will be saved.
- Volume capacity Ratio will be improved.
- Average travel speed will be improved from present 21 km/hr to 27 km/hr.
- The scenario can be financially affordable by the Government under the assumption of 5% of DPWH budget increase and about 40% private sector financing.
- High economic return can be expected.

9.7 Proposed HSH Network

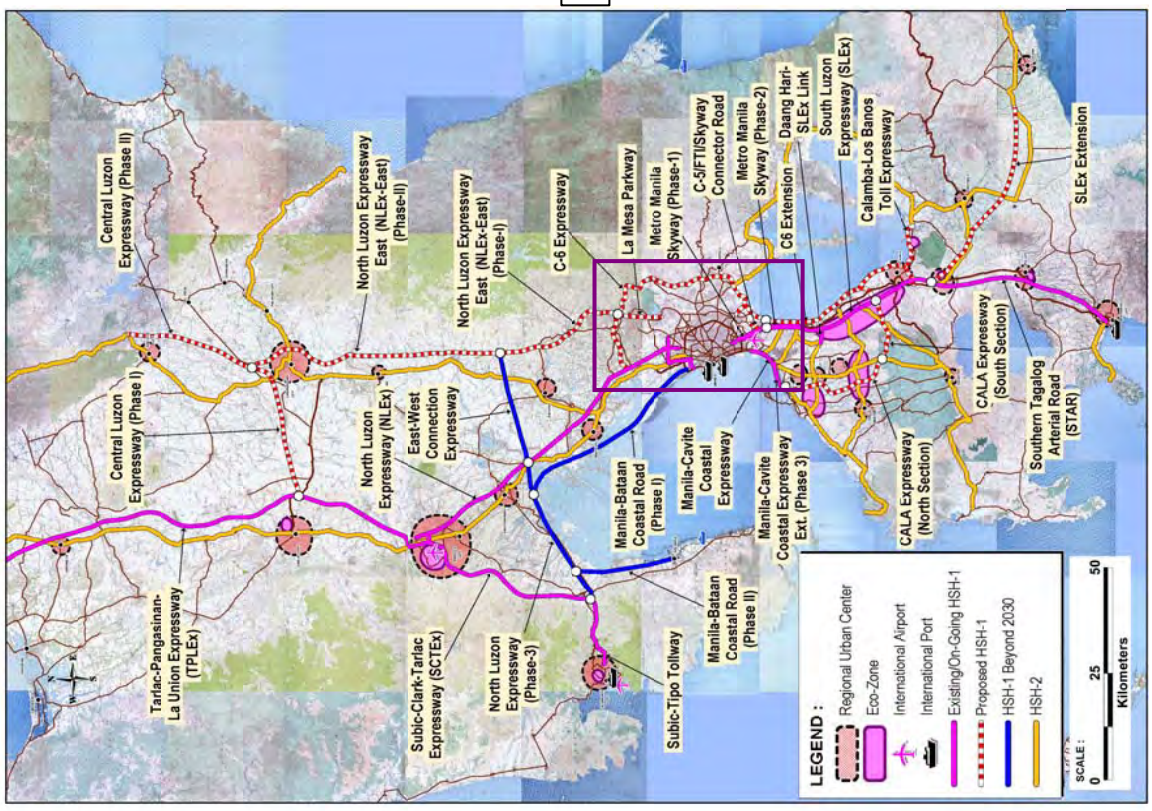
The proposed HSH Network is shown below:

Proposed HSH Network in Metro Manila



Source: Study Team

Proposed HSH Network in Metro Manila and its 200 km Sphere



Source: Study Team

9.8 Proposed HSH-1 Projects

Project Name

- NLEx – SLEx Link Expressway
- NAIA Expressway (Phase 2)
- C-6 Expressway/Global Link*
- C-6 Extension (along Laguna de Bay)
- Manila Bay Expressway
- CALA Expressway
- Central Luzon Expressway (CLEx)
- Calamba-Los Baños Expressway
- SLEx Extension (to Lucena City)
- NLEx East
- La Mesa Parkway
- C-5/FTI/Skyway Connector Road
- Pasig-Marikina Expressway
- R-7 Expressway*

(Beyond 2030)

- Manila-Bataan Coastal Road*
- NLEx-Phase 3
- East-West Connection Expressway*

**These projects are added to the projects listed in Section 6.3 in the course of the study*

9.9 Measures to be Taken for HSH-2

Various projects were proposed as measures to be taken for HSH-2, such as the following: (i) widening of existing road within the existing ROW, (ii) construction of grade separation at traffic bottleneck intersection and (iii) construction of bypasses.

Careful planning is required for the corridors where HSH-1 project is proposed such as Manila North Road and Pan Philippines Highway (Daang Maharlika), so as to avoid over or double investment within the same corridor. Concerned DPWH Regional Offices should coordinate with DPWH Central Office for proper implementation of the proposed HSH-2 projects.

10. INITIAL ENVIRONMENTAL EXAMINATION

According to DENR Guideline, categorization of project based on the overall rating is as follows;

Category A: Environmentally Critical Projects (ECP) – Major roads with length greater than or equal to 20 km for flat terrain and greater than or equal to 10 km for areas with critical slopes. Will require preparation of EIS to merit ECC.

Category B: Non-Environmentally Critical Project (NECP) in Environmentally Critical Area (ECA) – Minor roads greater than 2 km but less than 20 km for flat terrain or greater than 2 km but less than 10 km for areas with critical slopes. Will require preparation of Initial Environmental Examination Report (IEER) to merit issuance of ECC

Category C: Same as Category B but will prepare Initial Environmental Examination Checklist (IEEC) if road is greater than 2 km but less than 10 km for flat terrain or greater than 2 km but less than 5 km for areas with critical slopes

Category D: Project does not fall within Phil. IES System and will require preparation of Project Description (now in form of a checklist) to merit Certificate of Non-Coverage (CNC).

For projects with >200 affected persons: WB, ADB, and JICA classify it as Category A. DENR still follows their project grouping but after scoping, they can reclassify from B to A. Under this Study, when 200 or more persons are expected to be affected, the project was classified as Category A.

Scoping of all projects was undertaken and result is shown below. All projects were assessed "Category A". Those projects located in the highly urbanized area, or with long length required relocation of large number of PAPs. Lengthy projects require land taking of productive agri/fishery land. Careful EIA Study is needed.

Results of Project Scoping

Priority Project	ROW Acquisition Area (Ha)	Estimated No. of PAPs	Category	Report Type	Decision Document	Approving Authority
1. NLEx-SLEx Link Expressway	1.5	2,050	A	EIS	ECC	DENR Secretary
2. NAIA Expressway-2	1.2	1,000	A	EIS	ECC	DENR Secretary
3. C6 Expressway + Global City link	416	6,000	A	EIS	ECC	DENR Secretary
4. C6 Extension	41	5,500	A	EIS	ECC	DENR Secretary
5. Manila Bay Expressway	0.9	50	A	EIS	ECC	DENR Secretary
6. CALA Expressway	255	1,200	A	EIS	ECC	DENR Secretary
7. Central Luzon Expressway	365	505	A	EIS	ECC	DENR Secretary
8. Calamba-Los Baños Expressway	64	650	A	EIS	ECC	DENR Secretary
9. SLEx Extension (To Lucena)	240	1,000	A	EIS	ECC	DENR Secretary
10. NLEx East	470	4,550	A	EIS	ECC	DENR Secretary
11. La Mesa Parkway	1.3	200	A	EIS	ECC	DENR Secretary
12. C5/FTI/Skyway Connector Road	0.5	200	A	EIS	ECC	DENR Secretary
13. Pasig-Marikina Expressway	19	3,650	A	EIS	ECC	DENR Secretary
14. R-7 Expressway	0.8	150	A	EIS	ECC	DENR Secretary
15. Manila-Bataan Coastal Road	280	3,700	A	EIS	ECC	DENR Secretary
16. NLEx Phase 3	190	1,200	A	EIS	ECC	DENR Secretary
17. East-West Connection Expressway	135	1,650	A	EIS	ECC	DENR Secretary

Source: Study Team

11. PRELIMINARY DESIGN AND PROJECT COST ESTIMATE

Each link of HSH-1 network was functionally classified into four (4) types.

Type 1:
A link which forms a backbone transport axis for national integration or for urban development

Type 2:
A link which connects 2 or more HSH-1 to improve the flexibility for road users in route selection

Type 3:
A link which branches off from the backbone transport axis.

Type 4:
A link which functions individually

Functional category, project objectives, length, project cost, etc. are summarized in the table below.

Features of HSH-1 Project

Proj No.	Project Name	Func. Cat'ry	Objectives of the Project	Road Length (km)	Type of Road Structures	Lane No.	Initial Investment (B. Pesos) (2010 Cost)			O & M Cost (B. Pesos / Year)
							Const.	ROW Acq.	TOTAL	
1	NLEx-SLEx Link Expressway	Type-1	• To complete North-South Industrial Development Beltway Transport Axis. • To decongest Metro Manila traffic	13.4	Elevated	4	29.12	1.00	30.12	0.22
2	NAIA Expressway (Phase 2)	Type-2	• To provide access to 3 NAIA terminals. • To connect Skyway with Manila-Cavite Coastal Expressway	4.9	Elevated	4	11.06	0.71	11.77	0.08
3/14	C-6 Expressway and Global City Link	Type-1	• To distribute traffic from expressways from North and South. • To guide sound urbanization of east Metro Manila.	66.5	At-grade + Elevated	4~6	44.08	5.35	49.43	0.95
4	C-6 Extension	Type-2	• To decongest traffic on SLEx. • Combined structure for flood control and traffic facility.	43.6	At-grade	4	15.37	1.53	16.90	0.46
5	Manila Bay Expressway	Type-2	• To decongest Metro Manila traffic, particularly Roxas Blvd. and C-2. • To provide access to Manila Ports.	8.0	Under pass and under-sea tunnel	4	44.69	0.29	44.98	0.18
6	CALA Expressway	Type-2	• To decongest Cavite roads traffic particularly Aguinaldo Highway. • To support economic zones development.	41.8	At-grade	6	15.81	1.41	17.22	0.41
7	Central Luzon Expressway	Type-2	• To connect SCTEx and NLEx-East. • To decongest Pan-Philippine Highway traffic.	63.9	At-grade	4	24.26	1.44	25.70	0.66
8	Calamba-Los Banos Expressway	Type-3	• To provide access to tourism destination. • To decongest national roads.	15.5	At-grade	4	5.05	0.85	5.90	0.15
9	SLEx Extension	Type-1	• To form South Luzon Development Axis. • To decongest Pan Philippine Highway traffic.	47.8	At-grade	4	13.96	0.38	14.35	0.49
10	NLEx East	Type-1	• To form North-East Luzon Development Axis. • To decongest Pan-Philippine Highway traffic.	92.1	At-grade	4	28.59	1.10	29.69	1.09
11	La Mesa Parkway	Type-1	• To form North-East Luzon Development Axis. • To decongest Quirino Highway traffic.	10.9	At-grade	4	3.94	0.09	4.03	0.14
12	C-5/FTI/Skyway Connector Road	Type-2	• To develop FTI area. • To connect Skyway and C-5.	3.0	Elevated	2	5.32	0.10	5.42	0.04
13	Pasig-Marikina Expressway	Type-4	• To decongest C-4 and C-5 traffic. • To provide another access to Makati CBD.	15.7	Elevated	4	34.65	1.00	35.65	0.26
15	R-7 Expressway	Type-4	• To decongest R-7.	16.1	Elevated / Under pass	4	23.98	1.00	24.98	0.29
16	Manila-Bataan Coastal Road	Type-2	• To develop Manila Bay Coastal Areas. • To provide alternate access to Metro Manila from Central/North Luzon.	70.3	At-grade / Bridges	4	82.50	0.37	82.87	1.21
17	North Luzon Expressway (Phase 3)	Type-2	• To provide direct connection between Metro Manila and Subic.	36.2	At-grade	4	24.34	0.29	24.63	0.54
18	East-West Connection Expressway	Type-2	• To connect NLEx and NLEx-East to improve HSH Network flexibility.	26.6	At-grade	4	7.93	0.21	8.14	0.36

12. ECONOMIC AND FINANCIAL EVALUATION

12.1 Purpose of Evaluation

In order to assess implementation priority of each proposed project, economic and financial evaluation was carried-out for each project under the condition that each project is to be operated in 2015. Thus, economic and financial evaluation was not undertaken in accordance with proposed implementation schedule at this stage.

12.2 Assumptions

Network for Traffic Assignment

- Without case: 2015 Network (on-going projects are assumed to be completed by 2015).
- With case: 2015 Network + Each Project

Project Implementation Schedule

- Detailed Design-2011 (1 year)
- ROW Acquisition-2012 to Mid 2013 (1.5 yrs)
- Construction – Mid 2012 to 2014 (2.5 yrs)
- Opening for traffic - 2015

Toll Rate

After the assessment of various toll rates, the following rates were adopted:

Toll Rate Adopted

	Car / Jeepney	Bus / Truck
Intra-urban Tollway (Flat toll rate)	100 pesos	200 pesos
Inter Urban Tollway (Mileage toll rate)	2.0 pesos/km	4.0 pesos/km

Evaluation Results

Priority Project	EIRR (%)	FIRR (%)
1. NLEx-SLEx Link Expressway	19.4	7.7
2. NAIA Expressway-2	16.7	8.9
3. C6 Expressway + Global City link	24.7	3.9
4. C6 Extension	42.6	9.9
5. Manila Bay Expressway	5.8	Negative
6. CALA Expressway	49.9	13.6
7. Central Luzon Expressway	15.6	Negative
8. Calamba-Los Baños Expressway	17.4	Negative
9. SLEx Extension (To Lucena)	20.3	Negative
10. NLEx East + La Mesa Parkway	23.3	4.0
11. C5/FTI/Skyway Connector Road	26.0	4.9
12. Pasig-Marikina Expressway	11.5	5.4
13. R-7 Expressway	23.4	7.5
14. Manila-Bataan Coastal Road	15.0	Negative
15. NLEx Phase 3	15.1	Negative
16. East-West Connection Expressway	8.0	Negative

Note: Negative means revenue can not cover the cost

Economic Analysis

- Benefit estimate period is 20 years
  (20 to 25-year period is commonly adopted but due to discount rate of 15%, effect of benefit beyond 20 years becomes minimal, thus 20-year period was adopted)
- Benefit calculated
  - VOC savings
  - Travel time cost savings
- Discount rate: 15%

Financial Analysis

- Revenue estimate period: 30 years
- Inflation rate: 5% per annum
  (Inflation rate average of the country from 2003 to 2007)

12.3 Results of Evaluation

The results of evaluation are shown in the table and illustrated in the figure below. The figure can be interpreted as follows:

FIRR over 12% with high EIRR

– High possibility of private sector's participation with less government support.

FIRR between 4% to 12% with EIRR over 15%

– Private sector participation with high government support.

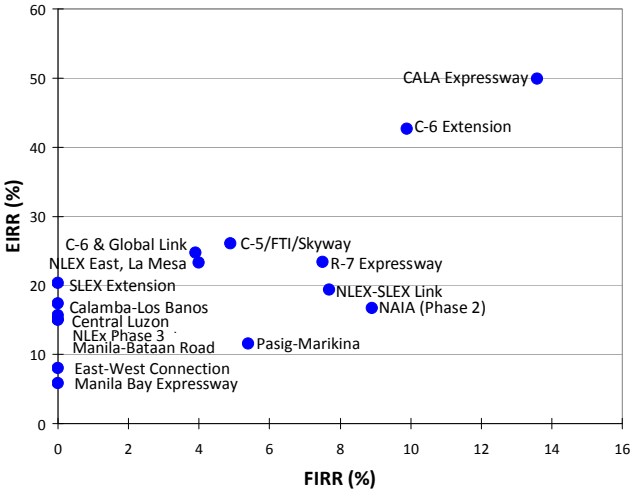
FIRR below 4% with EIRR over 15%

– Mainly operation and maintenance by private sector

FIRR below 15%

– Projects to be deferred

Graph of EIRR and FIRR



13. PROPOSED HSH DEVELOPMENT MASTER PLAN

13.1 Prioritization Criteria

Similar method used by DPWH which is Multi-criteria Analysis was adopted. Eight (8) evaluation items and fourteen (14) sub-items were selected through discussion with TWG. The major considerations in giving weight to each item and sub-item are shown in the table below:

Major Considerations in Giving Weight to Items

Item	Weight	Sub-Item	Sub-Weight
1. Functional Importance of a link in HSH Network and improvement of Inter-modal Linkage	17	1.1 Functional Importance	15.0
		• This is to evaluate conformity with National Policy of Decentralization; therefore, second highest weight was given.	
		1.2 Improvement of Intermodal Linkage	2.0
		• This is to evaluate improvement of logistic system. Additional weight to above.	
2. Urgency based on contribution to traffic decongestion	17	2.1 Number of traffic attracted to a link. (pcu/day)	7.0
		• This is to evaluate contribution to traffic decongestion which is one of the HSH-1 development policy, thus given high weight.	
		2.2 Reduction of travel time (pcu-hour/ day).	10.0
		• This is to evaluate contribution to delivery of people and goods faster and on time which is the major function of HSH-1, thus given high weight.	
3. Project Readiness	15	• This item clearly shows the DPWH's and the Private Sector's implementation priority, thus given second highest weight	15.0
4. Contribution to National Regional Socio-Economic Development	10	4.1 Contribution to National/Regional Economic Development	5.0
		• This is to evaluate contribution to economic development. Sub-item 8.1 does not quantify this benefit.	
		4.2 Contribution to Social Development: Contribution to Job Creation	5.0
		• This is to evaluate contribution to social development in terms of job creation which is not quantified in Sub-item 8.1.	
5. Initial Investment Fund Requirement	10	5.1 Construction Cost	6.0
		• This is to evaluate Government's or Private Sector's fund preparation difficulty.	
		5.2 ROW Acquisition and Resettlement Cost	4.0
		• This is to evaluate Government's fund preparation difficulty.	
6. Environmental and Social Impact	8	6.1 Natural Impact	3.0
		• During F/S or D/D, this impact can be mitigated by selecting appropriate route, thus given low weight.	
		6.2 Social Impact (No. of Structure Affected)	5.0
		• Relocation of PAPs is one of the bottlenecks in implementation though during F/S and D/D, this impact can be mitigated.	
7. Impact of a project on viability of Existing Toll Expressway	3	7.1 Impact on Traffic Volume of Existing Expressway	3.0
		• This is to evaluate if revenue of existing toll road is affected or not.	
8. Economic and Financial Viability	20	8.1 Economic Viability (Is the Project economically justifiable?)	16.0
		• This is DPWH's top concern, thus given highest weight.	
		8.2 Financial Viability (Is the Chance of Private Sector Participation high?)	4.0
		• This is to evaluate chances of private sector's participation and possibility to reduce Government's financial burden.	
Total	**100**		**100**

13.2 Project Priority

In accordance with the prioritization criteria, projects were evaluated as shown in the table in succeeding page. Projects were grouped into two – first and second priority group.

- **First Priority Group**

Project with a total score of more than 70 points, except R-7 Expressway. The reason is that there is another proposal to introduce BRT system along the R-7 corridor, thus, how to develop this corridor should be carefully studied.

- **Second Priority Group**

Project with a total score of less than 70 points.

Priority Ranking and Priority Group

Priority Rank	Score	Name of Project (km)	Length	Priority Group
1	89.0	NLEx-SLEx Link Expressway	13.4	First Priority Group
2	88.0	CALA Expressway	41.8	
3	87.0	C-5/FTI/Skyway Connector Road	3.0	
4	78.0	NAIA Expressway (Phase II)	4.9	
4	78.0	C-6 Expressway (Global City Link)	66.5	
4	78.0	CLEx	63.9	
7	76.5	SLEx Extension (to Lucena City)	47.8	
8	71.5	Calamba-Los Bañ Expressway	15.5	
		Sub-total	256.8	
9	71.0	R-7 Expressway	16.1	Second Priority Group
10	66.0	NLEx East/La Mesa Parkway	103.0	
11	64.5	C-6 Extension	43.6	
12	63.5	Manila Bay Expressway	8.0	
13	55.0	Pasig-Marikina Expressway	15.7	
		Sub-Total	319.5	
		Manila-Bataan Coastal Road	70.3	Beyond Year 2030
		NLEx (Phase III)	36.2	
		East-West Connection Expressway	26.6	
		Sub-total	133.1	

Priority of Projects

Item	Weight	Sub-Item	Sub-Weight	Project Number												
				1	2	3/14	4	5	6	7	8	9	10/11	12	13	15
				N-S Link	NAIA	C-6/Global City	C-6 Extension	Manila Bay	CALA	CLEx	Calamba-Los Baños	SLEx Extension	NLEx East/ La Mesa	C-5/FTI/ Skyway	Pasig-Marikina	R-7
1. Functional Importance of a link in HSH Network and Improvement of Inter-modal Linkage	**17**	1.1 Functional Importance	**15.0**	15.0	14.0	15.0	14.0	14.0	14.0	14.0	10.0	15.0	15.0	14.0	8.0	8.0
		1.2 Improvement of Intermodal Linkage	**2.0**	2.0	2.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2. Urgency based on contribution to traffic decongestion	**17**	2.1 Number of traffic attracted to a link. (pcu/day)	**7.0**	7.0	5.0	7.0	5.0	7.0	7.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0
		2.2 Reduction of travel time (pcu-hour/km/day).	**10.0**	10.0	7.0	7.0	7.0	10.0	7.0	4.0	7.0	7.0	4.0	10.0	7.0	10.0
3. Project Readiness	**15**	3.1 Project Readiness	**15.0**	14.0	8.0	14.0	4.0	4.0	14.0	14.0	8.0	8.0	8.0	15.0	4.0	4.0
4. Contribution to National/Regional Socio-Economic Development	**10**	4.1 Contribution to National/Regional Economic Development	**5.0**	5.0	5.0	5.0	3.0	4.0	5.0	4.0	5.0	5.0	5.0	3.0	4.0	4.0
		4.2 Contribution to Social Development: Contribution to Job Creation	**5.0**	4.0	3.0	5.0	4.0	3.0	4.0	5.0	3.0	4.0	5.0	3.0	4.0	4.0
5. Initial Investment Fund	**10**	5.1 Construction Cost	**6.0**	4.0	4.0	2.0	4.0	2.0	4.0	4.0	6.0	4.0	2.0	6.0	2.0	4.0
		5.2 ROW Acquisition and Resettlement Cost	**4.0**	2.5	2.5	1.0	1.0	2.5	1.0	1.0	2.5	2.5	1.0	4.0	2.5	2.5
6. Environmental and Social Impact	**8**	6.1 Nature's Impact	**3.0**	3.0	3.0	3.0	1.0	1.0	3.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0
		6.2 Social Impact (No. of Structures Affected)	**5.0**	3.0	5.0	1.0	1.0	5.0	5.0	5.0	5.0	5.0	1.0	5.0	3.0	5.0
7. Impact of a project on viability of Existing Toll Expressway	**3**	7.1 Impact on Traffic Volume of Existing Expressway	**3.0**	3.0	3.0	1.0	1.0	3.0	3.0	3.0	3.0	2.0	1.0	1.0	2.0	2.0
8. Economic and Financial Viability	**20**	8.1 Economic Viability (Is the Project economically justifiable?)	**16.0**	14.0	14.0	14.0	16.0	5.0	16.0	14.0	14.0	14.0	14.0	16.0	5.0	14.0
		8.2 Financial Viability (Is the Chance of Private Sector Participation high?)	**4.0**	2.5	2.5	1.0	2.5	1.0	4.0	1.0	1.0	1.0	1.0	1.0	2.5	2.5
Total	**100**		**100**	**89.0**	**78.0**	**78.0**	**64.5**	**63.5**	**88.0**	**78.0**	**71.5**	**76.5**	**66.0**	**87.0**	**55.0**	**71.0**
Ranking				***1***	***4***	***4***	***11***	***12***	***2***	***4***	***8***	***7***	***10***	***3***	***13***	***9***

13.3 Proposed Implementation Schedule of HSH-1 Projects

In due consideration of priority of project and some development status of each project, implementation schedule was proposed as shown in table in the succeeding page. Special consideration was paid to the following projects;

NLEx-SLEx Link Expressway

- Unsolicited proposal was submitted by a private group on April 30, 2010.
- Pre-feasibility study by METI, Japan and Feasibility Study by a private group was undertaken.

NAIA Expressway (Phase-2)

- Pre-feasibility Study was carried out by Economic Research Institute for ASEAN and East Asia (ERIA), Japan.

C-6 Expressway

- North section will be constructed by MRT-7 Consortium.
- KOICA will undertake a Feasibility Study of the remaining sections.

CALA Expressway

- Feasibility Study of Segment-1 was undertaken by JICA in 2006.
- Technical assistance for Segment-2 will be provided by WB.

La Mesa Parkway

- Concession holder submitted the Detailed Design to DPWH.

NLEx-East

- This expressway should be so planned that it can start soon after completion of La Mesa Parkway.

C-5 / FTI / Skyway Connector Road

- Detailed Design is on-going by the DPWH, so this will be ready for implementation soon.

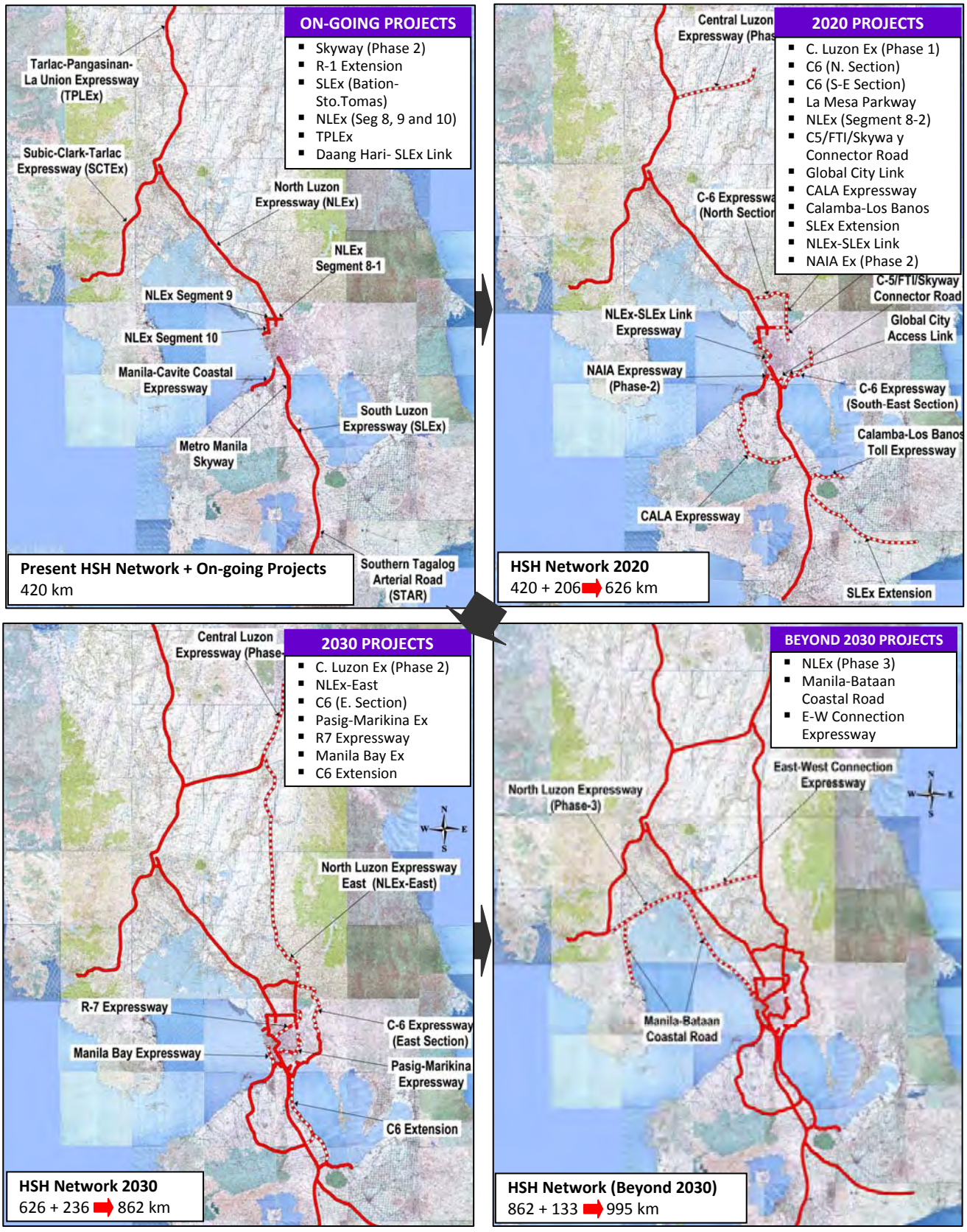
Proposed Implementation Schedule

Project No.	Project Name	Priority Group	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	After 2031
1	NLEx-SLEx Link Expressway	First																						
2	NAIA Expressway (Phase 2)	First																						
3/14	C-6 Expressway and Global City Link	First																						
	North Section	First																						
	East Section	First																						
	South-East Section	First																						
4	C-6 Extension	Second																						
	Phase-1	Second																						
	Phase-2	Second																						
5	Manila Bay Expressway	Second																						
6	CALA Expressway	First																						
	Segment-1	First																						
	Segment-2	First																						
7	Central Luzon Expressway	First																						
	Phase-1	First																						
	Phase-2	First																						
8	Calamba-Los Baños Expressway	First																						
9	SLEx Extension (to Lucena City)	First																						
10	NLEx East	Second																						
	Phase-1	Second																						
	Phase-2	Second																						
11	La Mesa Parkway	Second																						
12	C-5/FTI/Skyway Connector Road	First																						
13	Pasig-Marikina Expressway	Second																						
15	R-7 Expressway	Second																						
Fund Requirement (excluding O & M)		Public			84.85 Billion Pesos					106.06 Billion Pesos					121.91 Billion Pesos				152.39 Billion Pesos				
		Private			56.56 Billion Pesos					35.35 Billion Pesos					81.27 Billion Pesos				50.79 Billion Pesos				
		TOTAL			141.41 Billion Pesos					141.41 Billion Pesos					203.18 Billion Pesos				203.18 Billion Pesos				
		PP Share			Public: 60%		Private: 40%			Public: 75%		Private: 25%			Public: 50%		Private: 50%		Public: 75%		Private: 25%		

Legend:
- : Project Preparation & Approval (& ODA Loan)
- : Detailed Design, ROW Acquisition & Loan Closure
- : Construction
- : Operation & Maintenance
- : Detailed Design
- : ROW Acquisition
- : Selection of Contractor
- : Fund Raising

13.4 Future HSH-1 Network Development

HSH-1 (Expressway) network of 1,000 km will be targeted. Existing HSH-1 (including on-going projects) networks will be doubled by 2030.

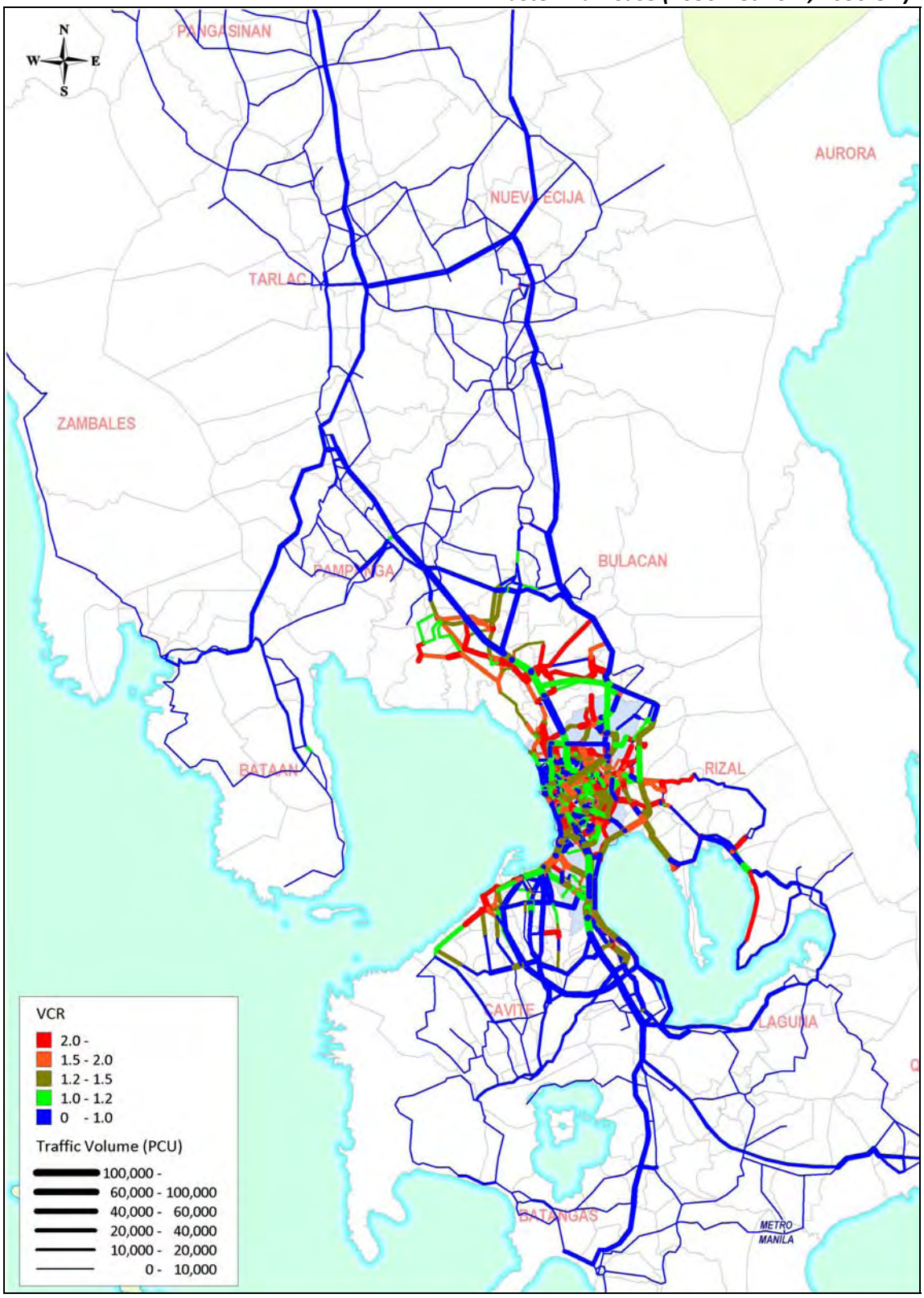


13.5 Evaluation of the Master Plan

Traffic Condition with Master Plan Case

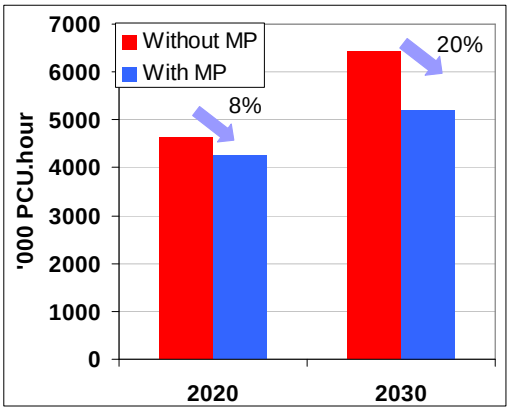
The traffic condition on the road network of the study area is shown in the figure below. Improvement of trafffic flow in the network is presented in the succeding pages.

Master Plan Case (2030 Network; 2030 OD)

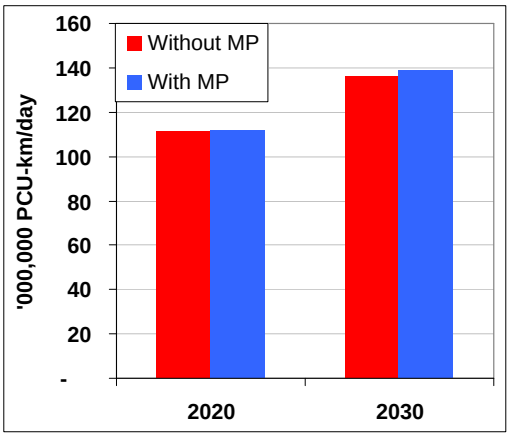


Improvement of Traffic Efficiency

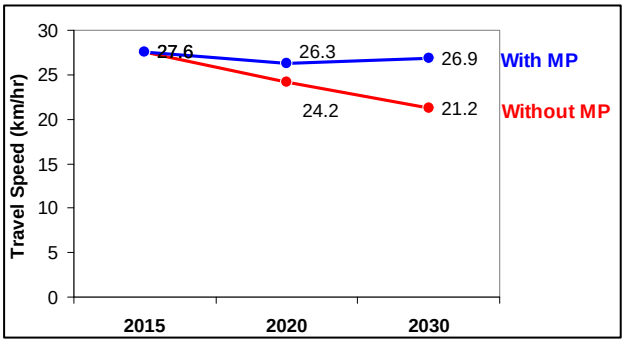
Travel Time



Travel Distance



Average Travel Speed



Travel time sphere (1-hour, 2-hours, and over 2-hours) of Without Masterplan Case and With Masterplan Case are shown in the figures in the succeding page.

Travel time reduction achieved by motorists by using the expressways is also illustrated in the figures found in the succeding page.

Economic Evaluation Result

Economic evaluation result shows the Master Plan is economically viable.

EIRR	:	29.7%
NPV	:	72,296 Million Pesos
B/C Ratio	:	1.98

Other Unquantifiable Effects

- Formation of backbone transport axis will contribute to economic development.
- Contribution to social development - sustainable job will be created.
- Construction industry will enjoy sustainable project opportunities.
- Contribution to tourism industry – tourists will have easier access.
- Sound urbanization in the grwoth areas will be properly guided.
- Improvement of transport efficiency which will possibly reduce emission of CO_2 and contribute to fight againts global warming.
- Improvement of environment along the existing roads
- Formulation of stronger road network against natural disaster.
- Expansion of business and social activities.

Government Financing Capability (GFC)

GFC was checked under the following asumptions:

- DPWH capital outlay budget will increase by 5% per annum in real term.
- Maximum allocation of DPWH to the Master Plan projects will be 10% of capital outlay budget.

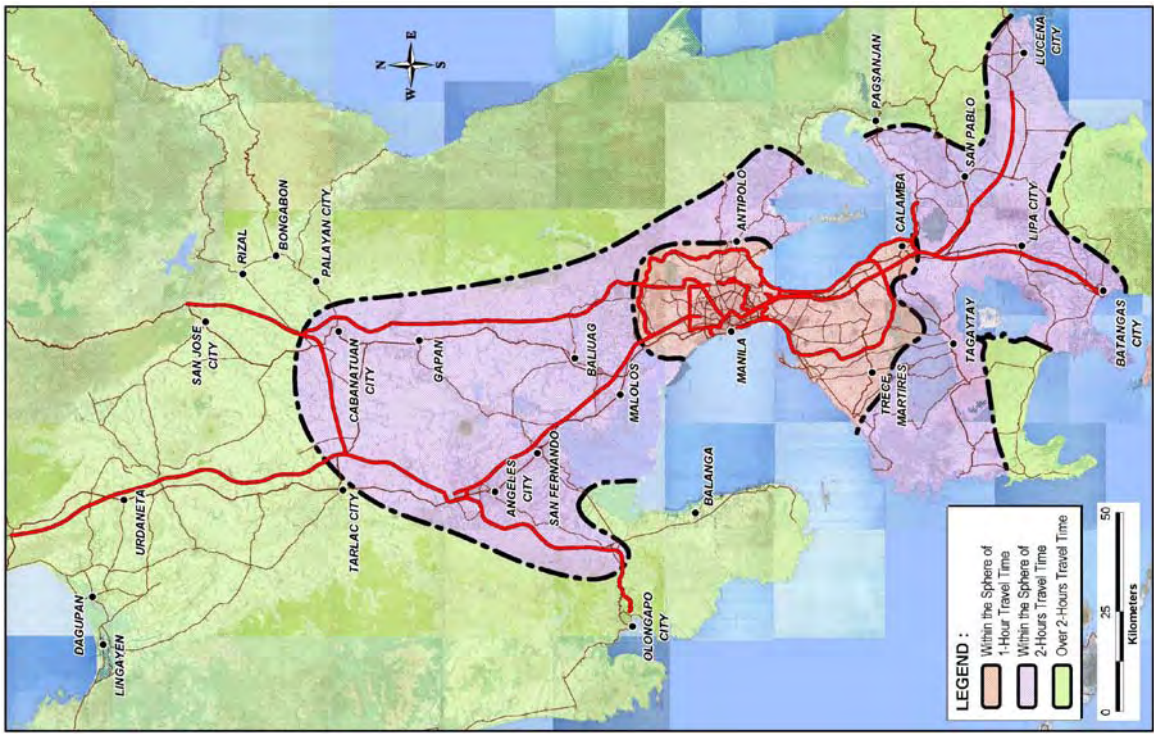
Annual fund requirement of the Master Plan (AFR) was compared with GFC. Comparision result is as follows:

AFR vs GFC

Fund sharing of AFR		No. of Years AFR>GFC
Case 1	100% Govt 0% Private	9 years
Case 2	75 Govt 25% Private	7 years
Case 3	60% Govt 40% Private	0 year

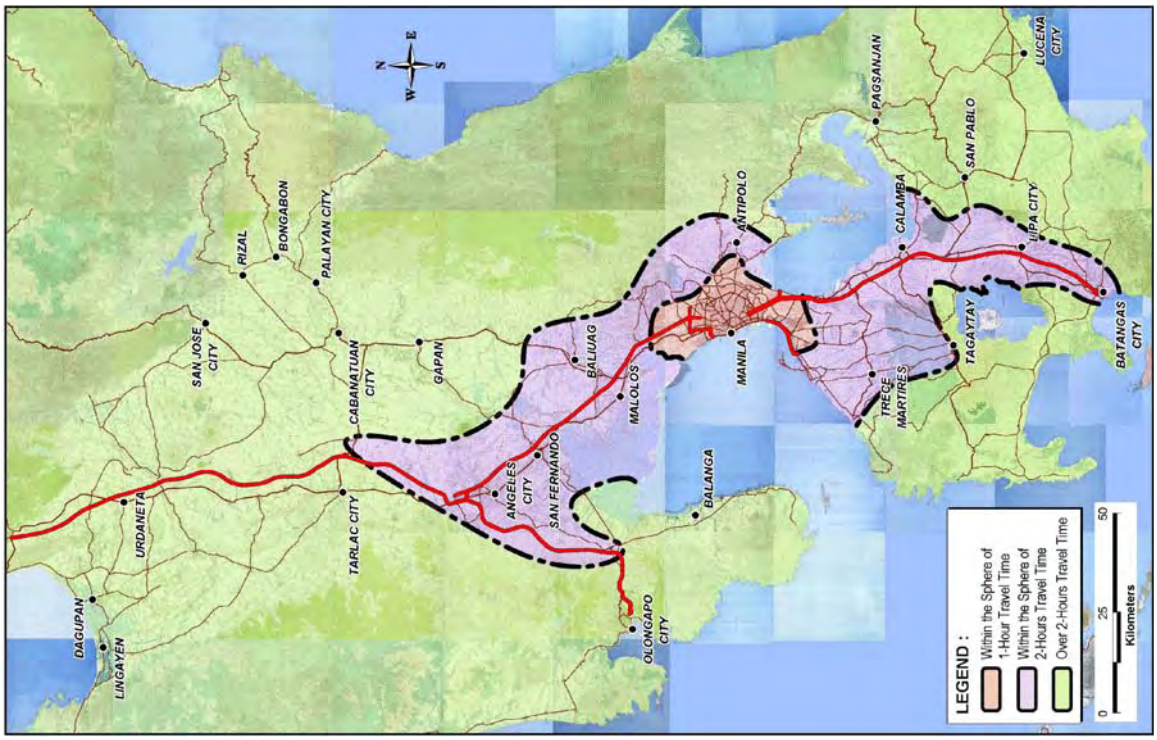
It is recommended that the Government should seek about 40% of the private sector funding for realization of the Master Plan (Case 3)

Travel Time Sphere (With Masterplan)



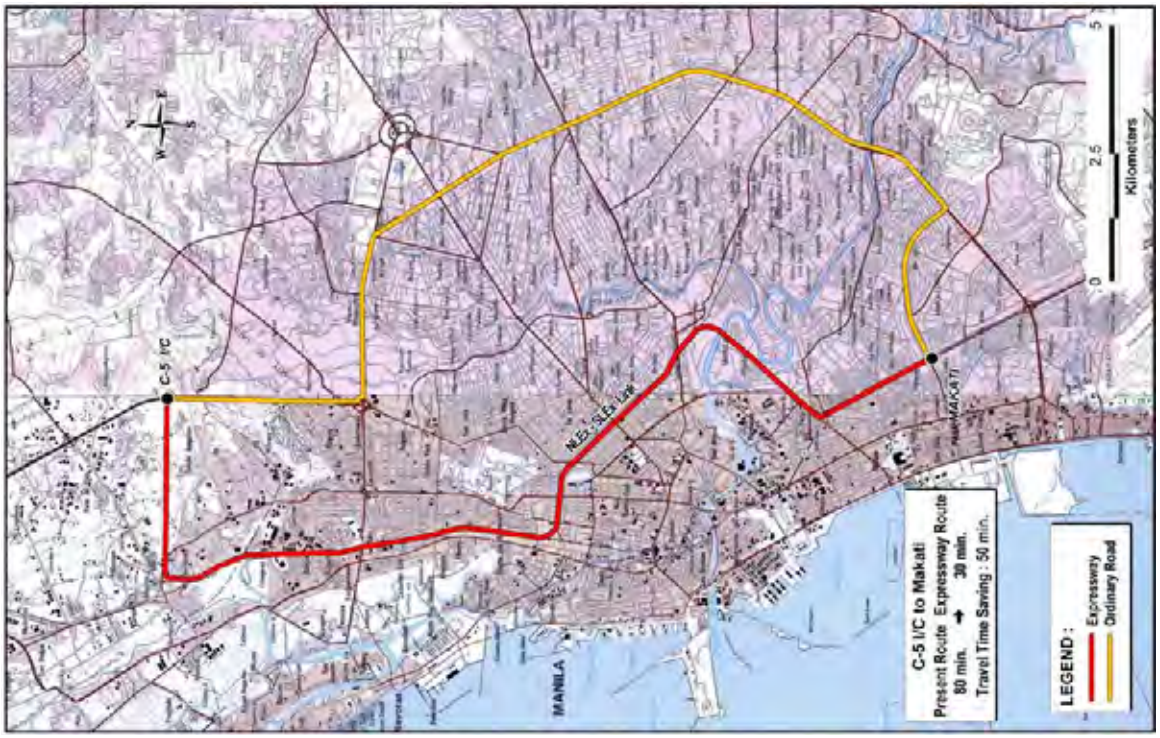
Note: Travel time during off-peak hours
Source: JICA Study Team

Travel Time Sphere (Without Masterplan)



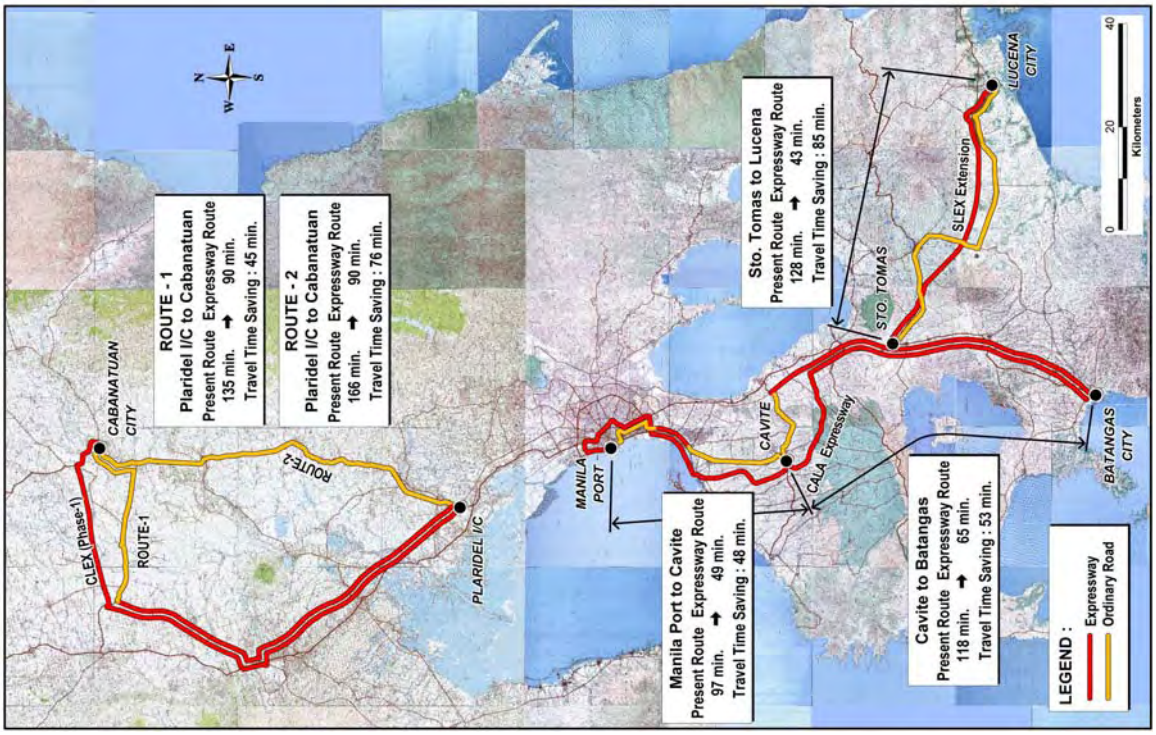
Note: Travel time during off-peak hours
Source: JICA Study Team

Comparison of Present Routes and Expressway Routes (Metro Manila)



Note: Travel time during off-peak hours
Source: JICA Study Team

Comparison of Present Routes and Expressway Routes (North and South of Metro Manila)



Note: Travel time during off-peak hours
Source: JICA Study Team

14. PRESENT PRACTICES OF HSH-1 DEVELOPMENT THROUGH PPP SCHEMES

14.1 Legislative Framework on PPP

In 1994, RA No. 6957 (Implementation of Infrastructure Projects by the Private Sector, BOT Law) was amended by RA No. 7718 (Amendment of BOT Law and its Implementing Rules and Regulations), including;

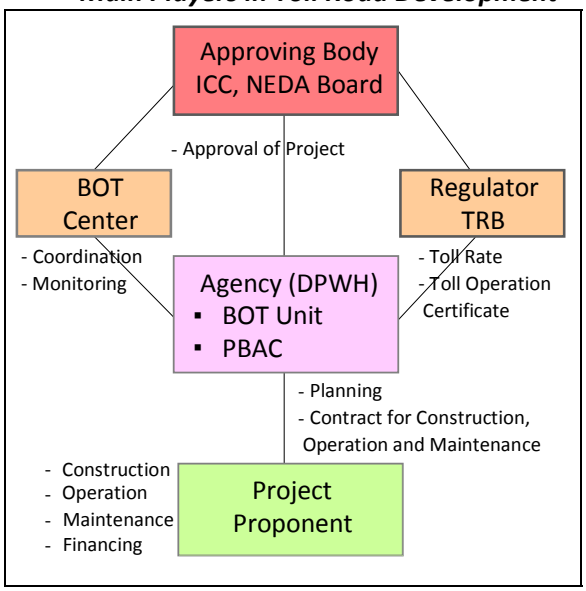
- More variants of BOT scheme
- Recognizing the need of private investors for reflecting market condition
- Authorizing Government support for BOT projects
- Allowing unsolicited proposals

14.2 Main Players in Toll Road Development

For development of toll roads, various government agencies and authorities as well as private entities are involved, including;

- DPWH; Agency for planning, construction and Operation & Management
- TRB; Regulator for issuing toll rate, and toll operation certificate
- NEDA; Approving Body with Local Sanggunian

Main Players in Toll Road Development



14.3 PPP Arrangement and Modality

Chronologically, the Franchise Approach/Joint Venture Arrangement was employed at the initial stage. Upon the passage of the

Amendment of BOT Law, the Public Bidding Approach (Solicited Proposal Approach through competitive Bidding) and Unsolicited Proposal Approach were utilized.

Those approaches include;

- PNCC Franchise/Joint Venture Agreement
- Public Estate Authority (PEA) Charter
- Bases Conversion and Development Authority
- Solicited Proposal Approach
- Unsolicited Proposal approach

14.4 Issues on Toll Road Development through PPP Schemes

The following are the lessons suggested by international agencies and comments from private sector in the country.

(1) Lessons through World Bank Experiences

- Appropriate pricing for infrastructure services
- Fair competition for reducing prices
- Regulatory frameworks credible to investors
- Legitimate involvement of political will

(2) Observations of Asian Development Bank

- Characteristics of toll road projects (huge initial investment and revenue risk)
- Attracting traffic and securing revenues (appropriate toll level and social acceptance)
- Determination of roles of private sector

(3) Comments from Private Sector

1) Regulation
   - Agree on delineation of responsibilities between DPWH and TRB per EO 686.

2) PPP Modality
   - Generally agree on bidding under BOT Law, with Government Financial Support (GFS) based on basic design parameters.
3) Government Financial Support
   - Agree that GFS be provided in terms of ROWA cost plus share/subsidy for construction (up to 50%) to make the project viable at affordable toll rates.
4) Project Approval
   - Streamline the lengthy process to package and approve BOT projects.
5) ROW Acquisition
   - Financiers require that ROW be cleared before financial closure
6) Feasibility Study (FS)
   - Agree that government should undertake FS which defines the alignment, and should start ROW acquisition before bidding.

7) Risks
   - Financial Risk – delay in financial closure due to delay in meeting the requirements (ROW, approved toll rate, etc.) and inadequate or late GFS.
   - Construction Risk – delay in ROW & delivery; and political intervention especially by LGUs.
   - Commercial Risk – shortfalls in traffic and revenues and exchange rate of foreign currency.
   - Operation Risks – political intervention which suppresses/delays agreed toll rates and adjustments.

15. PPP OPTIONS FOR HSH-1 DEVELOPMENT

15.1 Objectives of PPPs

The government recognizes the indispensable role of the private sector as the main engine for the national growth and development. There are ranges of reasons that the government enter into PPPs for infrastructures including the following;

- Mobilization of private capital to provide increased infrastructure provision and service.
- Toll for greater efficiency with the clear goal of maximizing profits and full utilization of skills.

15.2 Characteristics of Toll Road Projects

Toll road projects are quite different from projects in other sectors as shown in the table below.

15.3 Typical Types of Contractual Agreement in BOT LAW

The Revised IRR prescribes the following types as shown in the table below.

Characteristics of Toll Road projects

Items	Characteristics
Land Requirements	▪ Large and difficult acquisition. (often in central locations/continuous strip)
Environmental Impact	▪ Large for elevated structures and medium for others. ▪ Extensive land acquisition/relocation involved.
Cost	▪ High and all up-front costs. ▪ Operation and maintenance cost low.
Demand and Revenues	▪ Low in early years ▪ Uncertain in the future depending on external factors
Tariff Problems	▪ Huge, often subject to considerable political interference. ▪ Sensitive for public acceptance.
Financial Viability	▪ Often not viable as a stand-alone project ▪ Only a few projects commercially viable.
Need for Government Support ▪ Operation ▪ Investment	▪ Permissions, land acquisition, relocation. ▪ Tariff increases ▪ Often substantial.
Risks	▪ High and extensive implementation and cost problems ▪ Very substantial traffic and revenue risk

Typical Types of Contractual Agreement in BOT Law

Option		Type	Public Undertaking	Private Undertaking	Major Risk Allocation
	Type 0	Conventional	* ROW Acquisition * Design & Construction * O & M * All Finances	(Contract-out to consultant & contractor for design & construction respectively)	*All risks with the government
PPP	Type 1	Build-and-Transfer (BT)	* ROW Acquisition * Operation	Design & Construction and its Finance	*After completion, turn it over to the government
	Type 2	Build-Lease-and-Transfer (BLT)	* Row Acquisition * (Operation)	Design & Construction and its Finance (Operation)	*After completion, turn it over to the government on Lease Agreement
	Type 3	Build-Transfer-and-Operate (BTO)	*ROW Acquisition	*Design & Construction on Turnkey Basis *Operation and Maintenance	*After completion, turn it over on Operation Agreement *Construction cost overruns, delays, and specified performance risks
	Type 4	Build-Operate-and-Transfer (BOT)	* ROW Acquisition	*Design & Construction *Operation and Maintenance	*Transfer at the End of Term *All Risks including Toll Revenue with Private Sector

15.4 Implementation Options through PPP Schemes

The following four (4) options were developed for comparative evaluation.

Option 0; Conventional Type (Base Type)
Option 1; Role sharing Type (Lease)
Option 2; Segment Dividing Type
Option 3; BOT type with Government Subsidy
Option 4; BOT Type

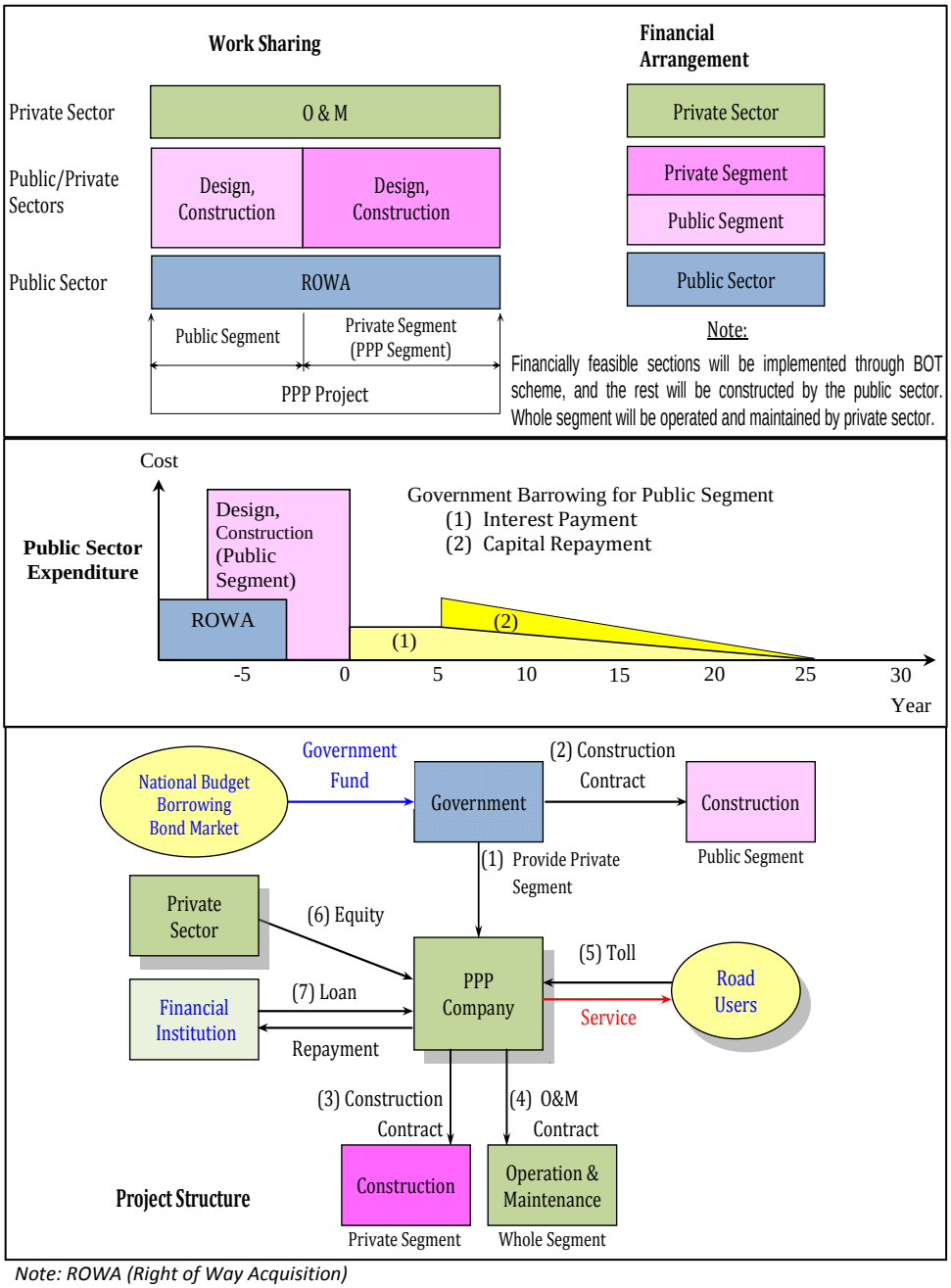
The major assumptions were made as follows;

- ROW Acquisition by the government
- Toll level and Traffic volume risks by both sectors.
- Government Financial Support, if necessary

15.5 An Example of Implementation Options (Option 2: Segment Dividing Type)

This type is evaluated as one acceptable type based on the following justification.

- The divisions of works/responsibility to be shouldered by both the government and private sector are clearly defined.
- Soft loan (ODA) is easily arranged for the public segment and the staged construction is adoptable.
- Financially viable depending on the dividing mechanism.



Note: ROWA (Right of Way Acquisition)

16. IMPLEMENTATION ARRANGEMENT OF RECOMMENDED PPP SCHEMES

The project types for discussion on implementation would be categorized based on the project characteristics which may be assessed in terms of economic feasibility (EIRR) and financial viability (FIRR).

16.1 Government Support

The government support/undertaking includes the following;

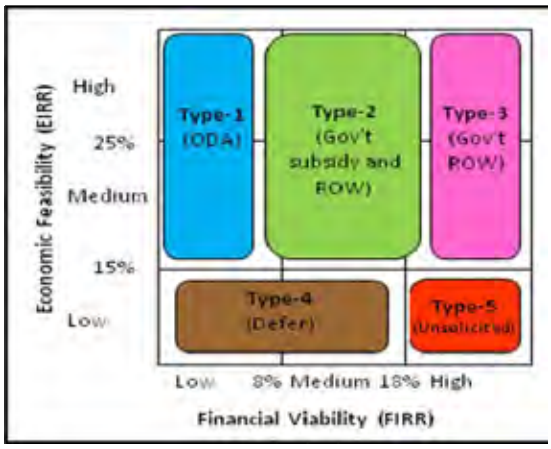
- Cost sharing and credit enhancement
- Direct government subsidy and equity
- ROW acquisition
- Guarantee of minimum traffic and revenue, if necessary

16.2 Work Sharing

With the traditional practices of work sharing, Material Adverse Grantor Action (public sector) shall be taken into consideration, including;

- Non-delivery or late delivery of ROW
- Any failure on adjustment of authorized toll rate
- Any failure to issue Toll Operation Certificate (TOC).

Conceptual Classification of PPP Projects



PPP Options and Applications

PPP Options		Work Sharing		Application
		Public	Private	
Option 0; Conventional Type	Proposed Toll Road **Government**	• ROWA • Design • Construction • O & M	• Outsourcing of some portion of works • O & M of whole section	Preferable for Type-1 Projects • Low financial viability • High/medium economic feasibility
Option 1; Role Sharing Type (Lease)	Proposed Toll Road **Government**	• ROWA • Design • Construction	• Outsourcing of some portion of works • O & M of whole section	Preferable for Type-1 Projects • Low financial viability • High/medium economic feasibility
Option 2; Segment Dividing Type	**Public** **Private**	• ROW of whole section • Design • Construction and financing of public segment	• Design • Construction & financing of private segment under BOT scheme • O & M of whole section	Adoptable for Type-2 Projects • Medium financial viability • High/medium economic feasibility
Option 3; BOT Type With Government Subsidy	**Private Segment**	• ROWA • Upfront capital subsidy (**Option 3-1)** • Annual service payment subsidy (**Option 3-2**)	• Design • Construction & financing of whole section under BOT scheme • O & M of whole section	Adoptable for Type-2 Projects • Medium financial viability • High/medium economic feasibility
Option 4; BOT Type	**Private Segment**	• ROWA	• Design and construction including financing under BOT scheme • O & M of whole section	Applicable for Type-3 Projects • High financial viability • Medium/high economic feasibility

Note: ROWA (Right of Way Acquisition)

16.3 Key Risks and Mitigation Measures

Key risks and issues were examined, and mitigation measures were proposed as shown in the table below.

Key Risks and Mitigation Measures

Risks	Proposed Mitigation Measures	Responsible Agency / Entity
1. Political Risk		
1.1 Unstable political support and commitment	1.1 Firm and strong commitment from politicians, government, and public.	DPWH
1.2 Lengthy process in packaging BOT project	1.2 Master Plan to justify Effective Road Network including Toll Road. Business Case Study to warrant appropriate PPP modality	DPWH
2. Administration Risk		
2.1 Inadequate capability of DPWH-BOT Group	2.1 Capacity Development for PPP project identification and formulation.	DPWH
2.2 Delay in approval/issuance of required documents	2.2 Clear work delineation of government operational responsibilities. Approval of necessary documents.	Cabinet level
3. ROW Risk		
3.1 Non-proper process for defining ROW	3.1 Preparation of reliable Feasibility Study defining required ROW.	DPWH
3.2 Non-realistic zonal value	3.2 More realistic BIR zonal valuation approximating market prices.	BIR
3.3 Delayed non/delivery of ROW before construction.	3.3 Work commencement for ROW acquisition immediately after F/S.	DPWH
4. Bidding Risk		
4.1 Required preparation of bid proposals	4.1 Availability of all data, analysis, and studies undertaken by government including traffic data, financial analysis and action plan for ROW acquisition.	DPWH
4.2 Non-clear standards, specification and parameters for detailed engineering	4.2 Preparation of complete and reliable Feasibility Study	DPWH
5. Financial Risk		
5.1 Non sufficient GFS	5.1 Preparation of financial analysis to justify GFS.	Private Sector
5.2 Foreign Exchange Risk	5.2 Maximum utilization of local financial system.	Private Sector
6. Toll Rate Risk		
6.1 Delay in TOC approval	6.1 Approval before bidding by TRB	TRB
6.2 Unreliable traffic forecast	6.2 Preparation of reliable traffic analysis during Feasibility Study	DPWH
6.3 Shortfalls in traffic volumes and revenues	6.3 Realistic toll rate and adjustment formula with GFS if necessary.	TRB
6.4 Delay in implementation of toll rate adjustment	6.4 Provision of Material Adverse Grantor Action	DPWH

16.4 Implementation Plan

Based on the examination on implementation processes and key issues, the conceptual implementation flow is prepared as shown in the figure (Roadmap) in the succeeding page.

Step 0: Preparation Stage

- Support from political leaders and commitment on PPP Policy
- National policy and regulatory structure
- Adherence to the transport Master Plan

Step 1: Project Identification (Business Case Study)

- PPP Modality and suitability assessment
- Business Case Study
- Value for money analysis

Step 2: Project Appraisal by Related Agencies

- Project Priority/PPP Modality
- Engineering and environmental assessment
- Economic/financial evaluation
- Obstacles and constraints identification
- Private sector interest research
- Budget allocation for F/S

Step 3: Feasibility study

- Implementation option/arrangement
- Engineering /parameters (Project configuration, Minimum requirement)
- Economic/financial parameters (GFS, Toll Rate/Adjustment)
- ROW acquisition/resettlement plan
- Bidding documents/draft contract

Step 4: Project Approval by approving Body

- Approval/authorization of F/S

Step 5: Bidding (Selection of PPP Project Proponent)

Step 6: Implementation (Design, Construction, O&M)

Special Activity 1: Loan/ODA Agreement
After Step 3 before Step 5

Special Activity 2: ROW Acquisition
After Step 3 before Step 5 or Step 6

16.5 Operation and Maintenance

The tasks of toll operation and maintenance to be undertaken by PPP project proponent includes; among others,

- Toll Operation System
  - Toll Collection and accounting (ETC)
  - Traffic control and management (TIS)
  - Vehicle regulation

- Toll Maintenance System
  - Maintenance work/preventive maintenance measures.
  - Asset management

16.6 Bidding Procedure

The success in implementation of toll road development through PPP schemes is extremely affected by the bidding procedure. To ensure the fair bidding, the following measures are recommended;

- Preparation of clear and specific bid documents
- Transparency/accountability procedures
- Ensuring of competitiveness

The Revised IRR clearly stipulates the timeframe required for the public bidding and unsolicited proposals with the estimated duration of 15 months and 20 months, respectively.

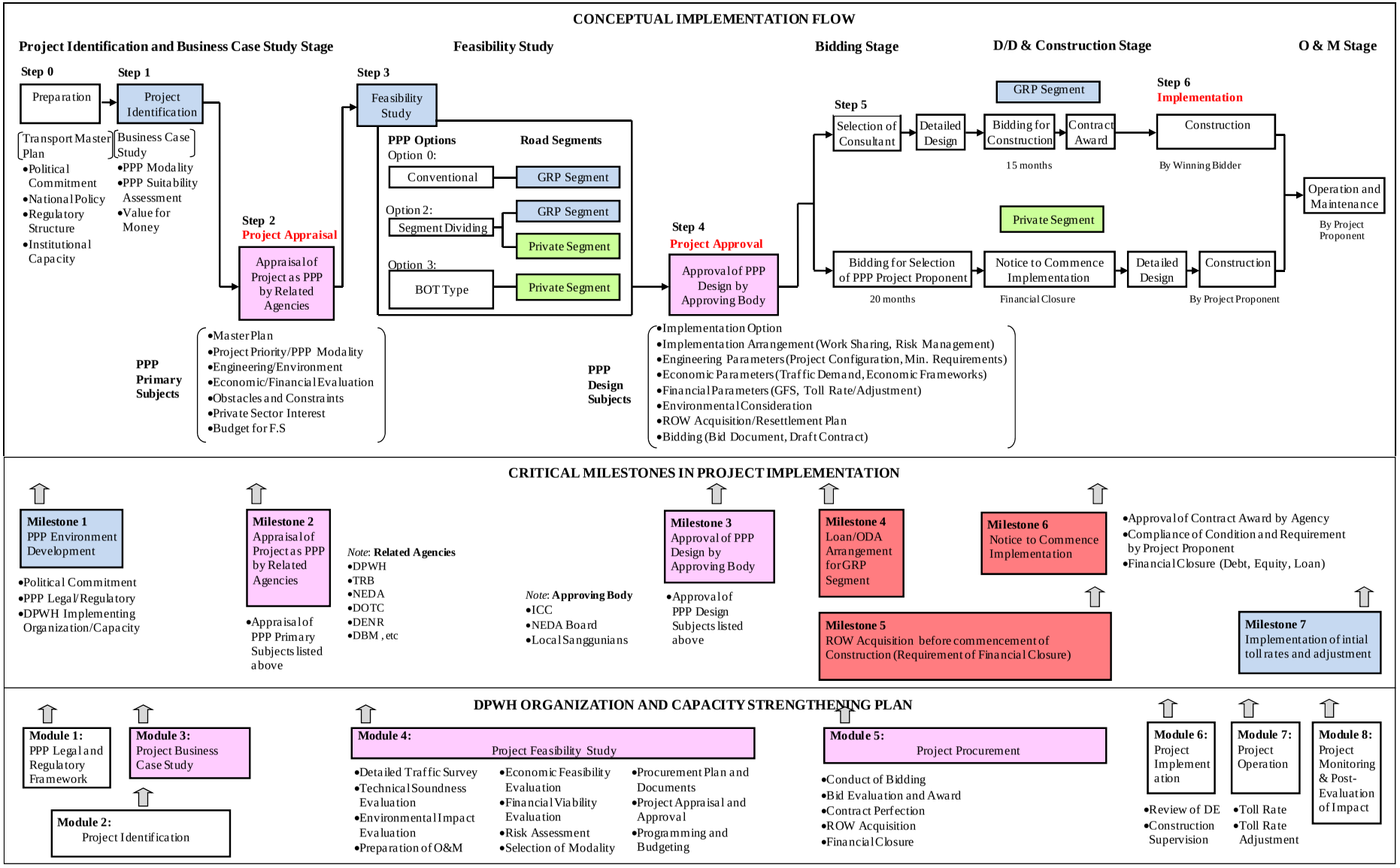
16.7 Roadmap for Toll Road Project Implementation through PPP Scheme

The potential and critical milestones in project implementation in line with the conceptual implementation flow are demonstrated in the Roadmap figure shown in the succeeding page.

Milestone 1; PPP Environmental Development (Step 0)
Milestone 2; Appraisal of Projects as PPP by related agencies (Step 2)
Milestone 3; Approval on PPP Design by Approving Body (Step 4)
Milestone 4; Loan (ODA) Arrangement for GRP Segment (Step 4)
Milestone 5; ROW Acquisition (Step 4 & 5)
Milestone 6; Notice to Commence Implementation (Step 5)
Milestone 7; Implementation of Initial Toll Rate and Adjustment (Step 6)

Special Milestones: DPWH Organization and Capacity Strengthening

Eight (8) modules were recommended for DPWH to strengthen their capability to fulfill the leadership and initiative for PPP toll road development.



Roadmap for Realization of Toll Road Project through PPP Schemes

PART III – METRO CEBU

17. GENERAL PROFILE OF METRO CEBU

17.1 Physical Profile

Metro Cebu is composed of five cities (Danao, Cebu City, Lapu-lapu, Mandaue, Talisay) and eight municipalities (Compostela, Liloan, Consolacion, Cordova, Minglanilla, Naga, San Fernando, and Carcar). Proposed HSH network for Metro Cebu is stretching out on the central east coast of Cebu Island. Some segments cross to Mactan Island.

Topography

80% of Cebu City is mountainous 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. This situation also holds true for the adjoining municipalities where development is along the coastal plains.

Meteorology

The Cebu Metropolitan Area is located in the third type climate that is classified by the Weather Bureau in which there is no distinct wet or dry season. Humidity is approximately 77%, decreasing during the summer months and increasing during the rainy days by a few percent.

17.2 Present Regional and Urban Development

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.

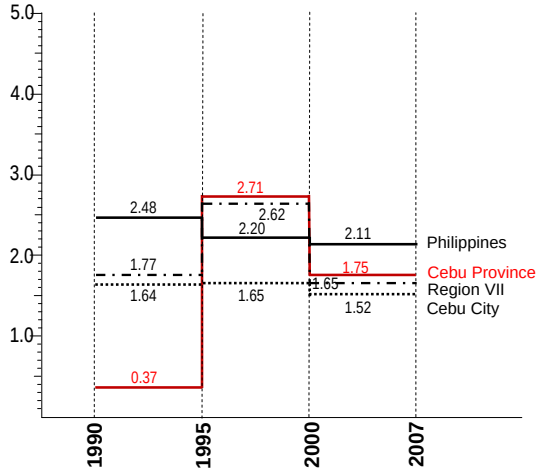
The clustering of commercial, industrial and institutional land uses in Cebu City justify the presence of metropolitan arrangements, thus the presence of Metro Cebu.

17.3 Socio-economic Profile

Demographic Trend

Population of Region VII was 6.4 million in 2007 (about 7% of the country's population). 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 the highest population growth rate for the said period at 4.36% and followed by Mandaue City (2.96%).

Population Growth Rate (Region VII)

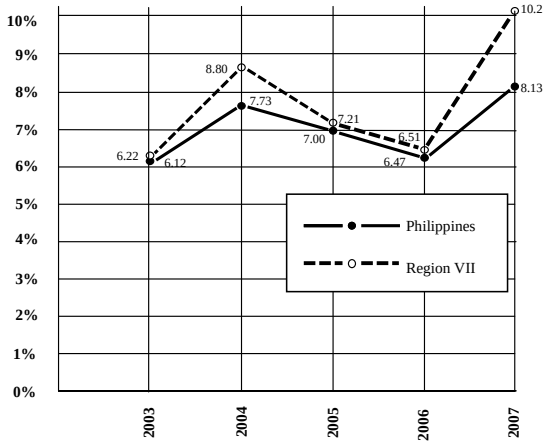


Source: NSCB, 2008

Economic Trend

- 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%, and tertiary sector 61%.

GDP and GRDP (Region VII) Growth Rate



Source: NSCB, 2008

Industrial Growth Rate (Region VII)

SECTOR	SECTORAL ECONOMIC GROWTH RATE				
	02-03	03-04	04-05	05-06	06-07
Total	4.56	7.22	6.00	4.81	8.92
Primary	1.68	3.49	1.74	-5.34	4.49
Secondary	2.72	5.76	5.38	5.42	7.17
Tertiary	6.22	8.80	7.21	6.51	10.24

Source: NSCB, 2008

18. PRESENT TRAFFIC CONDITIONS OF METRO CEBU

18.1 Distribution of Traffic Generation

Majority of the economic zones are clustered in Metro Cebu area. The same is true for shopping malls and interest spots.

Source: Philippine Economic Zone Authority (PEZA), 2008

18.2 Road Traffic Condition

Travel speed inside the cities of Talisay, Mandaue, and Cebu is shown in the figure below. There are many sections where travel speed is less than 20 km/hr including on the 2nd Mactan Bridge.

(North Road)

Congestion is experienced from Liloan until UN Avenue (junction to the 2nd Mactan Bridge) where travel speed is less than 20 km/hr. Vehicles moving in opposite direction experienced traffic congestion on the same road section. The above road is generally one-lane per direction.

(South Road)

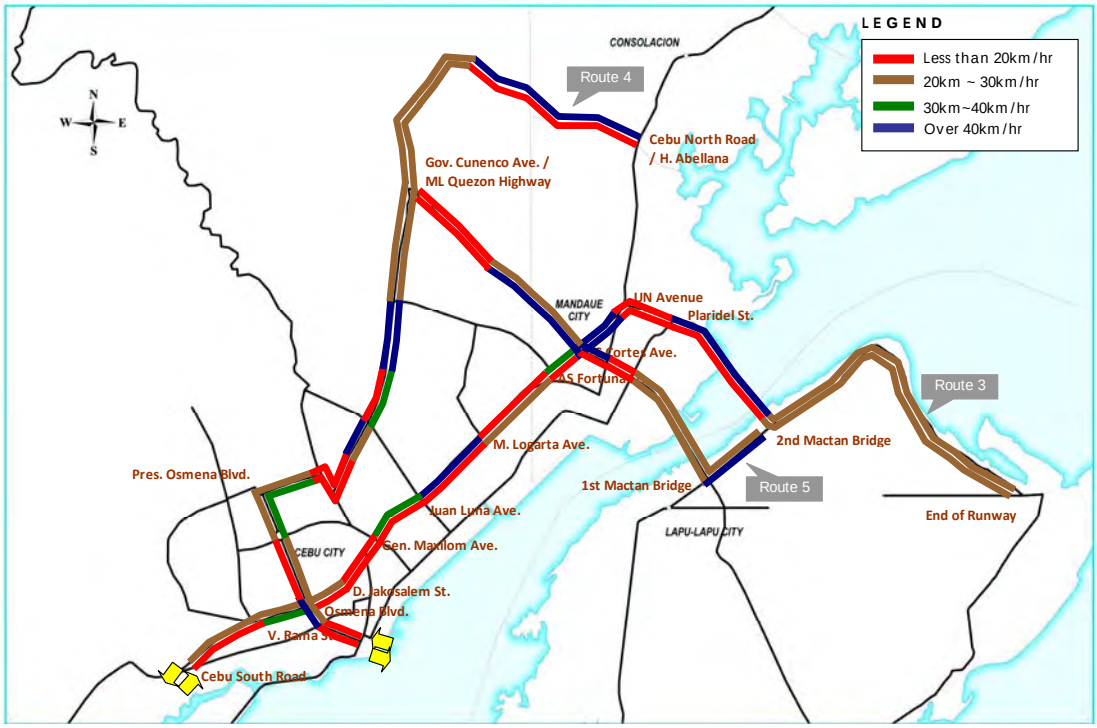
Heavy traffic congestion is experienced from the junction of Cebu South Coastal Road until center of Cebu city where travel speed ranges from 15 km/hr to 19 km/hr. Like the Cebu North Road, the above road is generally one-lane per direction.

18.3 Freight Movements and Logistics Corridors

Based on the OD survey results carried out at ports and airport, the major freight movements are between:

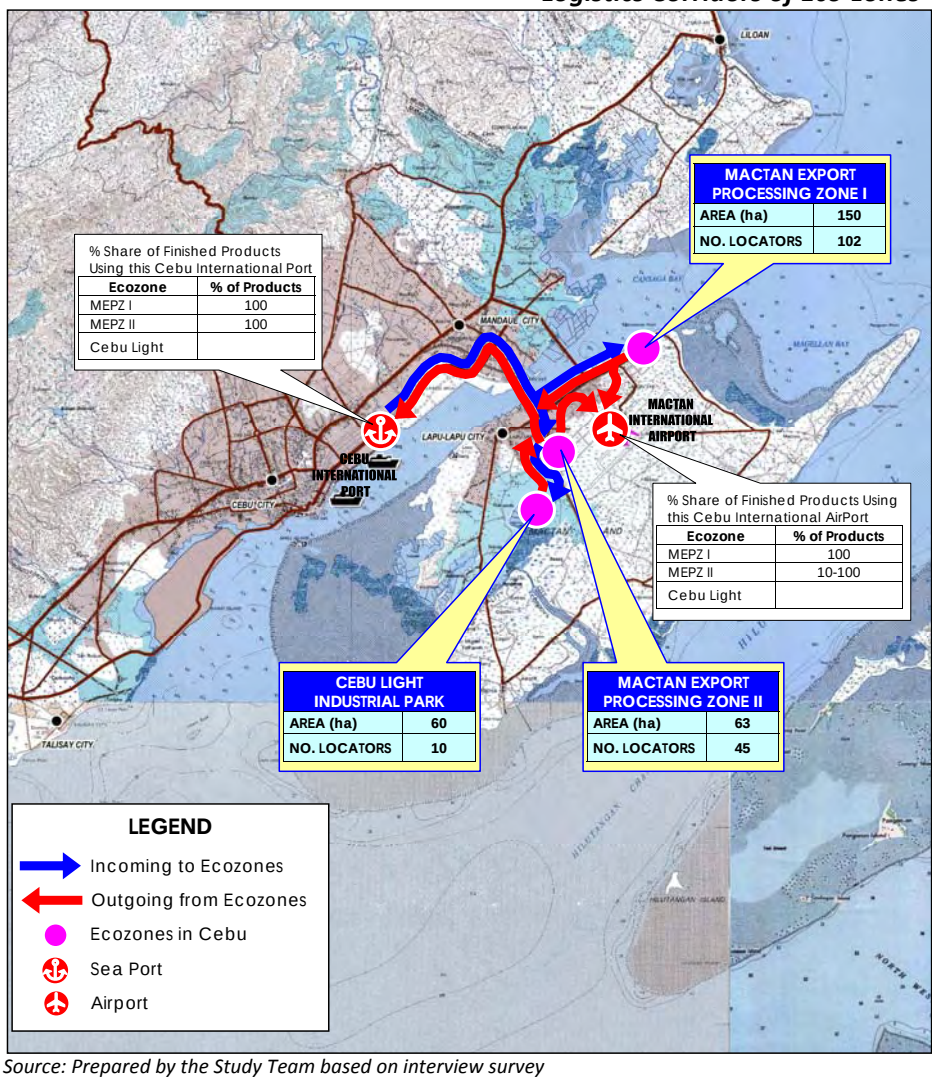
- Cebu City – Mandaue City
- Cebu City – Lapu-Lapu City
- Cebu City – Talisay City
- Cebu City – Naga City

Travel Speed in Metro Cebu



Source: Study Team

Logistics Corridors of Eco-zones



Source: Prepared by the Study Team based on interview survey

18.4 Identified Issues – Road Network

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 government is studying the introduction of Bus Rapid Transport (BRT) system, and the Cebu Provincial government is studying the introduction of Light Rail Transit (LRT) system.

Arterial Road Network

- Existing arterial road network is rather simple except in highly urbanized areas, the network implies that there is no alternative route.
- Two transport corridors are formed in the highly urbanized area
  - Central transport corridor - (Cebu North Road and Cebu South Road)
  - Coastal transport corridor, about to be completed -(Cebu South Coastal Rd & S. Osmena Blvd.)
- Most roads in the highly urbanized area are narrow. 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.

19. FUTURE SOCIO-ECONOMIC FRAMEWORK AND REGIONAL DEVELOPMENT SCENARIO OF METRO CEBU

19.1 Future Population

Adopted population growth rate and projected population is shown in the tables below.

Area	Annual Growth Rate		
	'90-95	'95-00	'00-07
Region VII	1.77	2.62	1.65
Cebu	0.37	2.71	1.75
Cebu city	1.64	1.65	1.52

Source: NSCB, 2008

Area	Projected Population ('000)			2030/2009 Ratio
	2015	2020	2030	
Region VII	7,245	7,792	8,904	1.35
Cebu	2,795	3,034	3,547	1.40
Cebu city	900	969	1,119	1.36

Source: Study Team

19.2 Future Socio-economic Framework

The table below shows the summary of future socio-economic framework.

	Increase 2030/2009	Average Growth Rate (%)
Population Growth	1.4 – 1.8	1.6% - 2.8%
Economy Growth	3.2	5.70%
Employment Growth	1.7	2.50%

Source: Study Team

19.3 Regional Development Scenario

Characteristics of Metro-Cebu

- 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.

Development Scenario

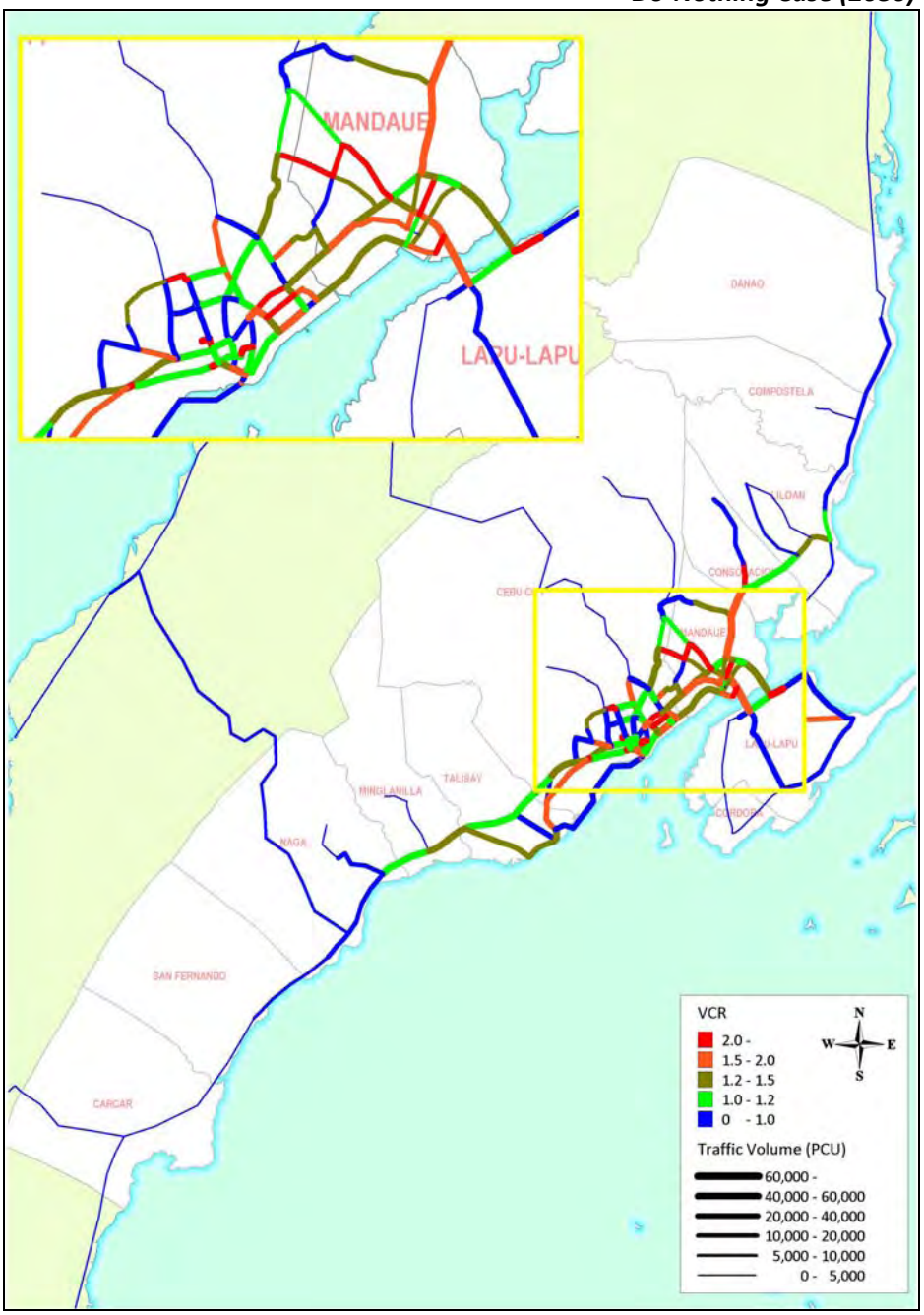
- Metro Cebu, particularly Cebu City, Mandaue City, Lapu-Lapu City and Talisay City shall grow as the business, commercial and industrial core of the Central Philippines.
- The function of international and domestic transportation hub shall be further strengthened.

Source: Study Team

20. FUTURE TRAFFIC DEMAND FORECAST OF METRO CEBU

The figure shown below illustrates the result of traffic assignment in "Do-Nothing" case. Without new construction and road improvement such as widening, most of the road network will experience serious traffic congestion in 2030 as indicated by the 'red' portion of the network.

Do-Nothing Case (2030)



Source: Study Team

21. ENVIRONMENTAL CONDITION AND SOCIAL CONSIDERATION FOR METRO CEBU

21.1 Natural Condition and Urban Development of the Study Area

Urban development is concentrated at narrow coastal plain areas and expanding towards the hill-side. 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.

21.2 Highway Planning to Minimize Adverse Impacts on Environmental and Social Conditions

Widening of the Existing Roads

- Widening of existing roads should be planned within existing road ROW.
- In many cases, a part of a house, shanties, and fences encroached 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.

New Road Construction

- Most proposed roads are planned in rapidly urbanizing areas & 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 identified critical areas. Alignment that minimizes adverse environmental and social impacts should be selected.
- To minimize environmental and social impacts, appropriate design standards should be selected.
- Consultation meetings with concerned people should be held from planning stage up to the detailed design and construction stage. Constant dialogue should be made for the successful implementation of the project.
- For new road construction, DPWH needs to undertake detailed feasibility study including EIA study. Recommended TOR is shown in Annex 13.2.

22. HSH DEVELOPMENT STRATEGY FOR METRO CEBU

22.1 Identified Issues - Arterial Road Network

- Cebu North Road serves northern area and Cebu South Road serves southern area. Total isolation of hinterland is very likely when natural calamity or collapse of bridge occur.
- All roads in highly urbanized area are narrow (mostly 4-lane undivided) and widening is extremely difficult due to heavy roadside development. Likewise, urbanization is expanding towards hilly area since the narrow coastal plain is highly urbanized. However, road development along hillside is not achieved yet.

Traffic Conditions

- Cebu North Road from Liloan towards Cebu City is experiencing traffic congestion and 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.

22.2 HSH Development Strategy

HSH development objectives and strategies are established as follows;

DEVELOPMENT OBJECTIVES

- To decongest traffic on arterial roads
- To achieve integration of socio-economic activities of Metro Cebu
- To enhance tourism industry
- To recover int'l. 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 transport 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 short interval in order to attract enough traffic; however, construction of interchanges is quite difficult due to topographical constraints.

22.3 Proposed HSH-2 Network

Based on urban center distribution, regional/urban development strategies, distribution of economic zones and tourist attraction points, topographical constraints and traffic conditions, HSH network is to be developed by 2030 as shown in the figure below. Major concepts are as follows;

Highly Urbanized Area

- Three (3) transport axes are formed;
  - Cebu Central Transport Axis (Cebu North Road and Cebu South Road)
  - Cebu Central Transport Axis (road constructed on the reclamation land). It is extended up to Liloan (new road).
  - Cebu Hillside Transport Axis (new road along the hillside and functions as a circumferential road for traffic distribution)

Northern Area

- Cebu North Transport Axis is formed consisting of Cebu North Road and its parallel road (new road).

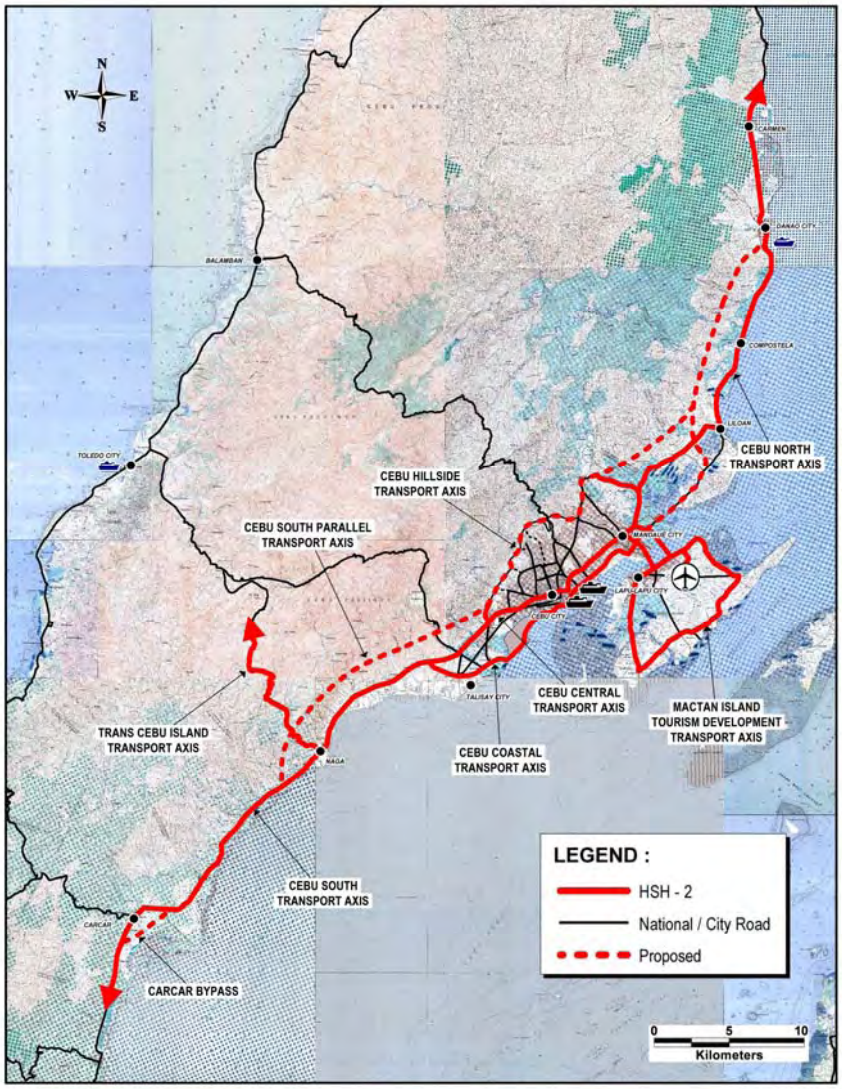
Southern Area

- Cebu South Transport Axis is formed consisting of Cebu South Road and its parallel road (new road).

Mactan Island

- Mactan Island Tourism Development Transport Axis (or Mactan Island circumferential road) is formed.
- Connection between Cebu Main Island and Mactan Island is strengthened.

Proposed HSH Network: Metro Cebu



22.4 Implementation Target of Proposed HSH-2 Network

Identified HSH projects and their implementation targets are shown in the table below.

22.5 Impact of Proposed HSH-2 Road Projects

The impacts of the proposed HSH network plan are as follows:

- The total travel distance of "Proposed" case indicates 8.5 million PCU*km. By comparing this value with that of "Do-Nothing" case, travel distance is shortened by 4%. This implies that 4% of wasteful detour travel may be improved.
- The impact on the improvement of travel time is more remarkable than travel distance. It would improve by 22% in 2020, and 40% in 2030 (222 thousand for "Proposed" case and 374 thousand for "Do-Nothing" case)
- Average travel speed indicates improvement of about 62%.

Identified HSH-2 Projects

Project Name		Implementation Target	
		By 2020	By 2030
Highly Urbanized Area	Extension of Cebu Coastal Rod up to Liloan	Construction of a 4-lane road	
	Construction of Cebu Hillside Road and its Connector Roads	Construction of a 2-lane road	Widening to a 4-lane road
	Flyover construction along Cebu North Road, Cebu South Roadd & Coastal Road	Construction of 4 flyovers	Construction of 5 flyovers
Northern Area	Widening of Cebu North Road	Widening to a 4-lane road from Mandauae / Liloan boundary to Danao City	
	Construction of Cebu North Parallel Road		Construction of a 2-lane road
Southern Area	Widening of Cebu South Road from Naga to Carcar	Widening to a 4-lane road	
	Construction of Cebu South Parallel Road	Construction of a 2-lane road	Widening to a 4-lane road
Mactan Island	Improvement of Mactan Circumferential Road	Improvement of existing road	
	Widening of First Mandaue-Mactan Bridge and its Approach Roads		Widening to a 4-lane bridge including approach roads
	Construction of 3rd Bridge and its Approach Road		Construction of a 4-lane bridge & its Approach Road

Impact of Proposed HSH-2 Projects

ITEM	2020		2030	
	Do-Nothing Case	Proposed Case	Do-Nothing Case	Proposed Case
Total Travel Distance(1000 PCU*km)	6,721	6,442	8,800	8,442
Total Travel Time(1000 PCU*hour)	241	189	374	222
Average Volume Capacity Ratio (volume/capacity)	0.82	0.64	1.04	0.74
Average Travel Speed (km/h)	27.9	34.2	23.5	38.1

PART IV – TAGUM-DAVAO-GEN. SANTOS (TDG) CORRDIOR

23. GENERAL PROFILE OF THE TDG

23.1 Physical Profile

Topography

Mindanao Island can be divided into eight (8) topographical divisions, namely (i) Diwata Cordillera, (ii) Agusan Plain, (iii) Davao Upland, (iv) Bukidnon Plateau, (v) Cotabato Plain, (vi) Tiruray Upland, (vii) Lanao Plateau, and (viii) Zamboanga Upland. The Diwata Cordillera is a tightly folded mountain range which runs in an almost N-S orientation.

Geology

A strong westerly relative plate motion component is observed on the southernmost station in Davao. This direction is almost perpendicular to the Philippine Fault and Cotabato Trench but oblique to the Cotabato Fault Zone. While this may imply frontal subduction along the trench, the computed motion vector may also mean that there is practically no lateral movement along the Philippine Fault along this segment.

Watershed and Flood Prone Area

(Davao del Norte) 15 rivers and 12 creeks traverse the province, such as the Lasang, Tuganay, Libuganon and Saug Rivers. All these rivers flow into Davao Gulf. Flooding can be classified as slight, moderate and severe. About 85% of the total provincial lands are subjected to slight flooding.

(Davao del Sur) The province of Davao del Sur has total of 40 watersheds which include three major watersheds. The largest watershed is the Padada Mainit River watershed with a total catchment area of 1,220 km2. Several flood prone areas were identified in the Padada Mainit River watershed that is located in the south of Digos.

(General Santos City) There is no official comprehensive yearly record of flood event and damage in the city. The Study Team identified that a flood plain forming on last 2km of the Buayan-Malungun River in Sarangani Bay area and a 5 km-stretch section of about 10km-upper stream of the river as flood prone areas.

23.2 Present Regional Development Plan

The Tagum-Davao-Gen. Santos corridor is considered to be a growing economic belt in Mindanao. It connects two of the developing regions in Mindanao, Southern Mindanao (Region XI) and Central Mindanao (Region XII). The corridor is also part of the BIMP-EAGA subregion and as such plays an important role in the subregional economic cooperation among Brunei, Indonesia, Malaysia and the Philippines. This is also one positive point that needs to be considered.

23.3 Socio-Economic Profile

Demographic Trend

Average annual population growth rate of Regions XI and XII, Davao City and Gen. Santos City is shown in the figure below.

Economic Trend

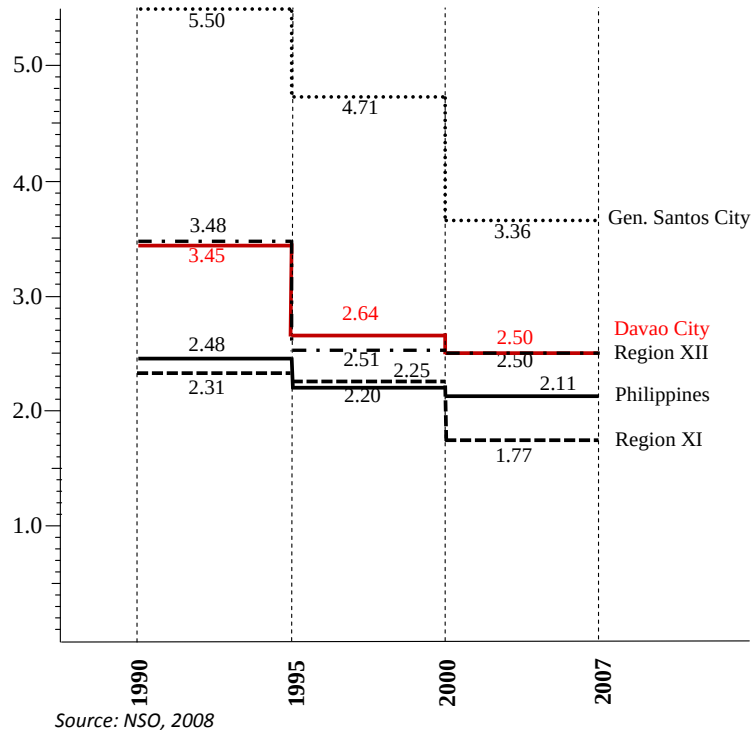
GDP and GRDP of Region XI and XII and the industrial structure and growth rate is shown below.

Sectoral Economic Growth Rate

	Sector	Sectoral GRDP (Billion PhP, Constant Price)		Sectoral Economic Growth Rate	
		2006	2007	2006	2007
Region XI	Primary	15.7 (27.1%)	16.0 (25.9%)	3.02	2.06
	Secondary	17.9 (30.9%)	20.1 (32.5%)	2.78	11.90
	Tertiary	24.2 (41.8%)	25.7 (41.6%)	6.43	5.91
Region XII	Primary	18.6 (39.2%)	20.00 (39.1%)	6.42	7.87
	Secondary	16.7 (35.2%)	18.7 (36.4%)	8.92	11.60
	Tertiary	12.1 (25.5%)	12.7 (24.7%)	5.13	4.64

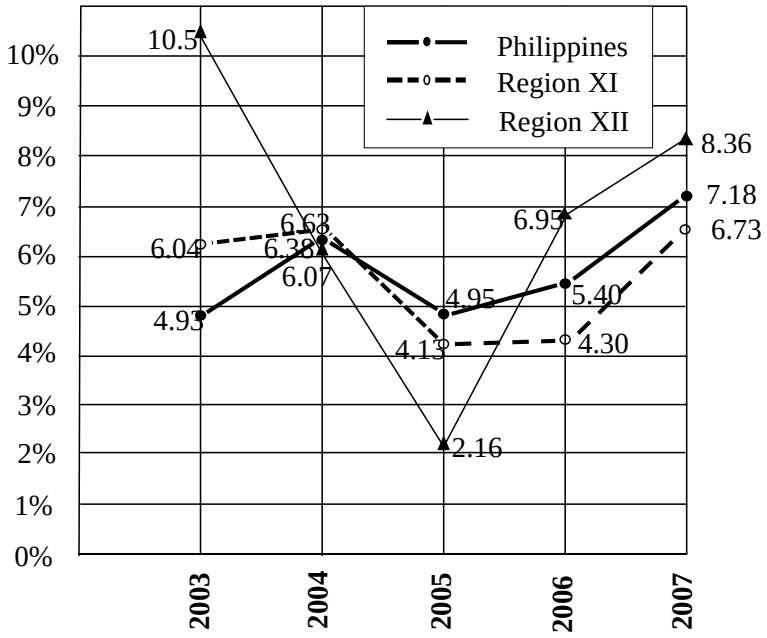
Source: NSCB, 2008

Population Growth Rate



Source: NSO, 2008

GDP and GRDP Growth Rate (Regions XI & XII)



Source: NSCB, 2008

24. PRESENT TRAFFIC CONDITION OF TDG

24.1 Distribution of Traffic Generation Sources

Distribution of economic zones in Tagum-Davao-Gen. Santos corridor is shown in the figure below.

24.2 Road Traffic Condition

- Travel speed along Tagum-Davao-Digos corridor is good except for sections approaching diversion road of Davao City and inside Tagum city (see figure on the next page)
- There are many road sections inside Davao city where travel speed is less than 20 km/hr.
- In General Santos, though section of Cahisot – Bula Amao road of P. Acharon Blvd. is experiencing slow movement, vehicles generally can accelerate for more than 20km/hr (average).

24.3 Freight Movements and Logistics Corridors

The truck OD survey was carried-out at Davao (Sasa) Port, Gen. Santos Port, Davao International Airport and Gen. Santos Airport and desire line map of trucks related to ports/Airports are shown in the figure below. Interviews with manufacturing companies were also conducted. The following were identified as logistics corridors:

- Pan Philippine Highway (Davao-Butuan)
- Davao – Cagayan de Oro Road
- Davao – Digos – Cotabato Road
- Davao – Digos – Gen. Santos Road

Comments on Problems Made by Manufacturing Companies, Trucking / Logistics Companies

Problems identified by manufacturing companies and trucking/logistics companies are as follows:

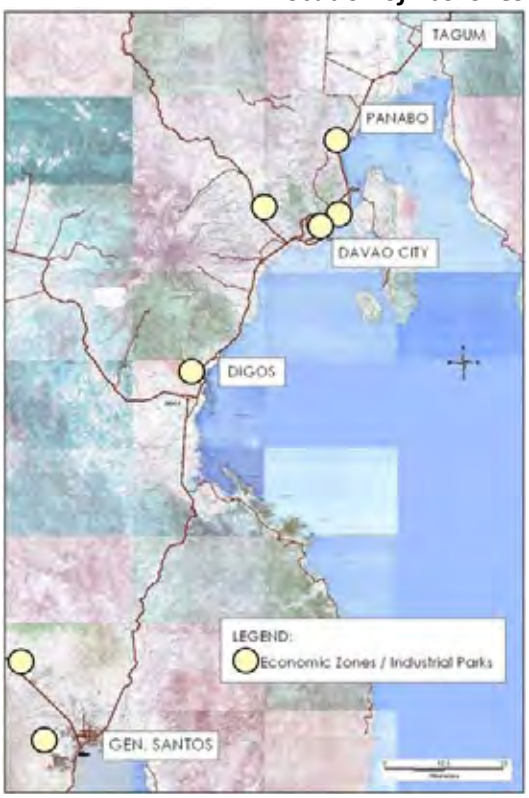
(Manufacturing Companies)

- Frequent delayed arrival of vessels
- Late delivery to clients due to poor road condition, traffic congestion, and poor traffic regulations
- On-street parking is causing traffic congestion

(Trucking Companies)

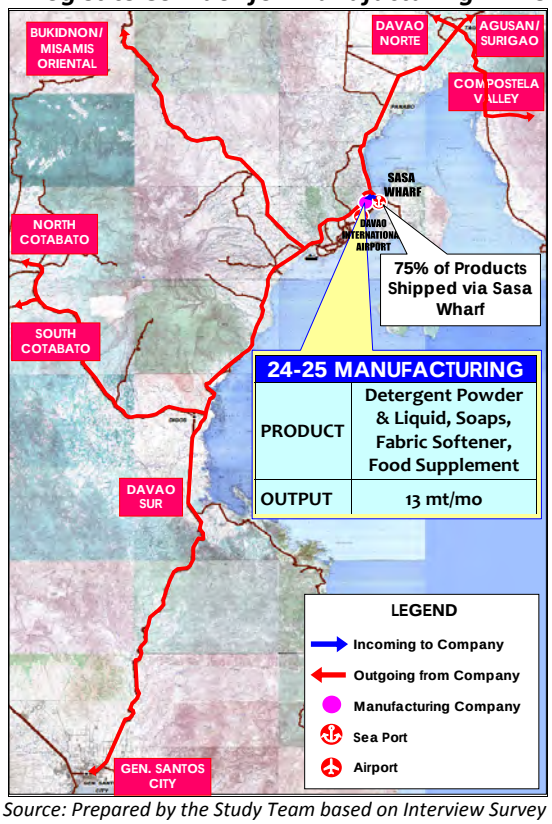
- Heavy traffic congestion on highways passing public markets, (e.g. b/w Paracan-Tibungco)
- Poor condition with many potholes along national road from Digos City to General Santos, Mabini Street and other Davao City roads
- Heavy traffic congestion,
- Long waiting time of trucks inside the port due to frequent delayed arrival of vessels
- Heavy congestion at port's access rd. during rush hours.

Location of Ecozones



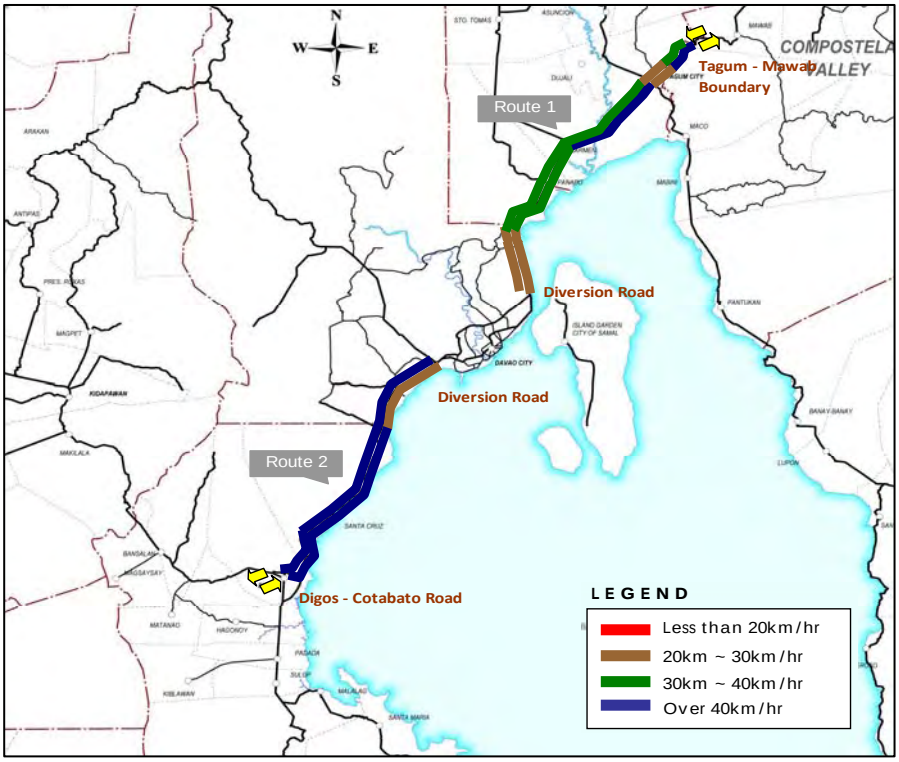
Source: Philippine Economic Zone Authority (PEZA), 2008

Logistics Corridor for Manufacturing Firms



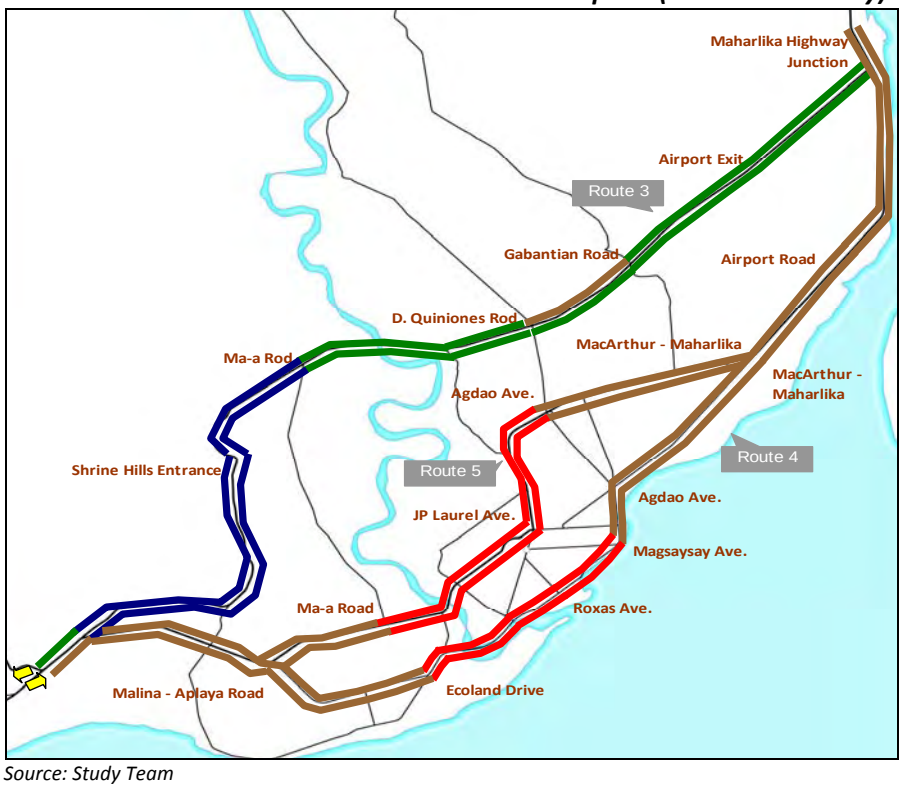
Source: Prepared by the Study Team based on Interview Survey

Travel Speed (Tagum – Davao – Digos Corrdior)



Source: Study Team

Travel Speed (Inside Davao City)



Source: Study Team

25. FUTURE SOCIO-ECONOMIC FRAMEWORK AND REGIONAL DEVELOPMENT SCHENARIO OF TDG

25.1 Future Population

Adopted population growth rate and projected population is shown in the two tables below.

Area	Annual Growth Rate		
	1990-1995	1995-2000	2000-2007
Region XI	2.31	2.25	1.77
Davao city	3.45	2.64	2.50
Region XII	3.48	2.51	2.50
Gen. Santos city	5.5	4.71	3.66

Source: NSO, 2008

Area	Projected Pop. ('000)			2030/2009 Ratio
	2015	2020	2030	
Region XI	4,765	5,169	5,971	1.39
Davao city	1,640	1,820	2,133	1.49
Region XII	4,613	5,162	6,417	1.60
Gen. Santos city	699	823	1,133	1.99

Source: Study Team

25.2 Future Socio-economic Framework

The table below shows the summary of future socio-economic framework.

	Increase 2030/2009	Average Growth Rate (%)
Population Growth	1.4 – 1.6	1.6% - 2.3%
Economy Growth	3.2 – 3.5	5.7 – 6.1 %
Employment Growth	1.9	3.1 %

Source: Study Team

25.3 Regional Development Scenario

Based on the characteristics of the Tagum – Davao – Gen. Santos corridor, the development strategy was established as follows:

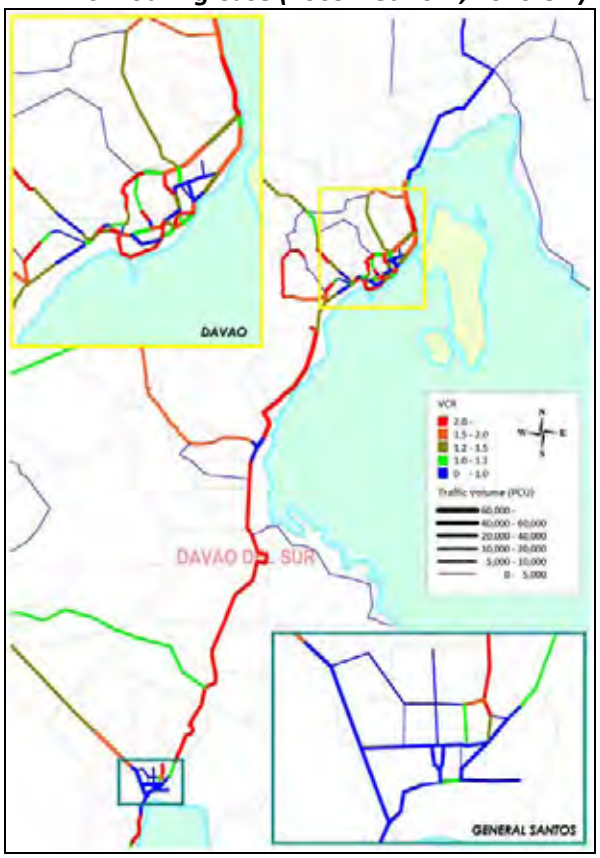
- Metro Davao shall grow as the business, commercial, industrial and educational core of the entire Mindanao.
- In order to achieve the integrated development of Mindanao, the linkage/connection between Metro Davao and other major urban centers in Mindanao shall be strengthened.
- To strongly support the development of agri-fishery industry in Mindanao, transport axes connecting major urban centers with Metro Davao shall be developed.
  - Davao-North Mindanao development axis
  - Davao-Region X development axis
  - Davao-Cotabato development axis
  - Davao-Gen. Santos development axis
  - Gen. Santos-Cotabato development axis
- As the core center of BIMP-EAGA, Metro Davao's urban function shall be further developed.
- As the regional urban center, Metro Gen. Santos' urban function shall be further developed.

26. FUTURE TRAFFIC DEMAND FORECAST FOR TDG

26.1 Do-Nothing Case Traffic Assignment

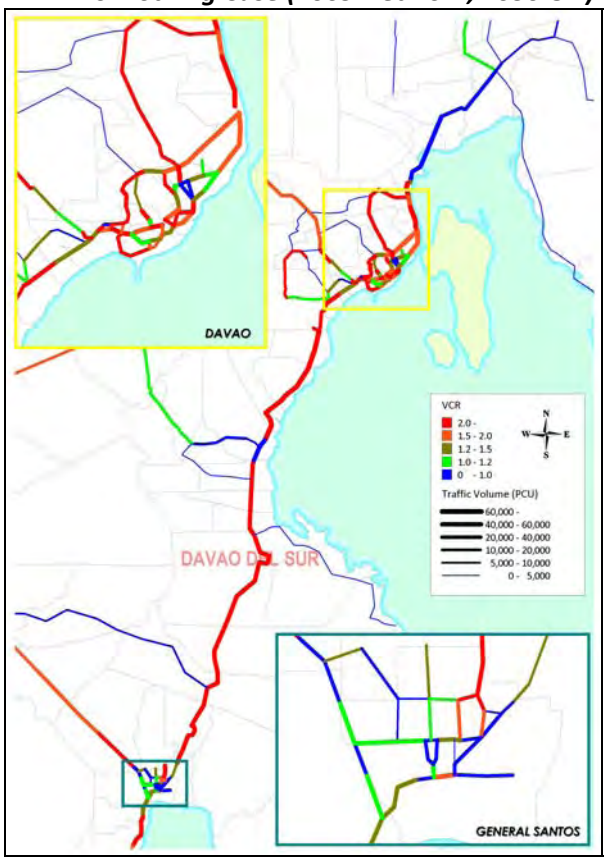
The figure below illustrates the result of traffic assignment in "Do-Nothing" case. Without new construction and road improvement such as widening, most of the road network will experience traffic congestion in 2020 and will further deteriorate in 2030 as shown in the succeeding figure.

Do-Nothing Case (2009 Network, 2020 OD)



Source: Study Team

Do-Nothing Case (2009 Network, 2030 OD)



Source: Study Team

27. HSH DEVELOPMENT STRATEGY FOR TDG

27.1 Identified Issues

Arterial Road Network

- Arterial roads connecting Davao City with other major urban centers in Mindanao have already been formed however alterative is missing thus these roads must be strong.
- Due to topographical constraints, highly urbanized area of Davao City developed at the narrow coastal plain and no systematic network is formed. Likewise, roads in these area are all narrow (mostly 4-lane) and widening is very difficult due to roadside development. Most roads in Gen. Santos City have wide ROW and can be converted easily to high standard roads.

Traffic Conditions

- Roads within the highly urbanized area of Davao City have traffic congestion problems and travel speed is less than 20 km/hr. Adjacent arterial roads to this area are also experiencing traffic congestion and travel speed is less than 20 km/hr. Gen. Santos City has less traffic problem and travel speed is over 20 km/hr.

27.2 Development Strategy

DEVELOPMENT OBJECTIVES

- To decongest of traffic on arterial roads
- To achieve strong linkage between Davao City and other major urban centers in Mindanao
- To enhance agro-fishery industry
- To recover international competitiveness of industries
- To promote sound urban expansion of Davao and Gen. Santos city

DEVELOPMENT STRATEGY

- To promote transport facilities with higher service level
- To connect Davao City with other major urban centers with high standard transport facilities
- To improve modal linkage
- To provide transport facilities which guide sound urban expansion at Davao City and Gen. Santos City

STRATEGY TO FORMULATE HSH NETWORK

- HSH network shall be formed WITH HSH-2, since formulation of HSH-1 is difficult due to the following reasons:
  - Traffic demand from outside to Davao City urbanized area is still low to require HSH-1;
  - In the highly urbanized area of Davao City, roads are too narrow to accommodate HSH-1.

27.3 Proposed HSH-2 Network

Based on the distribution of urban center, development strategies, distribution of economic zones and tourist attraction points, topographical constraints and traffic conditions, HSH network was proposed as shown in the figure in the succeeding page. Major concepts are as follows;

Inter-City Transport Axes

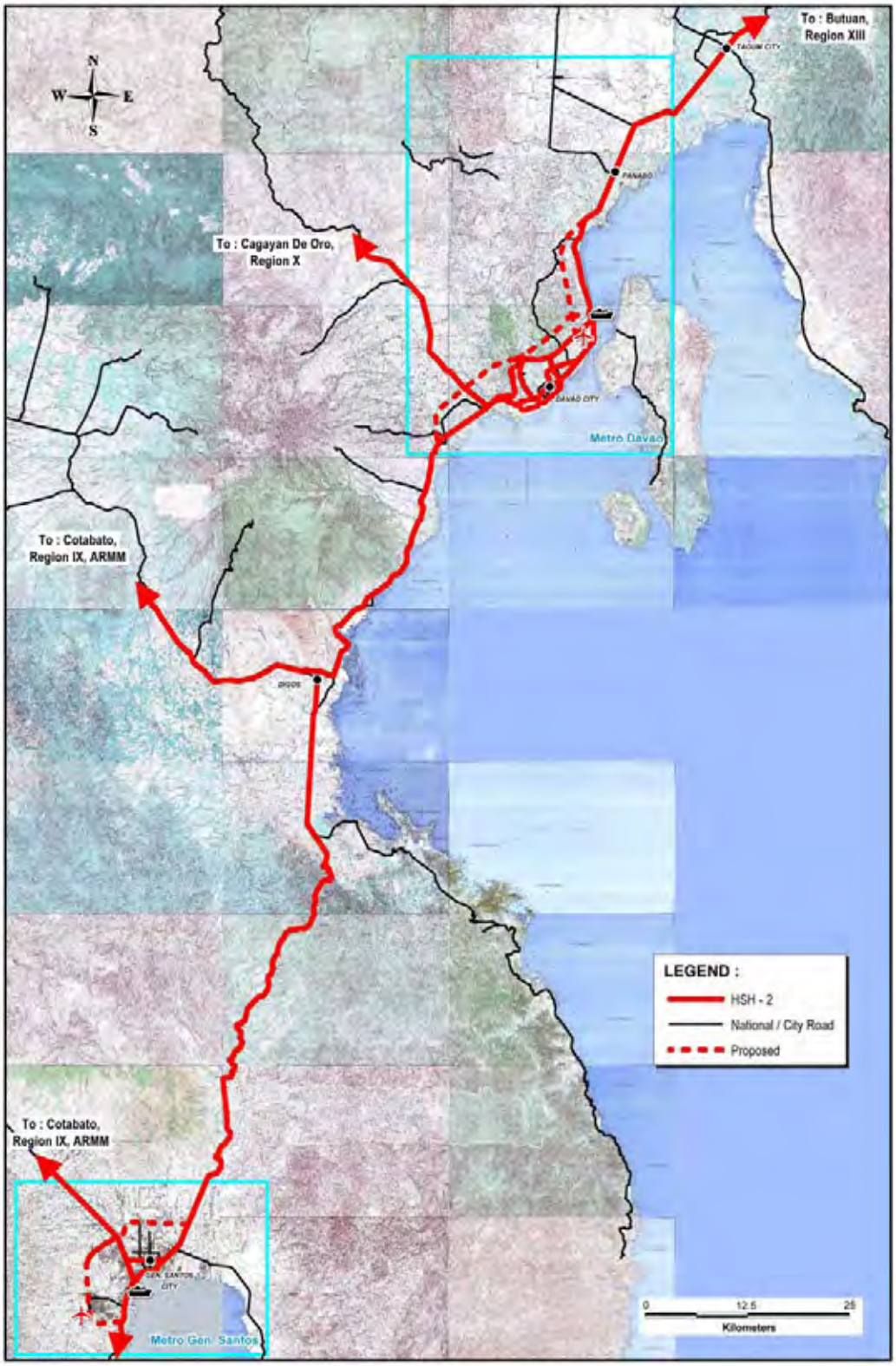
- Davao-Tagum Transport Axis together with Davao-Tagum Parallel Transport Axis is formed as a HSH network
- Davao-Digos-General Santos Transport Axis together with Davao-General Santos Parallel Transport Axis is formed as a HSH network
- Davao-Cagayan De Oro Transport Axis is formed as a HSH network

Intra-City Transport Axes

Roads to be designated as HSH are as follows;

- Davao City Diversion Road
- Second Diversion Road to be formed
- MacArthur Highway – E. Quirino Avenue
- Quimpo Blvd.-Quezon Blvd.-Leon Garcia Avenue-R. Castillo Avenue
- C.M. Recto Avenue-J.P. Laurel Avenue
- Ma-a Road
- D. Quinones Road-Dacudao Avenue
- General Santos City Circumferential Road

Proposed HSH Network: Tagum-Davao-Gen. Santos Corridor



27.4 Implementation Target of Proposed HSH-2 Project

Identified HSH projects and their implementation targets are shown in the table below.

27.5 Impact of Proposed HSH-2 Projects

The impact of the proposed HSH network plan can be summarized as follows:

- The total travel distance of "Proposed" case indicates 17.4 million PCU*km. By comparing this value with that of "Do-Nothing" case, travel distance is shortened by 5%. This implicates that 5% of wasteful detour travel may be improved.
- Impact on improvement of travel time is more remarkable than travel distance. It would be improved by 20% in 2020, and 46% in 2030 (690 thousand for "Proposed" case and 1,280 thousand for "Do-Nothing" case)
- Average travel speed indicates improvement about 94%.

Identified HSH Projects

	Project Name	Implementation Target	
		By 2020	By 2030
Inter-City HSH	1. Widening to 4-lane divided rd. for Davao-Tagum Road (At present, mostly un-divided 4-lane and some sections are still 2-lane)	Convert to a 4-lane divided road	
	2. Providing frontage roads for urban sections of Davao-Tagum Rd. (Panabo and Tagum urban sections)		Construction of frontage roads to separate thru traffic from local traffic
	3. Construction of Davao-Tagum Parallel Road including Sasa Port access road	Construction of a 2-lane road	Widening to a 4-lane road
	4. Widening of Davao City Diversion Road from Sasa to Davao River Bridge	Widening to a 6-lane road	
	5. Construction of Davao-General Santos Parallel Road	Construction of a 2-lane road	Widening to a 4-lane road
	6. Widening of Davao-General Santos Road between Davao and Digos	Widening to a 4-lane road	
	7. Widening of Davao-General Santos Road between Digos and General Santos		Widening to a 4-lane road
Intra-City HSH	8. Flyover construction for HSH within Davao City	4 Flyovers	3 Flyovers
	9. Construction of Second Diversion Road		Construction of a 4-lane road
	10. Construction of General Santos City Circumferential Road	Construction of a 2-lane road	Widening to a 4-lane road

Impact of Proposed HSH-2 Projects

Item	2020		2030	
	Do-Nothing Case	Proposed Case	Do-Nothing Case	Proposed Case
Total Travel Distance (1000 PCU*km)	11,937	12,629	16,640	17,426
Total Travel Time (1000 PCU*hour)	707	568	1,280	690
Average V/C Ratio	1.16	1.01	1.61	1.02
Average Travel Speed (km/h)	16.9	22.2	13.0	25.3

PART V – CAPACITY DEVELOPMENT

28. CAPACITY DEVELOPMENT

28.1 The Need for DPWH Capacity Development for PPP

There is a strong need to improve the capability to effectively promote and manage PPP expressway projects for the following reasons:

- Government budgetary constraints for National Road Development.
  - 0.86% of GDP in CY 2010 (budget ceiling for national roads).
  - 1.6% of GDP required in CY 2016 to support the growth of the economy.
- PPP projects will provide infrastructure and services within budgetary constraints by utilizing private resources to finance.
- The government policy discourages unsolicited proposals.
- DPWH is propose to be the sole entry point for toll road projects and take the lead role in all toll road transactions and decision-making.

28.2 Bases of Capacity Development at DPWH

The capacity development program in the study was prepared with due consideration of the following main factors:

- Self-assessment survey among DPWH officials to determine their needs for organizational strengthening and training for PPP project development and management.
- Comments and suggestions from private PPP firms so as to make PPP more attractive and effective.
- Existing DPWH organization and functions and its Rationalization Plan under Executive Order No. 366.

28.3 Survey of Organizational Improvement

The survey asked the DPWH officials the following information.

A. Organizational Strengthening

- The existing functions and staff of their organizational units related to PPP.
- Suggested changes in their functions and staffing for PPP.

B. Skills Training

- Their perceived priority capacity development in the different topics prepared by the Study Team.
- Their present state of knowledge in each topic.
- If further training is needed: desired training level and model.

28.4 Comments and Suggestions of Private BOT/PPP

The comments and recommendations based on the interview with the private firms are summarized below:

- DPWH should have a focused full time group for PPP to handle all aspects – technical, financial, environmental, legal aspects, and ROW.
- All government approvals should be secured before bidding – toll rate caps and adjustment formulae, ECC, LGU permits, etc.
- The government should undertake the F/S and complete ROW acquisition before the bidding – prompt ROW delivery before start of construction.
- Once the ROW is defined, the government should freeze developments therein.
- The government should provide and enforce the time limits and milestones for the project proponent to implement the different stages of the project.
- The government should ensure the automatic grant franchise by the TRB after bidding and contract award.
- The proponent is to assume financing and construction risks, if the government can handle the above measures.

28.5 Suggestions from DPWH Officials

- PMO-BOT
  - Implement the proposed Rationalization Plan of DPWH.
  - Staff should be further reinforced (legal expert, financial analyst, marketing and communication expert, economist,

upgrading position of legal officer, financial analyst).
  - Be authorized to approve PPP billings, variation orders and payments.
- PS supports the Rationalization Plan of DPWH.
- PMO-FS
  - All BOT related functions and staff be integrated into the PMO-BOT as a one-stop office for PPP matters.
  - New positions for Engineer III, to create evaluation section.
- BOD
  - Be strengthened by adding engineers and geologists.
- ESSO
  - Social Scientists be provided for community organization matters.
- IROWR-PMO
  - Requires Economic and Financial Analysts

28.6 Capacity Requirements for DPWH in the PPP Project Cycle

The DPWH capacity should be sufficiently developed to effectively handle basic steps in the PPP project cycle.

1. Preparation - national legislative and regulatory policies.
2. Project Identification - business case study.
3. Project Appraisal – PPP modality selection, PPP structure definition.
4. Feasibility Study – including bidding, ODA arrangements, and ROW acquisition.
5. Bidding - project requirements, government support, bid evaluation criteria, tender process.
6. Implementation – proper coordination between public and private sector in accordance with precise requirements, including construction, O&M and monitoring.

28.7 Proposed DPWH Rationalization Plan

Restructuring

The plan, pursuant to the provisions of EO 366, seeks to build up the organizational capability of the Department to undertake PPP projects as follows.

- PMO-BOT is to be renamed in PPIPO and strengthened to focus on the identification, packaging, monitoring and development of road-related PPP projects.
- The PS is to be strengthened through absorbing PMO-FS functions which has a new division or the PPED.
- The ESSO and the IROWR-PMO are to be merged to form the ESROWO.

Strengthening of Proposed Organization

PPIPO
- Director IV (Head), Eng V, Eng III, Legal Officer IV, Financial Analyst IV, Economist IV, Marketing and Communication Specialist, Project Development Officer II

PS
- Augmenting the staff of DPD, Creating PPED

ESROWO (new)

BOD
- Additional engineers and geologists, CAD operators

Any proposed revisions in the staffing pattern of DPWH should be made within the "scrap-and-build" policy of the government.

28.8 Proposed Delineation of PPP Functional Responsibilities

Recommended delineation of functions and responsibilities are shown in the table.

Activity	Lead Office	Cooperating Offices	Possible Out-Sourcing
PPP Policy Framework Formulation	PS-DPD	PPIPO, LS, (NEDA)	
Project Identification	PS-DPD	PPIPO,PS-RSD, PS-RSTAD	
Project Business Case Study	PS-PPED	PPIPO,ESROWO, BOD, BOM, (DENR), (NEDA)	Entire BC Study
Project FS	PS-PPED	PPIPO,ESROWO,PS-RSTAD,BOD,BOM, (NEDA), (BIR, LGUs, PCUP, NHA)	Entire FS Study
Project Procurement	PO	BAC, PPIPO, LS	
Project Implementation	PPIPO	ESROWO, BOD, BOC, (BIR, LGUs, OSG, Courts)	Val. eng'g, ICE, IDC
Project Operation	PPIPO	(TRB)	
Project Monitoring and Post-Evaluation	PPIPO	PS-MIS, PS-PPED	Impact evaluation

28.9 Recommended Training Program

The recommended subjects for capacity development program and the main target offices are shown below.

Recommended Training Programs

Training Module Corresponding to Activities	Target Offices
M1.PPP Policy Framework Formulation/Update	**PS-DPD / FS/ PPIPO**
1.1 Legal and Policy Framework	PS-DPD
M2.Project Identification	**PS-DPD**
2.1 Formulation/Road Network Plan	PS-DPD
2.2 Identification of Potential Expressway Projects	PS-DPD
2.3 Formulation of Expressway Master Plan	PS-DPD
M3.Project BC Study	**PS-PPED**
3.1 PPP Suitability Assessment	PPIPO
3.2 Preliminary Traffic Study	PS-PPED
3.3 Technical Assessment	PS-PPED
3.4 Environmental Assessment (including ROW)	ESROWO
3.5 Preparation of O&M Scheme	PPIPO
3.6 Preliminary Economic Analysis	PS-PPED
3.7 Preliminary Financial Evaluation	PS-PPED
3.8 Project BC Appraisal/Approval	PPIPO
M4.Project FS	**PS-PPED**
4.1 Detailed Traffic Study and Forecast	PS-PPED
4.2 Technical Soundness Evaluation	PS-PPED
4.3 Environmental Impact Evaluation	ESROWO
4.4 Preparation of ROW & Resettlement Plans	ESROWO
4.5 Preparation of O&M Plan	PPIPO
4.6 Economic and Financial Evaluation	PS-PPED
4.7 Risk Assessment	PS-PPED
4.8 Selection of Appropriate PPP Modality	PPIPO
4.9 Prep. of Procurement Plan and Bidding Docs	PPIPO
4.10 Project Appraisal/Approval	PPIPO
M5.Project Procurement	**PO**
5.1 Conduct of Bidding	PO/BAC
5.2 Bids Evaluation and Award	PO/BAC
5.3 Contract Perfection	PPIPO
M6.Project Implementation	**PPIPO**
6.1 ROW Acquisition and Delivery	ESROWO
6.2 Financial Closure	PPIPO
6.3 Review/Supervision of Detailed Eng'g Design	BOD
6.4 Supervision of Construction	PPIPO
M7.Project Operation	**PPIPO**
7.1 Toll Rates and Adjustments	PPIPO
7.2 Supervision of O&M	PPIPO
M8.Project Monitoring and Post-Evaluation	**PPIPO**
8.1 Monitoring & Evaluation of Outputs and Outcomes	PPIPO

Note: PS-DPD should participate in all modules, since they will conduct post-evaluation of PPP projects.

29. MEETINGS AND COUNTERPART TRAININGS

The following meetings and trainings were held in the course of the Study:

KICK-OFF MEETING : April 14, 2009

Inter-Agency Steering Committee (ISC) Meeting

- First ISC meeting - April 28, 2009
- Second ISC meeting - September 29, 2009
- Third ISC meeting - January 27, 2010
- Fourth ISC meeting - May 18, 2010

Technical Working Group (TWG) Meeting

- First TWG meeting - May 5, 2009
- Second TWG meeting - June 19, 2009
- Third TWG meeting - August 26, 2009
- Fourth TWG meeting - Sept 23, 2009
- Fifth TWG meeting - January 25, 2010
- Sixth TWG meeting - March 19, 2010
- Seventh TWG meeting - May 6, 2010
- Eighth TWG meeting - May 14, 2010

Stakeholders (SH) Meeting

- First SH at Manila - January 22, 2010
- Second SH at Manila - April 28, 2010
- First SH at Cebu - April 6, 2010
- First SH at Davao - April 13, 2010

Consultation Meeting

- Metro Cebu - May 8, 2009
- Metro Davao - June 1, 2009
- Metro Gen. Santos - June 2, 2009

Counterpart Training in Japan

- Five (5) counterparts were sent to Japan for training
- Period: November 25 – December 15, 2009 (15 days)

Intensive Training on JICA STRADA

- Eighteen (18) counterparts and DPWH staff attended the training
- Period: April 19 – April 23, 2010
- Subjects:
  - Outline of Traffic Demand Forecast
  - Network Database Development
  - OD Matrix Forecasting
  - Traffic Assignment
  - Future Road Network Development and Evaluation
  - Presentation of Exercise Result by Participants

30. RECOMMENDATIONS

- **PLAN AUTHORIZATION**

Proposed Master Plan should be authorized by DPWH as the agency's plan, then by NEDA as the national plan. Eight (8) projects under the first priority group should be included in "LIST OF PRIORITY PROJECTS for PPP", MTPDP, CIIP, MTPIP, and MTRDP, thus the firm commitment of the Government and DPWH should be expressed.

- **SUFFICIENT STUDY FOR PROJECT PREPARATION**

To successfully implement PPP projects, sufficient study should be undertaken. Business Case Study and detailed feasibility Study should be undertaken to formulate firm PPP scheme. More time and fund should be spent for project preparation stage.

- **GOVERNMENT BUDGET INCREASE AND ACTIVE PARTICIPATION OF PRIVATE SECTOR**

Huge investment (141 Billion pesos by 2020 and 203 Billion pesos between 2020 and 2030 or a total of 344 Billion pesos) to realize Master Plan is required. DPWH budget should be increased and active private sector participation should be seeked. DPWH capital outlay budget should be increased at least 5% per annum in real term. About 40% of private sector financing for the Master Plan projects should be targeted.

- **STRONG DPWH's INITIATIVE TO BE EXERCISED**

DPWH should authorize eight (8) priority projects, include them in the "List of Priority Projects for PPP" and establish firm implementation schedule. For various projects proposed by GOCCs and the private sector, DPWH should properly act on them.

- **DPWH AS A SINGLE ENTRY POINT OF PPP PROJECT**

DWPH should be authorized as a single entry point of expressway projects.

- **EXPEDITION OF ROW ACQUISITION**

One of the most serious bottlenecks of project implementation is delay in ROW acquisition. Early start of ROW acquisition soon after project is approved, adoption of market price for purchasing lands and properties and strengthening of PMO-IROWR are needed.

In order to start ROW acquisition early, accuracy of the preliminary design during the detailed feasibility study should be improved.

- **STRENGTHENING OF DPWH ORGANIZATION AND CAPACITY DEVELOPMENT**

DPWH should be the "main engine" to accelerate PPP projects. DPWH's initiative and roles are quite important. To pursue these objectives, DPWH needs to strengthen its PPP related organization and capacity. Various recommendations made by this Study should be implemented.

- **UPDATING OF THE MASTER PLAN**

The master plan should be updated every 5 years.

- **UNSOLICITED PROPOSAL**

Present Government policy stipulated in the BOT Law should be continuously and strictly followed. The private sector should formulate projects which are financially viable without direct Government's guarantees, subsidy and equity.

For this purpose, private sector should plan toll expressway combined with a land development project to improve profitability.

- **COMPREHENSIVE EIA STUDY**

All projects will require high number of resettlement, and many projects will take productive agricultural or fishery lands. All possible mitigation measures should be proposed and implemented.

- **METRO CEBU AND TAGUM – DAVAO – GEN. SANTOS CORRIDOR**

DPWH should prepare Master Plan based on proposed HSH Network Development Strategy.

- **HSH-2 ROAD DEVELOPMENT**

Proposed HSH-2 Projects should be planned and implemented in due consideration of HSH-1 Network Development.

- **DPWH's ROAD CLASSIFICATION**

DPWH should add HSH-1 and HSH-2 in its road classification and information of these should be compiled in the road statistics.

- **UPDATING OF TRAFFIC DATA**

Traffic data gathered under this Study should be updated regularly.

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