JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
METRO CEBU DEVELOPMENT AND COORDINATION BOARD (MCDCB)

THE ROADMAP STUDY FOR SUSTAINABLE URBAN DEVELOPMENT IN METRO CEBU

FINAL REPORT

SUMMARY

JUNE 2015

ALMEC Corporation
Oriental Consultants Global Co., Ltd.

EXCHANGE RATE USED IN THE REPORT

USD 1 = JPY 119 = PHP 44

(RATE IN MARCH 2015)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

AGT	Automated Guideway Transit
ASEAN	Association of Southeast Asian Nations
ATC	Area Traffic Control
BOD	Biochemical oxygen demand
BOT	Build Operate Transfer
BPO	Business Process Outsourcing
BRT	Bus Rapid Transit
CB3R	Community Based 3R
CML	Cebu – Mandaue – LapuLapu
CPA	Cebu Port Authority
CTS	Collection and Transport System
DBP	Development Bank of Philippines
D/D	Detailed Design
DENR	Department of Environment and Natural Resources
DOF	Department of Finance
DOTC	Department of Transportation and Communications
DPWH	Department of Public Works and Highways
DTI	Department of Trande and Industry
EAP	Economic Active Population
EIRR	Economic Internal Rate of Return
EMB	Environmental Management Bureau
FDI	Foreign Direct Investments
FS	Feasibility Study
GDP	Gross Domestic Products
GIS	Geographical Information System
GRDP	Gross Regional Domestic Product
HIS	Household Interview Survey
HLURB	Housing and Land Use Regulatory Board
HRD	Human Resource Development
ISFs	Informal Settler Families
IT	Information Technology
JICA	Japan International Cooperation Agency
JST	JICA Study Team
JV	Joint Venture
KPO	Knowledge Process Outsourcing
LBP	Land Bank of the Philippines
LGU	Local Government Unit
LRT	Light Rail Transit
MCDCB	Metro Cebu Development and Coordination Board
MCDA	Metro Cebu Development Alliance
MCDP	Metro Cebu Development Project
MCIA	Mactan – Cebu International Airport
MCIAA	Mactan – Cebu International Airport Authority
MCIB	Mega Cebu Investment Board
MCIFDS	Metro Cebu Integrated Flood and Drainage System
MCLUTS	Metro Cebu Land Use and Transport Study
MCWD	Metropolitan Cebu water District
MEPZ	Mactan Export Processing Zone

MICE	Meeting, Incentive tour, Convention/Conference, Exhibition
MLIT	Ministry of Land, Infrastructure, Transport and Tourism
MP	Master Plan
MRF	Materials Recovery Facility
MRT	Mass Rapid Transit)
NAIA	Ninoy Aquino International Airport
NAMRIA	National Mapping and Resources Information Authority
NEDA	National Economic and Development Authority
NGA	National Government Agencies
NGO	Non-Governmental Organizations
NRW	Non-Revenue. Water
NSO	National Statistical Office
OD	Origin–Destination
PEZA	Philippines Economic Zone Authority
PHP	Philippine peso
PMO	Project Management Office
PNR	Philippine National Railways
PPA	Philippine Ports Authority
PPP	Public-Private Partnership
PUV	Public Utility Vehicle
R&D	Research and Development
RDC	Regional Development Conference
ROW	Right of Way
RROW	Road Right Of Way
SEZ	Special Economic Zone
SLF	Sanitary Landfill
SRP	South Road Properties
SRTM	Shuttle Radar Topographic Mission
SWOT	Strength, Weakness, Opportunity, Threat
TDM	Traffic Demand Management
TOD	Transit Oriented Development
USD	US Dollar
VCR	Vehicle Capacity Ratio
WD	Water District
WS	Work Shop
WTE	Waste to Energy
WTP	Willingness To Pay
WTTC	World Travel & Tourism Council
WW	Water Works

EXECUTIVE SUMMARY

1 STUDY SCOPE

1) Mega Cebu Vision 2050

The Metro Cebu Development and Coordinating Board (MCDCB) is a coordinating body for metro-wide planning and development created on April 1, 2011 through a Memorandum of Agreement (MOA) signed by local government executives, regional heads of national government agencies, and leaders of the private – civil society sector. The creation of the MCDCB is a manifestation of the heightened desire of public and private stakeholders to lead and plan for an envisioned collective future for Metro Cebu.

Mega Cebu Vision 2050 is the first visioning document formulated by the Metro Cebu stakeholders in cooperation with JICA in 2013. Yokohama City also contributed to the visioning process as a resource organization. It consists of the following four strategic pillars (Competitiveness, Mobility, Livability and Metropolitan Management), which further translate to 15 development directions.

2) The Roadmap Study

In 2013, MCDCB and JICA agreed to conduct a follow-up study to formulate a roadmap and action plan to realize the Mega Cebu Vision 2050. In the aftermath of super typhoon Yolanda (international code name: Haiyan) in November 2013, the study area was expanded to cover the northern part of Cebu Province only in terms of map preparation and hazard map analysis.

The ultimate objective of this study is to draw up a roadmap and detailed action plan which consists of the following:

(i) The long-term roadmap (up to 2030, thence up to 2050) in order to realize the Mega Cebu Vision 2050;
(ii) The detailed action plan consisting of priority projects for the short-term (1–3 years) and medium-term (4–6 years); and
(iii) The hazard map covering Metro Cebu and the northern part of Cebu Province.

2 FRAMEWORK FOR MEGA CEBU 2050

1) Demography

The future population of Metro Cebu was projected using logistic regression of past census data. Metro Cebu's population is estimated to reach 3.8 million in 2030 and will be nearly 5.0 million people in 2050, which is double the 2010 population of about 2.5 million.

2) Urbanization

New workplaces and residential areas will continue proliferating throughout Metro Cebu in an uncontrolled manner. Moreover, urbanization will not homogenously be taking place. Due to limited land available for urban land uses, the population growth rates of core cities, such as Cebu and Mandaue, will gradually lessen as they become more dense. In contrast,

the populations of LGUs with more land for urban development will ceaselessly increase to be more than double in 2050.

3) Economic Activities

Metro Cebu will enjoy a steady economic growth and people's affluence level, in terms of per capita GRDP, is projected to grow to more than USD20,000 in 2050. To realize this sustainable growth, macroeconomic policies should be properly undertaken.

The study projected the growth potentials of economic activities up to 2050. GRDP of Metro Cebu will grow at 8.3% per year between 2010 and 2020, 7.8% per year from 2020 to 2030, then 5.8% per year from 2030 to 2050. As a result, the magnitude of economic activities in Metro Cebu will be almost 15 times as large as their 2010 level.

4) Employment

By 2050, total employment in Metro Cebu will reach 2 million with approximately1 million already created in 2010. Employment will shift to a more industry-oriented structure, where the economy will be driven by strategic development of industry and urban service sectors.

To ensure such an economic movement in Metro Cebu, about 317,000 new jobs should be created in the secondary sector and 641,000 in the tertiary (service) sector. Diversification of the urban economy is a must to induce more foreign direct investments (FDIs) as well as encourage local investors in various potential business areas.

Table 1 Population of Metro Cebu, 1980–2050

City / Municipality Name	Population				Projection		Change
	1980	1990	2000	2010	2030	2050	2050 / 2010
City of Carcar	57.8	70.8	89.2	107.3	190.9	400.5	3.7
Cebu City (Capital)	490.3	610.4	718.8	866.2	1,090.7	1,211.6	1.4
Compostela	17.5	22	31.4	42.6	63.1	114.5	2.7
Consolacion	27.5	41.3	62.3	106.6	210.9	280.4	2.6
Cordoba	16.5	22.3	34.0	50.4	93.0	121.5	2.4
Danao City	57.0	73.4	98.8	119.3	163.1	273.1	2.3
Lapu-Lapu City	98.7	146.2	217.0	350.5	645.2	803.8	2.3
Liloan	30.2	42.6	65.0	100.5	202.8	271.0	2.7
Mandaue City	110.6	180.3	259.7	331.3	445.4	506.9	1.5
Minglanilla	38.5	50.9	77.3	113.2	160.6	192.2	1.7
City of Naga	45.8	60.4	80.2	101.6	148.8	267.2	2.6
San Fernando	28.3	35.1	48.2	61.0	96.9	187.1	3.1
City of Talisay	69.7	98	148.1	200.8	298.3	363.3	1.8
Metro Cebu	1088	1454	1,930	2,551	3,810	4,993	2.0

Source: JICA Study Team, calculated based on Census.

3 MEGA CEBU ROADMAP

To concretize the roadmap, seven sub-roadmaps are worked out in an integral manner. Each sub-roadmap sets its development scenario and target from the present to 2030 and to 2050, identifies projects and programs, and recommends implementation modalities.

1) Sub-roadmap for Metropolitan Competitiveness Enhancement

For a competitive industrial development, the Mega Cebu Vision 2050 identified four priority components, namely: (i) high value-added manufacturing industries, (ii)

IT/business process outsourcing (BPO) including knowledge process outsourcing (KPO), (iii) tourism, and (iv) new technology driven industries. To make it happen, the sub-roadmap puts emphasis on three levels of interventions. They include: (i) regional branding – addition of value, guarantee of quality, differentiation and appeal, (ii) strengthening research and analysis function and human resource development, and (iii) establishment of Mega Cebu Investment Board (MCIB).

Table 1 Sub-Roadmap for Metropolitan Competitiveness

Term	Programs/Projects
Short-Term	• Establishment of Mega Cebu Investment Board (MCIB) • Preparation of feasibility study for industrial parks/estates development projects • Establishment of a Cebu Branding Institute for regional branding with good networking with existing institutions • Establish a Cebu Educational Development Foundation for Health Care and capacity development of HR in the sector • Establishment of a research and development centre for Tourism • Update the Master Plan for the entire Cebu Province
Mid-Term	• Further research and analysis on the strategies of global investors and neighbouring countries. • Implementation of the short-term project for investment promotion and Mega Cebu brand • Facilitate development of new industrial parks/estates under a newly conceptualized PPP scheme
Long-Term	• Realize the vision of the long-term target set up by the Mega Cebu 2050 • Propagate firm-level productivity and competitiveness in line with HRD • Facilitate entrepreneurial mindset and a proactive attitude to assure sustainable improvement and innovation

Source: JICA Study Team.

2) Sub-roadmap for Urban Structure and Land Use

The sub-roadmap proposes several planning tools and guidelines in order to promote functional, safe and environmentally friendly urban areas. They are: (i) urban cluster system which divides Metro Cebu into six urban function clusters, (ii) designation of urban limits on hilly slopes so as to form less hazardous urban spaces free from landslides and floods, (iii) Green Loop development which guide compact urbanization and amenity space for non-vehicle road users, and (iv) the Mega Cebu Spatial Plan to guide all public and private investments in urban development.

Table 3 Sub-Roadmap for Urban Structure and Land Use

Term	Programs/Projects
Short-Term	• Utilize Metro Cebu Spatial Plan in various administration services in relation to infrastructure and land use zoning (2015–2017) • Develop effective Land Use Control Guidelines (2015–2017) • Facilitate urban greening measures (2015–2020)
Mid to Long-Term	• Complete 'Green Loop' (2021–2030) • Provide programs to utilize and update Metro Cebu Spatial Plan (2021–2050) • Promote rail and TOD for compact city and wide pedestrian space at roads (2021–2050) • Improve riverine environment (2021–2050)

Source: JICA Study Team.

3) Sub-roadmap for Highway Network and Public Transport

The roadmap proposes new road projects for an orderly future urban expansion and for the decongestion of existing roads. Among these projects are the Metro Cebu Circumferential Road, the Second Cebu North Road and the Second Cebu South Road, which are strategically important to structure future urban areas, particularly controlling upland development above the proposed roads.

The Mactan-Cebu link must be strengthened by adding another bridge infrastructure to

meet increasing traffic. The roadmap proposes the dual-mode bridge for both road and rail between Mandaue City and Mactan on the north in the short-term and another road bridge between Cebu City and Cordova by 2030.

In order to mitigate road traffic bottlenecks, four kinds of measures are proposed from the less capital-intensive to the more capital-intensive traffic management stanpoint, namely: (i) traffic management improvement by intersection, (ii) area traffic control (ATC) system, (iii) grade separation of intersections, and (iv) road widening.

It is desirable for Metro Cebu to develop the most suitable transport system through a combination of road and rail transport modes by 2050. The trunk mode will be a large capacity transport system such as the MRT carrying large volume of people (20-50 thousand passengers/hour/direction). The next mode will be a medium capacity system such as the LRT (less than 20 thousand passengers/hour/direction). the bus will serve the entire urban areas and will provide access services to the MRT/LRT stations. All the identified projects for this sub-roadmap are listed in Table 4.

4) Sub-roadmap for Water Supply and Disposal

Key issues of water supply in Metro Cebu are the supply deficit in the future as well as the salinity intrusion and the *E.coli* contamination. Moreover, peripheral urbanization in the watershed areas is becoming a threat to water supply development. In order to narrow the gap between demand and supply, increase water service coverage, and provide safe water on a 24/7 basis, a set of projects are identified. Among these is the construction of Mananga II dam, which is the most significant project.

Although flooding is proliferating in many areas of Metro Cebu, technical knowledge on the actual cause of floods is limited. Therefore, a master plan study for an integrated flood and drainage system must be urgently undertaken. Cleaning rivers and drainages, river improvement, and development of rain water storage facilities are potent solutions when they are designed and implemented adequately.

The major problem about waste water in Metro Cebu is that waste water has been hardly treated to begin with. Consequently, the water quality of the metropolis is worsening. Septage treatment plants will be constructed and operated as an urgent and cost effective solution. For the long term, it should be advocated that domestic and industrial waste water be properly treated by an appropriate system to assure human health and protection of the natural environment. In Metro Cebu, a centralized sewerage system will be developed with two target milestones: coverage of 50% of population in 2030 and 90% in 2050. All the identified projects for this sub-roadmap are listed in Table 4.

5) Sub-roadmap for Solid Waste Management

The protection of public health and the environment is ensured by establishing the solid waste management system underpinned by environmentally-sound methods and technology. For this purpose, cooperation and self-regulation of the citizens and the private sector as waste generators are encouraged and public-private cooperation for sustainable business development for the medium to long-term is promoted. Consequently, achieving “Livability” as one of the Mega Cebu visions will be attained. The proposed projects include, among others, waster reduction and recovery, introduction of effective management system with new technologies, and construction of metropolitan sanitary landfill facilities,

are listed in Table 4.

6) Sub-roadmap for Smart SRP Development

SRP aims to be an IT-concentrated industry model area for Metro Cebu. To this end, a stable power supply, advanced energy saving technologies, and an effective disaster response system need to be pushed forward. In addition, investment incentives such as tax benefits, simplification of import procedures, and working visa for foreigners, among others, will be beneficial. A Smart Area also encompasses residential and commercial areas. To realize a Smart SRP, "Unified Management System of Energy Supply and Demand" in SRP will be promoted. The proposed projects for the Smart SRP are listed in Table 4.

Table 4 Summary of the Proposed Infrastructure Projects for Mega Cebu Roadmap

Urban Transport and Highway Network

Name of Project			Area	Status	Description		Total Cost (PHP mil. or USD mil.)	Implementing Agency	Environment & Social Considerations		Finance	Implementation Schedule	Remarks
					Type	Length (km)			E	S			
A. Roads & Highways	1. Dual-Mode Bridge and Scenic Coastal Road between the Second Bridge and Cansaga Bay Bridge		Mandaue Reclamation, Cansaga Bay and the northern part of Lapu-Lapu	Proposed	New	3.80	PHP15,569	DPWH	P: B- O: B+	P: B- O:A+	Tracking fee by rail operator	2018–2020	Incl. rail substructure
	2. FS on Area Traffic Control in Metro Cebu		Metro Cebu	Proposed	Study	-	USD1.2	DPWH/ LGUs/ MCDCB	P: E	P: C+		2015–2017	
	3. Synchronized Signalization System in Urban Areas		Replacement of 69 signals by MCDP and development of synchronized system with new ones	Proposed	Upgrade	-	PHP1,285	DPWH/ LGUs/ MCDCB	P: E O: C+	P: E O: C+		2018–2020	
	4. Roads Widening		Arterial roads, mainly unimplemented from MCLUTS	Proposed	Upgrade	-	PHP4,264	DPWH	P: B- O: B+	P: B- O: C+		2018–2020	
	5. Metro Cebu Outer Circumferential Road		Talisay to Consolacion	Proposed	New	39.5	PHP15,561	DPWH	P: A- O: B+	P: B- O: C+		2021–2030	
	6. Second Cebu North Road		Consolacion–Liloan–Compostela -Danao	Proposed	New	18.5	PHP3,380	DPWH	P: B- O: B+	P: A- O: B+		2021-2030	
	7. Second Cebu South Road		Talisay-Minglanilla-Naga-San Fernando-Carcar	Proposed	New	35.0	PHP7,980	DPWH	P: B- O: B+	P: A- O: B+		2021-2030	
	8. Cebu-Cordova Bridge (3rd Bridge)		Cebu City (C. Padilla) to Cordova (part of Green Loop Corridor)	Proposed	New	10.0	PHP16,880	Private/ LGUs/ DPWH	P: B- O: C+	P: B- O: B+	Toll Bridge	2021 - 2030	Incl. approach causeway at Cordova
	9. Metro Cebu Intersection Improvements (Grade-separation)		20 Intersections at Cebu City and Mandaue City	Proposed	Upgrade	-	PHP9,214	DPWH	P: C- O: B+	P: B- O: B+		2021–2030	
	10. Road Widening on the MRT Central Line and Its Access Roads		Imus Ave., MJ Cuenco Ave., Lopez Jaena St., MC Briones St., General Maxilom Ave., Pope John Paul II Ave.	Proposed	Upgrade	7.3	PHP2,220	DPWH	P: B- O: A+	P: A- O: A+		2021–2030	
	11. Talisay – Naga Coastal Road (ex PNR)		Brg. Lawaan, Talisay–Minglanilla New Center –Brg. Colon, Naga	Proposed	New	7.1	PHP1,315	DPWH	P: B- O: B+	P: A- O: B+	Tracking fee by rail operator	2021–2030	Incl. MRT South Line ROW
	12. Tayud Coastal Road with the Second Cansaga Bay Bridge		Mandaue–Brg. Tayud, Consolacion–Brg. Poblacion, Liloan	Proposed	New	8.9	PHP3,262	DPWH	P: B- O: B+	P: A- O: B+		2021–2030	To serve for a new port
	13. Rest of Mandaue Scenic Coastal Road (2 sections)		Ouano Ave.–the Second Bridge, Cebu North Road–Cansaga Bay Bridge	Proposed	New	5.4 in total	PHP4,834	DPWH	P: B- O: B+	P: A- O: B+			
	14. Airport Underpass Road		The Second Bridge–MCIA–Brg. Pajak, Lapu-Lapu	Proposed	New	2.7	PHP2,438		P: C- O: C+	P: C- O: B+	Possibly toll road	2021–2030	
	15. Mactan MRT Avenue (incl. 1 bridge)		Brg. Dapitan, Cordova–Brg. Mactan, Lapu-Lapu	Proposed	New	8.6	PHP2,244		P: B- O: B+	P: C- O: B+	Tracking fee by rail operator	2021–2030	
	16. Metro Cebu Coastal Expressway		Part of Coastal Line from Danao to Carcar	Conceptualized	New	unknown	N.A.		P: A- O: B+	P: A- O: B+		2031–2050	
B. Public Transport / Mass Transit	1. BRT Line		Cebu City (Talamban–Bulacao - SRP)	Committed	New	23	USD212	DOTC	P: C- O: A+	P: B- O: A+	LOT	2015–2018	World Bank
	2. MP and FS on Metro Cebu Mass Transit System Devt		Metro Cebu	Proposed	Study	-	USD2.0	DOTC	P: E-	P: C+		2015–2016	
	3. Public Transport Terminal		Carcar City Center	Proposed	New	-	PHP140	LGU/ MCDCB	P: C- O: C+	P: C- O: B+		2017–2018	
	4. Public Transport Terminal (Second Phase)		Cebu North Terminal	Upgrade	New	-	PHP118	LGU/ MCDCB	P: C- O: C+	P: C- O: B+		2021–2030	
	5. AGT–CML Line		Cebu City–Ouano Ave., Mandaue City - MCIA	Proposed	New	19.2	USD819	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2017–2021	
	6. Mrt Lines	a. Central	Consolacion to Talisay	Proposed	New	21.2	USD1,774	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2021–2030	
		b. North	Danao City to Liloan	Proposed	New	24.7	USD1,369	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2031–2050	
		c. South	Minglanilla to Carcar City	Proposed	New	29.2	USD1,799	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2031–2050	
		d. Mactan	Cebu City–Lapu Lapu City	Proposed	New	21.5	USD1,737	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2031–2050	
C. Others	1. FS on Consolacion New Port		Tayud, Consolacion	Committed	Study	-	USD1.5	DOTC	P: E-	P: C+		2015–2017	KOICA
	2. Consolacion New Port Const and Revitalization of Cebu Port		Cebu City, Consolacion	Proposed	New	-	PHP9,900	DOTC / Private	P: A- O: C+	P: B- O: A+	PPP	2018–2022	
	3. MCIA Development Project		MCIA	Committed	New	-	PHP17,500	DOTC / Private	P: B- O: C+	P: B- O: A+	PPP	2015–2020	GMR – Megawide Group
	Total (2015–2030)						PHP241,731						

Source: JICA Study Team

<Legend> ESC: Environment & Social Considerations, E: Environment; S-Social, A: Significant impacts are expected, B: Major, C: Moderate impacts are expected, D: Minor, E: Impacts are negligible/insignificant, F: Impacts are not known (To Be Determined), NA: Not applicable, P:pre-construction and construction phases, O: Operational phases, "+": Positive Impacts, "-": Negative/Adverse Impacts

Water Supply and Disposal Management

	Name of Project	Area	Status	Total Cost (PHP mil.)	Implementing Agency	Impact Factor ESC E	Impact Factor ESC S	Impact Factor Finance	Schedule	Remarks
Water Supply	1. Construction of New Water Supply Facilities	Cebu City, Liloan, Consolacion, Compostela, Mandaue, Talisay, Lapu-lapu, and Cordova	Proposed	2,470	MCWD	P: C- O: B+	P: B- O: A+		2015–2020	Reservoirs, Pump Stations, Well Development
	2. Mananga Dam Bulk Water Supply	MCWD franchise area, Danao, Minglanilla, Naga, San Fernando and Carcar	Proposed	4,780	TBD	P: B- O: A+	P: B- O: A+	BOT or JV	2015–2020	Incl. transmission pipeline and water treatment plan, but not resettlement
	3. Kotkot Dam and Lusuran Dam	Metro Cebu	Proposed	10,320	TBD	P: B- O: A+	P: A- O: A+	BOT or JV	2018–2030	
	4. Groundwater Exploitation Study	Northern and southern areas of Metro Cebu	Proposed	160	MCWD	P: E	P: D+		2018–2030	
	5. Reduction of Non-Revenue water I	MCWD Service Area	On-going	590	MCWD	P:F O:F	P:F O:F		–2030	
	6. Development of Surface Water	Can-Asujan River, Pangdan River, Cantao River in Naga-Minglanilla	Proposed	5,320	TBD	P: B- O: A+	P: B- O: A+		2028–2040	
	7. Development of Groundwater	Northern and southern areas in Metro Cebu	Proposed		MCWD	P: C- O:B-	P: C- O: B+		2028–2040	
	8. Construction of Reverse Osmosis Desalination Plant	Lapu-Lapu City	Proposed	1,550	MCWD	P: C- O: B+	P: C- O: B+		2028–2040	
	9. Reduction of Non-Revenue water II			590	MCWD				2030–2040	
	10. Groundwater Occurrence (recharge)	Metro Cebu	Proposed	180	MCWD	P :F O: F	P: F O: F		2028–2040	
	11. Use of Recycling Water	Metro Cebu	Proposed	780	MCWD	P: F O: F	P: F O: F		2028–2040	
Storm Water Management	12. Implementation of "A Comprehensive Study for A Metro Cebu Integrated Flood and Drainage System (MCIFDS) Master Plan"	Metro Cebu	Proposed	75	DPWH LGU	P: E	P: C+		2015–2020	
	13. Cleaning Rivers, Creeks, and Drainages	Mandaue City	Committed	125	DPWH LGU	P: C- O: B+	P: B- O: B+		2015–2020	
	14. Construction of Small Scale Rain Water Storage Facilities	Upstream of Guadalupe River, Lahug River, and Butuanon River	Proposed	82	LGUs	P: E O: B+	P: E O: B+		2015–2025	
	15. Construction of drainage facilities based on MCIFDS	TBD	Proposed	720	DPWH LGU	P: C- O: B+	P: B- O: B+		2020–2030	
	16. River Improvement Projects	Subangdaku, Kinalumsan, and Lahug Rivers	Proposed	2,250	TBD	P: C- O: B+	P: B- O: B+		2020–2040	
	17. Embankment at inundation places in rural area		Proposed		TBD	P: C- O: B+	P: B- O: B+		2020–2030	
	18. River Improvement Projects	Guadalupe, Butuanon Rivers	Proposed	2,330	TBD	P: C- O: B+	P: B- O: B+		2030–2050	
	19. Construction of Large Scale Rain Water Storage Facilities	Catchment of Guadalupe River, Lahug Creek, Mahiga Creek, Subandaku River, Butuanon River	Proposed	2,850	DPWH LGU	P: C- O: B+	P: B- O: B+		2030–2050	
Waste Water Management	20. Construction of Septage Treatment Plant	Metro Cebu	Proposed	1,215	MCWD LGU	P: C- O: A+	P: C- O: A+	BOT or JV	2016–2020	
	21. Improvement for Inappropriate Septic Tanks	Metro Cebu			MCWD LGU	P: C- O: A+	P: C- O: A+		2016–2020	
	22. Construction of Proper Waste Water Treatment Facility for Development Areas	Metro Cebu	Proposed		TBD	P: C- O: A+	P: C- O: A+		2016–2020	
	23. Construction of centralized sewerage system	Lapu Lapu City, Cebu City and Mandaue City	Proposed	41,500	MCWD	P: C- O: A+	P: C- O: A+		2020–2030	
	24. Promotion of Ecological Sanitation technologies	Metro Cebu	Proposed	-	MCWD LGU	P: C- O: A+	P: C- O: A+		2025–2030	
	25. Expansion and Construction of existing sewerage systems	Metro Cebu	Proposed	56,100	MCWD	P: C- O: A+	P: C- O: A+		2030–2050	
	26. Construction of Small Scale Water Detention Facilities	Cebu City and Mandaue City Rivers upstream	Proposed	1,215	DPWH	P: C- O: B+	P: C- O: B+		2015–2016	
				135,202						

Source: JICA Study Team

Solid Waste Management

Name of Project	Area	Status	Total Cost (PHP mil.)	Implementing Agency	Impact Factor ESC E	Impact Factor ESC S	Impact Factor Finance	Schedule	Remarks
1. Formulate a Comprehensive Solid Waste Management Master Plan for Metro Cebu	Metro Cebu	Proposed	-		P: E	P: C+		2015-6	
2. Enhance a Waste Reduction & Recovery Program	Metro Cebu	Proposed	287		P: D- O: A+	P: B+ O: A+		2015-6	
3. Conduct Action Planning and Implement the project for Environmentally Sustainable Closure of the Inanwayan Sanitary Landfill	Cebu City	Proposed	328		P: E	P: C+		2015	
4. Introduce an effective management system of medical waste and hazardous waste treatment facilities	Metro Cebu	Proposed	123		P: C- O: A+	P: C+ O: A+		2015-6	
5. Implement the medium-term projects/programs identified in the Comprehensive Solid Waste Management Master Plan for Metro Cebu	Metro Cebu	Proposed	205		O: A+	O: A+		–2020	
6. Implement the Enhanced Waste Reduction & Recovery Program with special attention to develop infrastructures	Metro Cebu	Proposed	287		P: C- O: A+	P: C+ O: A+		–2018	
7. Construct and upgrade the operation and maintenance of City-Wide MRF	Metro Cebu	Proposed	246		P: C- O: A+	P: C+ O: A+		– 2018	
8. Construct the medical waste and hazardous waste treatment facilities and develop an appropriate operation and management system	Metro Cebu	Proposed	205		P: C- O: A+	P: C+ O: A+		– 2018	
9. Conduct the feasibility study for appropriate technologies of Waste-to-Energy (WTE) facilities	Metro Cebu	Proposed	-		P: E	P: C+		2018	
10. Implement log-term projects and programs proposed by the Comprehensive Solid Waste Management Master Plan for Metro Cebu	Metro Cebu	Proposed	205		P: E	P: C+		–2030	
11. Construct two (2) Metropolitan Sanitary Landfill Facilities based on the feasibility study to be conducted in the medium-term	Metro Cebu		820		P: C- O: A+	P: C+ O: A+		–2025	
12. Enhance and disseminate the Waste Reduction & Recovery Program, based on the community-based 3R Movement	Metro Cebu		82		P: D- O: A+	P: B+ O: A+		–2025	
13. Construct Waste-to-Energy facilities based on feasibility studies to be conducted in the medium-term	Metro Cebu	-			P: C- O: A+	P: C+ O: A+		–2025	
Total			2,788						

Source: JICA Study Team

Smart SRP

Name of Project	Status	Description	Total Cost (PHP mil.or USD mil.)	Implementing Agency	ESC		Finance	Schedule	Remarks
					E	S			
1. Establishment of unified management system of energy supply and demand in SRP	Proposed	Establishment of Energy Consumers' Cooperative with the Optimum Energy Consumption Plan	PHP37	LGU/Land Owners & Tenants/VECO	O: A+	O: A+		2015–2017	
2. Introduction of management system to visualize energy demand and supply	Proposed	Introduction of Energy Monitoring System (50 sites)	PHP185	LGU/Land Owners & Tenants/VECO	O: A+	O: A+	Private	2018–2020	
3. Implementation of introduction of individual technology elements which is suitable for each area	Proposed	Installment of Energy-saving Equipment (solar panel, EV)	PHP1,074	LGU/Land Owners & Tenants/VECO	O: A+	O: A+	Private	2018–2020	Covering 25%of SRP energy consumption
4. Expansion of knowledge and know-how from SRP to other parts of Metro Cebu	Proposed	Metro Cebu	TBD	LGU/Private Sector/VECO	O: A+	O: A+		2021–2030	
5. Establishment of suitable energy management scheme for Metro Cebu	Proposed	Metro Cebu	TBD	LGU/Private Sector/VECO	O: A+	O: A+		2021–2030	
Total (2015–2030)			PHP1,296						

Source: JICA Study Team

7) Sub-roadmap for Metropolitan Governance

To implement the projects outlined by sub-roadmap to solve metropolitan-wide issues, the metropolitan area should be regarded as a single development governance area, and development of an effective administrative system is further required with legal basis.

For the first step in the institutional development process, it is suggested that MCDCB be strengthened to conduct feasibility study, arrange project finance, and enhance planning capacity, etc. in line with the proposed Technical Research and Planning Unit.

There are two phases for the evolution of MCDCB into a new metropolitan organization on a sound legal basis. The first and immediate phase is the intermunicipal association and final phase is the metropolitan governance institution. Establishment of a "Metro Cebu Model" may be meaningful for the Philippines where private sectors and civil society organizations are duly involved.

Table 5 Sub-Roadmap for Metropolitan Governance

Term	Programs	Projects
Short-term (up to Year 2020)	• Strengthening MCDCB through project implementation and capacity building • Development of policy networks for preparation, coordination, and implementation of policies and projects • Foundation of an intermunicipal association (Metro Cebu Development Alliance) derived from policy networks	• Continuation of a study on appropriate metropolitan institution, governance, and legal system • Establishment of Metro Cebu "Technical Research and Planning Unit" and posting relevant experts • Foundation of Metro Cebu Investment Promotion Center, with an action plan • Foundation of a Metro Cebu Traffic Management Center
Mid-term (up to Year 2030)	• Strengthening an intermunicipal association (Metro Cebu Development Alliance) • Preparation study on foundation of a metropolitan governance institution, Metro Cebu Development Agency (MCDA) which is evolved from the intermunicipal association and preparation of the foundation	• Strengthening institutions and units which would be core in policy networks • Evaluation of the intermunicipal association (Metro Cebu Development Alliance) in terms of improvement on public service delivery, etc.) • Preparatory study on needs and effectiveness of metropolitan authority (Metro Cebu Development Agency)
Long-term (up to Year 2050)	• Foundation of a metropolitan governance institution, MCDA, evolved from then intermunicipal association	• Provision of capacity development and institutional development to the metropolitan governance body (Metro Cebu Development Agency) • Assessment of performance of the metropolitan governance body (Metro Cebu Development Agency)

Source: JICA Study Team.

4 INVESTMENT

1) Public Investment Affordability

The national government's affordability for infrastructure investment in terms of funding the roadmap projects is assessed. According to NEDA, the ratio of the infrastructure investment by the central government to GDP is 3.5% for 2015-2020 and 5.0% for 2021-2030. In the case of Metro Cebu, the investment affordability amounts to 608.3 billion pesos for the yearly aggregate covering 2015 to 2030. Within this amount, net investment affordability is estimated to be 486.6 billion pesos by reserving 20% of the total amount (0.7% - 1.0% of GDP) for annual routine works including small-scale infrastructure investment and maintenance of the existing infrastructures.

The required investment for the short to mid-term roadmap projects (2015-2030) amounts to 308.6 billion pesos including the investments for major infrastructure sectors. This accounts 63% of the national government's budget envelope for Metro Cebu if all the cost is shouldered by the national government. It only shows that the new infrastructure investment amount is not excessive considering the current government's financial standpoint and this is expected to increase in the future.

Table 6 Budget Envelope for Infrastructure Investment by National Government for Metro Cebu

		2015 - 2020	2021 - 2030	Total
GDP (2013 constant price)	Growth Rate (%/year)	6.3	5.5	-
	Aggregated GDP (PHP, Bil.)	91,523	240,083	-
Budget for Infrastructure	3.5% of GDP till 2020; 5.0% till 2030	3,203.3	12,004.2	15,207.5
	Region 7 (6% of National)	192.2	720.2	912.4
	Metro Cebu (4% of National)	128.1	480.2	608.3
	Net Budget for Metro Cebu Infrastructure (excl. 20%)	102.5	384.1	486.6

Source: JICA Study Team

2) PPP Scheme Applications

4.1 Implementing agencies are advised to adopt a deliberate approach to explore PPP arrangements as these are effective ways of increasing the resource pie. Based on a preliminary review, the following are projects which have excludable economic benefits, that can generate revenues and that lend themselves to commercial operation appear suitable for PPP arrangements:

Table 7 Possible Projects for PPP Scheme Application and Options

Project	PPP Scheme
Mananga II Dam Bulk Water Supply Project	Build-operate-transfer or joint venture arrangement (availability payment)
Septage Management Project	Build-operate-transfer or joint venture arrangement (availability payment)
BRT (Bus Rapid Transit) System	Lease-operate-transfer (concession agreement)
Urban Railway Project	Build-operate-transfer or Lease-operate-transfer (concession agreement)
High Capacity Roads and Bridges	Build-operate-transfer (concession agreement)
Solid waste facilities	Build-operate-transfer (concession agreement)

Source: JICA Study Team

5 PROJECT PACKAGES

1) Anchor Programs

5.1 Mega Cebu roadmap consists of seven sub-roadmaps. Each sub-roadmap has

corresponding proposed projects on a metropolitan level which should not be implemented by an individual LGU alone since metropolitan coordination grants and gains implementing power Considering the many stakeholders for each sub-roadmap project, focus is required for implementation. Based on the implementation perspective, several high priority roadmap projects are rearranged into 14 anchor programs and proposed in Table 8.

Table 8 List of Anchor Programs

	Programs	Primary Responsible Organizations
1.	Investment Promotion by a Mega Cebu Investment Board (MCIB) through Cebu Branding	Cebu Province (Investment Promotion Center) and DTI
2.	Urban Greening (Completion of 'Green Loop', etc.)	DPWH, DENR, related LGUs
3.	Operationalization of Mega Cebu Spatial Plan	MCDCB (Technical Research & Planning Unit), all LGUs
4.	Urban Fringe Highway Network Development (Circumferential Road, etc.)	DPWH
5.	Mactan Link Development	DPWH and DOTC (in the case of rail bridge)
6.	Mass Transit Network Development (MRT/LRT/BRT)	DOTC
7.	Gateway Development (Airport, Seaport)	DOTC, CPA and MCIAA
8.	Integrated Road Traffic Management and Bottleneck Clearance	MCDCB (a new service unit) with support from DPWH
9.	Surface Water Resource Development	MCWD and related LGUs
10.	Urban Septage / Sewerage Service	MCWD and other water works/districts
11.	Comprehensive Flood Control	Participating LGUs with support from DPWH
12.	Metropolitan Solid Waste Management	MCDCB (a new service unit) with participating LGUs
13.	Advanced Energy Management System	Cebu City with an energy solution company
14.	Institutional Building of Metropolitan Governance	MCDCB

Source: JICA Study Team

2) Flagship Projects

5.2 The projects which are recommended for early implementation until 2017 with assistance or initiative of the central government are referred to as the flagship projects. Ten flagship projects are selected from the roster of the short-term projects (2015–2020) of the roadmap. These include three projects for immediate implementation with project preparedness features, four new projects for study for project preparation, two projects already in the pipeline and one project for institutional enhancement.

Table 9 List of Flagship Projects

	Projects
1.	Master Plan Study and Feasibility Study (FS) on Mass Transit Network Development (MRT/LRT/BRT) in Metro Cebu
2.	Update of the Cebu Province Development Master Plan
3.	Construction of the Mactan North Dual-mode Bridge
4.	Construction of Mananga II Dam
5.	Construction and Networking of Septage Plants
6.	FS on Area Traffic Control in Metro Cebu
7.	A Comprehensive Solid Waste Management Master Plan for Metro Cebu
8.	FS on Sea Gateway Port Construction (Committed by DOTC)
9.	A Comprehensive Study for a Metro Cebu Integrated Flood and Drainage System Master Plan (Committed by DPWH)
10.	Establishment of Technical Research Unit to MCDCB and Its Capacity Development

Source: JICA Study Team

6 METRO CEBU SPATIAL PLAN AND MAJOR ROADMAP PROJECTS

Resulting from an exhaustive workshop with member LGUs of Metro Cebu and

consultations with relevant central government agencies, the academe and experts, a spatial plan at a scale of 1:10,000 was formulated. (See Figure 1.) This draft spatial plan illustrates salient guiding development features for Metro Cebu; namely, (1) urban limits to delineate future urban development, (2) proposed future land use zones (residential, commercial, industrial, tourism, agriculture, public facilities, parks and open spaces, preservation areas, etc.), (3) proposed projects for central government intervention or support, and (4) proposed projects for metropolitan initiative.

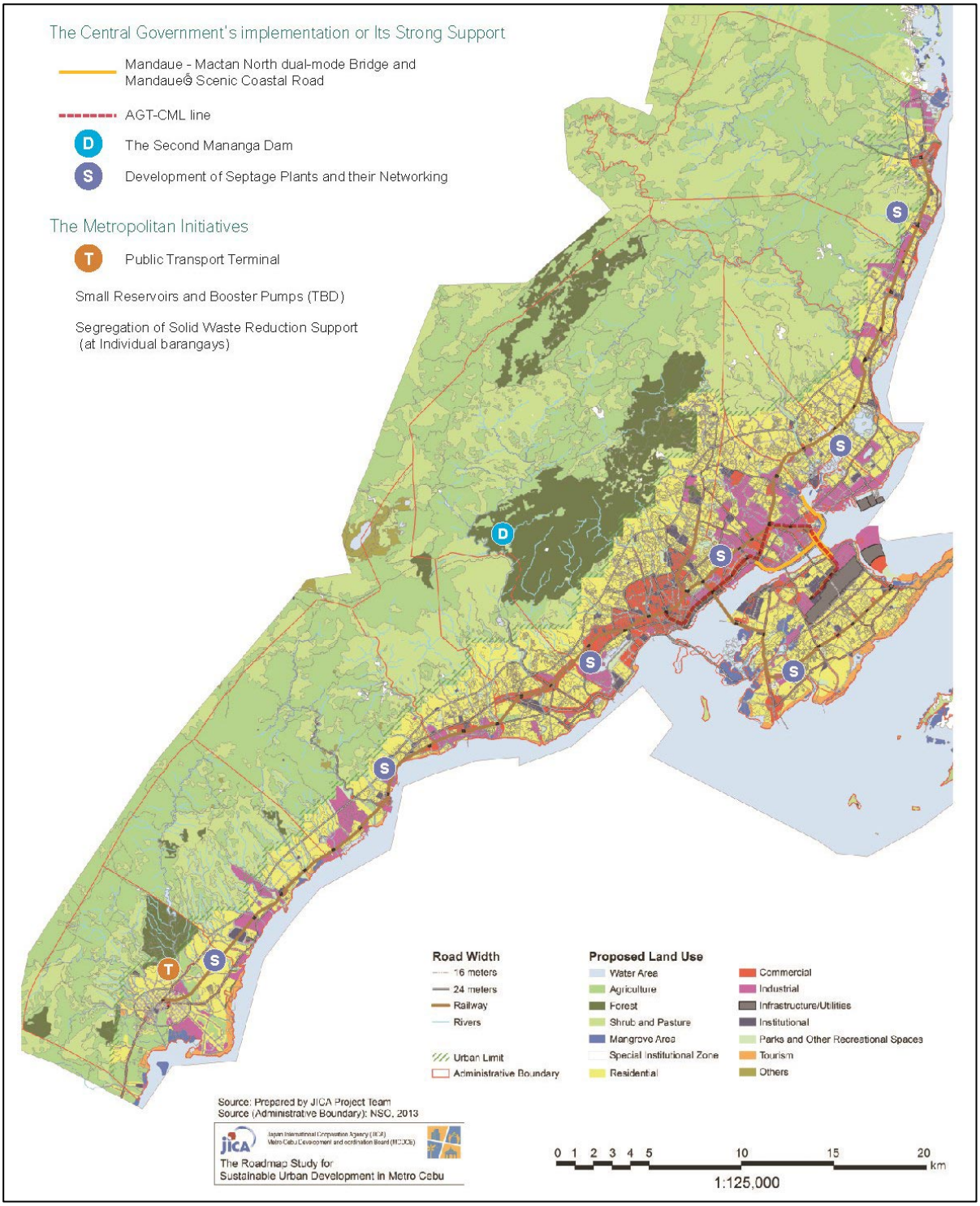


Figure 1 Metro Cebu Spatial Plan and Major Roadmap Projects

PART I OVERVIEW OF THE STUDY AND EXISTING CONDITIONS IN METRO CEBU

1 STUDY SCOPE AND ACTIVITIES

1.1 Study Scope

1) Study Objectives

The ultimate objective of this study is to draw up a roadmap and detailed action plan for Metro Cebu which consists of the following:

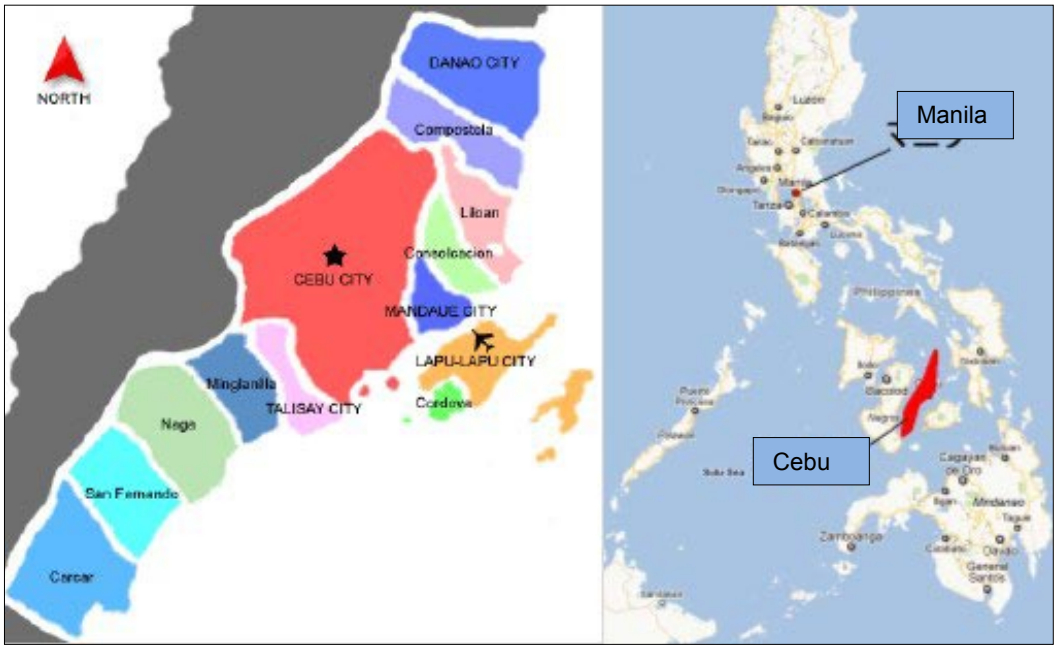
(i) A long-term roadmap (up to 2030, thence up to 2050) in order to realize the Mega Cebu Vision 2050;

(ii) A detailed action plan consisting of priority projects for the short term (1–3 years) and medium term (4–6 years); and

(iii) The hazard map covering Metro Cebu and the northern part of Cebu Province.

2) Study Area

The study area covers Metro Cebu consisting of the seven cities of Cebu, Danao, Mandaue, Lapu-Lapu, Talisay, Naga and Carcar, and the six municipalities of Compostela, Liloan, Consolacion, Cordova, Minglanilla and San Fernando (see Figure 1.1). In the aftermath of r Typhoon Yolanda (international code name: Haiyan), the study area was extended to cover the northern part of Cebu Province only in terms of map preparation and hazard map analysis.

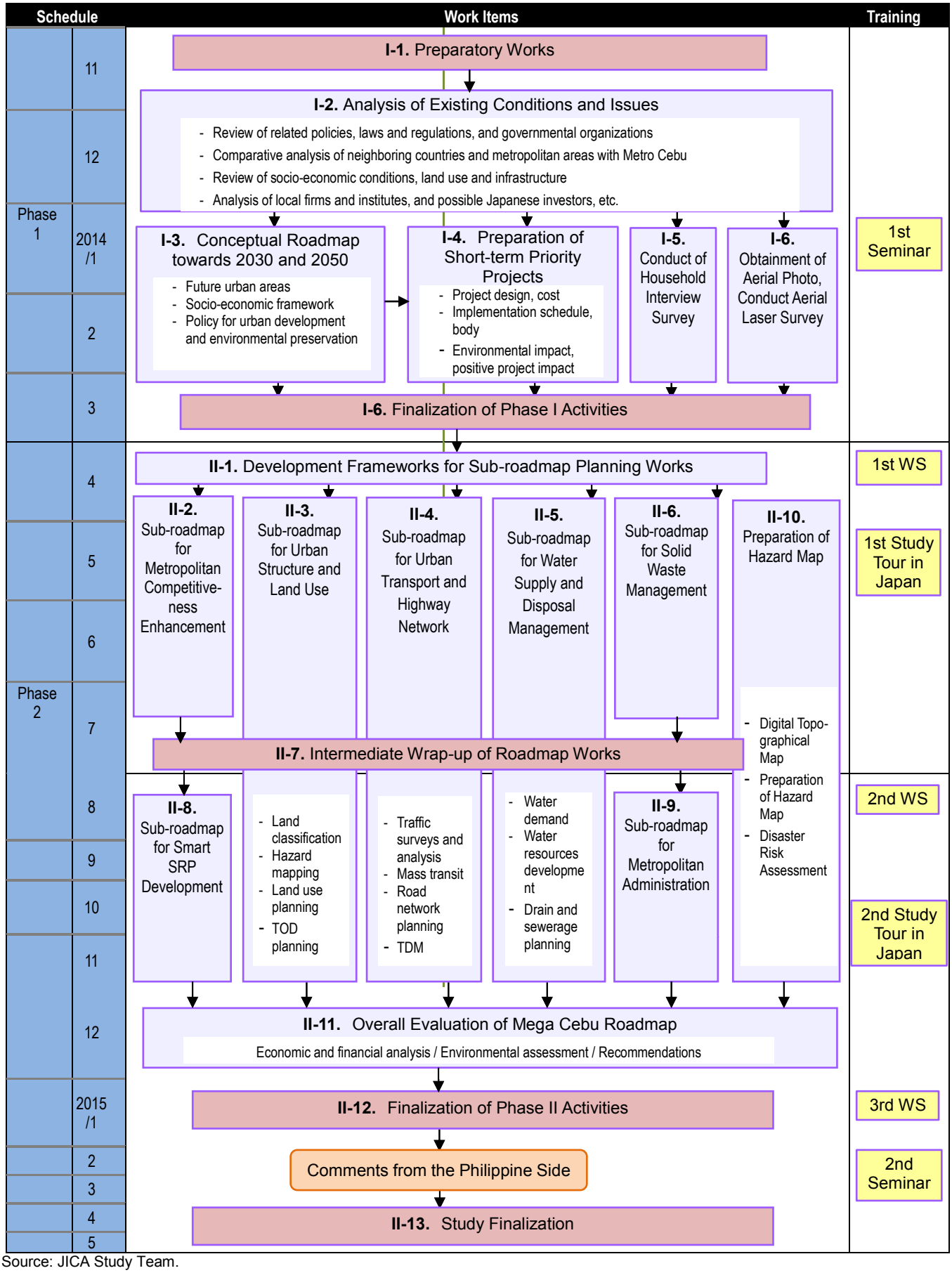


Source: JICA Study Team.

Figure 1.1 Location and Coverage of Metro Cebu

1.2 Study Activities

The overall study work flow is shown in Figure 1.2 and the general activities of the study are as follows:



Source: JICA Study Team.

Figure 1.2 Overall Work Flow

2 OVERVIEW OF THE STUDY AREA

2.1 Socio-economic Conditions

1) Labor Force

An advantage of Metro Cebu for development is its abundant labor force. In 2007, the labor force population in Metro Cebu was 1,422,100 persons or 62% of the population, which was higher than the national level of 58%. (See Table 2.1)

In addition to labor force supply, the quality of labor population matters for economic development. Nearly 30% of the population 25 years and over in Metro Cebu attended college or academic degree programs. This is 6% higher than the national average. This abundant and educated labor force provides Metro Cebu a strong advantage for economic development.

Table 2.1 Labor Force and Educational Attainment (Population 25 Years and Over) in Metro Cebu in 2007

	Labor Force Population (15–60)		Education Attainment (Population 25 Year and Over)						
	Persons	%	Elementary or Less*	High School	Post Secondary	College Undergraduate / Academic Degree Holder	Post Baccalaureate	Not Stated	Total
City of Carcar	56,871	56.6	22,181	12,055	852	6,748	93	2,145	44,074
Compostela	22,924	64.1	6,785	6,245	466	3,481	46	544	17,567
Consolacion	54,218	58.5	12,521	14,968	1,265	11,339	79	539	40,711
Cordoba	26,890	62.0	8,018	6,992	392	4,197	39	363	20,001
Danao City	64,141	59.8	21,534	17,257	1,289	8,473	104	845	49,502
Liloan	55,700	58.8	14,518	14,169	1,560	9,622	94	2,697	42,660
Minglanilla	59,447	61.7	14,894	13,881	1,206	14,330	141	504	44,956
Naga City	55,053	60.2	17,400	15,074	958	8,202	61	514	42,209
San Fernando	31,070	63.2	11,504	7,491	434	3,924	113	567	24,033
City of Talisay	107,189	60.1	24,617	24,411	2,383	24,772	372	3,845	80,400
Cebu City	507,784	57.9	84,337	122,095	10,927	136,223	1,599	13,601	368,782
Lapu-Lapu	179,958	56.6	35,883	50,576	4,084	32,561	205	5,530	128,839
Mandaue City	200,846	61.1	34,740	54,854	5,251	42,858	357	3,096	141,156
Metro Cebu	1,422,091	61.8	308,932	360,068	31,067	306,730	3,303	34,790	1,044,890
Cebu	1,371,636	56.4	535,414	315,918	22,836	189,583	2,333	27,105	1,093,189
Region VII	3,662,083	57.4	1,323,666	825,912	72,608	612,741	6,798	64,507	2,906,232
Philippines	51,416,747	58.2	14,140,953	13,840,636	1,871,844	9,201,947	117,255	715,512	39,888,147

Source : National Statistics Office, Population and Housing Census 2007.
Note : * Including “No Grade Completed” and “Pre-school.”

2) Regional Economy

The regional economy of Central Visayas has grown since 2009 as compared with the national economy and the regional economy of the National Capital Region. The gross regional domestic product (GRDP) of Central Visayas increased to PHP56,500 per capita, at constant 2000 price in 2012, at an annual growth rate of 7.9%. However, the growth in the industry sector did not contribute to the expansion of employment as much as the other sectors. (See Table 2.2)

Table 2.2 Central Visayas Gross Domestic Product (GRDP) and Per Capita GRDP by Sector in 2009 and 2012 (At Constant 2000 Prices; Million Pesos)

Sector / Year		2009	2012	Average Annual Growth Rate 2009–2012	
				Region VII Central Visayas	Philippines
Per capita GRDP	Pesos	44,993	56,507	7.9	4.2
Primary (Agriculture, Hunting, Forestry and Fishing)	Million Pesos	27,013.2	28,781.4	2.1	1.7
	% Share in GRDP	9.0	7.2		
	% Share in GNDP	4.1	4.1		
Secondary (Industry)	Million Pesos	98,301.7	145,507.4	14.0	6.7
	% Share in GRDP	32.6	36.6		
	% Share in GNDP	5.9	7.2		
Tertiary (Service)	Million Pesos	176,568.0	223,362.9	8.2	6.6
	% Share in GRDP	58.5	56.2		
	% Share in GNDP	6.0	6.2		
Gross Regional Domestic Product	Million Pesos	301,882.9	397,651.7	9.6	6.0
	% Share in GNDP	5.7	6.3		

Source: National Statistical Coordination Board.

3) Poverty Incidence and Informal Settler Families

Poverty still persists in Central Visayas and Cebu Province, where nearly 30% of the regional population and about 23% of the provincial population are considered poor.

Table 2.3 Poverty Incidence in Cebu Province, Region VII and the Philippines in 2006 and 2012

Region/Province	Magnitude of Poor Population		Poverty Incidence among Families (%)		Magnitude of Poor Population		Poverty Incidence among Population (%)	
	2006	2012	2006	2012	2006	2012	2006	2012
Cebu	209,301	185,603	25.6	18.9	1,184,478	1,000,163	30.4	22.7
Central Visayas	411,431	405,694	30.7	25.7	2,274,400	2,094,911	35.9	30.2
Philippines	3,809,283	4,214,921	21.0	19.7	22,643,980	23,745,895	26.6	25.2

Source: National Statistical Coordination Board.

There are 35,217 informal settler families (ISFs) in Metro Cebu. Nearly 50% of the ISFs reside in the City of Talisay, followed by Cebu City with 32%.

4) Development Issues and Priorities of 13 LGUs in Metro Cebu

There are four major development issues in Metro Cebu namely: (1) septage and sewerage management, (2) solid waste management, (3) traffic management, public transport, roads and other transport infrastructure, and (4) water supply. In addition, the member local government units (LGUs) of the metropolis also identified concerns for rapid population increase and informal settlements, economic development and the environment.

2.2 Natural Conditions

1) Topographical and Geological Condition

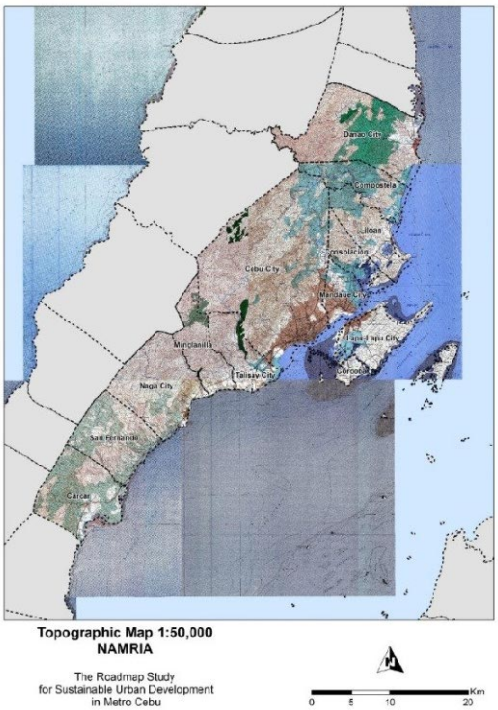
(1) Topographical Conditions : The study area is mainly composed of hilly uplands and mountains. The distribution of flat land is quite limited (see Figure 2.1).

(2) Elevation : Elevation in the study area varies from below 0 m to more than 500 m

(see Figure 2.2).

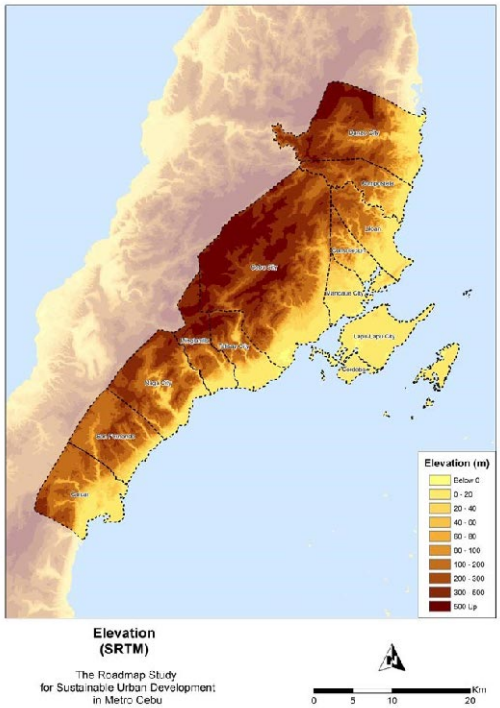
(3) Slope : Slope of less than 8%, which makes for higher land use suitability, can be found mainly in the alluvial lowland areas along the coastline (see Figure 2.3).

(4) Geology : The main geology is sedimentary rock which formed the backbone of Cebu Island (see Figure 2.4)



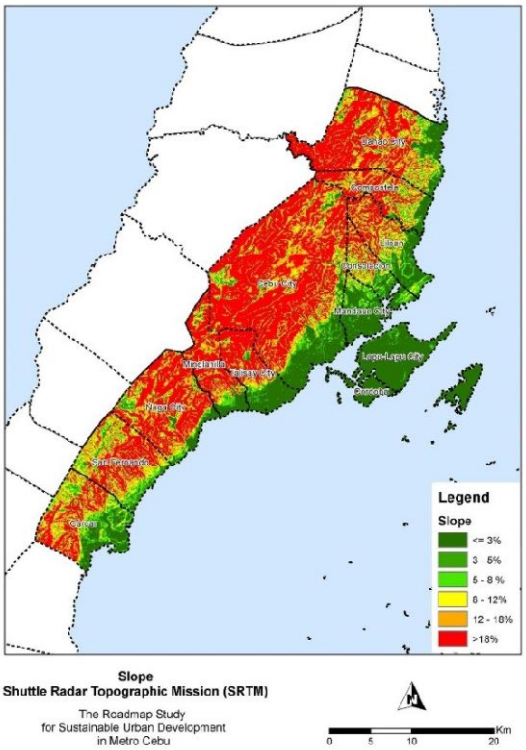
Source: NAMRIA

Figure 2.1 Topography of Metro Cebu



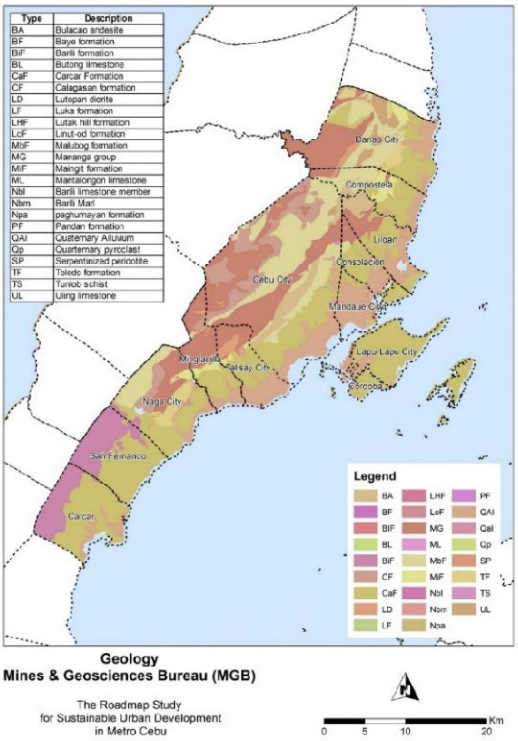
Source: SRTM

Figure 2.2 Elevation of Metro Cebu



Source: Shuttle Radar Topographic Mission (SRTM)

Figure 2.3 Slope of Metro Cebu



Source: Mines and Geological Bureau, DNER

Figure 2.4 Geologic Profile of Metro Cebu

2) Protected Areas

Protected areas are also identified based on official proclamations. A total of six protected areas were established in Cebu Province with three areas (30,039.5 ha) located in Metro Cebu.

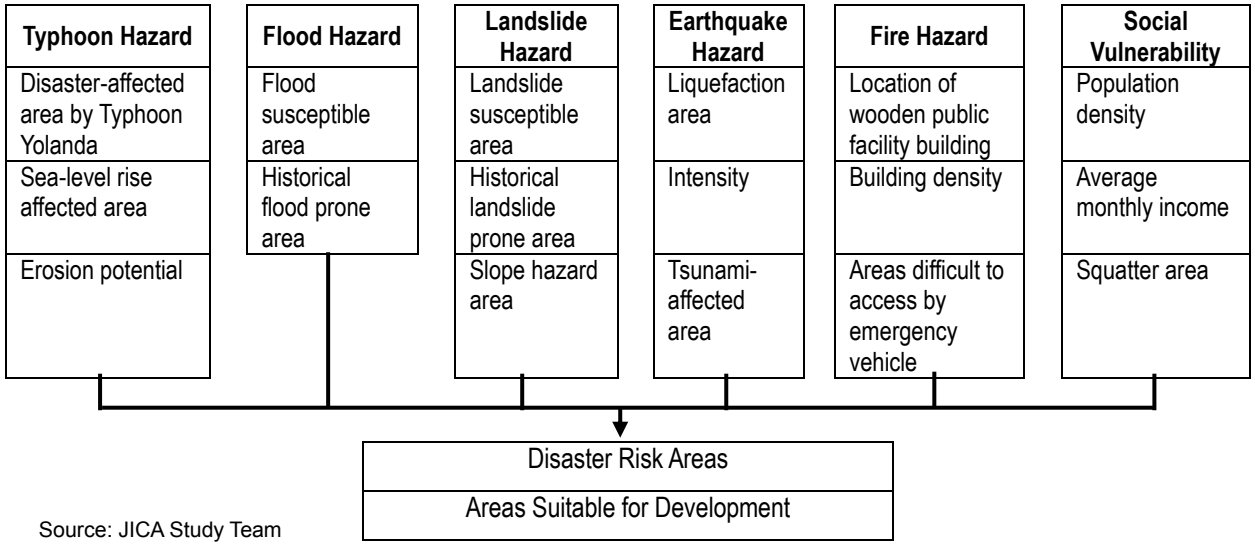
2.3 Mapping, GIS Development and Hazard Analysis

1) Maps and GIS

Available Maps and GIS : Maps of the National Mapping and Resources Information Authority (NAMRIA) covering Metro Cebu are prepared mostly in 1:50,000 scale, and partly in 1:10,000 scale. Cebu and Mandaue have developed their own GIS systems for managing urban planning and urban facilities or land cadastral and tax collection. However, the rest of the LGUs do not have GIS databases.

Preparation of Topographic Map : The JICA Study Team (JST) prepared a land use map in Metro Cebu for both existing and future conditions in 1:10,000 scale. In addition, JICA expanded the mapping area to cover also northern Cebu for topographic mapping and hazard assessment.

Hazard Mapping : Based on the topographic map in 1:10,000 and 1:25,000 scale, hazard maps is prepared. Figure 2.5 illustrates these procedures.



Source: JICA Study Team

Figure 2.5 Procedure of Disaster Risk Assessment

2) Hazard Analysis

(1) Reservation Area and Hazardous Areas

To evaluate the potential occurrence of natural disasters in the current urbanized area and determine the areas for future development, Metro Cebu land was classified according to the following categories:

(a) **Protected Area by Laws and Ordinances**

(b) **Slope Hazard Area:** the constrained areas of slope according to Philippine laws are those with more than 18% gradient, and these cover 72% of the study area.

(c) **Lowland Hazard Area:** JST defined areas less than 2 m above sea level as lowland hazard area that is highly affected by sea level rise caused by climate change. It covers 0.13% of the study area.

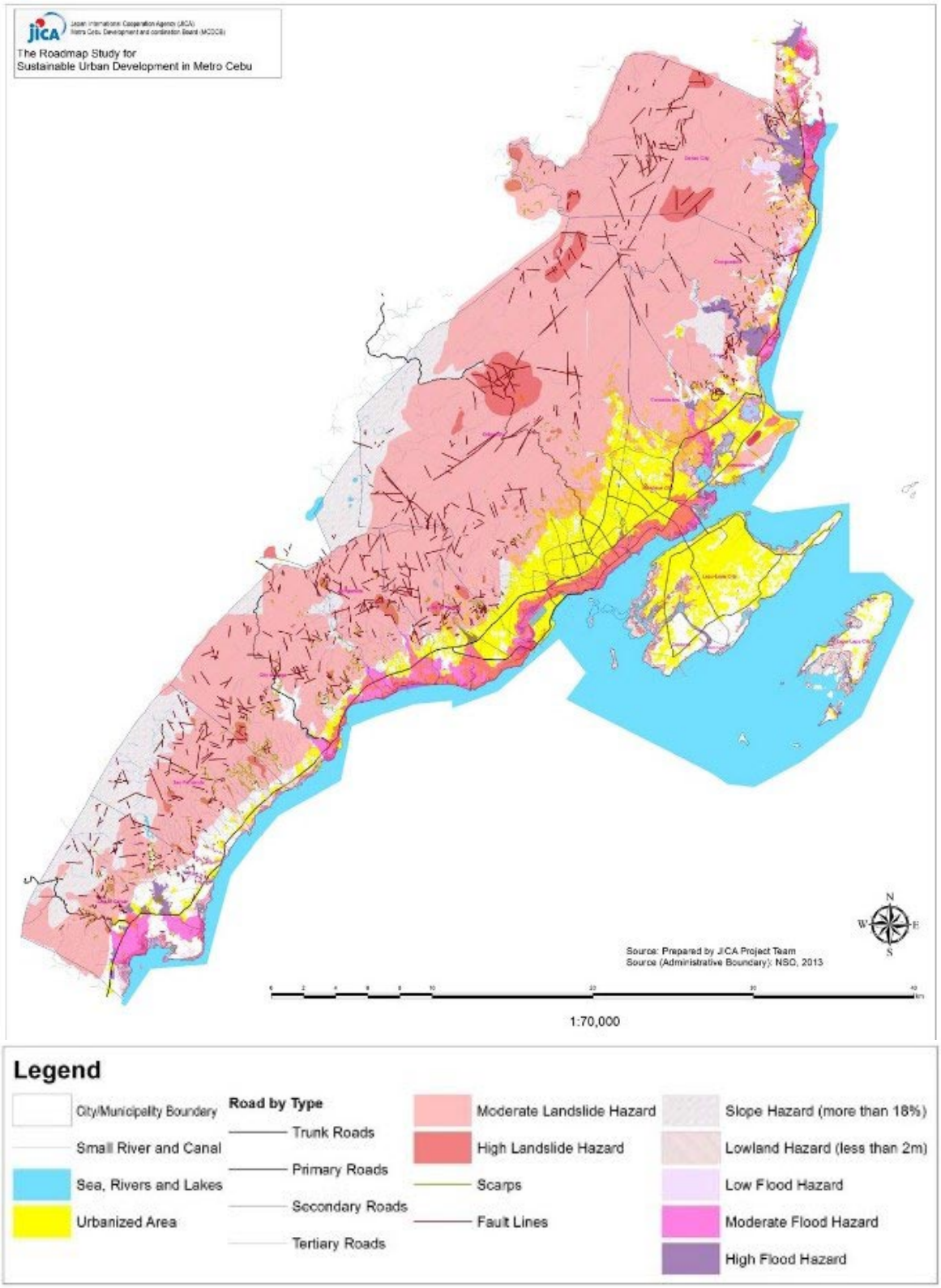
(d) **Flood Hazard Area:** flood hazards are evaluated at three levels (Low/ Moderate/ High) with consideration of topography, stream flow capacity and inundation patterns.

(e) **Landslide Hazard Area:** landslide hazards are evaluated at three levels (Low/ Moderate/ High) based on analysis of satellite images, digital geographical features model and contour.

(2) Possibile Land Supply for Urbanization

Based on the results of hazard analysis, 76% of the study area is considered hazardous and not suitable for urban development. About 1.9% of this unsuitable area is located in the current urbanized area (see Figure 2.6).

Development suitable area which has not been urbanized and without any hazards is 11,948 ha, or 10.9% of the study area. In developing a good urban area, future urbanization should only be considered within this area.



Source : JICA Study Team.

Figure 2.6 Hazard Area and Urbanized Area

3 URBAN STRUCTURE AND INFRASTRUCTURE

3.1 Review of Urban Development

As to urban development in Metro Cebu, the following past four development undertakings were reviewed.

1) Metro Cebu Land Use and Transport Study (MCLUTS)

The development of Metro Cebu between 1980 and 2000 was guided by a structure plan formulated by MCLUTS which was completed in 1981. The components of the plans and programs implemented by the national government agencies (NGA) and LGUs are given in Table 3.1.

Table 3.1 MCLUTS Plan Implementation Status

The Components Implemented	The Components NOT Implemented
• Mandaue City reclamation project; • South reclamation project; • New roads built such as the connector road from M. J. Cuenco to P. Del Rosario St., By-pass road from H. Cortez to the Reclamation Area, Extension of F. Cabahug St. to H. Cortez St., and Tayug Link as part of Plan 3; • Construction of 2nd bridge between the mainland and Mactan Island; • Widening/improvement of arterial roads; • Construction of the southern bus terminal; • Installation of a modern traffic signal system; • Implementation of some traffic management measures; and • Development of the Mactan tourism area.	• Creation of the Metro Cebu Development Authority; • Construction of other new roads such as a circumferential road from A. Fortuna to the South Road, Extension of H. Cortes St., A. Abellana St., and the Northern Ring Road from Talamban to Liloan; and • Improvement/ Widening of existing roads, e.g., Gov. Cuenco Ave.

Source : JICA Study Team.

2) Metro Cebu Development Project (MCDP)

The Metro Cebu Development Project (MCDP) was conducted in three phases through a Yen-loan to realize a comprehensive development of the urban infrastructure (see Table 3.2).

Table 3.2 MCDP in 1988 ~ 2000

Project	Main Projects
MCDP Phase 1	・ New construction/ extension of national road ・ Improvement of traffic management system (installation of traffic signals and road signs, etc. ・ Constrution of the Cebu South Bus Terminal
MCDP Phase 2	・ Extension of national road/ new construction of roads (Mandaue causeway, etc.) ・ Construction of the Cebu North Bus Terminal ・ Expansion/ development of public markets (Mandaue public market and Talisay public market) ・ Development of a solid waste disposal system (Inayawan sanitary landfill)
MCDP Phase 3	・ Reclamation project in the Cebu South Road Property (SRP) ・ Construction of the Cebu South Coastal Road

Source : JICA Study Team.

In addition, the following two Yen-loan projects were conducted simultaneously with MCDP, namely: (a) Mactan – Cebu International Airport (MCIA) Development Project, and (b) the Second Mactan Bridge Construction Project.

3) PEZA-Registered Projects

The Philippine Economic Zone Authority (PEZA) is a government agency under the

Department of Trade and Industry (DTI) which was established in 1995 in order to realize investment promotion, employment provision and export facilitation.

There are 64 PEZA-registered projects in Metro Cebu, covering a total of 989 ha. In terms of development phase, 37 projects with 825 ha are operating, 14 projects with 143 ha are under development, and 13 projects with 21 ha proclaimed.

4) Residential Development

Data from the Housing and Land Use Regulatory Board (HLURB) show that subdivisions and other residential development projects or formal housing projects are suitable for middle- to high-income groups. According to data on the residential development trend in Metro Cebu, there were 6,541 projects covering a total of 2,696 ha reported to HLURB between 1995 and 2012. The average project site area was 4,123 m^2 or almost one acre.

3.2 Sea and Air Gateways

1) Seaport

Cebu is a historical port city where the port supports the local economy and living activities of the people. It is the Philippines' main domestic shipping port and is home to about 80% of the country's domestic shipping companies.

In recent years, Cebu Port suffers from shallow berth facilities (i.e., up to -8.5 meters). It is a serious concern particularly among international shipping operators when assigning their container ships on the routes to Cebu. Another issue is its small container yard. There are several container depots around Cebu Port to offset its container yard shortage.

2) Airport

Mactan Cebu International Airport (MCIA) has witnessed significant growth in traffic handling 5.16 million domestic passengers and 1.67 million international passengers in 2014. It is the second largest airport of the country, next to the Ninoy Aquino International Airport (NAIA) in Manila. Average annual growth rates in the last decade are 10.5% for domestic flight passengers and 10.6% for international flight passengers.

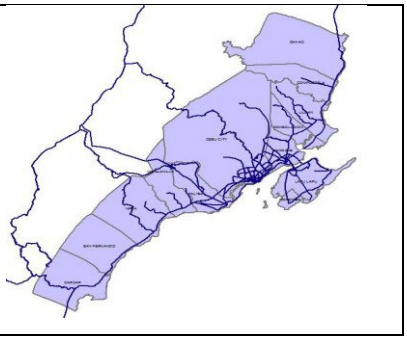
3.3 Road Network

1) Road Network in Metro Cebu

The total length of the road network in Metro Cebu is 1,140.2 km (see Table 3.3). MCDCB's envisioned road network is composed of unimplemented projects of MCLUTS and MCDP. The proposed network of MCDCB is shown in the Main Text.

Table 3.3 Existing Metro Cebu Road Network

Road Classification	Length (km)	Share (%)
National Road	159.6	14.0
Provincial Road	112.5	9.9
City Road	171.1	15.0
Municipal Road	66.4	5.8
Barangay Road	630.6	55.3
Total	1,140.2	100



Source: (Left) RBIA Generated Report as of 15 November 2011, (Right) MCTPS Report

2) Issues

In Metro Cebu, most roads are two-lane roads (i.e., one lane per direction) including the highways and there are a few wide roads with four lanes. The generally narrow width of roads is aggravated by the decreasing traffic capacity caused by jeepneys or taxis waiting for passengers and passengers getting on and off the public utility vehicles on the road.

3.4 Water Supply

1) Current Water Supply Service and Sources

At present, the supply of water in Metro Cebu is managed and operated either by the LGUs or the Water District (WD) holding a franchise over the area. Eight out of the 13 LGUs in the study area are served by the Metro Cebu Water District (MCWD). Water in the remaining five LGUs, referred hereinafter as non-MCWD areas, are supplied and managed by water district or waterworks of the respective LGUs supported by a private water supply company.

The main water source of MCWD is groundwater, which constitutes 98% of the water supply (see Table 3.4). Surface water accounts for only a small fraction of 2%.

Table 3.4 Existing Water Sources and Rated Production in Metro Cebu, 2013

Sources	Actual Supply (m^3/day)	Ratio, (%)
(a) MCWD Service Area	209,252	92.0
Groundwater	173,183	76.1
Surface water	3.080	1.4
Bulk supply (Private supplier)	28,108	12.4
Desalination (Mactan Rocks)	4,881	2.1
(b) Non-MCWD Service Area	18,273	8.0
[1] Northern Areas- Danao	5,541	2.4
Southern Areas	12,732	5.6
[2] Minglanilla (Miwasco)	2,690	1.2
[3] Naga (Abejo)	1,200	0.5
[4] San Fernando (LGU)	1,271	0.6
[5] Carcar (Water District)	7,571	3.3
Total Rated Production (m^3/day)	227,525	100.0

Source: MCWD Databook.
Notes: [1] Danao Waterworks, [2] Miwasco, [3] Naga Planning, [4] San Fernando, [5] Carcar Water District.

2) Issues and Concerns

The current water supply system in Metro Cebu is beset with several issues, as follows; (i) salinity intrusion, (ii) Nitrate and *E.coli* contamination, (iii) peripheral urbanization of the watershed areas, (iv) active faults in Cebu, and (v) hardly any access to water by the poor.

3.5 Storm Water and Water Disposal Management

1) Storm Water

(1) Current Situation

The drainage system in Metro Cebu reflects the same categories for draining rainwater, such as: (i) river, (ii) creek, and (iii) drainage. The flood-prone areas in Metro Cebu are identified by the respective LGUs. There are many flood-prone areas in the metropolis although flooding happens only when high tide and heavy rain occur at the same time.

One of the major problems regarding rivers, creeks and drainages are the presence of informal settlements and irresponsible private property owners along the riverbanks disposing an enormous amount of garbage that obstructs the flow of natural and man-made waterways (see Figure 3.1).

(2) Issues

The biggest problem of storm water management lies in the lack of information on conditions of flooding. In addition, there is no estimation of the economic losses caused by flooding. If the condition of storm water facilities is not improved in the future, flooding in the Metro Cebu area will become more widespread and the duration of inundation would become longer.

Relentless Waste Disposal

Illegal Housing on the River

Clogged Waterway

Source: JICA Study Team, MCDCB.

Figure 3.1 Current Conditions of Riverways in Metro Cebu

2) Waste Water Disposal

(1) Current Situation

The water quality monitoring results by the Environmental Management Bureau (EMB) of DENR show that downstream of some river's biochemical oxygen demand (BOD) is about 4 ~ 7 times compared to the standard level. In terms of groundwater quality, the results of well investigation show that a high number of water samples exceeded the allowable limit of 10 mg/L of nitrate and *E.coli*.

Based on a survey of households in 2014 at the MCWD area, 20% of respondents have experienced water-borne diseases such as diarrhea, dysentery, skin diseases, etc. In addition, 7% of the 400 sample households have no toilet.[1]

(2) Issues

The biggest problem regarding wastewater management in Metro Cebu is the lack of wastewater treatment. In the absence of an effective wastewater management system, the waterside environment would continue to be degraded by wastewater. As a consequence, the livability of Metro Cebu would get worse. Its competitiveness, for example, as an investment and tourist destination, would also decrease.

3.6 Waste Management

1) Current Situation

The estimated total volume of solid waste sent to final disposal sites or unidentified dumpsites is as large as 652 tons per day (i.e., 60% of total waste generated). Of this, 486 tons (44% of total waste) are disposed in sanitary landfills. The remaining 122 tons (11%)

[1] The Willingness To Pay (WTP) survey was conducted by the JICA Study Team in October 2014.

are disposed in the various dumpsites. Some 44 tons or 4% of total solid waste, are regarded as unaccounted, which might end up in illegal dumping sites.

The hygienic treatment of hospital waste and the proper treatment of hazardous waste are of serious importance in Metro Cebu.

Table 3.5 shows the solid waste generation volume per day, generation unit per capita/day and estimated disposal volume. Considering that not all the waste transported to the material recovery facilities (MRFs) are recycled, approximately 858 tons/day or 77% of the total volume generated are for disposal at the final disposal sites.

Table 3.5 Solid Waste Generation Volume and Unit, and Disposal Volume

LGUs	Population (in 2010)	Solid Waste Generation		Estimated Disposal (tons/day)
		Generation (tons/day)	Rate (g/capita・day)	
Cebu City	866,171	423	488	390
Lapu-Lapu	350,467	175	499	50
Mandaue	331,320	180	543	175
Talisay	200,772	80	400	60
Danao	119,252	45	377	16
Carcar	107,323	30	280	25
Naga	101,571	21	207	18
Compostela	42,574	15	352	10
Consolacion	106,649	35	328	30
Cordova	50,353	20	400	10
Liloan	100,500	34	338	25
Minglanilla	113,178	45	400	40
San Fernando	60,970	9	148	9
Total	2,551,100	1,113	436	858

Source : JICA Study Team.
Note: The solid waste generation unit for Talisay and Minglanilla is assumed to be 400 g/capita・day. The unit of San Fernando is much lower than other LGUs due to substantial amount of unaccounted waste in illegal dumping.

2) Issues

Main issues related to the final disposal site is as follows; (i) securing land for the final disposal site, (ii) leachate treatment at the existing disposal site, and (iii) management of the Inayawan Landfill.

Inayawan Final Disposal site (left)
MRF inside the compound (right)
Source: JICA Study Team.

Figure 3.2 Inayawan Final Disposal Site and the MRF Inside the Compound

4 BUSINESS AND INVESTMENT IN METRO CEBU

4.1 Business and Investment Conditions

Metro Cebu has a wide variety of industrial sub-sectors. It needs to foster some highly potential industries to enhance its “Competitiveness”.

1) Manufacturing Sector

Some conventional sub-sectors such as food processing, furniture and garment, which used to be major sectors in each LGU, are currently facing global competition and are losing cost competitiveness against Vietnamese or Chinese competitors. It may be difficult for these sectors to lead the industrial development of Metro Cebu in the future.

There are some Japanese electronics and optical product companies mostly located in the Mactan industrial zone. In general, their business model is a simple assembling process. Almost all existing industrial estates are full and it is getting difficult to find a location for additional factories.

2) IT / BPO Sector

Other major industrial sub-sectors in Metro Cebu are Information Technology (IT) and Business Process Outsourcing (BPO). Some of the BPOs are developing into Knowledge Process Outsourcing (KPO) such as for research and development.

The advantage of Metro Cebu in the IT/ BPO sector is its abundance of graduates from higher education institutions and its wage level that is lower than Metro Manila. For communications, an optical fiber business track can be connected between Cebu and Japan.

3) Tourism Sector

Cebu is famous as a beach-oriented tourism destination. In addition, Cebu has an International Convention Center built in 2007. However, the convention center is isolated from existing commercial areas. For Metro Cebu to develop its business for meetings, incentives, conferences and exhibitions (MICE) as one of the industrial pillars of the region, integrated development will be needed.

4) Technology Development and Potential New Industry

As to new technology development, university–industry linkage and industrial development are beginning to go hand-in-hand. To promote domestic industries, the Government of the Philippines is promoting the E-trike as a national project. Thus, eco-friendly and pro-environment innovation is a potential new industry.

5) Incentive Scheme for Investment

Most of the industrial zones and IT buildings in Cebu are registered with PEZA. Tax incentives are given to investments satisfying PEZA’s qualification requirements. Export-oriented companies located in the PEZA-registered special economic zones are eligible to receive tax incentives.

6) Business Platforms with Japan

There are some cooperation partnerships between Cebu and Japan which can function as business platforms. They include the following:

- Technical cooperation partnership for urban development;
- Business development support in Yokohama; and
- Human Resource Training for Manufacturing by Saitama Prefecture.

4.2 Comparative Analysis between Metro Cebu and Neighboring Countries and Metropolises

1) Economic Growth

Over the past 10 years, the growth of the Philippine economy has been moderate, averaging around 5% a year. This is not outstanding compared to neighboring countries.

2) Foreign Direct Investment (FDI)

FDIs in the Philippines have been low compared to those of other ASEAN countries in the past 10 years. However, the Philippines has been re-evaluated by foreign investors in view of the recent invesment climate in neightbouring countries and some large investments were made in the country these past few years. Now, those investments are concentrated in the Luzon region but needs to be brought into Cebu as well.

3) Composition of Economic Activity

The composition of GDP of the Philippines is unique compared to neighboring countries. The services sector accounts for 57% of total GDP, whereas the industry sector only has a 31% share.

4) Wages

As mentioned earlier, Cebu has a large advantage in its human resources. The wage level is competitive with those in neighboring countries, and lower than in Manila. This is true for all types of human resources. Only Hanoi, Vietnam is lower than Cebu, but the comparative advantage of Cebu is the workers' fluency in English.

4.3 Opportunities for Yokohama-based Companies

In terms of industrial development and private investments, not only Yokohama-based companies but also other Japanese companies are looking at the Philippines as a potential destination. It is more realistic to enhance existing advantages and resources rather than build up a completely new industrial sector. The potential target sectors, therefore, are identified as follows:

- Simple assembling and exporting sectors of manufacturing;
- IT / BPO / KPO sectors;
- Tourism sector; and
- Technology-driven sector, such as environmental, eco-friendly products and services.

5 Supplemental Surveys

The JICA Study Team conducted following surveys:

(1) Household Interview Survey (HIS) : The objective of the survey is to collect data about socioeconomic conditions of households, characteristics of weekday trips of Metro Cebu residents, and public opinions about development issues in Metro Cebu. All barangays in the study area were covered with approximately 6,500 households randomly sampled.

(2) Willingness to Pay Survey (WTP) : The objective of the survey is to collect pertinent information from households to examine the current status of water usage and sanitation/septage conditions as well as to plan out a sub-roadmap for the improvement of water supply and septage system. Selected barangays in MCWD-serviced LGUs were covered (i.e. Compostela, Liloan, Consolacion, Cordova, Lapu Lapu, Mandaue, Cebu and Talisay).

(3) Traffic Surveys : The traffic surveys conducted were Cordon Line Survey, Screen Line Survey, Public Transport Passenger Interview Survey, and Travel Speed Survey. Among others, these surveys are basically to provide data on traffic of vehicles and people to calibrate the HIS results; explore development directions for public transport; and identify bottlenecks on roads.

The results derived from all these surveys are summarized in the Main Text and elaborated in the report volume entitled Supporting Report 1: Database Formation. For the HIS, this includes household information, household member's information, details of trip record of each member in a day, and people's satisfaction/perception on existing living conditions and urban services. The latter covers perceptions on disaster, water supply service, sanitation, drainage, electricity and fuel, solid waste disposal, and traffic congestion.

Results on WTP includes household information of residents in the MCWD-serviced areas, water supply situation and the WTP for water supply service improvement. It also reveals results on sanitation/septage management as well as the WTP for septage management service.

The various traffic surveys portray travel conditions covering the origin-destination of people moving to/from and around the study area by mode, time and trip purpose. It therefore, reveals the volume of vehicles by road or corridor surveyed. A compilation of passenger opinions on the current level of public transport services (i.e., frequency, fare, travel time, safety, access to terminals, ease of transfer, waiting conditions, on-board or in-vehicle conditions, air and noise quality, etc.) and modal preference of passengers for daily commute are made available.

Through the conduct of a travel speed survey, levels of service of 343 road sections in the metropolis are known. The information is given by direction and time periods. Roads with travel speeds lower than 10 kph show serious congestion.

PART II MEGA CEBU ROADMAP 2050

6 DEVELOPMENT FRAMEWORK FOR MEGA CEBU ROADMAP

6.1 Mega Cebu Vision 2050

Mega Cebu Vision 2050 was formulated in 2013 by MCDCB in cooperation with JICA and Yokohama City. It consists of the following four strategic pillars (Competitiveness, Mobility, Livability and Metropolitan Management), which further translate into 15 development directions (see Figure 6.1):

Source: MCDCB-JICA 2013.

Figure 6.1 Strategies and Development Directions of Mega Cebu Vision 2050

6.2 Urban Population and Urbanization Framework

1) Future Urban Population

The future population of Metro Cebu was projected using logistic regression of past census data. Metro Cebu's population is estimated to reach 3.8 million in 2030 and will reach nearly 5.0 million people in 2050, which is double the 2010 population of 2.5 million (see Table 6.1).

2) Demands for Urban Development

Continuous population increase will require the creation of new workplaces and residential areas. The supply of new residential areas can be gleaned from statistics of the HLURB. The creation of new employment opportunities with urban development is made through registration of development areas with the PEZA.

JST assumed that demand for urban development will further increase to a total

requirement for new urban land for the period 2011–2050 of 12,120 ha (see Table 6.2). This is 11% of the total area of Metro Cebu and about 66% of the current urbanized area.

Table 6.1 Population of Metro Cebu, 1980–2050

City / Municipality Name	Population				Projection		Change
	1980	1990	2000	2010	2030	2050	2050 / 2010
City of Carcar	57.8	70.8	89.2	107.3	190.9	400.5	3.7
Cebu City (Capital)	490.3	610.4	718.8	866.2	1,090.7	1,211.6	1.4
Compostela	17.5	22.0	31.4	42.6	63.1	114.5	2.7
Consolacion	27.5	41.3	62.3	106.6	210.9	280.4	2.6
Cordoba	16.5	22.3	34.0	50.4	93.0	121.5	2.4
Danao City	57.0	73.4	98.8	119.3	163.1	273.1	2.3
Lapu-Lapu City	98.7	146.2	217.0	350.5	645.2	803.8	2.3
Liloan	30.2	42.6	65.0	100.5	202.8	271.0	2.7
Mandaue City	110.6	180.3	259.7	331.3	445.4	506.9	1.5
Minglanilla	38.5	50.9	77.3	113.2	160.6	192.2	1.7
City of Naga	45.8	60.4	80.2	101.6	148.8	267.2	2.6
San Fernando	28.3	35.1	48.2	61.0	96.9	187.1	3.1
City of Talisay	69.7	98.0	148.1	200.8	298.3	363.3	1.8
Metro Cebu	1,088.0	1,454.0	1,930.0	2,551.0	3,810.0	4,993.0	2.0

Source: JICA Study Team, calculated based on Census.

Table 6.2 Land Development Demand of Metro Cebu, 2011–2050

Type	Yearly Demand (in ha.)	Aggregated Demand (2011–2050; in ha.)	JST Estimated Demand (2011–2050; in ha.)
Residential Land under HLURB Category	150–300	6,000–12,000	9,000
Industrial and Service Land under PEZA Category	52–104	2,080–4,160	3,120
Total	202–404	8,080–16,160	12,120

Source: JICA Study Team.

6.3 Trade and Investment Framework

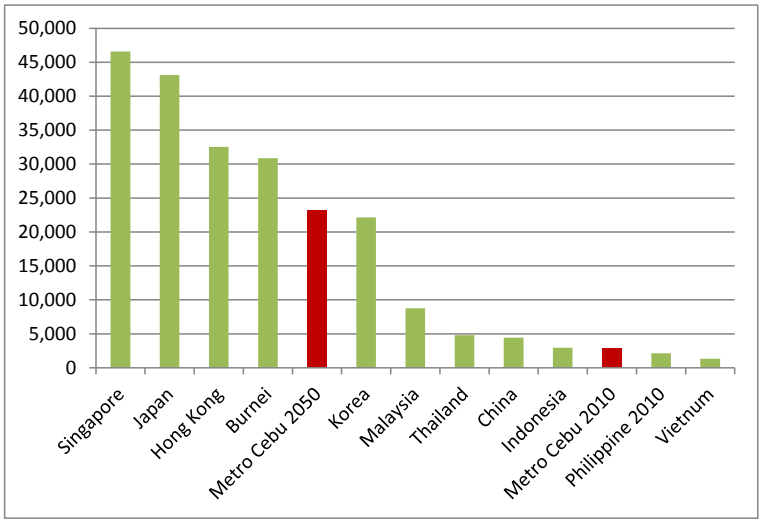
1) Economy

The study projected the growth potentials of economic activities up to 2050. GRDP of Metro Cebu will grow at 8.3% per year between 2010 and 2020, 7.8% per year from 2020 to 2030, then 5.8% per year from 2030 to 2050. As a result, the magnitude of economic activities in Metro Cebu will be almost 15 times as large as their 2010 level, where it is almost the same as Korea's as of 2010 (see Figure 6.2). To realize this sustainable growth, macroeconomic policies should be properly undertaken.

2) Employment

By 2050, total employment in Metro Cebu will reach 2 million with approximately 1 million already created in 2010. Employment will shift to a more industrialization-oriented structure, where the economy will be driven by strategic development of industrial and urban service sectors.

To ensure such an economic movement in Metro Cebu, about 317,000 new jobs should be created in the secondary sector and 641,000 in the tertiary (service) sector (see Table 6.3). Diversification of the urban economy is a must to enduce more foreign direct investments (FDIs) as well as to encourage local investors in various potential business areas.



Source: JICA Study Team.

Figure 6.2 Comparison of Per Capita GDP among Asian Countries in 2010 and Metro Cebu 2050 (USD at 2000 prices)

Table 6.3 Projection of Employment by Sector in Metro Cebu in 2050

Urban Cluster	Population 2050 ('000)	EAP (15–60 yes old)	Employment Needs in Formal Sector	Sector Structure of Employment (%)			Employment by Sector ('000)			
				Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	Total
Danao–Compostela	387.6	232.5	162.8	30	20	50	48.8	32.6	81.4	162.8
Consolacion–Liloan	551.4	330.8	231.6	20	25	55	46.3	57.9	127.4	231.6
Cebu–Mandaue	1,718.5	1,031.1	721.8	5	35	60	36.1	252.6	433.1	721.8
Talisay–Minglanilla–Naga	822.7	493.6	345.5	20	20	60	69.1	69.1	207.3	345.5
San Fernando–Car- car	587.6	352.6	246.8	25	15	60	61.7	37.0	148.1	246.8
Lapu Lapu–Cordova	925.3	555.2	388.6	5	35	60	19.4	136.0	233.2	388.6
Metro Cebu 2050	4,993.1	2,995.8	2,097.1	13.4	27.9	58.7	281.5	585.2	1,230.4	2,097.1
< Comparison between 2010 and 2050 >										
Metro Cebu 2010	2,551.1	1,530.7	1,071.5	20	25	55	214.3	267.9	589.3	1,071.5
Increase 2010–2050	2,442.0	1,465.2	1,025.6	-6.6	2.9	3.7	67.2	317.4	641.1	1,025.6

Source: JICA Study Team.
Note: (1) Economically Active Population (EAP) is assumed to share 60% of the total population.
(2) It is assumed that 70% of EAP will demand for employment in the formal sector.

3) Trade

Together with the steady growth of the economy, Philippine export and import performance has also shown robust growth. Exports in 2013 (including services) expanded by 7 .7% from its 2012 level.

Total exports of Metro Cebu show constant growth in the past two decades and even during the Asian financial crisis in 1997. Imports to Cebu are mostly raw materials for foreign export firms that locate in Cebu's growing export processing or special economic zones.

Historically Metro Cebu is the Visayas' trading hub supported by Cebu Port. Cebu Port has a share of 7.0% in terms of cargo throughput among Philippine Ports Authority (PPA) and Cebu Port Authority (CPA) ports while its domestic container volume has a more significant

share of 13.1% in 2010.

4) Tourism

Cebu is rich in history and cultural heritage, and also gifted with breathtaking natural attractions and white sand beaches. Cebu has become a major destination of choice for visitors in the country.

In 2013, Cebu's total number of tourist arrivals breached the 2.5 million mark at 2.59 million composed of 1.15 million foreign tourists and 1.44 million domestic tourists. This represented a 16.8% increase over the previous year's tourist arrivals. World Travel and Tourism Council (WTTC) forecasted 6 % annual growth of tourist arrival in Cebu for 2014 to 2024, i.e., 4.65 million tourists in 2024.

The growth in tourist arrivals raises issues on accommodations and airport capacity, and this requires immediate actions to improve those capacity to meet tourist demand.

5) Investments and Economic Zone

Metro Cebu is now one of the most progressive investment centers in the country and in Asia. Many foreign investors are attracted to Cebu because of its abundant supply of highly skilled and educated labor force, strategic location, availability of infrastructure, presence of related and supporting industries, good peace and order situation, and supportive local government officials.

7 SUB-ROADMAP FOR METROPOLITAN COMPETITIVENESS ENHANCEMENT

7.1 Industry and Investments in the Region

1) Industrial Development Policy

The major regional industries of Central Visayas are (i) Manufacturing, (ii) BPO, (iii) Tourism, and (iv) Electronics / Semiconductors, all of which the DTI also defines as the priority sectors in the region.

2) Local Development Management

Guided by the national industry development priorities, the 13 LGUs of Mega Cebu have drawn up their respective local development plans and programs. Taking into consideration their strengths, weaknesses, development opportunities and challenges, the LGUs have set their respective priorities (see Table 7.1).

Table 7.1 Development Priorities and Directions of 13 LGUs

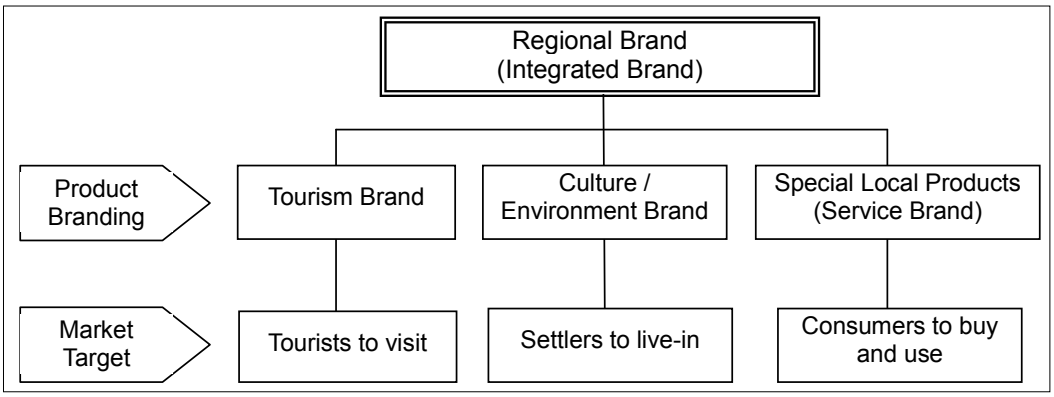
LGU	Priority / Direction	LGU	Priority / Direction
Danao	Development as a north gate pole/Sub-urban center of Metro Cebu, IT, Agriculture, Agro-industry and Tourism. In addition to MRI, new Industrial Zone 2 & 3 in the northern coastal area, potential to IT cluster second to MEPZ	Cordova	Second gateway to/from Mactan with new bridge, Reclamation for new business and industrial locations, Marine tourism. Has a policy of no manufacturing industry.
Compostela	Reclamation for new industrial locations, Development of IT park with fiber-optic line, Agriculture, Agro-Industry	Cebu	IT/BPO business center (smart city) at SRP, Commercial and business center, High education and training hub, City tourism, Gateway functions of Mega Cebu to international investors and visitors
Liloan	Education, Health care, Agro-industries, Sea-based public transport terminal	Talisay	Public market, International marina, fish port and food processing industries, Agro-industry, Commercial, Industry
Consolacion	Reclamation for new industrial locations, Container port and Logistic center, Light industries to compliment MEPZ, Agriculture, Tourism, Education, Sports-recreational center	Minglanilla	Light industry, Service industry, Reclamation for industrial locations of SMEs, Agro-industry, Wood craft and furniture, Bus terminal with a sub-regional market
Mandaue	IT/BPO center, Commercial and business sub-center, Logistic center, Recreational and tourism center. Largest industrial area (925 ha) in Metro Cebu.	Naga	Development as a Sub-urban center, Naga Valley Industrial Park (36 ha) has developed in 2014 and Naga SEZ (30 ha) will be implemented. Home to Apo Cemex cement factory. Tourism resource center, New Naga public market, Education and vocational training center (new college), Agro-industry
Lapu-Lapu	Sub-urban center with business and commercial functions, Reclamation project (northern part) for new industrial locations, Sport-recreational center, Sophisticated marine tourism, Eco-tourism gateway, Health services	San Fernando	Agriculture, Agro-industry, Industrial estate for basic industrial locations and logistic services. Home to Taiheiyo Cement Php.Inc. Educational Center for Cebu-South.
		Carcar	Historical and Eco-tourism, Agro-industry, Food processing industry, Bus terminal with a sub-regional market

Source: JICA Study Team.

7.2 Roadmap Direction on Metropolitan Competitiveness

1) Regional Branding

Regional branding is adding value that appeals to the region. The functions of branding include guarantee of quality, differentiation, and recall. Its effects include premium price effect and loyalty effect. Figure 7.2 presents an example of tourism branding.



Source: JICA Study Team.

Figure 7.1 Regional Branding for Economic Growth

Cebu needs a better understanding of the importance of developing its regional brand and how to fully utilize the potential of its resources in different economic sectors.

2) Strengthening Research and Analysis Function and HRD

For strengthening the priority sectors it is necessary to further develop the function of R&D and HRD (Education). Cebu has a reputation for its excellence in education (academe), hospital and health care. The advantage of English as an official language will be further utilized as in the BPO / KPO sector.

3) Mega Cebu Investment Board (MCIB)

An Investment Board for Mega Cebu needs to be urgently established to facilitate implementation of a unified investment promotion strategy for both public and private sectors and for the entire area.

The proposed MCIB should consist of concerned organizations from public, private and academic sectors and will not be dependent on a particular political party, hopefully to be managed through income from membership and service fees.

7.3 Summary of Sub-Roadmap Projects for Metropolitan Competitiveness Enhancement

Roadmap for Competitiveness is summarized in Table 7.2.

Table 7.2 Sub-Roadmap for Metropolitan Competitiveness Enhancement

Term	
Short-Term	• Establishment of Mega Cebu Investment Board (MCIB) • Preparation of feasibility study for industrial parks/estates development projects • Establishment of a Cebu Branding Institute for regional branding with good networking with existing institutions • Establish a Cebu Educational Development Foundation for Health Care and capacity development of HR in the sector • Establishment of a research and development centre for Tourism • Update the Master Plan for the entire Cebu Province
Mid-Term	• Further research and analysis on the strategies of global investors and neighbouring countries. • Implementation of the short-term project for investment promotion and Mega Cebu brand • Facilitate development of new industrial parks/estates under a newly conceptualized PPP scheme
Long-Term	• Realize the vision of the long-term target set up by the Mega Cebu 2050 • Propagate firm-level productivity and competitiveness in line with HRD • Facilitate entrepreneurial mindset and a proactive attitude to assure sustainable improvement and innovation

Source: JICA Study Team.

8 SUB-ROADMAP FOR URBAN STRUCTURE AND LAND USE

8.1 Urban Society in 2050

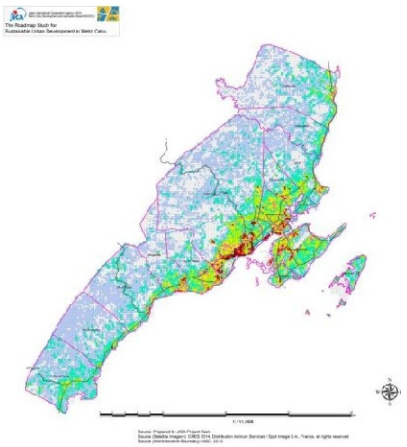
The available land resource of Metro Cebu is limited and thus the most suitable lands for urban uses have to be developed in order to accommodate the 5 million people forecasted for 2050. Thus, there are two options for the urban structure in 2050.

1) Monocentric and Densely Inhabited Urban Area

The present urbanization pattern will continue. Urban development will still be concentrated in Cebu City, Mandaue City and Lapu-Lapu City. Urban sprawl will encompass peripheral LGUs. Traffic congestion will worsen and eventually hamper economic and social activities, discouraging spacious suburban development.

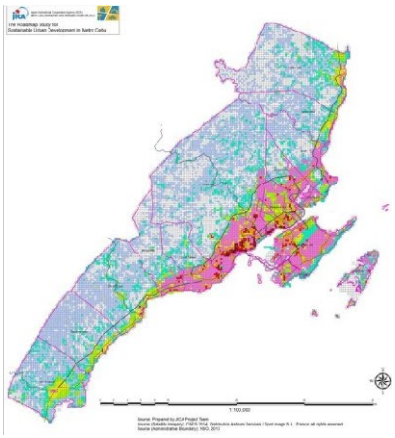
2) Polycentric and Equitably Developed Urban Areas

New workplaces and residential areas will be distributed throughout Metro Cebu. Hillside development will be constrained and favourable urban amenity will be created so as to prevent urban disasters such as landslides and floods. In order to realize a polycentric and equitably developed urban place, infrastructure development will take an important role to enhance development potential at suitable lands for urbanization and guide investment flow to these.



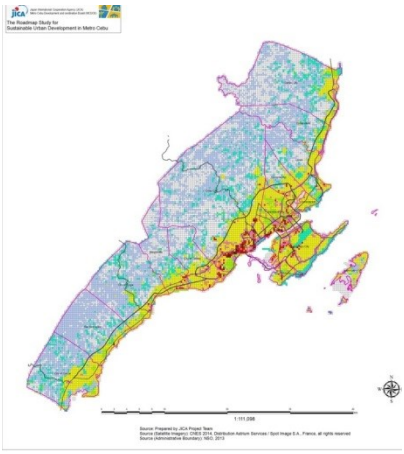
Source: JICA Study Team.

Figure 8.1 Existing Population Distribution in 2010



Source: JICA Study Team.

Figure 8.2 Monocentric and Densely Inhabited Urban Society in 2050



Source: JICA Study Team.

Figure 8.3 Polycentric and Equitably Developed Urban Society in 2050

8.2 Urban Structure and Urban Functions

To realize a balanced urban society in 2050, the Study applies three planning devices which have been discussed locally;

1) Urban Cluster System

Metro Cebu is divided into six clusters to design urban functions. For example, Danao City

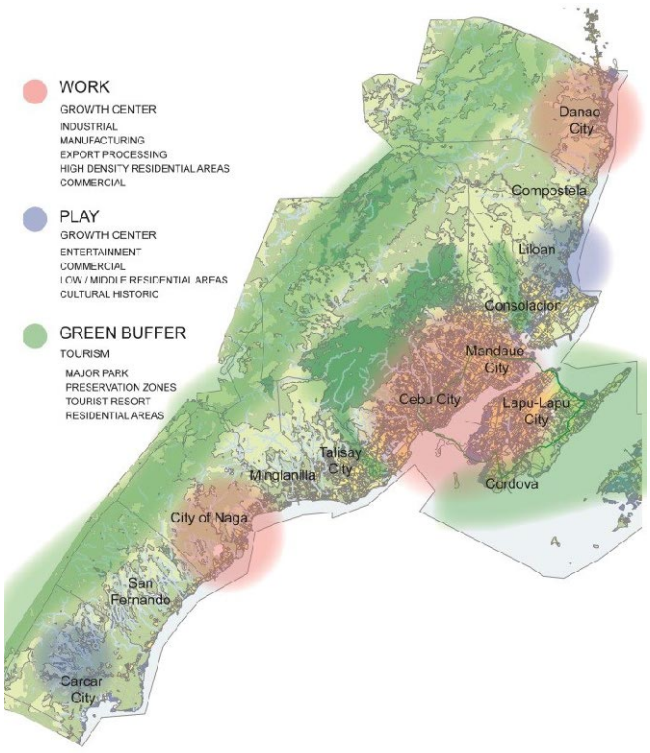
and Naga City will be developed as growth poles next to the core area (Cebu City, Mandaue City and Lapu-Lapu City). (see Figure 8.4)

2) Urban Limits

Urban limits are set on hilly slopes so as to form less hazardous urban spaces free from landslides and floods. The proposed Metro Cebu Circumferential Road in particular will be able to control urban development when no arterial road is planned at the upper lands above the circumferential road (see Figure 8.5).

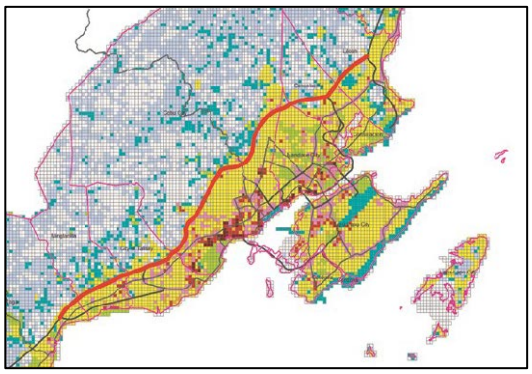
3) Green Loop

The Green Loop gives two re-definition concepts on and along the designated road space at the Metro Cebu's core area (Cebu City, Mandaue City and Lapu-Lapu City) (see Figure 8.6). One is the re-definition of a road user to include not only a road vehicle owner, which is a small percentage of the citizenry, but also pedestrians and bicycle users. The Green Loop project aims to develop comfortable road space for all users. Another re-definition is to identify urban boundary which should promote more attractive urban functions in the Green Loop.



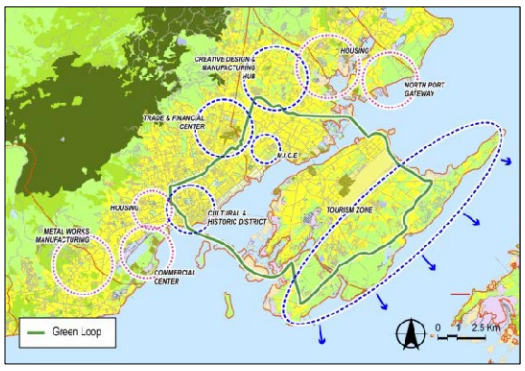
Source: JICA Study Team.

Figure 8.5 Concept of Urban Structure and Urban Functions in Metro Cebu



Source: JICA Study Team.

Figure 8.4 Urban Limit



Source: JICA Study Team.

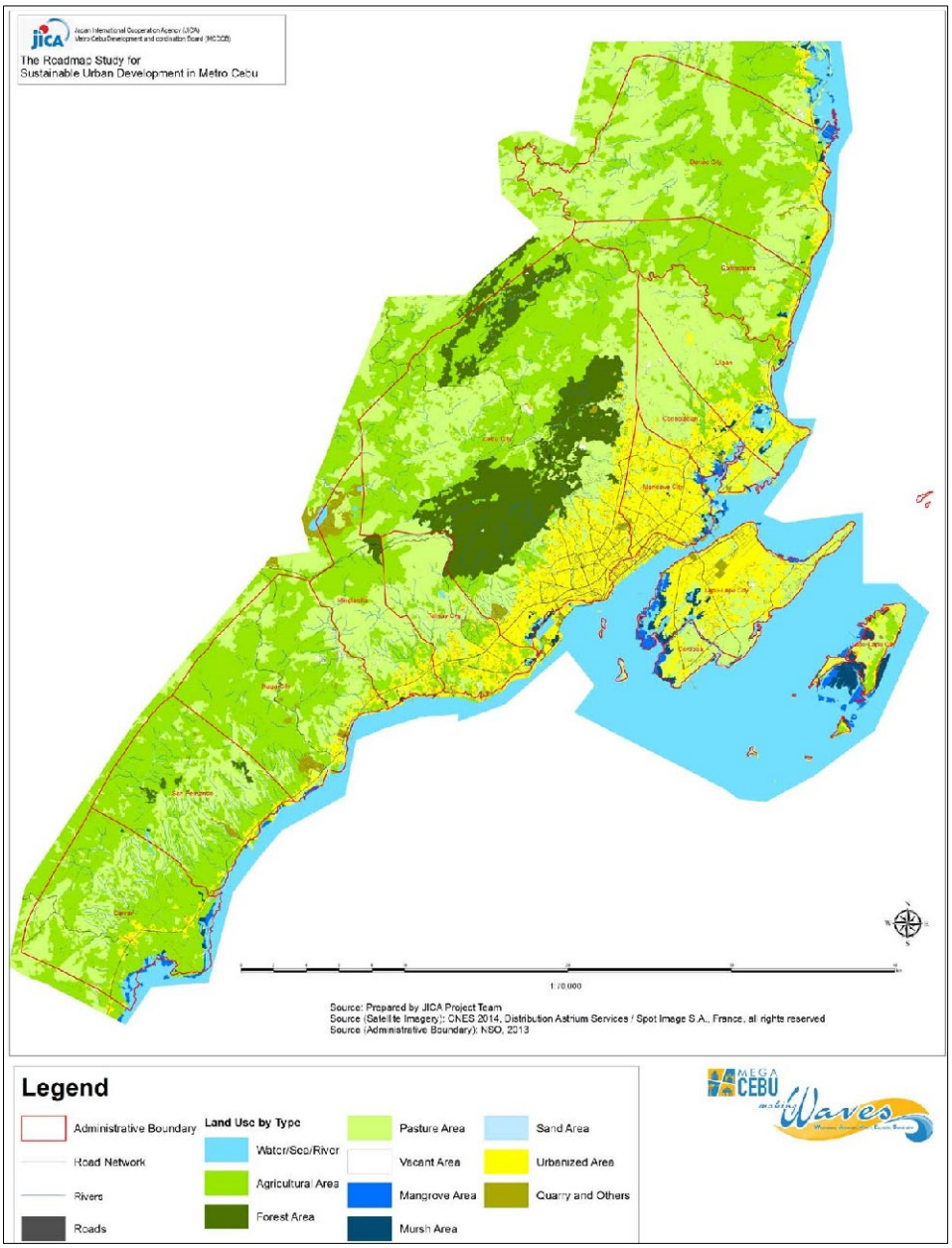
Figure 8.6 Concept of the Green Loop

8.3 Metro Cebu Spatial Plan

1) Confirmation of Existing Land Use

At the beginning of the Study, there was no existing land use map for Metro Cebu since individual LGUs prepared their own existing land use maps at different scales, categories

and drawing methods. In order to confirm the existing land use, the Study organized a workshop to coordinate such identified issues and surveyed an original map. Figure 8.7 shows the existing land use confirmed by the Study.

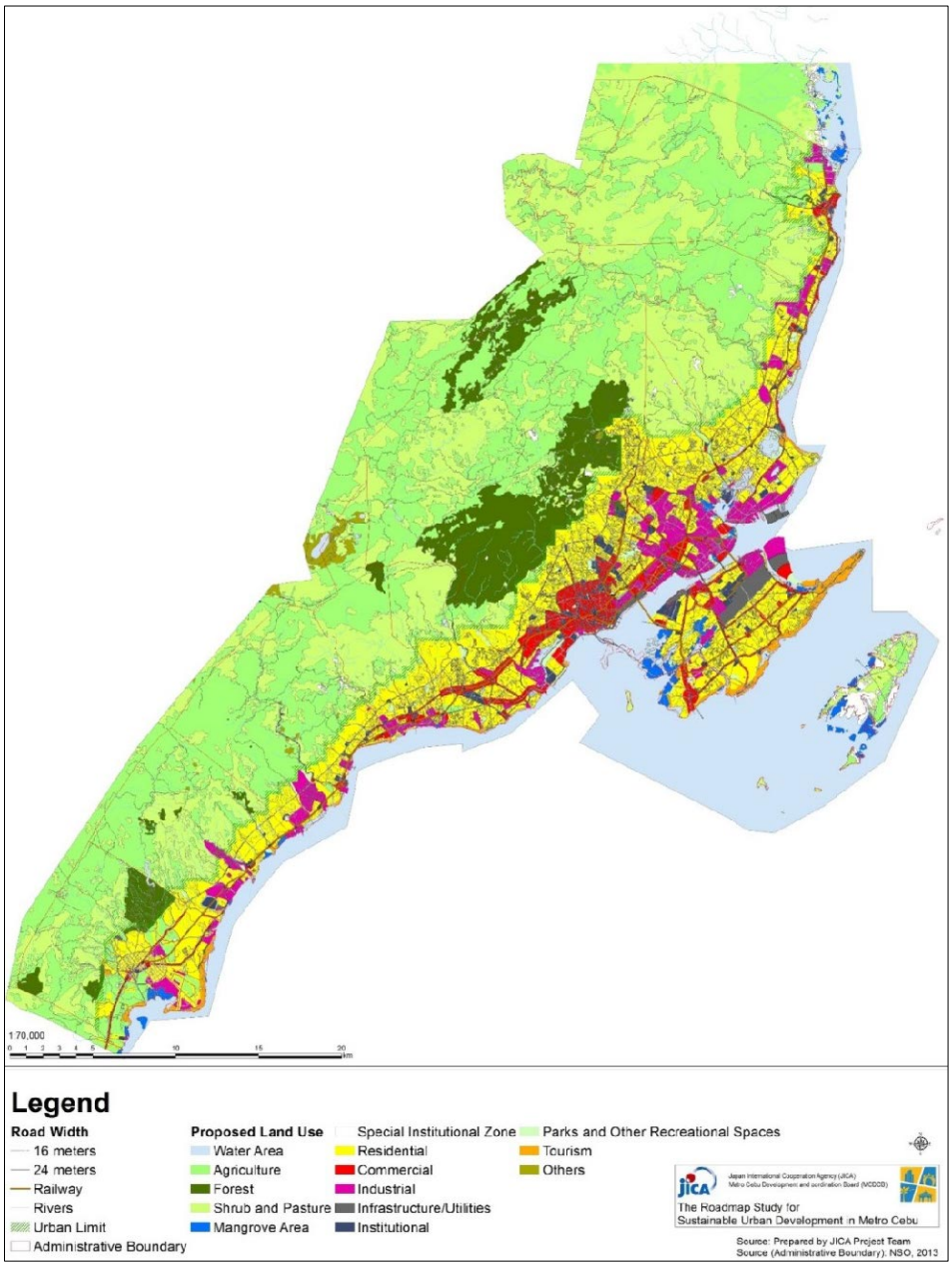


Source: JICA Study Team.

Figure 8.7 Existing Land Use Map in Metro Cebu

2) Draft Spatial Plan

SWOT analysis was done by workshop participants in the formulation process of the Mega Cebu Vision 2050. Lack of infrastructure and urban land use plan are highlighted by the participants as weaknesses. In order to address this, the Study has elaborated a spatial plan at a scale of 1:10,000 subject to future urban areas in collaboration with LGU counterparts, relevant nationall government agencies, the academe and experts. This spatial plan will be a guiding document when infrastructure projects are planned and private development permits are issued. (see Figure 8.8)



Source: JICA Study Team.

Figure 8.8 Metro Cebu Spatial Pan

8.4 Summary of Sub-Roadmap Projects for Urban Structure and Land Use

Sub-Roadmap for Urban Structure and Land Use is summarized in Table 8.1.

Table 8.1 Sub-Roadmap for Urban Structure and Land Use

Term	Title
Short-Term	• Utilize Metro Cebu Spatial Plan in various administration services in relation to infrastructure and land use zoning (2015–2017) • Develop effective Land Use Control Guidelines (2015–2017) • Facilitate urban greening measures (2015–2020)
Mid to Long-Term	• Complete 'Green Loop' (2021–2030) • Provide programs to utilize and update Metro Cebu Spatial Plan (2021–2050) • Promote rail and TOD for compact city and wide pedestrian space at roads (2021–2050) • Improve riverine environment (2021–2050)

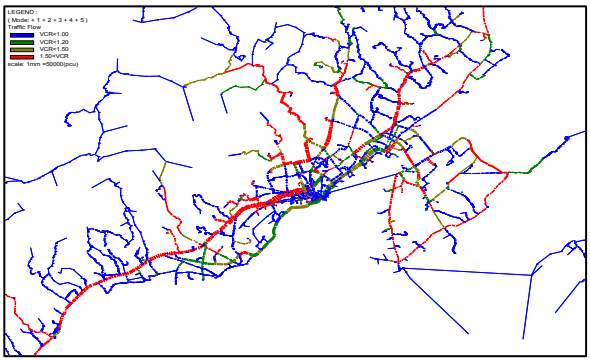
Source: JICA Study Team.

9 SUB-ROADMAP FOR HIGHWAY NETWORK AND PUBLIC TRANSPORT

9.1 Highway Network

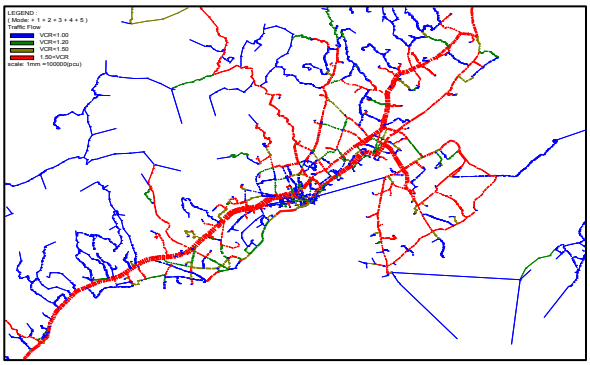
1) Existing Situation and Traffic Demand

Because of rapid population growth in Metro Cebu, road capacity of existing road network will not be suitable for traffic demand in 2050. Following figures show Vehicle Capacity Ratio (VCR). Blue line means smooth traffic flow and red line means heavy congested road. This results show necessity of new road development and introduction of public transportation. (See Figure 9.1 and 9.2)



Source: JICA Study Team
Note: [Blue] VCR<1.00, [Green] VCR<1.20, [Brown] VCR<1.50, [Red] 1.50<VCR

Figure 9.1 Year 2014 Demand on Existing Highway Network



Source: JICA Study Team
Note: [Blue] VCR<1.00, [Green] VCR<1.20, [Brown] VCR<1.50, [Red] 1.50<VCR

Figure 9.2 Year 2050 Demand on Existing Highway Network

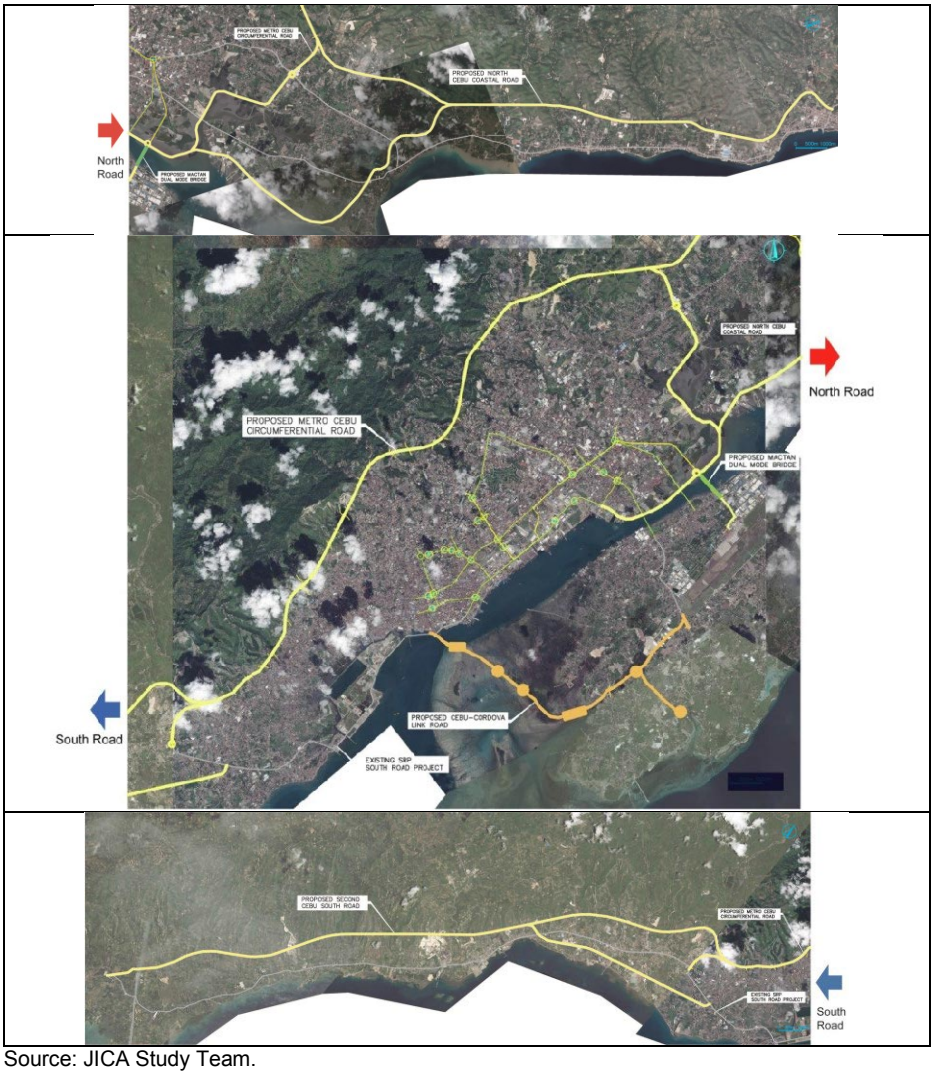
2) Metro Cebu Highway Network

The study has proposed road projects taking into consideration of the results of previous study such as MCLUTS, workshop and meeting held in this study. The proposed Metro Cebu Circumferential Road is strategically important to structure urban areas, guiding orderly urbanization and controlling upland development above the proposed road. North Cebu Coastal Road and Second Cebu South Road are also proposed to provide alternative route to avoid existing road congestion. (see Figure 9.3)

3) Mactan Link

Though there are presently two (2) bridges serving inter-island traffic between Cebu and Mactan, vehicular traffic on the first bridge has reached its capacity, and it is highly possible that the second bridge will experience congestion by 2020. Thus it is necessary to construct the third bridge.

Based on the review of existing study and consultation with related LGUs and institution, the northern route (route A) is recommendable though there are five alternatives. If a dual-mode bridge for road and rail is constructed, it is possible to draw the shortest alignment to the airport terminal from among the bridge alternatives.

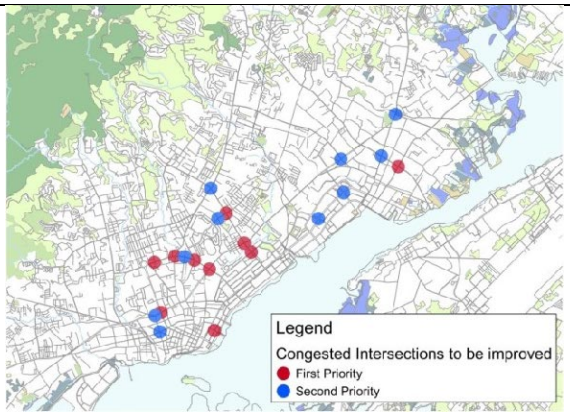


Source: JICA Study Team.

Figure 9.3 Major Road and Bridge Projects in Metro Cebu

9.2 Mitigation Measures of Traffic Bottlenecks

In order to mitigate the 20 bottlenecks identified by this study, four kinds of measures are proposed from theless capital-intensive to the more capital-intensive traffic management measures as follows. (see Figure 9.4)



Source: JICA Study Team.
Note: Red Circle – First Priority, Blue Circle–Second Priority.

<Traffic management measures>

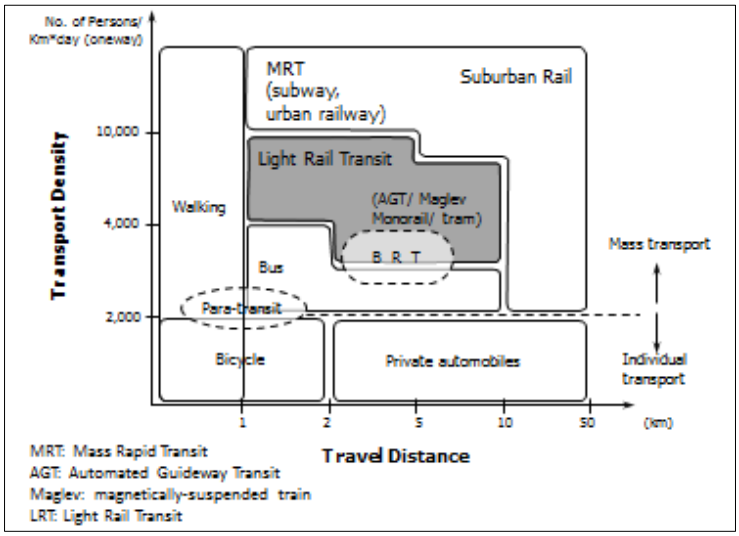
(i) Traffic management improvement by intersection;
(ii) Area traffic control (ATC) system;
(iii) Grade separation of intersections; and
(iv) Road widening.

Figure 9.4 Congested Intersections for Improvement

9.3 Public Transport

1) Policy of Rail-Based Public Transport Services

It is desireable for Metro Cebu to develop the most suitable transport system through a combination of road and rail transport modes by 2050 when it becomes a mega city of over 5 million people. The trunk mode will be a large capacity transport system such as the MRT carrying large volume of people (20-50 thousand passengers/hour/direction). The next mode will be a middle capacity system such as the LRT (less than 20 thousand passengers/hour/direction). The bus will serve the entire urban areas and will provide access services to the MRT/LRT stations.



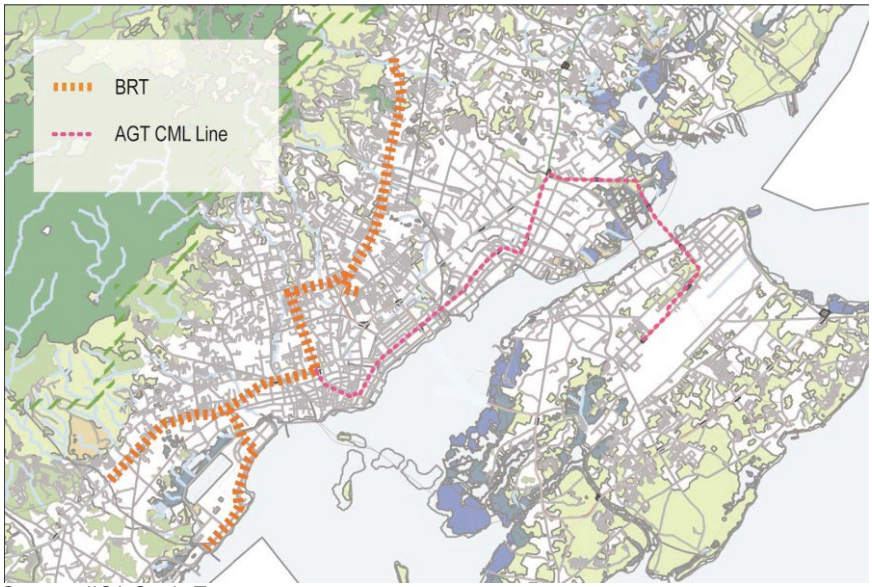
Source: MLIT Japan, The Seminar on Urban Transport Systems in Metro Cebu, 2014.

Figure 9.5 Optimum Combination of Transport Modes in a Mega City

(1) LRT System to be Introduced by Early 2020s

The Study has analyzed road congestion conditions in the central areas of Metro Cebu and the performance of road-based public transport services within such congested areas. Then, LRT development opportunities have been identified with some advantages such as a simple and compact system, less land acquisition requirement, and economical construction.

Since it is the first urban rail in Metro Cebu, route alternatives were prepared taking a potential local market into account. Suitable urban rail users may encompass airport passengers, commuters to business parks / IT parks, visitors to large-scale shopping malls and orderly developed subdivision dwellers among Cebu City, Mandaue City and Lapu-Lapu City. As results, one route is recommended from the viewpoints of traffic demand and engineering analysis.



Source: JICA Study Team.

Figure 9.6 Alignment of AGT-CMLLine

(2) MRT System to be Introduced from 2020s and by 2050

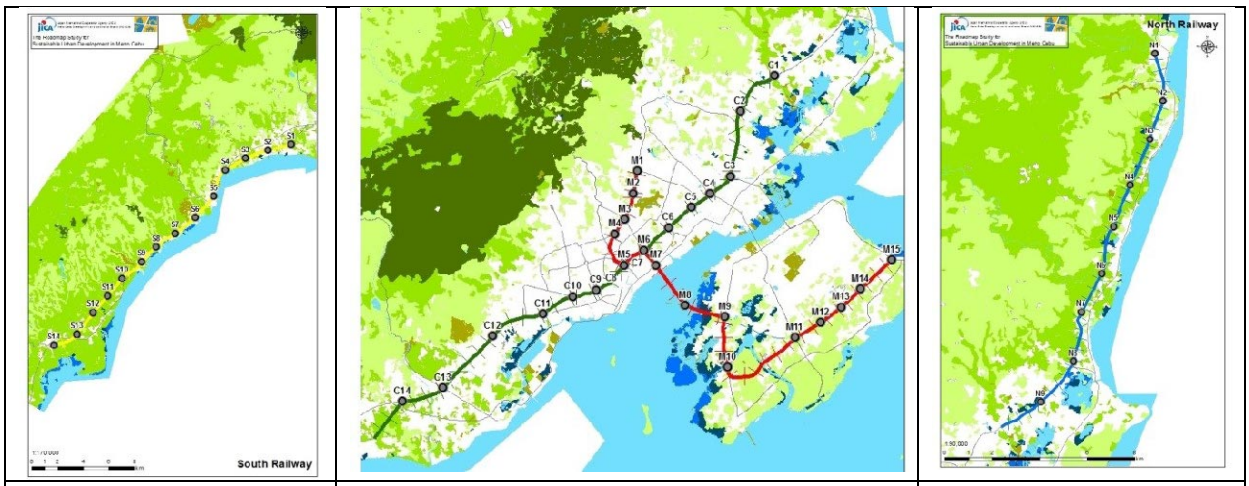
A MRT system has been studied together with a metropolitan land use plan so as to promote urban growth in the metropolis. The proposed routes are divided into several phases taking demand and construction cost into account. The draft spatial plan includes the following MRT lines with a route length of 96.6 km and 50 stations in total (see Figure 9.7):

(i) MRT North Line (Danao City–Liloan: 24.7 km, USD1,369 million);

(ii) MRT Central Line (Consolacion–Talisay City: 21.2 km, USD1,774 million);

(iii) MRT South Line (Minglanilla–Carcar City: 29.2 km, USD1,799 million); and

(iv) MRT Mactan Line (Cebu City–Lapu-Lapu City: 21.5 km, USD1,737 million).



South Railway	Central and Mactan Railway	North Railway

Source: JICA Study Team.

Figure 9.7 MRT Lines for Metro Cebu Coastal Shipping in Urban Commuting

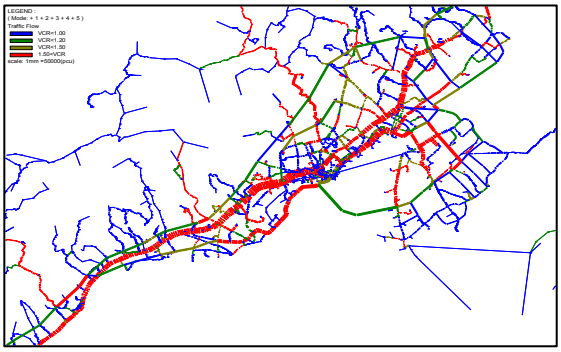
9.4 Summary of Sub-Roadmap Projects for Highway Network and Public Transport

Sub-Roadmap for Highway Network and Public Transport is summarized in Table 9.1. Future road situation with completion of roadmap projects is shown in Figure 9.8 and 9.9. Road congested situation will be solved after implementation of roadmap projects.

Table 9.1 Sub-Roadmap for Highway Network and Public Transport

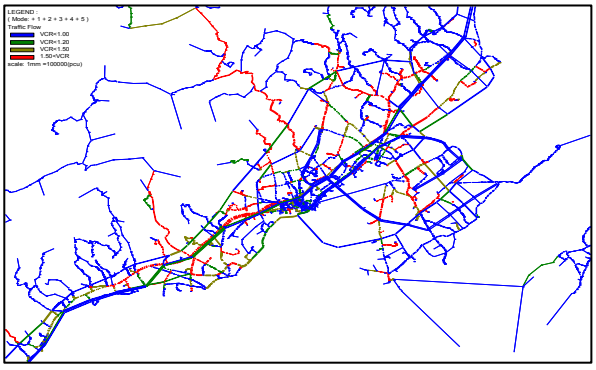
Term	Projects
Short-Term	• MP and FS on mass transit system (BRT/LRT/MRT) development for Metro Cebu (2015–2017) • The Cebu City BRT Project, reorganization of bus/PUV routes (2015–2017) • FS on ATC for Metro Cebu (2015–2017) • A synchronized signalization system covering major intersections by TCC (2018–2020) • Carcar public transport terminal (2018–2020) • RROW Widening with wide sidewalks and bicycle lanes (2018–2020) • A dual-mode bridge between Mandaue City and Mactan North (2017–2020)
Medium-Term	• Construction and operation of the CML-AGT Line (2018–2021) • Urban fringe roads (the Metro Cebu Circumferential Road, the Second Cebu South Road and the Second Cebu North Road) (2021–2030) • A new road bridge between Cebu City and Mactan South (2021–2030) • Continuous improvement of congested intersections (2021–2030) • Construction and operation of the MRT Central Line (2021–2030) • Revitalization of the abandoned PNR ROW for road and railway (2021–2030) • Completion of the Mandaue's Scenic Coastal Road and the Tayud Coastal Road (2021–2030) • Strengthening of the Mactan Island Road Network (2021–2030) • Construction of secondary roads and collector roads in accordance with Metro Cebu Spatial Plan (2021–2030) • Introduce ferry commuting service (when urban traffic is seriously clogged)
Long-Term	• Completion of the remaining MRT lines (2031–2050) • Promotion of bus/minibus/jeepney and TOD around MRT/LRT stations (2031–2050) • Continuous construction of secondary roads and collector roads in accordance with Metro Cebu Spatial Plan (2031–2050) • Construct toll skyway (when necessary)

Source: JICA Study Team.



Source: JICA Study Team
Note: [Blue] VCR<1.00, [Green] VCR<1.20, [Brown] VCR<1.50, [Red] 1.50<VCR

Figure 9.8 Year 2050 Demand on Future Highway Network



Source: JICA Study Team
Note: [Blue] VCR<1.00, [Green] VCR<1.20, [Brown] VCR<1.50, [Red] 1.50<VCR

Figure 9.9 Year 2050 Demand on Future Highway and Rail Network

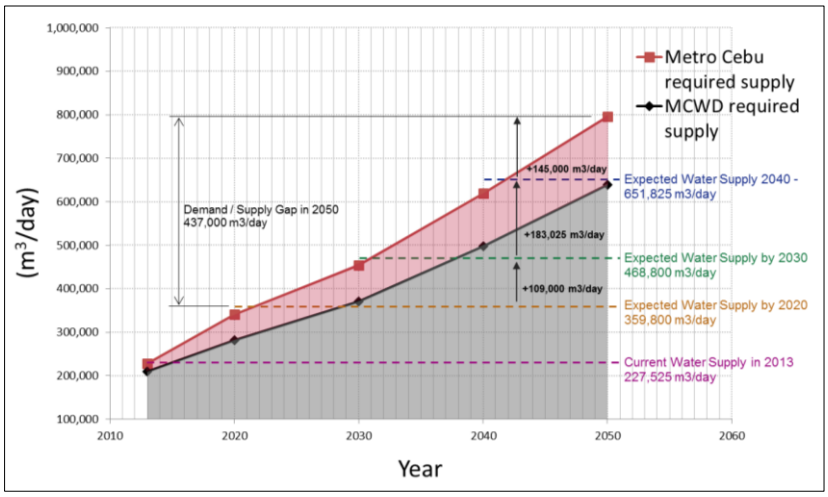
10 SUB-ROADMAP FOR WATER SUPPLY, STORM WATER AND WASTEWATER MANAGEMENT

10.1 Water Supply Development

1) Water Demand Projection

Key issues of water supply in Metro Cebu are the supply deficit in the future as well as the salinity intrusion, nitrate and E.coli contamination. Moreover, peripheral urbanization in the watershed areas is becoming a threat to water supply development. In order to address such critical issues, a sub roadmap with a vision, “to narrow the gap between demand and supply, increase water service coverage, and provide safe water on a 24/7 basis to uplift the people’s quality of life” is proposed. (See Figure 10.1)

Figure 10.1 shows water demand and required future water supply capacity at each planning term (Short Term, Medium Term, Long Term).



Source: JICA Study Team.

Figure 10.1 Future Water Demand and Required Water Supply Capacity

2) Water Resource Potentials

To meet the future demand for water in Metro Cebu, several water sources may be considered including surface water, groundwater, desalination, and rain water harvesting.

3) Summary of Sub-Roadmap Projects for Water Supply

The roadmap program and projects for Water Supply is summarized in following Table 10.1.

Table 10.1 Sub-Roadmap of Water Supply

Term	Project	Start Year	Project Cost* Million Peso
Short	a. Project for Construction of New Water Supply Facilities (Reservoirs, Pump Stations, Well Development)	2015–2020	2,470
	b. Construction of Mananga II Dam	2015–2020	4,780
	Subtotal		7,250
Medium	(a) Construction of Kotkot and Lusaran Dam	2018–2030	10,320
	(b) Groundwater Exploitation Study	2018–2030	160
	(c) Reduction of NRW		590
	Subtotal		11,070
Long	(a) Development of Surface Water and Groundwater at the Northern and Southern areas of Metro Cebu	2028–2040	5,3200
	(b) Construction of Desalination Plant	2028–2040	1,550
	(c) Reduction of NRW	2028–2040	590
	(d) Recharge to the Ground Water	2028–2040	180
	(e) Use of Recycled Water	2028–2040	780
	Subtotal		8.420
Total			26,740

Source: JICA Study Team * Exchange Rate: 1PHP=2.442 JPY (JICA, November 2014).

10.2 Strom Water Management

1) Objectives and Target

The biggest problem of storm water management is that the technical knowledge on the actual cause of flooding is limited. Cost-benefit analysis is not done to assess the effectiveness of specific project. To address these issues, a sub-roadmap is proposed with a vision, “to increase resilience from flooding and storm water disasters, based on an integrated flood and drainage system development to assure livable environment in the entire Metro Cebu”.

2) Summary of Sub-Roadmap Projects for Storm Water Management

The roadmap program and projects for Storm Water Management is summarized in following Table 10.2.

Table 10.2 Sub-Roadmap of Storm Water Management

Term	Project	Start Year	Project Cost* Million Peso
Short	(a) Implementation of “A Comprehensive Study for A Metro Cebu Integrated Flood and Drainage System (MCIFDS) Master Plan”	2015–2020	75
	(b) Cleaning Rivers, Creeks, and Drainages	2015–2020	125
	(c) Construction of Small Scale Rain Water Storage Facilities	2015–2025	82
	Subtotal		282
Medium	(a) Construction of drainage facilities based on MCIFDS	2020–2030	720
	(b) River Improvement Projects	2020–2040	2,250
	(c) Embankment at inundation places in rural area	2020–2030	
	Subtotal		2,970
Long	(a) River Improvement Projects	2030–2050	2,330
	(b) Construction of Large Scale Rain Water Storage Facilities	2030	2,850
	Subtotal		5,180
Total			8,432

Source: JICA Study Team Note: Relocation cost is estimated in the Master plan.

10.3 Waste Water Management

1) Objectives and Target

The major problem about waste water in Metro Cebu is that waste water has been hardly treated to begin with. Consequently, the water quality of the metropolis is worsening. Advocating that “domestic and industrial waste water are properly treated by an appropriate sewerage system to assure human health and the natural environment", it was targeted that the waste water treatment system cover 50 % of the population in 2030 and 90% in 2050.

2) Summary of Sub-Roadmap Projects for Waste Water Management

The roadmap program and projects for Wastewater Management is summarized in following Table 10.3

Table 10.3 Sub-Roadmap of Waste Water Management

Term	Project	Start Year	Project Cost* Million Peso
Short	(a) Construction of Septage Treatment Plant	2016	1,215
	(b) Improvement for Inappropriate Septic Tanks	2016	-
	(c) Construction of Proper Waste Water Treatment Facility for Development Areas	2016	-
	Subtotal		1,215
Medium	(a) Construction of centralized sewerage system	2020	41,500
	(b) Promotion of Ecological Sanitation technologies	2025	-
	Subtotal		41,500
Long	(a) Expansion and Construction of existing sewerage systems	2030	56,100
	Subtotal		56,100
Total			98,815

Source: JICA Study Team.
Note: Cost of existing septic tanks and water treatment facilities for development area, ecological sanitation technologies are not included as it requires to grasp the current condition of those and other development plan as well as willingness of residents and developers.

11 Sub-Roadmap for Solid Waste Management

11.1 Objectives and Target

The protection of public health and the environment is ensured by establishing the solid waste management system underpinned by environmentally-sound methods and technology. For this purpose, cooperation and self-regulation among citizens and private sector as waste generators are encouraged, and public-private cooperation for sustainable business development for the medium to long term is promoted. Consequently, achievement of "Livability", one of the Mega Cebu Visions, will be ensured.

11.2 Summary of Sub-Roadmap Projects for Solid Waste Management

The roadmap for solid waste comprises of a number of projects and programs as summarized in Table11.1.

Table 11.1 Proposed Projects for Solid Waste Management System in Metro Cebu

Term	Proposed Projects / Programs
Short Term	(a) Formulate a Comprehensive Solid Waste Management Master Plan for Metro Cebu
	(b) Enhance a Waste Reduction & Recovery Program • Community Based 3R/Waste segregation program (CB3Rs) • Improving collection and transport system (CTS) • Promotion of market oriented recycle business • Formulating guidelines for improving collection and transportation • Study for Construction, and upgrading the operation and maintenance of City-Wide MRF • Upgrading of existing composting facilities • Introduction of Waste Management Buy-Back Recycling System for electric products, etc. and Construct the Centers
	(c) Conduct Action Planning and Implement the project for Environmentally Sustainable Closure of the Inawayan Sanitary Landfill
	(d) Introduce an effective management system of medical waste and hazardous waste treatment facilities
Medium Term	(a) Implement the medium-term projects/programs identified in the Comprehensive Solid Waste Management Master Plan for Metro Cebu
	(b) Implement the Enhanced Waste Reduction & Recovery Program with special attention to develop following infrastructures • Develop Area-wide (Metropolitan) Disposal Sites with Sanitary Landfill Standard and Secure the land and Construct two SLFs
	• Enhance the Existing SLFs (Appropriate for Structure and Efficiency)
	• Implement Environmental Closure and Restoration Project for Closed Dumpsites in Metro Cebu
	(c) Construct and upgrade the operation and maintenance of City-Wide MRF
	(d) Construct the medical waste and hazardous waste treatment facilities and develop an appropriate operation and management system
	(e) Conduct the feasibility study for appropriate technologies of Waste-to-Energy (WTE) facilities
Long Term	(a) Implement log-term projects and programs proposed by the Comprehensive Solid Waste Management Master Plan for Metro Cebu
	(b) Construct two (2) Metropolitan Sanitary Landfill Facilities based on the feasibility study to be conducted in the medium-term
	(c) Enhance and disseminate the Waste Reduction & Recovery Program, based on the community-based 3R Movement
	(d) Construct Waste-to-Energy facilities based on feasibility studies to be conducted in the medium-term
	(e) Achieve the Mega Cebu Vision with a sustainable waste management system in Metro Cebu

Source: JICA Study Team.

12 SUB-ROADMAP FOR SMART SRP DEVELOPMENT

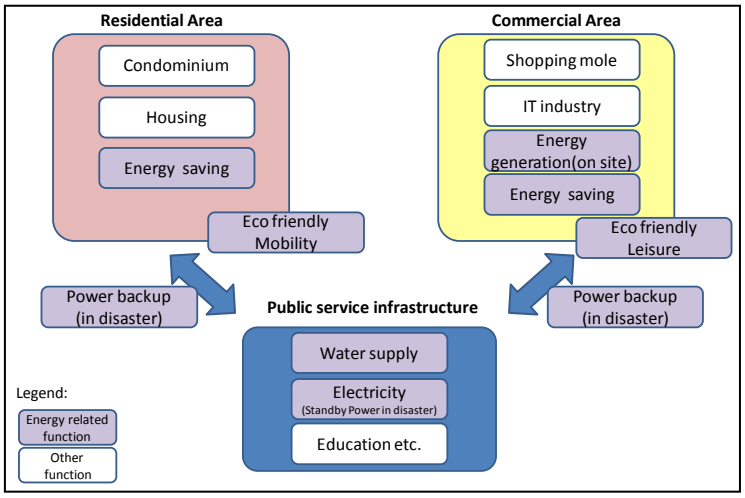
12.1 Smart SRP Development

1) Development Situation in SRP

South Road Properties (SRP) is a 300-ha reclamation area and a newly developed road which was constructed under a Japanese yen loan. Current occupants in SRP include private companies and public institutions in various stages of development/construction.

2) Concept of a Smart SRP

SRP aims to be an IT-concentrated industry model area for Metro Cebu. To this end, a stable power supply, advanced energy saving technologies, and an effective disaster response system need to be pushed forward. In addition, investment incentives such as tax benefits, simplification of import procedures, and working visa for foreigners, among others, will be beneficial. A Smart Area also includes residential and commercial areas. To realize a Smart SRP, “Unified Management System of Energy Supply and Demand” in SRP will be promoted.



Source: JICA Study Team.

Figure 12.1 Basic Concept of Smart Development for SRP

12.2 Summary of Sub-Roadmap for Smart SRP Development

The roadmap program and projects for Smart SRP Development is summarized in following Table.

Table 12.1 Sub-Roadmap Projects for Smart SRP Development

Term	Item
Short-Term Projects	(a) Establishment of unified management system of energy supply and demand in SRP. (2015–2017) (b) Introduction of management system to visualize energy demand. (2018–2020) (c) Introduction of individual technology elements which are suitable for each area. (2018–2020)
Mid-Term and Long-Term Projects	(a) To expand knowledge and know-how obtained from SRP efforts to Cebu City and the whole Metro Cebu area. (2021–2050) (b) Establishment of the most suitable energy management scheme based on resource development in the Philippines, development of renewable energy, and trend of power system reform. (2021–2050)

Source: JICA Study Team.

13 SUB-ROADMAP FOR METROPOLITAN GOVERNANCE

13.1 Need for Metropolitan Governance in Metro Cebu

Having been keenly aware of the importance of developing Metro Cebu in an integrated and coordinated manner, the MCDCB consisting of the provincial government as well as 13 LGUs, national government agencies, business communities and civil society was established. This became a unique platform to judge how to plan and implement projects in the context of an area-wide metropolitan management of Cebu.

Due to rapid population growth in Metro Cebu, various development issues have appeared. These problems and issues cannot be solved by separate actions of the member LGUs. Thus, metropolitan governing institutions to guide and regulate development are urgently required for an integrated and balanced development of Metro Cebu. In particular, there are six areas identified where interventions are required at the metropolitan level.

(i) Coordination of development planning (especially land use) and growth management;
(ii) Transport planning and traffic management;
(iii) Affordable housing (for low-income households);
(iv) Disaster risk reduction and environmental management – flood control, water resource management, and solid waste management;
(v) Enhancing competitiveness; and
(vi) Strengthening public finance and project financing.

13.2 Institution Building for Metropolitan Governance

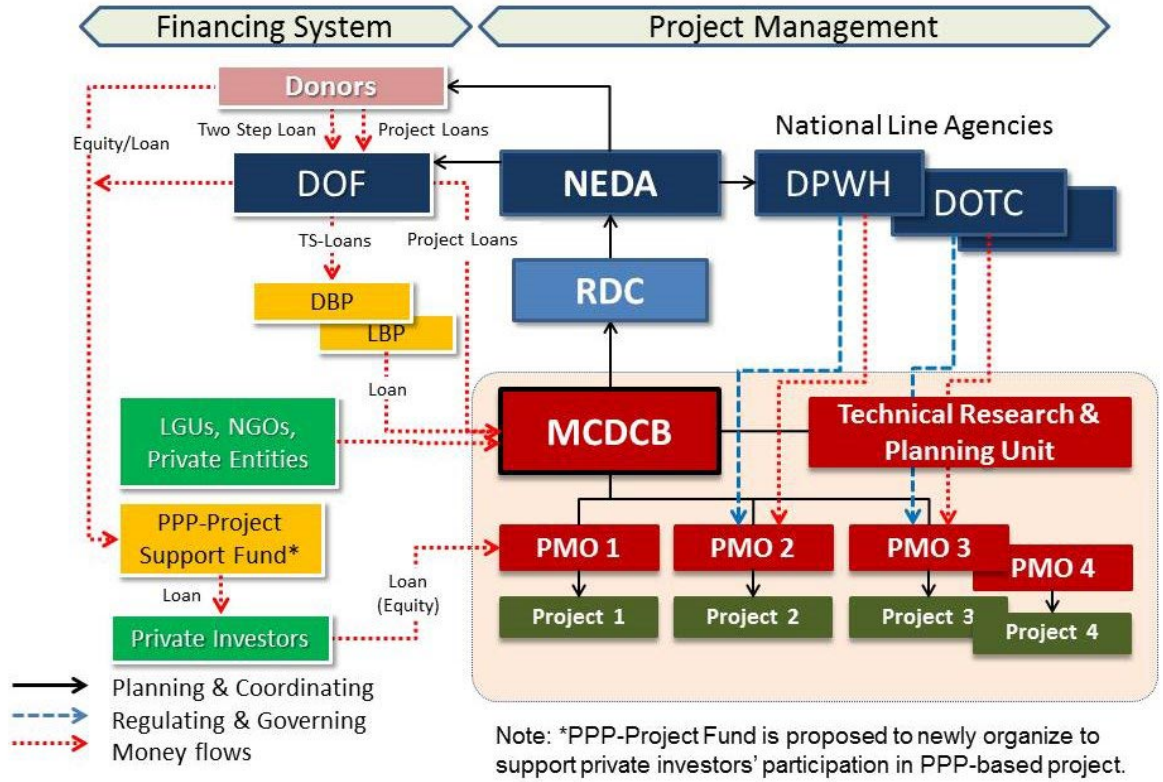
To implement the projects outlined by sub-roadmap to solve metropolis-wide issues, the metropolitan area should be regarded as a single development governance area, and development of effective administrative system is further required with legal basis. Establishment of a “Metro Cebu Model” is meaningful for the Philippines as a public-private partnership model based on the involvement of private sectors and civil society organizations.

As first step for institutional development process, MCDCB will be strengthen to coordinate several types of feasibility study, arrange project finance and enhance planning capacity, etc.

A mechanism of priority project implementation under MCDCB’s initiatives, management and coordination is tentatively depicted as shown in Figure 13.1. As the ordinal approving procedure from RDC to NEDA headquarter is required to have authorization of priority projects, MCDCB has an important role to promote the procedure.

For the sake of facilitating technically rational decision-making in the official procedure, it is necessary to establish a Technical Research Unit inside MCDCB, and to invite professional experts for planning and designing infrastructures and their economic/financial viability assessment.

At the outset of project implementation, a project management office (PMO) shall be established per project, and project manager and staffs are dispatched from relevant organizations based on the modality of involvement.



Source: JICA Study Team.

Figure 13.1 Priority Project Implementation and Management System

13.3 Summary of Sub-Roadmap Projects for Metropolitan Governance

The roadmap program and projects for metropolitan governance is summarized in following Table 13.1.

Table 13.1 Sub-Roadmap for Metropolitan Governance

Term	Objectives	Projects / Programs
Short-term (up to Year 2020)	• Strengthening MCDCB through project implementation and capacity building • Development of Policy Networks for preparation, coordination, and implementation of policies and projects • Foundation of an intermunicipal association (Metro Cebu Development Alliance) derived from policy networks	• Continuation of a study on appropriate metropolitan institution, governance, and legal system. • Establishment of Metro Cebu "Technical Research & Planning Unit" and posting relevant experts. • Foundation of Metro Cebu Investment Promotion Center, with an action plan • Foundation of a Metro Cebu Traffic Management Center
Mid-term (up to Year 2030)	• Strengthening an intermunicipal association (Metro Cebu Development Alliance) • Preparation study on foundation of a metropolitan governance institution, Metro Cebu Development Agency (MCDA) which is evolved from the intermunicipal association and preparation of the foundation	• Strengthening institutions and units which would be core in policy networks • Evaluation of the intermunicipal association (Metro Cebu Development Alliance) in terms of improvement on public service delivery, etc.) • Preparatory study on needs and effectiveness of metropolitan authority (Metro Cebu Development Agency)
Long-term (up to Year 2050)	• Foundation of a metropolitan governance institution, MCDA, evolved from then intermunicipal association	• Provision of capacity development and institutional development to the metropolitan governance body (Metro Cebu Development Agency) • Assessment of performance of the metropolitan governance body (Metro Cebu Development Agency)

Source: JICA Study Team.

14 EVALUATION OF MEGA CEBU ROADMAP

14.1 Proposed Projects within Timeframes

Each of the sub-roadmaps identified projects according to the following time frames: short-term (2015-2020), medium-term (2021-2030), and long-term (2031-2050) for rational and efficient project implementation.

The short term program includes fast track projects such as deferred priority projects with funding commitments, addresses the biggest demand gaps that, if unresolved, will be binding constraints to the high growth trajectory of Mega Cebu. They are thus reactive and are intended to catch up to reduce or eliminate shortfalls in basic services in water and sanitation services, reduce severe transportation bottlenecks and alleviate social and economic losses from flooding. Moreover the short term program will also include projects with high level of preparedness and government commitment in terms of: having feasibility studies, approval by oversight bodies, with ROW secured or being secured, and/or included in the budget program.

The medium and long term programs adopt a strategic and pro-active approach to addressing sustained economic growth, aligning development support to economic roles of local government units comprising Metro Cebu, further improving connectivity of production, trade and industry hubs with supply areas and sources of labor, and ensuring environment protection and ecological integrity. These projects are indispensable to put the plan on track for sustainable urban development of Metro Cebu.

A summary of the proposed infrastructure projects for Mega Cebu Roadmap is shown in Table 14.1 where project outline and environmental and social considerations are indicated.

Table 14.1 Summary of the Proposed Infrastructure Projects for Mega Cebu Roadmap

Urban Transport and Highway Network

Name of Project			Area	Status	Description		Total Cost PHP mil. or USD mil.)	Implementing Agency	Environment & Social Considerations		Finance	Implementation Schedule	Remarks
					Type	Length (km)			E	S			
A. Roads & Highways	1. Dual-Mode Bridge and Scenic Coastal Road between the Second Bridge and Cansaga Bay Bridge		Mandaue Reclamation, Cansaga Bay and the northern part of Lapu-Lapu	Proposed	New	3.80	PHP15,569	DPWH	P: B- O: B+	P: B- O:A+	Tracking fee by rail operator	2018–2020	Incl. rail substructure
	2. FS on Area Traffic Control in Metro Cebu		Metro Cebu	Proposed	Study	-	USD1.2	DPWH/ LGUs/ MCDCB	P: E	P: C+		2015–2017	
	3. Synchronized Signalization System in Urban Areas		Replacement of 69 signals by MCDP and development of synchronized system with new ones	Proposed	Upgrade	-	PHP1,285	DPWH/ LGUs/ MCDCB	P: E O: C+	P: E O: C+		2018–2020	
	4. Roads Widening		Arterial roads, mainly unimplemented from MCLUTS	Proposed	Upgrade	-	PHP4,264	DPWH	P: B- O: B+	P: B- O: C+		2018–2020	
	5. Metro Cebu Outer Circumferential Road		Talisay to Consolacion	Proposed	New	39.5	PHP15,561	DPWH	P: A- O: B+	P: B- O: C+		2021–2030	
	6. Second Cebu North Road		Consolacion–Liloan–Compostela -Danao	Proposed	New	18.5	PHP3,380	DPWH	P: B- O: B+	P: A- O: B+		2021-2030	
	7. Second Cebu South Road		Talisay-Minglanilla-Naga-San Fernando-Carcar	Proposed	New	35.0	PHP7,980	DPWH	P: B- O: B+	P: A- O: B+		2021-2030	
	8. Cebu-Cordova Bridge (3rd Bridge)		Cebu City (C. Padilla) to Cordova (part of Green Loop Corridor)	Proposed	New	10.0	PHP16,880	Private/ LGUs/ DPWH	P: B- O: C+	P: B- O: B+	Toll Bridge	2021 - 2030	Incl. approach causeway at Cordova
	9. Metro Cebu Intersection Improvements (Grade-separation)		20 Intersections at Cebu City and Mandaue City	Proposed	Upgrade	-	PHP9,214	DPWH	P: C- O: B+	P: B- O: B+		2021–2030	
	10. Road Widening on the MRT Central Line and Its Access Roads		Imus Ave., MJ Cuenco Ave., Lopez Jaena St., MC Briones St., General Maxilom Ave., Pope John Paul II Ave.	Proposed	Upgrade	7.3	PHP2,220	DPWH	P: B- O: A+	P: A- O: A+		2021–2030	
	11. Talisay – Naga Coastal Road (ex PNR)		Brg. Lawaan, Talisay–Minglanilla New Center –Brg. Colon, Naga	Proposed	New	7.1	PHP1,315	DPWH	P: B- O: B+	P: A- O: B+	Tracking fee by rail operator	2021–2030	Incl. MRT South Line ROW
	12. Tayud Coastal Road with the Second Cansaga Bay Bridge		Mandaue–Brg. Tayud, Consolacion–Brg. Poblacion, Liloan	Proposed	New	8.9	PHP3,262	DPWH	P: B- O: B+	P: A- O: B+		2021–2030	To serve for a new port
	13. Rest of Mandaue Scenic Coastal Road (2 sections)		Ouano Ave.–the Second Bridge, Cebu North Road–Cansaga Bay Bridge	Proposed	New	5.4 in total	PHP4,834	DPWH	P: B- O: B+	P: A- O: B+			
	14. Airport Underpass Road		The Second Bridge–MCIA–Brg. Pajak, Lapu-Lapu	Proposed	New	2.7	PHP2,438		P: C- O: C+	P: C- O: B+	Possibly toll road	2021–2030	
	15. Mactan MRT Avenue (incl. 1 bridge)		Brg. Dapitan, Cordova–Brg. Mactan, Lapu-Lapu	Proposed	New	8.6	PHP2,244		P: B- O: B+	P: C- O: B+	Tracking fee by rail operator	2021–2030	
	16. Metro Cebu Coastal Expressway		Part of Coastal Line from Danao to Carcar	Conceptualized	New	unknown	N.A.		P: A- O: B+	P: A- O: B+		2031–2050	
B. Public Transport / Mass Transit	1. BRT Line		Cebu City (Talamban–Bulacao - SRP)	Committed	New	23	USD212	DOTC	P: C- O: A+	P: B- O: A+	LOT	2015–2018	World Bank
	2. MP and FS on Metro Cebu Mass Transit System Devt		Metro Cebu	Proposed	Study	-	USD2.0	DOTC	P: E-	P: C+		2015–2016	
	3. Public Transport Terminal		Carcar City Center	Proposed	New	-	PHP140	LGU/ MCDCB	P: C- O: C+	P: C- O: B+		2017–2018	
	4. Public Transport Terminal (Second Phase)		Cebu North Terminal	Upgrade	New	-	PHP118	LGU/ MCDCB	P: C- O: C+	P: C- O: B+		2021–2030	
	5. AGT–CML Line		Cebu City–Ouano Ave., Mandaue City - MCIA	Proposed	New	19.2	USD819	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2017–2021	
	6. Mrt Lines	a. Central	Consolacion to Talisay	Proposed	New	21.2	USD1,774	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2021–2030	
		b. North	Danao City to Liloan	Proposed	New	24.7	USD1,369	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2031–2050	
		c. South	Minglanilla to Carcar City	Proposed	New	29.2	USD1,799	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2031–2050	
		d. Mactan	Cebu City–Lapu Lapu City	Proposed	New	21.5	USD1,737	DOTC / Private	P: C- O: A+	P: C- O: A+	BOT or LOT	2031–2050	
C. Others	1. FS on Consolacion New Port		Tayud, Consolacion	Committed	Study	-	USD1.5	DOTC	P: E-	P: C+		2015–2017	KOICA
	2. Consolacion New Port Const and Revitalization of Cebu Port		Cebu City, Consolacion	Proposed	New	-	PHP9,900	DOTC / Private	P: A- O: C+	P: B- O: A+	PPP	2018–2022	
	3. MCIA Development Project		MCIA	Committed	New	-	PHP17,500	DOTC / Private	P: B- O: C+	P: B- O: A+	PPP	2015–2020	GMR - Megawide Group
	Total (2015–2030)						PHP241,731						

Source: JICA Study Team

SMART SRP

Name of Project	Status	Description	Total Cost (PHP mil.or USD mil.)	Implementing Agency	ESC		Finance	Schedule	Remarks
					E	S			
1. Establishment of unified management system of energy supply and demand in SRP	Proposed	Establishment of Energy Consumers' Cooperative with the Optimum Energy Consumption Plan	PHP37	LGU/Land Owners & Tenants/VECO	O: A+	O: A+		2015–2017	
2. Introduction of management system to visualize energy demand and supply	Proposed	Introduction of Energy Monitoring System (50 sites)	PHP185	LGU/Land Owners & Tenants/VECO	O: A+	O: A+	Private	2018–2020	
3. Implementation of introduction of individual technology elements which is suitable for each area	Proposed	Installment of Energy-saving Equipment (solar panel, EV)	PHP1,074	LGU/Land Owners & Tenants/VECO	O: A+	O: A+	Private	2018–2020	Covering 25%of SRP energy consumption
4. Expansion of knowledge and know-how from SRP to other parts of Metro Cebu	Proposed	Metro Cebu	TBD	LGU/Private Sector/VECO	O: A+	O: A+		2021–2030	
5. Establishment of suitable energy management scheme for Metro Cebu	Proposed	Metro Cebu	TBD	LGU/Private Sector/VECO	O: A+	O: A+		2021–2030	
Total (2015–2030)			PHP1,296						

Source: JICA Study Team

<Legend>
ESC: Environment & Social Considerations, E: Environment; S-Social, A: Significant impacts are expected, B: Major, C: Moderate impacts are expected, D: Minor, E: Impacts are negligible/insignificant, F: Impacts are not known (To Be Determined), NA: Not applicable, P:pre-construction and construction phases, O: Operational phases, "+": Positive Impacts, "-": Negative/Adverse Impacts

Water Supply and Disposal Management

	Name of Project	Area	Status	Total Cost (PHP mil.)	Implementing Agency	Impact Factor			Schedule	Remarks
						ESC		Finance		
						E	S			
Water Supply	1. Construction of New Water Supply Facilities	Cebu City, Liloan, Consolacion, Compostela, Mandaue, Talisay, Lapu-lapu, and Cordova	Proposed	2,470	MCWD	P: C- O: B+	P: B- O: A+		2015–2020	Reservoirs, Pump Stations, Well Development
	2. Mananga Dam Bulk Water Supply	MCWD franchise area, Danao, Minglanilla, Naga, San Fernando and Carcar	Proposed	4,780	TBD	P: B- O: A+	P: B- O: A+	BOT or JV	2015–2020	Incl. transmission pipeline and water treatment plan, but not resettlement
	3. Kotkot Dam and Lusuran Dam	Metro Cebu	Proposed	10,320	TBD	P: B- O: A+	P: A- O: A+	BOT or JV	2018–2030	
	4. Groundwater Exploitation Study	Northern and southern areas of Metro Cebu	Proposed	160	MCWD	P: E	P: D+		2018–2030	
	5. Reduction of Non-Revenue water I	MCWD Service Area	On-going	590	MCWD	P:F O:F	P:F O:F		–2030	
	6. Development of Surface Water	Can-Asujan River, Pangdan River, Cantao River in Naga-Minglanilla	Proposed	5,320	TBD	P: B- O: A+	P: B- O: A+		2028–2040	
	7. Development of Groundwater	Northern and southern areas in Metro Cebu	Proposed		MCWD	P: C- O:B-	P: C- O: B+		2028–2040	
	8. Construction of Reverse Osmosis Desalination Plant	Lapu-Lapu City	Proposed	1,550	MCWD	P: C- O: B+	P: C- O: B+		2028–2040	
	9. Reduction of Non-Revenue water II			590	MCWD				2030–2040	
	10. Groundwater Occurrence (recharge)	Metro Cebu	Proposed	180	MCWD	P :F O: F	P: F O: F		2028–2040	
	11. Use of Recycling Water	Metro Cebu	Proposed	780	MCWD	P: F O: F	P: F O: F		2028–2040	
Storm Water Management	12. Implementation of "A Comprehensive Study for A Metro Cebu Integrated Flood and Drainage System (MCIFDS) Master Plan"	Metro Cebu	Proposed	75	DPWH LGU	P: E	P: C+		2015–2020	
	13. Cleaning Rivers, Creeks, and Drainages	Mandaue City	Committed	125	DPWH LGU	P: C- O: B+	P: B- O: B+		2015–2020	
	14. Construction of Small Scale Rain Water Storage Facilities	Upstream of Guadalupe River, Lahug River, and Butuanon River	Proposed	82	LGUs	P: E O: B+	P: E O: B+		2015–2025	
	15. Construction of drainage facilities based on MCIFDS	TBD	Proposed	720	DPWH LGU	P: C- O: B+	P: B- O: B+		2020–2030	
	16. River Improvement Projects	Subangdaku, Kinalumsan, and Lahug Rivers	Proposed	2,250	TBD	P: C- O: B+	P: B- O: B+		2020–2040	
	17. Embankment at inundation places in rural area		Proposed		TBD	P: C- O: B+	P: B- O: B+		2020–2030	
	18. River Improvement Projects	Guadalupe, Butuanon Rivers	Proposed	2,330	TBD	P: C- O: B+	P: B- O: B+		2030–2050	
	19. Construction of Large Scale Rain Water Storage Facilities	Catchment of Guadalupe River, Lahug Creek, Mahiga Creek, Subandaku River, Butuanon River	Proposed	2,850	DPWH LGU	P: C- O: B+	P: B- O: B+		2030–2050	
Waste Water Management	20. Construction of Septage Treatment Plant	Metro Cebu	Proposed	1,215	MCWD LGU	P: C- O: A+	P: C- O: A+	BOT or JV	2016–2020	
	21. Improvement for Inappropriate Septic Tanks	Metro Cebu			MCWD LGU	P: C- O: A+	P: C- O: A+		2016–2020	
	22. Construction of Proper Waste Water Treatment Facility for Development Areas	Metro Cebu	Proposed		TBD	P: C- O: A+	P: C- O: A+		2016–2020	
	23. Construction of centralized sewerage system	Lapu Lapu City, Cebu City and Mandaue City	Proposed	41,500	MCWD	P: C- O: A+	P: C- O: A+		2020–2030	
	24. Promotion of Ecological Sanitation technologies	Metro Cebu	Proposed	-	MCWD LGU	P: C- O: A+	P: C- O: A+		2025–2030	
	25. Expansion and Construction of existing sewerage systems	Metro Cebu	Proposed	56,100	MCWD	P: C- O: A+	P: C- O: A+		2030–2050	
	26. Construction of Small Scale Water Detention Facilities	Cebu City and Mandaue City Rivers upstream	Proposed	1,215	DPWH	P: C- O: B+	P: C- O: B+		2015–2016	
				135,202						

Source: JICA Study Team

Solid Waste Management

Name of Project	Area	Status	Total Cost (PHP mil.)	Implementing Agency	Impact Factor			Schedule	Remarks
					ESC		Finance		
					E	S			
1. Formulate a Comprehensive Solid Waste Management Master Plan for Metro Cebu	Metro Cebu	Proposed	-		P: E	P: C+		2015~6	
2. Enhance a Waste Reduction & Recovery Program	Metro Cebu	Proposed	287		P: D- O: A+	P: B+ O: A+		2015~6	
3. Conduct Action Planning and Implement the project for Environmentally Sustainable Closure of the Inawayan Sanitary Landfill	Cebu City	Proposed	328		P: E	P: C+		2015	
4. Introduce an effective management system of medical waste and hazardous waste treatment facilities	Metro Cebu	Proposed	123		P: C- O: A+	P: C+ O: A+		2015~6	
5. Implement the medium-term projects/programs identified in the Comprehensive Solid Waste Management Master Plan for Metro Cebu	Metro Cebu	Proposed	205		O: A+	O: A+		~2020	
6. Implement the Enhanced Waste Reduction & Recovery Program with special attention to develop infrastructures	Metro Cebu	Proposed	287		P: C- O: A+	P: C+ O: A+		~2018	
7. Construct and upgrade the operation and maintenance of City-Wide MRF	Metro Cebu	Proposed	246		P: C- O: A+	P: C+ O: A+		~ 2018	
8. Construct the medical waste and hazardous waste treatment facilities and develop an appropriate operation and management system	Metro Cebu	Proposed	205		P: C- O: A+	P: C+ O: A+		~ 2018	
9. Conduct the feasibility study for appropriate technologies of Waste-to-Energy (WTE) facilities	Metro Cebu	Proposed	-		P: E	P: C+		2018	
10. Implement log-term projects and programs proposed by the Comprehensive Solid Waste Management Master Plan for Metro Cebu	Metro Cebu	Proposed	205		P: E	P: C+		~2030	
11. Construct two (2) Metropolitan Sanitary Landfill Facilities based on the feasibility study to be conducted in the medium-term	Metro Cebu		820		P: C- O: A+	P: C+ O: A+		~2025	
12. Enhance and disseminate the Waste Reduction & Recovery Program, based on the community-based 3R Movement	Metro Cebu		82		P: D- O: A+	P: B+ O: A+		~2025	
13. Construct Waste-to-Energy facilities based on feasibility studies to be conducted in the medium-term	Metro Cebu	-			P: C- O: A+	P: C+ O: A+		~2025	
Total			2,788						

Source: JICA Study Team

14.2 Investment

1) Public Investment Affordability

Affordability of the national government for infrastructure investment in the roadmap projects is assessed. However, the target project period is focused to the short-term and medium-term only because of unpredictable economic condition and infrastructure needs of the long-term projects (2031-2050).

According to NEDA, the ratio of the infrastructure investment by the national government to GDP is 3.5% for 2015-2020 and 5.0% for 2021-2030. In the case of Metro Cebu, the investment affordability amounts to 608.3 billion pesos. Within this amount, net investment affordability is estimated to 486.6 billion pesos by reserving 20% of the total amount (0.7% - 1.0% to GDP) for annual routine works including small-scale infrastructure investment and maintenance of the existing infrastructures.

Besides, the required investment for the short to middle-term roadmap projects (2015-2030) amounts to 308.6 billion pesos including the investments for major infrastructure sectors. It consists of 63% of the national government's budget envelope if all the amount is shouldered by the national government. It has proved that the new investment amount is not excessive considering the current government's standpoint and its expected growth in the future.

Table 14.2 Budget Envelope for Infrastructure Investment by National Government for Metro Cebu

		2015 - 2020	2021 - 2030	Total
GDP (2013 constant price)	Growth Rate (%/year)	6.3	5.5	-
	Aggregated GDP (PHP, Bil.)	91,523	240,083	-
Budget for Infrastructure	3.5% for GDP till 2020; 5.0% till 2030	3,203.3	12,004.2	15,207.5
	Region 7 (6% of National)	192.2	720.2	912.4
	Metro Cebu (4% of National)	128.1	480.2	608.3
	Net Budget for Metro Cebu Infrastructure (excl. 20%)	102.5	384.1	486.6

Source: JICA Study Team

2) PPP Scheme Applications

Implementing agencies are advised to adopt a deliberate approach to explore PPP arrangements as these are effective ways of increasing the resource pie. Based on a preliminary review, the following are projects which have excludable economic benefits, that can generate revenues and that lend themselves to commercial operation appear suitable for PPP arrangements:

Table 14.3 Possible Projects for PPP Scheme Application and Options

Project	PPP Scheme
Mananga II Dam Bulk Water Supply Project	Build-operate-transfer or joint venture arrangement (availability payment)
Septage Management Project	Build-operate-transfer or joint venture arrangement (availability payment)
BRT (Bus Rapid Transit) System	Lease-operate-transfer (concession agreement)
Urban Railway Project	Build-operate-transfer or Lease-operate-transfer (concession agreement)
High Capacity Roads and Bridges	Build-operate-transfer (concession agreement)
Solid waste facilities	Build-operate-transfer (concession agreement)

Source: JICA Study Team

14.3 Project Packages (Anchor Programs and Flagship Projects)

1) Anchor Programs

Mega Cebu roadmap consists of seven sub-roadmaps. Each sub-roadmap has corresponding proposed projects on a metropolitan level which should not be implemented by an individual LGU alone since metropolitan coordination grants and gains implementing power.

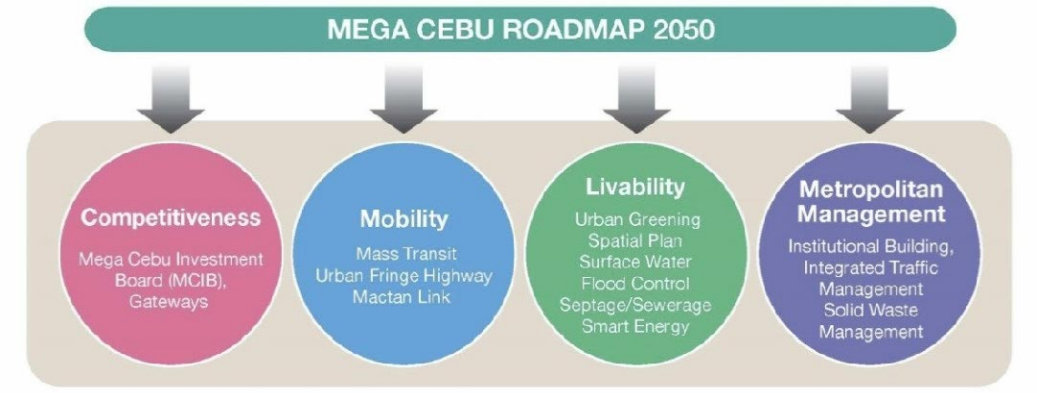
Considering the many stakeholders for each sub-roadmap projects, focus is required for implementation. Based on the implementation perspective, several high priority roadmap projects are rearranged into 14 anchor programs and proposed in Table 14.4.

Table 14.4 List of Anchor Programs

	Programs	Primary Responsible Organizations
1.	Investment Promotion by a Mega Cebu Investment Board (MCIB) through Cebu Branding	Cebu Province (Investment Promotion Center) and DTI
2.	Urban Greening (Completion of 'Green Loop', etc.)	DPWH, DENR
3.	Operationalization of Mega Cebu Spatial Plan	MCDCB (Technical Research & Planning Unit), LGUs
4.	Urban Fringe Highway Network Development (Circumferential Road, etc.)	DPWH
5.	Mactan Link Development	DPWH and DOTC (in the case of rail bridge)
6.	Mass Transit Network Development (MRT/LRT/BRT)	DOTC
7.	Gateway Development (Airport, Seaport)	DOTC, CPA and MCIAA
8.	Integrated Road Traffic Management and Bottleneck Clearance	MCDCB (a new service unit) with support from DPWH
9.	Surface Water Resource Development	MCWD and related LGUs
10.	Urban Septage / Sewerage Service	MCWD and other water works/districts
11.	Comprehensive Flood Control	Participating LGUs with support from DPWH
12.	Metropolitan Solid Waste Management	MCDCB (a new service unit) with participating LGUs
13.	Advanced Energy Management System	Cebu City with an energy solution company
14.	Institutional Building of Metropolitan Governance	MCDCB

Source: JICA Study Team

The anchor programs are grouped into four strategies under the Mega Cebu Vision 2050; namely: (i) competitiveness through facilitation of people and goods movement and investment, (ii) mobility through metropolitan transport network, (iii) livability by environmentally sustainable urban management, and (iv) strengthening of metropolitan management capacity. (See Figure 14.1.)



Source: JICA Study Team.

Figure 14.1 Anchor Programs under Mega Cebu Policy Initiatives

2) Mega Cebu Perspectives to be guided by the Roadmap

The Metro Cebu Roadmap is assessed from different viewpoints, mainly from developmental benefits.

Table 14.5 Roadmap's Interpretation in Development

	Present	Future (2030, 2050)	Roadmap
Population	2.55 million in 2010	4.99 million in 2050	Approx. 8,000 ha lands are planned for new housing areas
Employment	1,071 thousand in 2010	2,097 thousand in 2050	Approx. 4,000 ha lands are planned for new commercial/business/industry areas
Trunk Road	Mostly 2-4 lanes without alternative roads	All over 4-lane roads with alternative routes	Urban fringe highway network (95 km in total) and others
Road Congestion	Many congestion points during peak hours	Road congestions will be slightly improved.	Integrated road traffic management and bottleneck clearance
People Movement	Largely by jeepneys (35%) and increasing motorcycles (22%)	More public transport users particularly urban rail (20%)	LRT/MRT network (116 km and 63 stations in total)
Water Supply	227 thousand m^3 in 2013	797 thousand m^3 in 2050	3 dams, further underground water exploitation and other measures
Septage/Sewerage	Almost no service	Urban septage services by 2030, urban sewerage services by 2050	7 septage plants and 10 sewerage plants
Flood Control	Many prone areas	Almost no flood areas along rivers except for coastal low lands	Cleaning of rivers and drains, River improvement and rain water storage facilities
Smart Energy	Very few application of smart energy technologies	Promotion of smart SRP development Smart technology transfer to other areas	Introduction of smart energy technologies to SRP
Metropolitan Management	MCDCB forums and workshops MCDCB's road requirements to DPWH	Promotion and supervision of the roadmap projects by MCDCB (particularly at Technical Research Unit) Transfer to new metropolitan organization	All the Roadmap planning contents are related

Source: JICA Study Team.

3) Flagship Projects

The projects which are recommended for early implementation until 2017 with assistance or initiative of the national government is referred to as the flagship projects. Ten flagship projects are selected from the short-term projects (2015–2020) of the roadmap[2]. These include three projects for immediate implementation, four new projects for the study on project preparation, two projects which have been committed already and one project for institutional enhancement.

[2] Steering Committee for ITR3 of the Study in 29 January 2015.

Table 14.6 List of Flagship Projects

	Programs
1.	Master Plan Study and Feasibility Study (FS) on Mass Transit Network Development (MRT/LRT/BRT) in Metro Cebu
2.	Update of the Cebu Province Development Master Plan
3.	Construction of the Mactan North Dual-mode Bridge
4.	Construction of Mananga II Dam
5.	Construction and Networking of Septage Plants
6.	FS on Area Traffic Control in Metro Cebu
7.	A Comprehensive Solid Waste Management Master Plan for Metro Cebu
8.	FS on Sea Gateway Port Construction (Committed by DOTC)
9.	A Comprehensive Study for a Metro Cebu Integrated Flood and Drainage System Master Plan (Committed by DPWH)
10.	Establishment of Technical Research Unit to MCDCB and Its Capacity Development

Source: JICA Study Team

PART III ACTION PLAN FOR SHORT-TERM PRIORITY PROJECTS

15 SELECTION OF SHORT-TERM PRIORITY PROJECTS

1) Selection

There is a huge backlog in infrastructure development for Metro Cebu which degrades people's lives and the metropolitan economy since the 2000s. In this connection, some key projects were identified for early implementation to jump-start MCDCB's initiatives for the Mega Cebu Vision 2050.

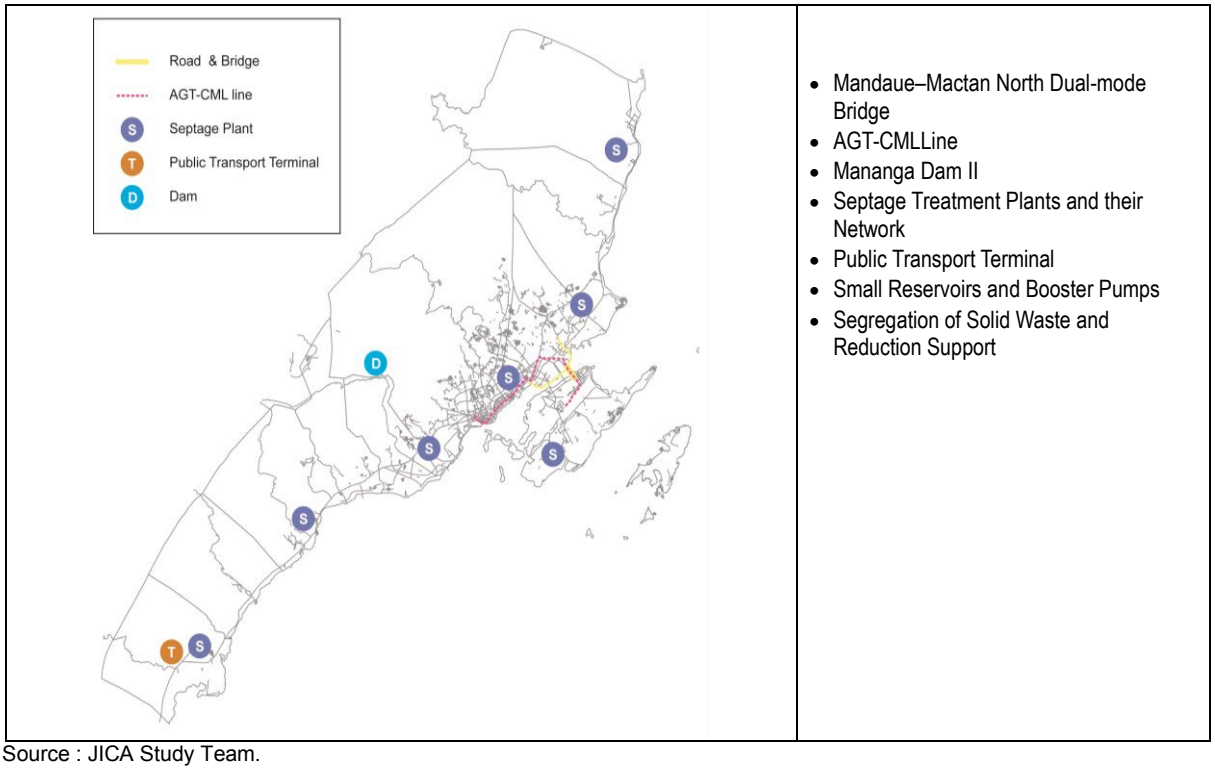
MCDCB and JST held discussions with the LGUs, the national government agencies, the civil society, and the private sector regarding short-term priority projects that were selected based on project selection criteria at three meetings from January to March 2014.

All seven projects can be grouped into those projects that have to be implemented and supported by the national government and those projects to be done by local or metropolitan initiatives (see Table 15.1). The former projects are briefly described in the sections that follow.

Table 15.1 Short Term Priority Projects

	Short-term Priority Projects
National Government's Implementation or Its Strong Support	Mandaue–Mactan North Dual-mode Bridge
	AGT–CML Line
	The Mananga Dam II
	Development of Septage Treatment Plants and their Network
The projects for Metropolitan Initiatives	Public Transport Terminal
	Small Reservoirs and Booster Pumps
	Segregation of Solid Waste and Reduction Support

Source : JICA Study Team.

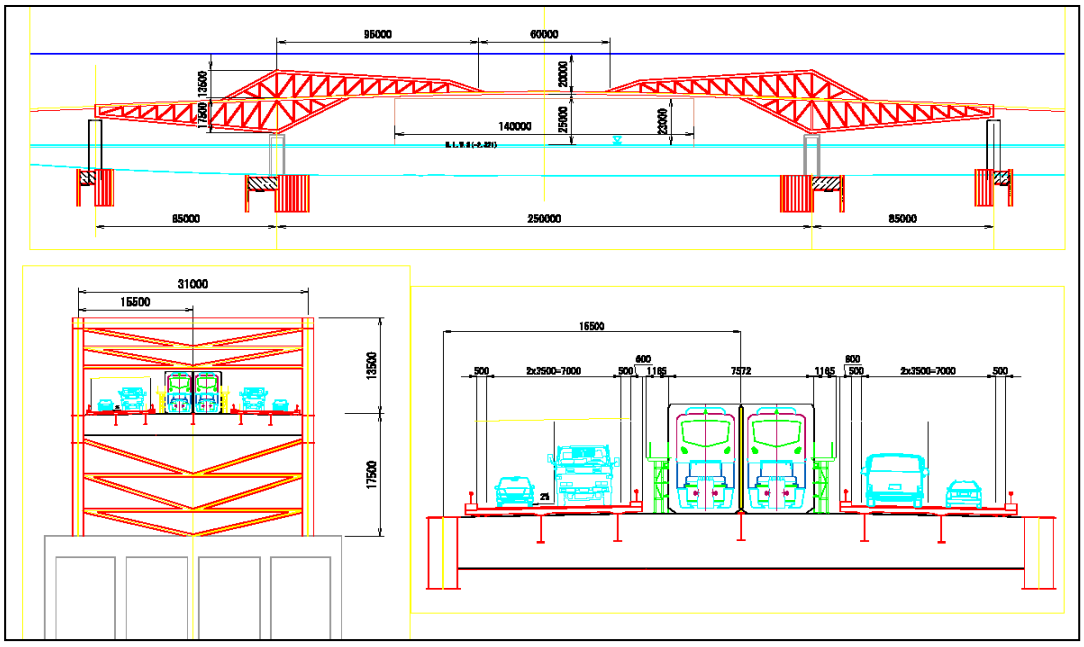


Source : JICA Study Team.

Figure 15.1 Project Sites Subject to Pre Feasibility Studies

2) Mandaue – Mactan North Dual-mode Bridge

Project Summary: Currently there are two bridges between the islands of Cebu and Mctan. However, they may not meet increasing interisland traffic by around 2020. Since the first bridge is dilapidated, safety concerns must be urgently addressed. With the construction of a second airport terminal, MCIA users are expected to increase. Also, a new container port is planned to be relocated to Tayud, Consolacion by DOTC. Therefore, the location of thenew bridge is proposed at the point 900meters toward north from the 2nd Mactan bridge. A synergy effect on local vehicular movement is anticipated when a new bridge is constructed together with Mandaue's Scenic Coastal Road particularly between the second bridge and the Cansaga Bay bridge via the proposed bridge. It is also suggested that the new bridge be constructed as a dual-mode bridge for road and rail to save on construction cost and bridge space. A high strength boltless steel truss with steel box girder is recommended as the main bridge structure.



Source:JICA Study Team

Figure 15.2 Main Bridge Design by High Strength Boltless Steel Truss with Steel Box Girder

Project Implementation Plan: The construction cost is estimated at PHP12.8 million (main bridge PHP5.5 billion, approach bridges and ramps at three locations PHP4.1 billion and the Scenic Coastal Road PHP3.2 billion). Land acquisition is necessary only for the Lapu-Lapu side and this will cost PHP85 million. In the proposed schedule, the project will start with a preparatory study in 2015 and the bridge will be open to traffic in 2021.

Economic Evaluation: The project's economic impact is assessed without the rail bridge option. The project costs include construction, operation and maintenance while the main economic benefits emanate from the savings owing to the reduction in vehicle operating cost and value of travel time. As a result, the project is shown to be viable with an EIRR of 19%.

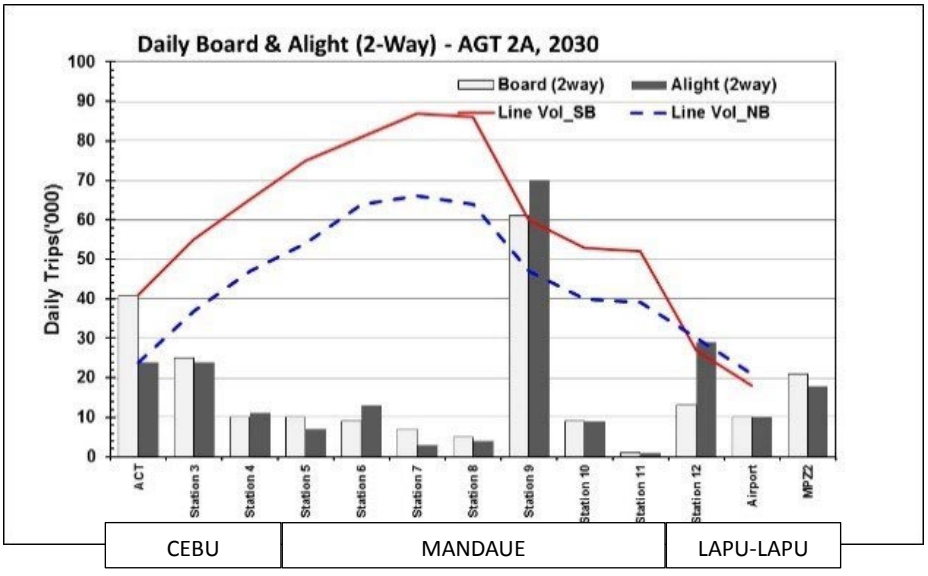
Social and Environmental Considerations: There is a community of informal settlers around the proposed bridge in Lapu-Lapu City. Around 10 households are to be relocated.

There are extensive mangrove habitations around the proposed bridge location in Mandaue City. Although the city plans a water amenity park, cutting down massive mangroves may not be allowed.

Suggestion for Implementation: As there is a lack of expertise for the construction of a dual-mode bridge in the Philippines, it is suggested that the project be undertaken by a consultant and construction firms with knowledge of dual-mode bridges abroad.

3) AGT-CML Line

Project Summary: A new light rail line, so-called AGT-CML (Cebu, Mandaue, Lapu-Lapu) Line, is proposed to serve the three core cities of Metro Cebu. This alignment uses Ouano Avenue between Cebu City and Mandaue City, and the proposed dual-mode bridge between Mandaue City and Lapu-Lapu City. This 19-km AGT line will carry 207 thousand passengers daily in the starting year 2021, 222 thousand passengers in 2030 and 363 thousand passengers in 2050. More sectional traffic demand is expected between Cebu City and Mandaue City than the section between Mandaue City and Lapu-Lapu City.



Source: JICA Study Team

Figure 15.3 Station Loadings and Line Volumes (Year 2030)

Project Implementation Plan: AGT is selected taking into account the advantages of intra-urban and airport access alignment. The advantages also include environmentally friendly operation, safe operation in emergency, simple system structure, better manoeuvrability in tight radius and easy change of train configuration to meet peak and off-peak demands. The project will be able to complete its 3-year construction in 2021 after engineering works and PPP arrangement.

Economic Evaluation: The AGT-CML Line is estimated to cost USD 819 million while its economic value is translated into USD815 million. Recent rail projects in Metro Manila provide some unit valuations for simple economic analysis. The EIRR value for the AGT-CML Line is 17.4% at increasing unit benefits, i.e., increasing through the years. This proves that the project is economically viable.

Social and Environmental Considerations: The AGT-CML Line does not require new ROW acquisition because the alignment is over the existing roads and the river buffer zone

of Butuanon River except for a depot area (6 ha) which is planned near the proposed dual-mode bridge in Mandaue City. The project may contribute to air quality improvement and urban beautification. During the construction period, road traffic and roadside environment such as noise and dust would temporarily become worse.

Suggestion for Implementation: In project finance, fare box revenue (fare revenues – operational expenses) would be positive every year. But it could not cover the project's capital cost. A practical PPP scheme is necessary.

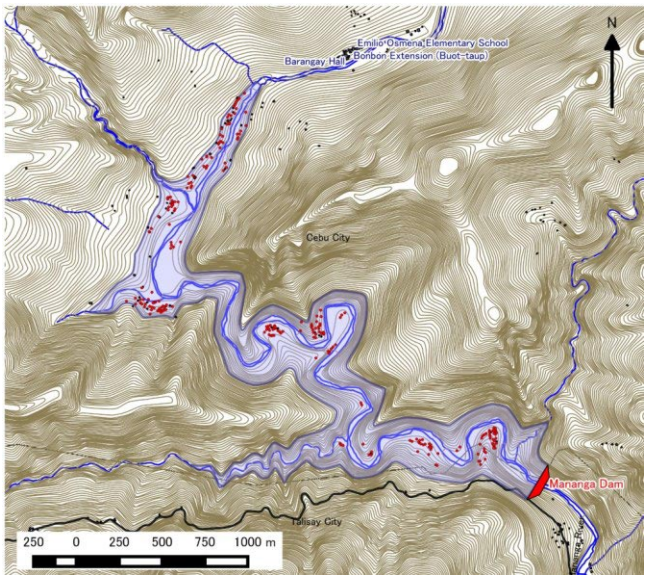
4) The Mananga II Dam

Project Summary: In order to address water supply and demand gap in the future and salinity intrusion in Metro Cebu, the Mananga II Dam is proposed. With the estimated yield of 68,000 m^3/day, the dam can provide the needs of roughly over 450,000 people. As a new surface water resource, the project has been repeatedly studied over 30 years. Difficulties in project planning and implementation arrangement have been experienced accordingly.

Project Implementation Plan: The estimated project cost is approximately PHP4.8 billion. The new dam will start to operate in 2023 provided that engineering works (hydrologic analysis and geographical survey, etc.), D/D and 3-year construction are undertaken beforehand.

Economic Evaluation: The project's EIRR is 16.2% where the value from the willingness-to-pay of beneficiaries, i.e., PHP500/month, is regarded as the economic benefit per household.

Social and Environmental Considerations: The barangays that will be partly inundated due to the project are Buot-Taop and Pamutan in Cebu City and Camp4 in Talisay City. The number of affected houses/buildings is about 272 based on the GIS data developed by the study. They are most likely dependent on farming the lands (fruits and floriculture), production of charcoal and quarrying services for sand and gravel.



Source: JICA Study Team

Figure 15.4 Inundated Area for Mananga II Dam (Height – 73 m)

A resettlement action plan must be prepared with basic services and facilities, access to employment opportunities and to provide specific measures to compensate for the loss brought about by the project.

Suggestion for Implementation: It is suggested that the Manange II Dam project be implemented by a PPP scheme. There are three options to form a public sector player: (1) MCWD, (2) LGU such as Cebu City and Cebu Province, and (3) joint implementation of MCWD and LGU. The most suitable option will be decided by the local stakeholders.

5) Development of a Network of Septage Treatment Plants

Project Summary: The best method for wastewater treatment is the sewerage system, which has about 90% efficiency in pollution load reduction. However, a centralized sewerage system is unlikely to be feasible across Metro Cebu in the near future given the high capital cost and the difficulty in laying new pipes in densely built-up areas. Hence in the immediate future, the practical intervention would be septage management where regular desludging of septage tanks can maintain up to 50% pollution reduction efficiency.

Project Implementation Plan: The project proposes to build seven septage treatment facilities; two in Cebu City and one each in Mactan, Danao City, Naga City Carcar City and Liloan. In the first stage, septage treatment plants will be built between 2016 and 2017 in order to initially treat 1,300 – 1,400 m^3/day of septage with 98 trucks and later expand the treatment capacity to 1,795 m^3/day with 127 trucks towards the year 2030. The initial project cost is estimated at PHP1,428 million and PHP1,866 million for the second stage (expansion).

Economic Evaluation: Since economic benefits considered were health, water and tourism cost savings based on the estimates of the study on “Economic Impacts of Sanitation in the Philippines” (2008), the project EIRR is as high as 357.6%.

Social and Environmental Considerations: Social acceptance is keen in building and operating septage plant facilities. Community-based consultation meetings and consensus building are of great importance. Planting trees and ornamental plants can beautify the plant and scrubbers can be used to avoid bad odour.

Suggestion for Implementation: The project is one of the potential PPP projects, and can be undertaken using the build-operate-transfer (BOT) scheme. The PPP option, not only relieves MCWD of the full financial burden, it will also obviate the need to put up a full complement of engineers and other experts necessary to run the operations and maintain the facility and trucks.