



# EST CASEBOOK

Leading Practices of Philippine Cities on  
Environmentally Sustainable Transport (EST)



University of the Philippines  
National Center for Transportation Studies  
November 2009



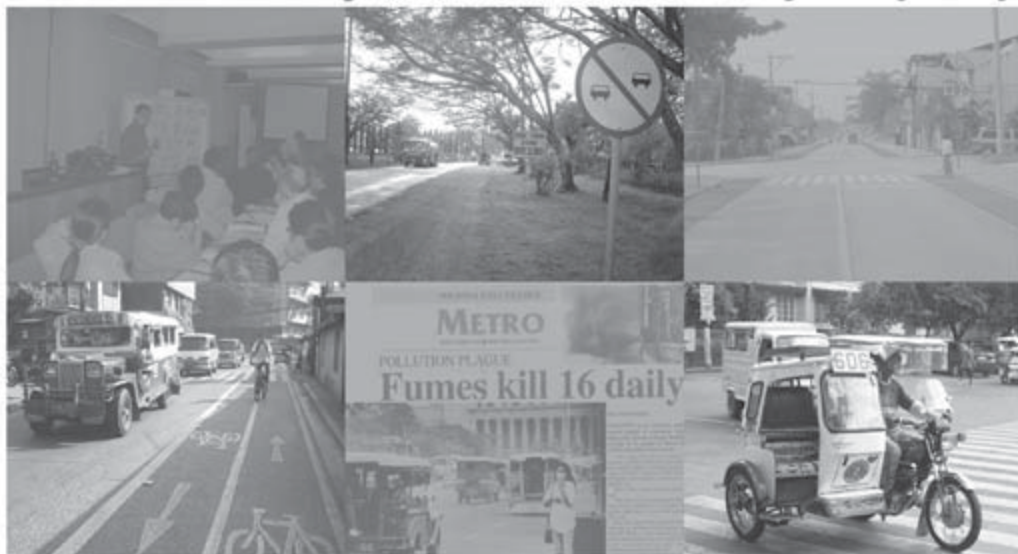






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LEADING PRACTICES OF PHILIPPINE CITIES ON  
ENVIRONMENTALLY SUSTAINABLE TRANSPORTATION (EST)

## **PROJECT TEAM MEMBERS**

Noriel Christopher C. Tiglao, Dr. Eng. – *Project Leader*

Karl N. Vergel, Dr. Eng. – *Case Writer*

Ma. Sheilah G. Napalang, Dr. Eng. – *Case Writer*

Alorna A. Abao – *Project Coordinator*

Michael Cocjin – *Research Assistant*

Anna Milissa Pacuña – *Research Assistant*

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The contents of this document are the sole responsibility of the authors.



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# Foreword

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Since the signing of the Philippines to the United Nations Framework Convention on Climate Change (UNFCCC) Agreement in Rio de Janeiro in 1992, it has undertaken programs and activities towards achieving sustainable development and addressing climate change. These include the enactment of enabling legislations and the establishment of appropriate institutional arrangements to effectively coordinate and implement the country's commitment in the Rio Summit. The passage of the Clean Air Act (CAA) or Republic Act No. 8749, enacted by the Eleventh Congress in 1999, is one of the major documents that made operational the principles of sustainable development in the country. This law provides for the Department of the Environment and Natural Resources (DENR), together with concerned agencies and local government units, to prepare and fully implement a national plan consistent with the UNFCCC, and other international agreements, conventions and protocols on the reduction of greenhouse gas (GHG) emissions in the country.

With respect to the transport sector, the Philippines is signatory to the Nagoya Statement agreed at the International Conference on Environmentally Sustainable Transport (EST) in the Asian Region in 2003. Furthermore, the Manila Policy Dialogue on Environment and Transportation was held in 2004. In this dialogue, the need for strategic planning on EST was recognized with both the long-term vision and short to long-term actions at the regional, national and local levels. As a result of these meetings, the First Regional EST Forum was conducted in Aichi, Japan in August 2005 that resulted in the Aichi Statement. Then, the Second Regional EST Forum was convened in December 2006 in Yogyakarta, Indonesia. Subsequently, the Asia Mayors' Policy Dialogue for the Promotion of EST in cities was held in Kyoto, Japan in April 2007 and resulted in the Kyoto Declaration.

With regard to the transport sector, the Philippines is signatory to the Nagoya Statement agreed at the International Conference on Environmentally Sustainable Transport (EST) in the Asian Region in 2003. Furthermore, the Manila Policy Dialogue on Environment and Transportation in 2004 identified need for strategic planning on EST with both the long-term vision and short to long-term actions at the regional, national and local levels. However, to date, the integrated national framework in achieving EST in the country is still being developed. Moreover, the capacities of concerned agencies and stakeholders are hampered by the lack of information on the transport sector resulting to skewed perceptions and uninformed decisions.

The Department of Transportation and Communications (DOTC) in collaboration with other concerned departments including the Department of Environment and Natural Resources (DENR) and Department of Energy (DOE), has promoted EST objectives through policies and programs in line with the provisions of the Philippine Clean Air Act. Existing programs include the development and enforcement of emission standards for motor vehicles, modernization of public transport units, promotion of clean fuels and engine technologies, and the development of mass transit systems. However, existing measures are generally of the 'end-of-pipe' type and there is a growing recognition for DOTC to develop more pro-active policies and strategies to deal with transport and environment challenges.

The University of the Philippines National Center for Transportation Studies (UP-NCTS), together with other concerned agencies, has strongly advocated for the mainstreaming of EST in national and local development in the country since 2006. A consultation workshop for all the 17 cities and municipalities was held in September 2006. Then an executive conference was held in October 2006 where local executives were informed about the need to promote EST in their respective cities. This was followed by a course for middle managers in November 2006. Finally, a capacity building program on mainstreaming EST was conducted for five (5) weeks in the months of February and March 2007. The program consisted of institutional visits, visioning sessions and action planning workshops that culminated in the Metro Manila Declaration on EST.

A Memorandum of Understanding (MOU) between DOTC and University of the Philippines Diliman (UPD) was formalized in March 2007 for the conduct of interdisciplinary, basic and applied research on sustainable transport policy, among others. The MOU will take effect for three years. Subsequently, a Joint Memorandum Agreement (JMA) was issued in November 2007 for the creation of a Joint Committee and a Technical Working Group (TWG) between DOTC and UPD.

The University of the Philippines National Center for Transportation Studies (UP-NCTS) has been appointed by the Department of Environment and Natural Resources (DENR) as the responsible party in one of the expected outputs of the UNDP-funded Environment and Natural Resources Capacity and Operations Enhancement (ENR-CORE), namely, "Enhanced capacities of a broad constituency of government, civil society, the private sector (SMEs including micro-enterprises), academic institutions and other key stakeholders for advocacy and implementation of ENR and sustainable energy management."

In 2007, UP-NCTS has conducted "Capacity Building and Social Marketing for Environmentally Sustainable Transport". The action included the conduct of case studies and consultation seminar-workshops for five (5) cities all over the country, namely, Cebu, Marikina, San Fernando in La Union, Cagayan de Oro and Iligan and the conduct of a National EST Conference.

The social marketing activity involved the conduct of four (4) regional seminar-workshops in key cities nationwide as part of mainstreaming EST. The seminar-workshops adopted a social marketing approach whereby representatives from the LGUs were requested to elaborate on their experiences and challenges and other LGU participants provided constructive suggestions under "mentoring" atmosphere. Moreover, allowing the LGUs to host a seminar-workshop allowed the other LGU participants to experience first-hand the EST initiatives, as well as, issues and challenges of the host LGU. The seminars were held in 2007 in the cities of Cebu (August 30-31), Iligan (September 19), Cagayan de Oro (September 20) and San Fernando, La Union (November 22). Close to 200 stakeholders attended the seminars consisting of local chief executives, planning officers, traffic unit heads, and environmental unit managers. The seminar-workshops included technical inputs from experts, sharing of experiences by local government executives and managers, consultation of local stakeholders and forging of partnerships between the local government units and the respective local academic institution.

A national conference was held in December 11, 2007 in Makati City. Case studies on the successful approaches and good practices of selected local government units in promoting EST were presented. The conference was attended by representatives from DOTC, LGUs and academic institutions.

All materials and knowledge resources generated by the project have been made available online through the project's website (<http://ncts.upd.edu.ph/estnow>).

Case studies on the experiences of selected local government units outside Metro Manila were conducted to identify lessons and good practices in achieving EST objectives at the local level. The practical experiences of the selected LGUs provide exemplars of EST project identification, implementation, monitoring and evaluation. The case study cities were selected based on their unique features and innovative approaches in jointly dealing with transport and environment issues in their respective localities. Consequently, four case study cities were identified, namely, Marikina City and the City of San Fernando, La Union in Luzon, Cebu City in the Visayas, and the city of Cagayan de Oro in Mindanao.

**Noriel Christopher C. Tiglao, Dr. Eng.**  
*Project Leader*

# List of Acronyms

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<b>BRT</b>	Bus Rapid Transit
<b>CPDO</b>	City Planning and Development Office
<b>CENRO</b>	City Environment and Natural Resources Office
<b>DENR</b>	Department of Environment and Natural Resources
<b>DOTC</b>	Department of Transportation and Communications
<b>ECAP</b>	Energy and Clean Air Project
<b>EST</b>	Environmentally Sustainable Transport
<b>GEF</b>	Global Environment Facility
<b>ENR-CORE</b>	Environment and Natural Resources Capacity and Operations Enhancement
<b>LGU</b>	Local Government Unit
<b>NMT</b>	Non-Motorized Transport
<b>RTA</b>	Roads and Traffic Administration
<b>TSP</b>	Total Suspended Particulates
<b>UNDP</b>	United Nations Development Programme



# Metro Cebu:

## INTEGRATING LAND USE AND TRANSPORT DEVELOPMENT



### Background

The name Cebu came from the word “sebu” meaning animal fat. Long before the coming of the Spaniards, it was a fishing village ruled by Rajah Humabon. Cebu metamorphosed in more ways than one, but always for the better. From a sleepy fishing village to a fledging trading port in 1521, from the first Spanish settlement named Villa del Santisimo Nombre de Jesus in 1575 to a municipality in 1901, Cebu finally became a chartered city on February 24, 1937. Cebu is replete with historical firsts being the first and oldest city in the country, antedating Manila by 7 years, having the oldest school and oldest street and being the cradle of Christianity in the Far East.

### Profile of the City

Cebu City is located on the central eastern part of Cebu province, an island at the center of the Visayas in Southern Philippines. It is bounded by Mandaue City in the North and the municipality of Talisay in the South. On the East is Mactan Channel and on the West are the municipality of Balamban and the city of Toledo. Cebu City is accessible from all places by air and sea transport. It only takes an hour or less by plane from Cebu to reach Manila and just a few hours more to reach most of the cities in the Asia Pacific region.

Cebu City has an area of 326.10 km<sup>2</sup>. Considering this, Cebu's total land area is equivalent to six percent of the entire province of Cebu, the largest among the seven cities and 48 municipalities in the province. The city is composed of 80 *barangays* grouped into 46 South District *barangays* and 34 North

District *barangays*. Cebu City's flat land occupies about 23 square km<sup>2</sup>, representing eight (8%) percent of its total land area but it contains over 40 *barangays* and about two thirds of the city's population.

Cebu City is the second biggest growth center in the country next only to Metro Manila. In contrast with other localities whose economy is based on agriculture, mining or manufacturing, Cebu City is more dependent on trade and service activities that now accounts for almost three fourths of its employment. The dominance of trade and service activities in the City is made possible by its strategic location in the central part of the Visayas and a good seaport. Surplus products from Cebu Island including those coming from the nearby provinces in Central Visayas and Mindanao are normally brought to the City for export or processing and redistribution to other parts of the country. Many products manufactured in Manila or imported from abroad are also channeled to Cebu prior to their distribution to the different provinces in the Visayas and Mindanao.

Because of its vibrant trading activities, many financial institutions and other supporting business activities are also located in the City. Allied with the trading and financial services in the city is the growing tourism industry. The growth of tourism is made possible by many recreation, entertainment and shopping facilities in the City.

The City is also well-known for its rich cultural heritage and history. It is considered the cradle of Christianity in Asia and the first city built by Spaniards in the country. Besides business and tourism, the city is also the center of health, educational and other important social and professional services that meet the needs of the people of the city and of those coming from other provinces in southern Philippines. The presence of many services and amenities makes Cebu City one of the most livable cities in Asia.

### Development Challenges

In 2000, Cebu City had a population of 718,821 and about 89% of which is urban (Cebu CLUP 2000). The annual population growth rate for the period of 1990 to 2000 was 1.73%, relatively lower than the whole province of Cebu (2.41%), Region 7 (2.19%) or the Philippines (2.34%). The population growth rate in urban areas was 1.33% per year, but it is interesting to note that there has been a lower influx of population to the urban areas when the rural population growth rate was higher at 3.97% annually for the same period. The slumping urban population of the city, accordingly among the lowest in the country, is attributed to the recent outward migration to the neighboring cities and municipalities. Table 1 shows the history of population of Cebu City from 1903 to 2000.

**Table 1. Cebu City Population History**

Census Year	Total City Population	Percent (%) to Province's Total	Intercensal Population Change	Intercensal Change Average/Yr.	% Annual Average Growth Rate	Population Density (Pop./ Sq. km.)
1903	45,994	7.71				141.1
1918	65,502	8.52	19,508	1,300	2.36	200.9
1939	146,817	16.24	81,315	3,872.	3.84	450.2
1948	167,503	17.88	20,686	2,068	1.32	5413.7
1960	251,146	23.86	83,643	6,970	3.38	770.2
1970	347,116	28.26	95,970	9,597	3.24	1,064.4
1975	413,025	31.07	65,909	13,181	3.48	1,266.6
1980	490,281	32.88	77,256	15,451	3.43	1,503.5
1990	610,417	32.89	120,136	12,013	2.19	1,871.9
1995	662,299	32.09	51,882	10,376	1.64	2,031.0
2000	718,821	30.23	56,522	11,304	1.77	2,204.0

The metropolitan area Metro Cebu is comprised of ten local government units including the cities of Cebu, Mandaue, Lapu-Lapu and Talisay, and six adjacent municipalities: Naga, Minganilla, Liloan, Consolacion, Cordova and Compostela as defined by the Cebu Integrated Area Development Master Plan Study (CIADMPS) in 1994. In the 1970 census, the population of Metro Cebu was just a little over half a million. This number doubled during the 1990s as the population hit over a million. From then on it steadily increased along with the rapid economic growth in the early 90s.

The share of Cebu City's population to Metro Cebu's decreased from 53% in 1970 to 42% and 39% in 2000 and 2007, respectively (Table 2). Among the component cities and municipalities of Metro Cebu, Cebu City itself had a decelerating growth rate for the past three decades while the adjoining cities and municipalities were growing comparatively faster.

**Table 2. Population of Metro Cebu for the Years 2000 and 2007**

City/ Municipality	Population				Population Growth Rate	
	2000	% Share	2007	% Share		
Cebu City	718,821	42.44%	798,809	38.97%	1.52%	
Mandaue City	259,728	15.33%	318,575	15.54%	2.96%	
Lapu-Lapu City	217,019	12.81%	292,530	14.27%	4.36%	
Talisay City	148,110	8.74%	179,359	8.75%	2.77%	
Naga	80,189	4.73%	95,163	4.64%	2.48%	
Minglanilla	77,268	4.56%	101,585	4.96%	3.99%	
Liloan	64,970	3.84%	92,181	4.50%	5.12%	
Consolacion	62,298	3.68%	87,544	4.27%	4.98%	
Cordova	34,032	2.01%	45,066	2.20%	4.09%	
Compostela	31,446	1.86%	39,167	1.91%	3.19%	
Total	1,693,881	100.00%	2,049,979	100.00%	Ave	2.76%

This trend of emigration from Cebu City has come along with the rapid growth of its core hub over the years which undoubtedly congested the entrails of the old city. People were drawn off to the peripheries, which in recent years have experienced the sprawling of Cebu's vibrant economic activities, especially with the establishment of Mactan Export Processing Zone and the Mactan International Airport both located outside Cebu City. In addition to that, many firms and factories also set up in outlying areas such as the cities of Mandaue and Lapu-Lapu, consequently attracting skilled workers from Cebu City and the vicinity. On the other hand, the rapid population growth rate of other municipalities such as of Liloan, Minganilla, Cordova and Consolacion can be accounted for by the extension of the mass housing developers on these areas due to the high land price in the cities and their apparent lack of space for expansion.

According to the Cebu City CLUP, the population density of the city in year 2000 was 2,370 persons per km<sup>2</sup>. Metro Cebu only had an average density of 1,990 persons per km<sup>2</sup> in the same period while the whole province only had 603 persons. Within Metro Cebu, Mandaue City had the highest density of 6,743 persons per square kilometer, followed by Cordova with 3,146 and Talisay with 3,062. While Cebu City's average density in 2000 was lower than in the three places mentioned, the city actually had a higher average density of 7,753 persons per square kilometer in its urban area.



## Key Transport and Environment Issues

**Poor Road Network**

With the rapid urbanization and population growth of its peripheries in recent years, Cebu City's transport problems did not differ much from the ones confronting Metro Manila and other rapidly urbanizing cities in the world. The Cebu City Strategic Master Plan Study (CCSMPS) identified the following major transport deficiencies in Metro Cebu:

- Sub-standard cross sectional roads;
- Primary and secondary road network not functioning as network;
- Urban functions are heavily concentrated in the central business district (CBD) of Cebu and Mandaue where road network improvement is difficult to introduce;
- Lack of continuity of some road links and poor geometric designs of road links and intersections which aggravate road congestion; and
- Unavailability of segregated service roads to major retail centers. On-street parking minimizes the carrying capacities of most roads.

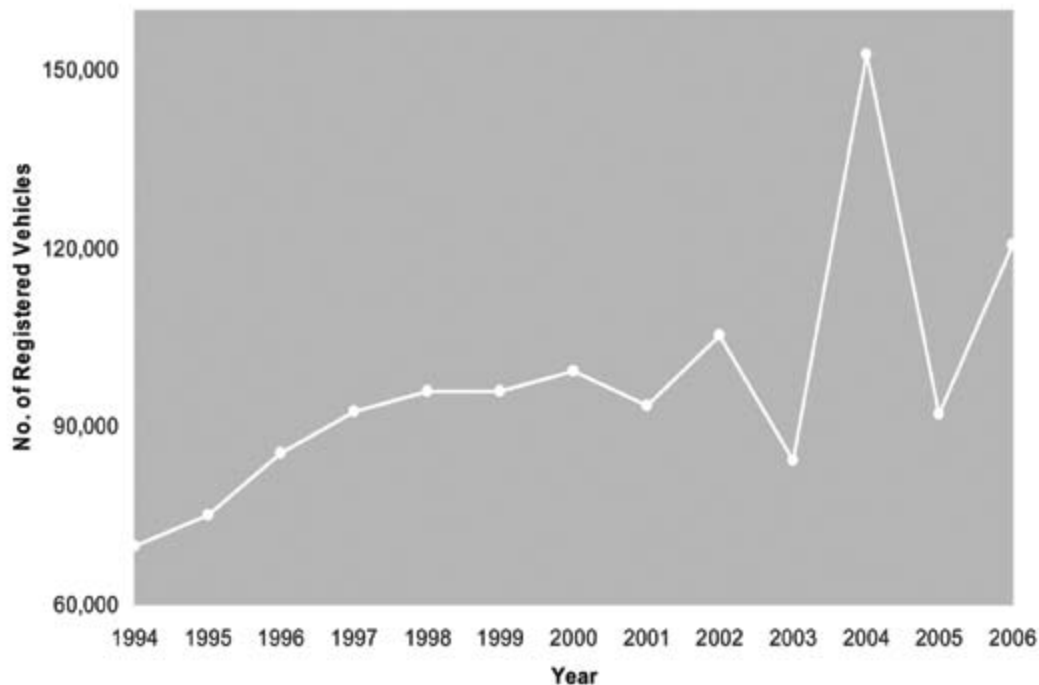
The city suffers from traffic problems because of its narrow, congested and poorly connected roads. The problems are also aggravated by the concentration of work, school, medical, shopping, and other private and public services located in the heart of the city. Further aggravating the situation is the continuing increase in population and number of vehicles. The recent construction or widening and improvement of existing roads are still behind the increase in the volume of traffic in the city (Cebu City CLUP, 2000).

**Increasing Motorization**

In 1994-1999, Cebu City's share of the total vehicles registered in Cebu Province ranged from 40 to 55%. From 1994 to 2000, motor vehicle registration in Cebu City tremendously increased by 42.1% with an average annual growth rate of 7.0% while the increment in 2000 to 2006 was halved to 21.4% or an average annual growth rate of 3.6% (Figure 1). In 2000-2006, the share of diesel-fueled vehicles and the share gasoline-fueled vehicles in Cebu Province were almost constant at 20% and 80%, respectively (Table 3).

Based on the 1979 Metro Cebu Land Use and Transport Study (MCLUTS) report and the 1992 Home Interview Supplemental Survey conducted by the Metro Cebu Development Project (MCDP) Phase 3, the Metro Cebu Trip Demand Projection estimated that the share of trips using the private modes increased from 9.7% in 1979 to 20.6% in 1992 while the share of trips using public transport decreased from 90.3% in 1979 to 79.4% in 1992.

It is anticipated that Cebu City will experience a declining rate of person-trips since there is also a decline in the population growth rate. This can be attributed to the present development pattern of Metro Cebu characterized by a linear dispersed development with the start of mainland reclamation. These findings were confirmed by the Special Assistance for Project Formation (SAPROF) team of the Overseas Economic Cooperation Fund (OECF) of Japan and supported by the developments projects identified and implemented by the Metro Cebu Development Project (Cebu City Strategic Master Plan Study, 2005).



**Figure 1.** Motor Vehicle Registration in Cebu City

**Table 3.** Vehicle registration by fuel type in Cebu Province, 2000-2006

Year	% Share of gasoline-fueled	% Share of diesel-fueled	Total no. of vehicles
2000	79.26	20.74	295,181
2001	79.91	20.09	327,218
2002	79.72	20.28	360,962
2003	80.06	19.94	392,160
2004	79.31	20.69	469,139
2005	81.99	18.01	399,216
2006	79.91	20.09	456,239

Source: Land Transportation Office (LTO)

### Traffic Congestion

Travel speeds of selected corridors in Cebu City by time of day were surveyed by CITOM in 2005. The travel speeds of Osmeña Boulevard towards the coastal area ranged from 7 to 17 kph with an average of 10 kph while the travel speed of Juan Luna St. ranged from 4 to 18 kph with a similar average of 10 kph. This indicates that these corridors experience traffic congestion at all times of the day. From the coastal area, the travel speeds of Osmeña Boulevard had a similar range from 6 to 17 kph with an average of 10 kph while the same was true for Juan Luna with a range of 4 to 21 kph at an average of 8 kph.

### Low Service Levels of Public Transport

Cebu City's public transport is mainly road-based. There are three modes of public transportation excluding 2 or 3-wheelers (CITOM, 2007), namely:

- Public Utility Jeepneys (PUJs) - 8,329 units
- Taxi - 5,788 units
- Buses and Mini Buses - 952 units

The following are the issues on public transportation according to CITOM:

- too many jeepneys/vehicles on the road and there is no new infrastructure improvements in the city;
- uncontrolled/unlimited issuance of franchise for the public utility vehicles and issues concerning travel lines;
- undisciplined drivers and pedestrians;
- rampant use of motorcycles for public transport known as the "habal-habal";
- illegal parking; and
- sidewalk encroachment and sidewalk vendors

### Decrease in Public Transport Patronage

The share of trips using the private modes increased from 9.7% in 1979 to 20.6% in 1992 while the share of trips using public transport drastically decreased from 90.3% in 1979 to 79.4% in 1992 (Table 4). It is anticipated that the Metro Cebu will experience an overall increasing rate of person-trips due to rapid population growth and urbanization.

**Table 4. Metro Cebu Travel Demand, 1979-2020**

Mode	1979		1992		2012*		2020*	
Private	110,500	9.7%	305,666	20.6%	515,416	17.1%	989,910	23.5%
Public	1,028,900	90.3%	1,180,408	79.4%	2,492,066	82.9%	3,229,717	76.5%
<b>Total</b>	<b>1,139,400</b>	<b>100.0</b>	<b>1,486,074</b>	<b>100.0</b>	<b>3,007,482</b>	<b>100.0</b>	<b>4,219,627</b>	<b>100.0</b>
Trip Rate	1.10		1.26		1.54		1.61	

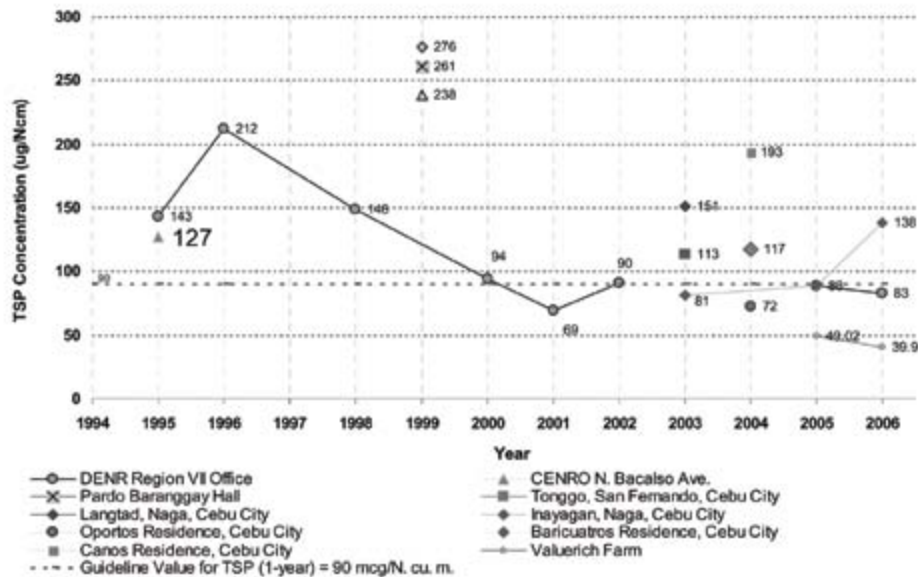
Notes: \*projected using regression  
Source: Cebu City CLUP (2000)

### Air Pollution

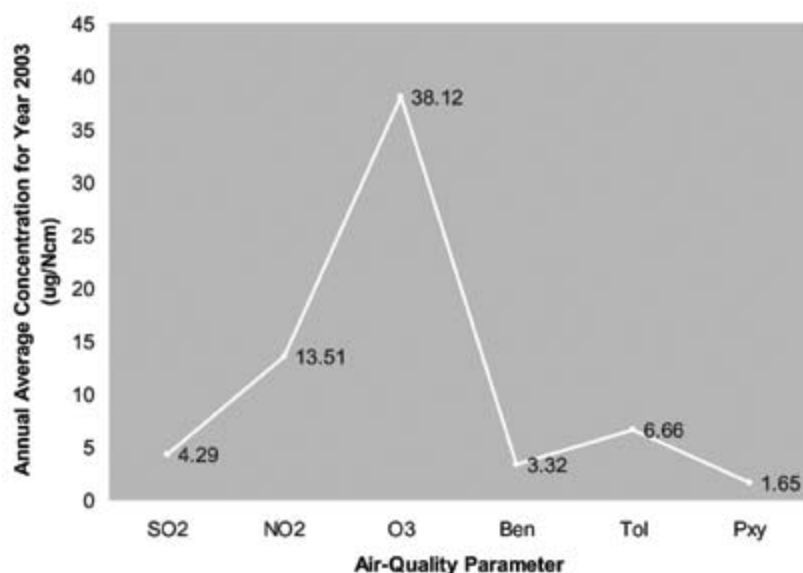
According to the Cebu City CLUP (2000), air pollution is now an increasing problem in the city. In the absence of heavy industries or thermal and coal fired plants in the city, the deterioration of air quality is mainly attributed to emissions from motor vehicles. Severe air pollution is now observed in many areas of the city particularly in major roads.



Data on the annual average concentration of total suspended particulates (TSP) in 1995 to 2006 in various air quality monitoring stations of the Environmental Management Bureau (EMB) in Metro Cebu were obtained (Figure 2). In 1995-2000, all stations were observed to exceed the 1-year ambient air quality guideline value for TSP of 90 mcg/N. cu. m. with peak concentrations occurring in 1999. In 2001-2006, there has been a slight improvement due to presence of annual average concentration values below the guideline value. Around 1-2 stations still exceed the guideline value. With few available data, the annual average concentrations of PM10 were also obtained and it was observed that there was one station that exceeded the guideline value of 60 mcg/N. cu. m. in 2002-2003 (Figure 3). This indicates that air pollution is still a continuing problem for the city.



**Figure 2.** Annual Average TSP Level (ug TSP/Ncm) in Selected Stations in Metro Cebu



**Figure 3.** Annual Average Concentration of Other Air Quality Parameters (ug TSP/Ncm) in Metro Cebu

The annual average concentrations of other pollutants such as sulfur dioxide, nitrogen dioxide and ozone recorded in the DENR-EMB Monitoring Station in the University of San Carlos (USC) in Talamban in 2003 also indicated that the ambient air concentrations of these three criteria pollutants are still below the guideline values.

The Land Transportation Office (LTO) and the CITOM have been undertaking an anti-smoke belching campaign since 1995. From 1995 until 1999, the number of units that were apprehended by CITOM totaled 10,670; 9,418 units of which were tested and 5,948 were issued compliance.

The Philippines Environment Monitor study (World Bank 2002) quantified the detrimental effect of air pollution on the health, productivity and quality of life into economic values and it estimated that the total cost of the exposure to PM10 in the four cities of Metro Manila, Baguio, Cebu and Davao adds up to over US\$430 million. Among the four cities, Cebu City ranked second to Metro Manila in derived costs, which in 2001 was equivalent to US\$16 million.

### **Road Traffic Accidents**

The number of accidents in Cebu City in 2000-2006 ranged from 14,000 in 2000 to around 10,000 in 2006. The number of accidents is quite high considering that Metro Manila recorded a maximum of 11,185 accidents in 2005 in its 2002-2005 data.

## **Transport Management Context**

Fortunately for the city, it was able to undertake or had been the recipient of projects initiated somewhere else even without a long term plan. One source of major project ideas for the city in the past was the Metro Cebu Land Use and Transport Study (MCLUTS). The study was initiated by the Ministry of Public Works, Transportation and Communications (MPWTC). The study was completed after almost 20 years in 1981. Many projects recommended by MCLUTS for undertaking in Metro Cebu were implemented later by the Metro Cebu Development Project or MCDP. The MCDP was established by the Regional Development Council (RDC) to carry out its objective of developing Metro Cebu as a catalyst of development in Central Visayas. Before the creation of MCDP, the RDC was undertaking the World Bank funded Central Visayas Regional Project or CVRP I (Rural) in the first half of the eighties. That was supposed to be followed by CVRP II (Urban) in 1985.

The change in administration along with the desire to limit the exposure of the government to foreign loans at high interest rates (World Bank charges are close to market rates) prompted the government to limit the urban projects to be undertaken in Metro Cebu only and to change the funding source from World Bank to OECF (Japan). The project was also renamed MCDP from CVRP II to conform to the limited coverage of the project that now excluded Tagbilaran City in Bohol and Dumaguete City in Negros Oriental.

Within Cebu City, the projects undertaken by MCDP I and II included the widening of the city's major arterial roads and the installation of modern traffic signals (separately funded from Australia). It also covered the construction of bus terminal buildings (north and south), public markets, (Mandaue and Talisay) and the landfill in Inayawan. The on-going South Reclamation Project and Coastal Highway implemented separately by the city government and the Department of Public Works and Highways (DPWH), respectively, were originally part of MCDP III. Still in blueprint is the construction of the city's circumferential road and other local road projects including the proposed Mass Transport System Project.

Presently, the planning for Cebu City and adjacent local government units has been anchored on the city and regional development planning that started from the regional framework planning of the national government in 1976. The strategy has been centered on the economy such that the City Government has



always been concerned on traffic congestion and its negative impacts on economic activities of the city and adjacent local government units in Metro Cebu.

In 2004, the Japan Bank for International Cooperation (JBIC) initiated the “Comprehensive Impact Study for Metro Cebu Development” project conducted by Global Group 21 Inc. for the various yen-loan projects in Metro Cebu since the 1970s which totaled over 100 billion yen. The study summarized the development planning process for Metro Cebu into three development cycles:

- First cycle (1978-1986) which covered the period of the physical development planning of regional growth centers;
- Second cycle (1987-2003) which promoted regional urban development for sustainable growth; and
- Third cycle (2004 and beyond) which envisions the dispersion of growth away from Metro Cebu.

Transport infrastructure projects that followed the first cycle like the MCDP were based on plans and recommendations of the Metro Cebu Land Use and Transport Study (MCLUTS) in 1981.

A metropolitan development plan proposed in MCLUTS was manifested in the City's Comprehensive Land Use Plan (2000-2010). As part of its environmental protection and sustainable development strategy, it advocated for dispersing the development from the inner city to development zones in other urban areas of the city and strict implementation of the Clean Air Act. Its economic development strategy is to improve the traffic management system aside from the expansion of the road network and road capacity. The City is also conscious of its air pollution problem which it attributed mostly to slow-moving motor vehicles.

### **Specific Programs and Initiatives**

#### ***Metropolitan Planning and Development***

*Metro Cebu Land Use and Transport Study (MCLUTS), 1978-1981.* Planning for Metro Cebu started as early as the middle of 1970s when the Framework Plan of Cebu City was developed in 1976. The Comprehensive Impact Study for Metro Cebu Development (JBIC, 2004) identified three cycles of development planning process for Metro Cebu. In the first cycle (1978-1986), Central Visayas Regional Development Plan (1978-1982) and the Metro Cebu Land Use and Transport Study (1978-1981) were carried out. During this period, the Mactan Economic Zone (1979) was established along with port development projects and building of power plants.

The MCLUTS was conducted in 1978 by the then Ministry of Public Works, Transportation and Communications (MPWTC) with technical assistance from the Government of Australia. It was the first comprehensive planning for transport and land use of the City. There were four plans for the Metro Cebu based on the analysis, forecasting, and evaluation process with 2000 as target year of completion. These are:

- Plan 1: Concentrated, Without Reclamation
- Plan 2: Concentrated, With Mainland Reclamation
- Plan 3: Linear Dispersed, With Mainland Reclamation
- Plan 4: Mactan Expansion, With Mainland and Mactan Reclamation

Plan 2 was adopted by the Metro Cebu Council. It recommended the radial-circumferential road network and new traffic signalization system. Also, short to medium term recommendations on public

transportation were provided, making the CBD as the most accessible and the center of commercial and educational activities. The main recommendations prepared were as follows:

- lifting the ban on the issuance of franchises for buses and jeepneys
- stopping of the issuance of operating permits for new tricycles
- phasing out of the operation of *PU* which was a modified taxi without meter
- prohibiting the entry of *tartanillas* into the CBD during peak periods

*Metro Cebu Development Project (MCDP), 1992-present.* Among the projects implemented after MCLUTS is the MCDP. MCDP was initially conceptualized as the urban component of the Central Visayas Regional Project (CVRP) which was created under Executive Order No. 907, series of 1983. The project's main objective is to accelerate the economic growth in Metro Cebu by providing an additional area for industrial and export processing use and to assist local governments of Metro Cebu in coping with rapid urban and population growth and in enhancing their potential for further economic development by providing a direct, uninterrupted access to its commuters. It has 3 phases with the following durations:

- MCDP 1, 1992-1995
- MCDP 2, 1994-1998
- MCDP 3, 2004-present

MCDP 1 has the following project components:

- Metro Cebu Road Improvement (1995) – construction/improvement of 13.298 km. of 15 arterial roads (north-south central axis)
- Traffic Control System (1995) – improvement of traffic management system (procurement of traffic signals, provision of street signs and road marking)
- Cebu South Bus Terminal (CSBT) (1992) – construction of terminal

MCDP 2 has the following project components:

- Metro Cebu Road Improvement (1999) – construction/improvement of other local and national roads (north-south central axis)
- Mandaue Coastal Road (Causeway) (2004) – construction of bypass road
- Cebu North Bus Terminal (1994) – construction of terminal

MCDP 3 is composed of the Cebu South Reclamation and Cebu South Coastal Road (11.66 km from Talisay City to Cebu City) which are currently under construction.



### ***Traffic Management Institutions***

*Cebu City Traffic Operations Management (CITOM), 1987.* City Ordinance No. 1264 was enacted on October 19, 1987 creating the Cebu City Traffic Management Coordination Committee. It was initially composed of a Chairman and Vice-chairman who were appointed by the Mayor of Cebu City. The members of the committee were composed of eight appointees of the City Mayor from the public and private sectors. The functions of the committee ranged from the coordination and monitoring



of traffic management plans, review of traffic engineering and management schemes and routing of public transport. City Ordinance No. 1264 was amended through City Ordinance No. 1451 on May 17, 1993. This increased the membership to 14 with ten sitting as ex-officio members. The most important goal of the CITOM Board is to make Cebu City an orderly urban locality with a comprehensive, measurable and sustainable Traffic Management Plan coordinated by the united efforts of all agencies concerned (CITOM P 2007). Another objective of CITOM is the provision of infrastructure support to maintain safe and efficient road network, traffic education, traffic law enforcement and local legislative support in ordinance development.

Currently, CITOM has a workforce of 536 composed of the following:

• Traffic Aides	-	306
• Parking Aides	-	122
• Support (Technical & Admin)	-	108

It currently has 10 sections including special units with tasks of enforcing special traffic ordinances such as the Anti-Jaywalking Task Force, Wheel Clamping, Anti-Smoke Belching, Towing, Motorcycles for Hire (MCH), Weighing, Overnight Parking, Night Patrol and Non-motorized units.

Adaptive Traffic Control System, 1993. The Metro Cebu Traffic Engineering and Management (MCTEAM) Project was established in 1989 wherein the City Government entered a memorandum of agreement with the DPWH in the installation of a computerized traffic signal system. Phase I included 68 intersections (65 in Cebu City and 3 in Mandaue City) and operation with the Traffic Control Center commenced in 1993. The traffic signal control system was installed by AWA Traffic and Information System of Australia and made use of the system called SCATS (Sydney Coordinated Adaptive Traffic System) which was the first of its kind in the country. The area-wide traffic control system is adaptive. Traffic signal timings dynamically respond to detected traffic volumes. Phase II (Metro Cebu Traffic Signal System Expansion Project) of the project acquired new traffic signals and signalized several intersections in new economic growth centers. Presently, there are 78 signalized intersections connected to SCATS within Cebu City.

Traffic Enforcement. Strict enforcement in loading and unloading bays of public transport due to the strong will of the Mayor to enforce traffic rules in the early 1990s. At first, this was enforced on drivers but later it was also implemented among passengers.

### ***Public Transport Improvement and Promotion***

Establishment of Public Transport Terminals. There were 2 public transport terminals constructed under the MCDP:

- Cebu South Bus Terminal (CSBT), 1992 (MCDP 1)
- Cebu North Bus Terminal, 1994 (MCDP 2)

Cebu South Bus Terminal (CSBT) consists of a terminal/parking area and a building with a total area of 1.2 hectares. There are 40 loading bays for buses in the terminal/parking area. In addition, the middle ground space, which can accommodate approximately 50 vehicles, is being utilized as a waiting area. There are, on average, 15,000 passengers commuting daily between the city and provinces and 335 trips to and from the terminal.

Ordinance on Designation of Travel Lines for Public Transport Vehicles. The City has been revising the routes of jeepneys (PUJ) in coordination with its traffic management schemes through enactment

of local ordinances on “travel lines” for public utility vehicles traveling in Cebu City. Recently, Lapu-lapu City has also enacted an ordinance (C.O. 327-2006) designating travel lines for PUJ and Filcabs.

### ***Mass Transit Initiatives***

The Cebu City Government has been contemplating on studying the viability of two BRT corridors to ease traffic congestion in the main north-south arterials (UP-NCTS, 2007):

- Cebu City BRT – Talamban-Central Business District
- Coastal North-South BRT – Minglanilla-Mactan Export Processing Zone

### ***Environmental Protection***

The proposed Cebu City BRT is within Cebu City while the Coastal North-South BRT traverses the 4 cities (Talisay, Cebu, Mandaue and Lapu-lapu) and 1 municipality (Minglanilla). In June 2007, the U.P. National Center for Transportation Studies has completed a pre-feasibility study for BRT for Metro Manila for USAID-ECAP.

*Heritage Conservation in Infrastructure Projects.* Segment 3 of the Cebu South Coastal Road Project starts at the Segment 2 - Causeway section and ends at the McArthur Boulevard (S. Osmeña Boulevard, Cebu City). Prior to the actual subway design, the subway component has three alternatives, namely: (1) widening of M.J. Cuenco Avenue along Plaza Independencia site; (2) elevated highway structure across the Plaza Independencia; and (3) subway/sub-surface alignment across the Plaza Independencia. Long-term traffic alleviation is only limited to second and third alternative (elevated and sub-surface alignment, respectively). The decision-makers have decided in favor of sub-surface alignment. It is clear that visual amenity and cultural heritage preservation were given great weight in the project evaluation (Parumog et al. 2003). Fort San Pedro is one of the oldest fortresses in the Philippines while the Plaza Independencia has been the center of social and cultural activities of the region.



*Anti-Smoke Belching (ASB) Ordinance.* After the Clean Air Action Plan was passed in Cebu City Council in February 2006, the City Ordinance 2111 - Cebu City's Vehicle Emissions Control Ordinance was enacted in March 2007. The recent activities of the ASB program are supported by the United States Agency for International Development's Energy and Clean Air Project (USAID-ECAP) where Cebu City is one of the four cities supported by the project. The ASB program of Cebu City has seven strategies: 1) establish baseline data of air quality; 2) broaden stakeholder participation in enforcement; 3) strengthen clean air legislation; 4) lead by example; 5) raise public awareness and participation; 6) expand sources of funding; and, 7) improve compliance to clean air standards by motor vehicle owners and operators. ECAP also distributed safety gears to CITOM which is in charge of enforcement of the ASB ordinance in July 2006 and piloted coco-methyl ester (CME) biodiesel in public transport vehicles in March 2007. Public partnership of the city government, academe, civil society and business sector on clean air has also been active. In the establishment of baseline air quality especially along roadside areas to monitor the impacts of the ordinance, the City has tied up with U.P. College Cebu with portable PM monitoring equipment lent by the U.P. NCTS.



The City is currently drafting the implementing rules and regulations for City Ordinance 2111. Some of the features of the Ordinance include the following:

- mandatory smoke testing of tricycles by CITOM prior to registration or grant of renewal of registration;
- offenders under this ordinance shall undergo a seminar on environmental sustainability including climate change and pollution control management; and
- funds collected from fines and penalties shall go to the Local Clean Air Fund to finance activities related to the Ordinance.

### **Successes Achieved**

MCLUTS has shown that a long-term transportation plan integrated with land-use and development plans is essential for a metropolitan area such as Metro Cebu. Most of the transportation projects in the MCDP followed the proposals in various plan scenarios of MCLUTS with some plan deviations and project delays. With the presence of a long-term metropolitan transport plan, it helped Cebu City to implement various projects such as the MCDP which was started to be planned in 1981 after MCLUTS. It has minimized planning efforts and cost of project development in the latter years. Metro Cebu was able to implement MCDP in Cebu City, initially consisting of MCDP Phase 1 (2.027 billion yen loan) in 1995 and MCDP Phase 2 (3.652 billion yen loan for roads and north bus terminal) in 1998. The on-going MCDP Phase 3, which consists of Cebu South Coastal Road (24.521 billion yen loan) and Cebu South Reclamation Project or SRP (6.420 billion yen loan), is a major feature of Plan 2 of MCLUTS in line with mainland reclamation.

The traffic signal control system recommended in Plan 2 of MCLUTS was implemented with the installation of the SCATS in 1993. CITOM's 18 personnel were trained on the operation and maintenance of the SCATS (JBIC, 2004). It continued to operate since then as the computerized traffic signal system for Metro Cebu. In contrast, its installation in Metro Manila in 1995 was not completed on time in 2000 due to delays and disagreements.

The establishment of CITOM in 1987 for the enforcement of traffic rules and regulations evolved into an important institution on traffic management and traffic engineering as well as some of the critical aspects of transportation such as public transport. It acquired experience from the field and established capacity in conducting traffic data collection needed in traffic engineering and management. CITOM was cited in a JBIC evaluation study in 2004 as a leader in traffic management. Its achievement is being duplicated, in one way or another, by other cities across the country. The strict enforcement policy that trained the people to follow traffic rules in public transport stops and the use of pedestrian walkways such as overpasses could not have been possible without the assistance of CITOM.

The operation of the two public transport terminals in 1992 and 1994 helped ease traffic congestion due to limiting buses accessing the road to the center of the city. This also helped establish the hierarchy of transport modes. Complementing this is the City Ordinance 2000 amending the travel lines of public transport vehicles enforced through CITOM that strengthened local government involvement in public transport management. A similar ordinance on travel lines of jeepneys and Filcabs were enacted in Lapu-lapu City in 2006.

The decision for sub-surface alignment in Plaza Independencia of Segment 3 of the Cebu South Coastal Road Project showed that heritage conservation was given more priority. This is in line with the development vision of the city is to become a cultural and heritage center. In 2005, the Cebu Provincial Government together with church and business groups initiated public-private cooperation on cultural heritage preservation.



The enactment of the Vehicle Emissions Control Ordinance (C.O. 2111) in 2007 institutionalized anti-smoke belching activities that began in 1995 by the LTO and CITOM. Civil society groups are present in Cebu and are strong advocates of clean air and the City Government is now proactive. The City has shown its leadership by example by using biodiesel in its vehicle fleet and passing the emission tests. In addition, the City Council has passed a resolution adopting the Cebu City Clean Air Action Plan which can be a model for other cities and towns in Metro Cebu to emulate. According to ECAP, initial linkages with the transport sector in Cebu have been established. The transport sector in Cebu is organized and cooperative to the local government.

### **Lessons Learned**

The Metro Cebu Development Authority (MCDA), the metropolitan body to govern Metro Cebu proposed in MCLUTS, was not realized. In revisiting the MCLUTS, Villarete and Cal (2007) proposed several recommendations. There is a need for an updated long-term structure plan for metropolitan areas since MCLUTS was up to year 2000 only. There is also a need for a metropolitan authority to continuously update plans and implement projects. Transportation and other infrastructure projects have been implemented by the MCDP Committee and MCDP Project Management Office. In addition, the structure plan has to be flexible, progressive and owned by stakeholders.

It can also be concluded that as in other urban areas, the road capacity widening and road network expansion are not the ultimate solution to traffic and transport problems. Even after the road network expansion/improvement in MCDP, Metro Cebu continued to experience traffic congestion. The adaptive traffic control signal system can be utilized with other traffic management and engineering measures as well as the improvement of public transport and non-motorized transport systems and travel demand management measures to reduce traffic congestion. With capacity for traffic data collection and the existence of SCATS that can continuously collect data through detectors, CITOM could utilize its database of traffic in the management and control of traffic. It could also extend its expertise to other local government units in Metro Cebu.

In public transport management, there is a need to reconcile the need for greater participation of the local government in land transport franchising especially for intra-city and inter-city public transport vehicles. Aside from the regulation of public transport, the local government also has the mandate for local traffic management which will affect public transport routes. This is shown in Cebu City where an ordinance amending the travel lines for public transport vehicles has been in effect.

Cultural heritage preservation as shown in the case of the sub-surface alignment of Segment 3 of the Cebu South Coastal Road Project can be sustained in other transport infrastructure projects by increasing public awareness of the cultural heritage including architectural heritage and its inventory, which has been conducted by the Ramon Aboitiz Foundation (RAF) in the province of Cebu. Parumog et. al. (2003) recommended the valuation of cultural heritage sites preservation as one of the strategies for roads and other infrastructure developments. Since the identification of the cultural heritage sites at the local level is an essential task before the benefits or disbenefits of a site can be listed, it is imperative that sites be identified and protected through local ordinances such as zoning. Since damages to cultural heritage is an irreversible environmental impact, its the appropriate protection of such cultural heritage must be supported by various related policies on cultural heritage protection specifically recommending tools for valuing cultural heritage resources.

The cooperation of City Government, City Council with civil society groups in the enactment of the vehicle emissions ordinance is a critical factor in enforcing environmental standards such as the Clean Air Act. This multi-stakeholder initiative has also been demonstrated in Metro Manila during the first few years of implementation of the Clean Air Act. However, there is still a need for continuous involvement of civil society in monitoring and ensuring the compliance of vehicles to emission standards. The linkage with



public transport sector has to be sustained and support has to be extended for continuous compliance. There is lack of ambient air quality monitoring equipment to measure various pollutants. Technical, manpower and adjudication problems experienced earlier by Metro Manila local governments in roadside apprehension of vehicles violating emission standards have to be understood and prevented in this new effort in Metro Cebu.

### **Future Directions**

According to the Cebu City Planning and Development Office (Cebu CPDO, 2007), transport development strategies of Cebu City consists of clean air and energy efficiency, street vacations, underground utility ducts, guidelines on transport plans, barrier-free design and a high-occupancy jeepney/bus system such as BRT. The Cebu CPDO's land use strategy proposes the adoption of the Dispersed-Concentrated Approach which will create three development zones of the city – central, north and south. Two new growth centers ringed with new housing settlement areas will be developed in the city's northwest area (Talamban) and southeast area (Pardo).

The direction of transport network development has been changed from single primary corridor to 3-corridor system in line with the present direction of the MCDP (Villarete and Cal, 2007). The first two corridors are the existing north-south arterial road (public transport corridor) passing through Cebu City and the partially opened Cebu South Coastal Road (industrial transport corridor). The third corridor is the Cebu City Circumferential Road with alignment that will start in Tisa traversing at the interior-mountain side of Cebu City and terminates in Sunny Hills subdivision in Banilad in Mandaue.

With respect to the introduction of an alternative mass transit system, Cebu City recently showed its interest in the introduction of BRT in two corridors with support from the private sector. However, the Department of Transportation and Communication (DOTC) already closed a deal with AMA Group of Holdings Corp. for the construction of a 71-kilometer, three-phased LRT system amounting to US\$1 billion that would run through Metro Cebu from Carcar in the south to Danao in the north. A bill was filed in Congress in 2007 for a similar LRT system called Metro Cebu Mass Transportation System (MCMTS) that involves the construction of a modern railway network from Talisay City to the Municipality of Consolacion for the first phase, and from Talisay to Carcar City and Consolacion to Danao City for the second phase. There is a need to provide guidance from DOTC through its Road Transport Planning Division and Rail Transport Planning Division to local governments on the promotion of BRT as an alternative mass transit system which is lower in cost. This will also have an impact on public transport management since the BRT system consists of buses running on medians of roads which is still technically road-based transport.

With respect to clean air, a local government-business sector-academe forum, collaborative activities, and roundtable discussions shall be held to define roles on clean air efforts, acquisition and installation of air quality monitoring equipment, activation of the Metro Cebu Airshed Governing Board and training module on preventive maintenance and responsible driving shall be developed for transport operators, owners and drivers for use by CITOM (USAID-ECAP, 2007).

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**(Footnotes)**

<sup>1</sup>

Based on the 1979 Metro Cebu Land Use and Transport Study (MCLUTS) report and the 1992 Home Interview Supplemental Survey conducted by the Metro Cebu Development Project (MCDP) for Phase 3.



# San Fernando, La Union:

## TRICYCLE SECTOR MANAGEMENT



### Background

San Fernando today is far from the rustic area, “Pindangan,” which it was once called because of its primordial status as a small fishing village, the place for “pindang” or the traditional method of drying fish. Today, San Fernando stands as a first class city and as the industrial and political center of the La Union province and the regional center of the Ilocos Region (Region I). Since its creation as a municipality on May 6, 1786, it has become the gateway to and the springboard of economic progress and the center for trade/commerce, finance, health and education of the entire Region I. It is blessed with a seaport responsive to international shipping and is home to an airport with viable capacity to accommodate international air traffic.

The city is home to numerous industries. Aside from farming and fishing, large manufacturing companies such as Coca Cola, Union Galva Steel, Soiltech Agricultural Products and commercial banks have established operations in the area. The Poro Point Special Economic Zone under the Bases Conversion Development Authority, is seen as a “sleeping giant.” It is expected to further boost economic activity in San Fernando once the area is fully developed.

While San Fernando is currently enjoying an economic boom, the city wants to streamline its progress via a number of development and environmental programs. In sustaining its commercial viability, it also aims to balance this by addressing the needs of its fragile ecology. Tagged as the “Botanical Garden City of the North,” it envisions itself as a healthy city where the city government is resolved to implement programs such as solid waste management, clean air protection and coastal resources management, among others.

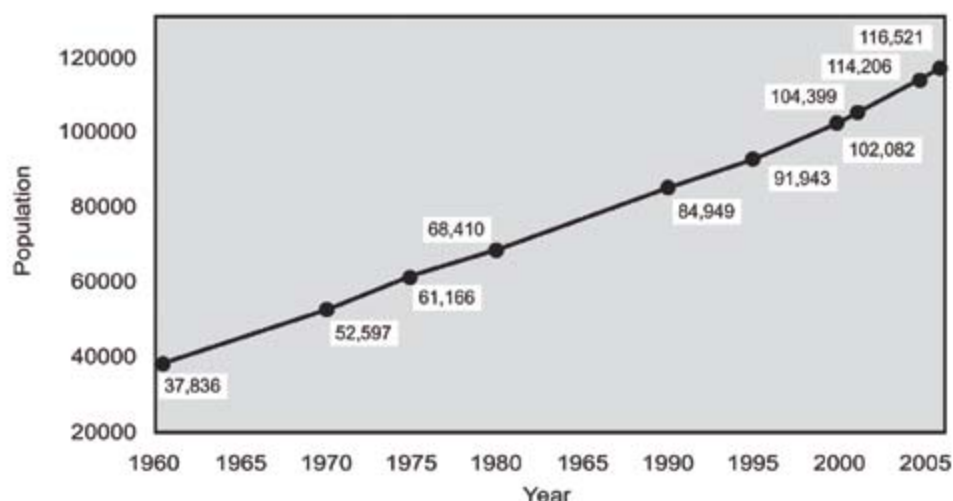
It is the hope of its people and local leaders to protect San Fernando’s natural resources and, in the process, turn the city into a model urban center for others in the region to emulate. Perennial problems like the traffic congestion that developing cities usually encounter in its quest for progress are also being resolutely addressed at the local level.

With its 59 *barangays*, San Fernando accounts for 10,526 hectares or more than 7% of the province's total land area. Twenty-five of these *barangays* are now considered urban while the rest are rural.

The present built up area, which is sprawled along the valleys of the seven hills that dominate the sight of the city towards the east, is sandwiched between two barriers. Along the city's eastern boundaries are the foothills of the Cordillera Mountain Range that lends rigid definition to the interior limits. The bodies of water in the west, while providing excellent recreational and visual amenities to the urban area, likewise form the structural limitation to the city's expansion.

### Population

In 2006, San Fernando registered a total population of 116,521, around 72% of which is urban. In the last five decades, the city has seen a gradual and steady increase in population as seen on Figure 4. Between the years 2005 and 2006, it registered an annual increase of 2.03%. In the year 2000, the City hit the 100,000 mark.



**Figure 4.** Population of San Fernando City from 1960-2006  
(Source: San Fernando City CLUP 2006)

The past decade saw a gradual decreasing trend in urban population (see Table 5). This is in contrast to the increasing rural population of the city. This trend in migration can be an indication that city dwellers are slowly moving out to the outskirts as the city itself expands. As a corollary, shifts in the economic activities of the people can be expected.

**Table 5.** Urban vs. Rural Population of San Fernando City

	1995	2000	2001	2005	2006
Urban	67,913.0	72,942.0	74,242.0	80,352.0	83,947.0
(% of total)	(73.9)	(73.9)	(71.1)	(70.4)	(72.0)
Rural	24,030.0	29,140.0	30,157.0	33,854.0	32,574.0
(% of total)	(26.1)	(28.5)	(28.9)	(29.6)	(28.0)
City	91,943.0	102,082.0	104,399.0	114,206.0	116,521.0

(Source: San Fernando City CLUP 2006)



The city has a general population density of 11.07 persons per hectare in 2006. However, the urban population density was disproportionately larger at 30 persons per hectare compared to the rural population density of only four persons per hectare.

Although much of the city is urban, its population is still largely involved in agriculture, fishery and forestry, which accounted for 44.5% of the number of gainful workers of the City in the year 2006. On the said year, the number of gainful workers was 40,239 or about 34.53% of the total population. Of this, 17,906 were engaged in agriculture, fishery and forestry, 5,199 in the industry sector and 17,134 in the service sector. The employment rate in San Fernando stands at a respectable 92.8%, one of the highest in all of the major cities in the Philippines. In year 2000 alone, PhP251 million worth of revenue came from the workers of San Fernando.

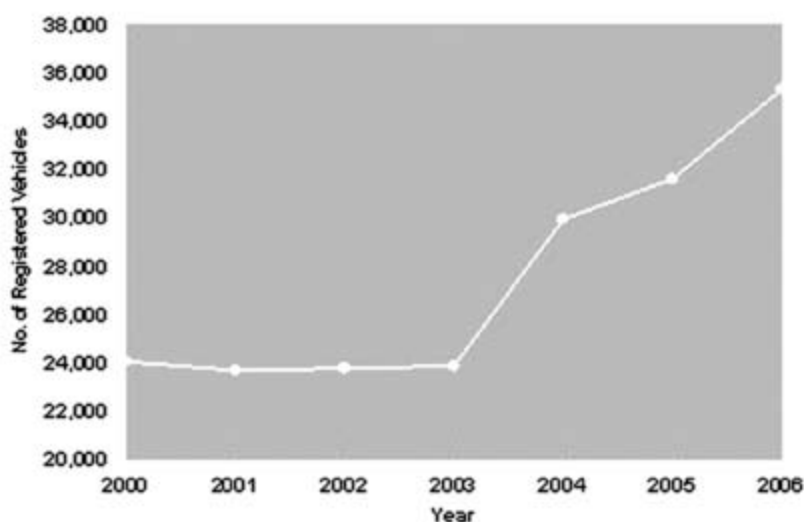
### Motorization

In 2006, San Fernando City had 35,313 registered motor vehicles. For the past few years, the city has seen this number grow considerably. Between 2003 and 2004, it registered a staggering 25.6% increase. Specifically, a steady increase in the number of private motor vehicles was observed (33.8% in 2003 to 2004). This increase in the total volume of vehicles is greatly attributed to the 55% increase in the number of motorcycles. Table 6 shows the number of vehicles registered by type in 2000 to 2006 while Figure 5 shows the trend of total vehicles registered in the same period.

**Table 6. Motor Vehicle Registration by Vehicle Type in San Fernando City, 2000-2006**

Year	Cars	UV	SUV	Trucks	Buses	MC	Trailers	Total
2000	3,376	8,657	-	1,424	409	10,009	142	24,017
2001	3,408	9,071	136	1,456	387	9,080	133	23,671
2002	3,448	9,385	112	1,482	328	8,909	116	23,780
2003	3,473	9,508	170	1,344	297	8,913	127	23,832
2004	3,701	10,289	294	1,392	327	13,805	124	29,932
2005	3,897	11,062	464	1,533	339	14,158	123	31,576
2006	3,847	10,810	574	1,428	385	18,140	129	35,313

Source: Land Transportation Office



**Figure 2. Motor Vehicle Registration in San Fernando City, 2000-2006**  
(Source: Land Transportation Office)

### Road-Based Public Transport

According to the City Government, there are 53 routes of public utility jeepneys (PUJ) with parking/loading areas in the City consisting of 1,386 units. There are four bus routes consisting of 550 units. There are 1,600 tricycle units as of July 2008 which are regulated by the City.

### Road Network

On the other hand, the total length of the road network of San Fernando City in 2000 was 189.77 kilometers (see Table 2). *Barangay* roads constitute more than half of this network (69.54%), while city roads with only 6.74 kilometers of road length make up a meager 3.55%. Of the total road network, 66.30% is concrete pavement and only 3.90% is asphalt. In the 2000 road inventory of San Fernando, the length of the urban road network of the city was 262.01 km.

### Air Quality

With respect to air quality, the only pollutant regularly monitored in recent years was total suspended particulates (TSP). Table 7 shows the annual geometric mean concentration of TSP in 2004 to 2007.

**Table 3.** Annual Average TSP Concentration, 2004-2007, San Fernando City, La Union

Year	TSP Concentration (Annual Geometric Mean), mcg/Ncm
2004	183
2005	144
2006	155
2007	148

Source: Environmental Management Bureau Region I

### Traffic and Transportation Problems and Issues

The following are the main problems of traffic and transportation in the City:

- Lack of parking spaces
- Lack of loading and unloading stations for public utility vehicles
- Lack of re-routing schemes
- Lack of manpower to direct traffic especially along intersections
- Narrow roads made narrower by poorly organized sidewalks due to encroachment of vendors
  - Uneven and unclear sidewalks due to uncoordinated design and lay-out
  - Lack of traffic management devices such as traffic signals and signages
  - Poor drainage system in certain areas which results to sparse flooding
  - Presence of traffic violators, specifically public utility vehicle drivers
  - High volume of pedestrians crossing the roads



## Transport and Environment Management Context

The City's vision is to be "The Botanical Garden City: a healthy city and the springboard for regional progress." The City of San Fernando wants to be known as an environment-conscious place and as a business-friendly city. The Botanical Garden symbolizes the city's recognition that it wants to be known as a clean and green city. City programs that tackle environmental concerns include the following: a) Environmental Governance which includes the City Environment Code, City Sanitation Code, City Solid Waste Management Ordinance and Environmental Citizenship; b) Clean Air Program; c) Coastal Resources Management Program; d) Re-greening and Forest Resource Management Program; and e) Water and Sanitation Program (Ortega, 2007). It is clear that transport and environment management is based on the strength of the city's environmental governance. In the Environment Code of the City of San Fernando enacted in 2006, transportation and environment management are incorporated in the chapter on Urban Air Quality Management.

### Specific Programs and Initiatives

#### *Tricycle Conversion Program (2000-present)*

The Tricycle Conversion Program was initiated in year 2000. It built on earlier initiatives on local transportation management, such as, traffic rerouting, tricycle color coding and the franchise cap of 1,600 tricycle units during the first term of then Mayor Mary Jane Ortega in 1998-2001. In November of the same year, the Philippine Clean Air Act began implementation and people have become aware of the significant contribution of motor vehicles to air pollution. With increased awareness and the need to formulate strategies for vehicle emission reduction, local transportation management initiatives evolved into a transportation and environment management program that targeted the conversion of engines of tricycles from two-stroke to four-stroke technology.

The Tricycle Conversion Program became the centerpiece of the City's Clean Air Program. The Program has the following components:

- Awareness
- Technical information verification/validation
- Project Conceptualization
- Information Education Communication (IEC) with stakeholders
- Sputum test and check up of driver's health
- Public and organization briefings and meetings
- Voluntary implementation
- Loan assistance program

The environmental aspect of the program has been supported by the ambient air quality monitoring conducted by the Environmental Management Bureau (EMB) Region I for the City. It monitored TSP concentration in cooperation with the City Environment and Natural Resources Office (CENRO) of San Fernando with a station located in front of the City Hall.

*Awareness and Conceptualization of the Program.* Former Mayor Mary Jane Ortega became aware of the pollution caused by two-stroke vehicles after participating in a forum on the environment in 2001. In this forum, a presentation showed the advantages of using two-stroke engines as in the experience of Thailand which successfully discarded four-stroke engines. Ortega ordered the City Permits and Licensing Section to conduct an inventory of tricycles. In this survey, it was found out that the entire fleet consisted of 1,142 tricycles with two-stroke engines (71%). The rest (458) is composed of units with four-stroke engines including 79 units of model 1970s and 66 units of model 1980s.



**IEC with Concerned Stakeholders.** In 2001, there was a draft resolution that targeted the phase out of 30-year old two-stroke tricycles; 1970s model by 2003 and 1980s by 2004. The draft resolution was proposed by the Mayor to the City Council but there had been serious debate especially on the advantages and disadvantages of each engine technology. Eventually, the resolution did not proceed.

In the same year, a dialogue was held with the tricycle sector on the effects of air pollution on health. Ortega explained the health hazards caused by two-stroke engines. After the explanation, many tricycle owners have volunteered to convert their engines to four-stroke technology. In her radio program, Ortega continued to disseminate the information on two-stroke engines.

In 2005, a preventive maintenance workshop consisting of four modules was conducted for 53 drivers/operators through the assistance of United States Agency for International Development-U.S.-Asia Environment Partnership (USAID-US-AEP) and the Motorcycle Development Program Participants' Association (MDPPA). It was explained in this workshop that hydrocarbon (HC) and carbon dioxide (CO) emissions reduction is possible through proper and regular engine maintenance. About 64% of the tested four-stroke tricycles experienced HC emissions reduction with a mean of 30% while 73% of the four-stroke tricycles achieved a mean CO emissions reduction of 395%. Lower emissions reductions were obtained from two-stroke tricycles.

**Health and Safety of Tricycle Drivers.** In 2006, the City Health Office started to conduct its annual sputum test check-up of tricycle drivers. Out of 1,800 drivers, there were eight drivers diagnosed to be positive of tuberculosis. The annual sputum test check up for tricycle drivers became a prerequisite in obtaining the authorized tricycle driver (ATD) identification card. The ATD is related to the tricycle body number which is tied up with the annual renewal of permits to operate. The City also distributed arm protectors to tricycle drivers and encouraged the use of masks and uniforms.

**Financing Programs.** In 2003, the City started to offer individual interest-free loans to the amount of PhP9,000.00. The loan is intended to cover the downpayment for the purchase of new four-stroke engine motorcycles. It was effected through a memorandum of agreement in 2002. Table 8 shows the number of operators who availed of the loan facility per year from 2003 to 2007. About 1 8 2 operators availed of the loans which totaled PhP1,638,000.00.

The City granted interest-free loans to tricycle cooperatives (PhP50,000.00 in 2005 and PhP100,000 in 2006). The loan is payable in one year. As an incentive, cooperatives were allowed to sub-lend to their members with an interest of 3% per annum.

**Table 8.** No. of Operators who Availed of City Government Soft Loans

Year	No. of Operators	Amount
2003	26	PhP 234,000.00
2004	56	PhP 504,000.00
2005	22	PhP 198,000.00
2006	27	PhP 243,000.00
June 2007	51	PhP 459,000.00



### *Supporting Programs and Initiatives for Local Transportation Management*

***Organization of Transport Cooperatives.*** Memorandum Order 116 mandating the transformation of all tricycle operators and drivers association (TODA) into a transport service cooperative/federation was also implemented. This was done so that the tricycle sector can easily access financial assistance and benefits provided by the City. It has not yet been completed and is still ongoing due to some difficulties in organizing the sector.

***Provision of Developmental Public Transport Services.*** The pilot project, “United-Area Tricycle Routes,” consisting of 60 four-stroke tricycles in some *barangays* was continued. This was piloted in *barangays* where there is lack of public transport services. Currently, the tricycles still have private licenses. The City Council has not yet decided on whether to regulate this local transport service.

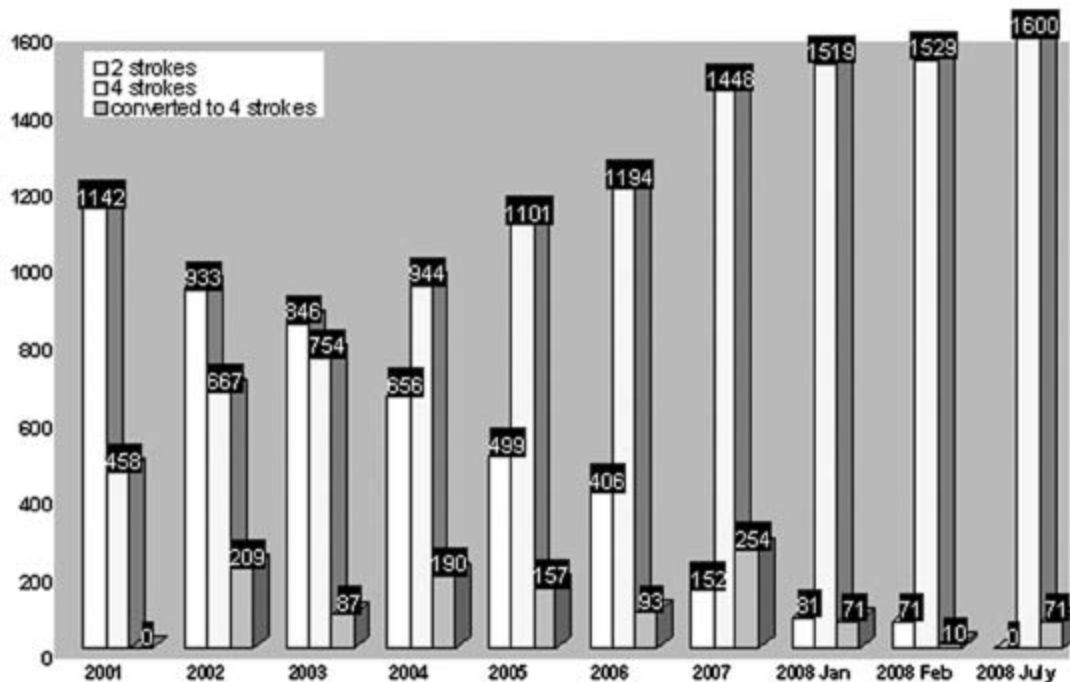
***Tricycle Regulation.*** Local transport regulation strategies include the physical inspection of tricycles at the city motorpool every January, issuance of City stickers and the strict limitation of the issuance of tricycle franchises. The City requires that the sidecar be painted white with bodynumber. Rerouting and other traffic management schemes and regulation on limiting of passenger loads were also implemented.

***Public Assistance Complaints Unit.*** Another important program supporting the regulation is the Public Assistance Complaints Unit (PACU). Established in the year 2000, it receives complaints through text message, filling up of form and through contacting a traffic aide. A substantial number of complaints was related to tricycles including claiming of lost and found belongings of passengers.

### **Successes Achieved**

The idea was simple: to convert the unbridled number of two-stroke engine tricycles operating to cleaner four-stroke engines. The implementation of the program went smoothly. No city ordinance had to be passed and neither was there any roadside apprehension. The City had successfully phased out 30-year old tricycles in 2002, 25-year old tricycles in 2003 and 20-year old tricycles in 2004. As of August 2006, only eight units which are older than 15 years old remained. By October 2007, there were no more units more than 15 years old (Galvez 2007).

According to the San Fernando Clean Air Program Report, 1,142 units of the total 1,600 tricycles in year 2000 had two-stroke engines. The number dropped to 480 in 2005. Meanwhile, the number of four-stroke tricycles has increased from 458 in 2000 to 1,120 units in 2005 (Figure 6). From 2001 to 2005, the volume of four-stroke units dramatically increased from 29% to 70%. As of October 2007, the number of two-stroke units decreased to 89 (6%) and the number of four-stroke units increased to 1,511 (94%) (Galvez 2007). In July 2008, roughly eight years after the Tricycle Conversion Program was introduced, the City announced that it has completely removed two-stroke engines in its tricycle fleet. It could have been the first city in the country to achieve such feat.



**Figure 3. Tricycle Fleet of San Fernando City, 2001-2008**  
(Source: City of San Fernando)

A mini-interview survey of tricycle drivers was conducted in July 2008. In this survey, the drivers shared that conversion to four-stroke engines brought about a slight increase in fuel consumption. The drivers nevertheless remarked that as a tradeoff, the four-stroke engines required less maintenance and has consequently availed them of as much as 50% savings. Drivers have also observed that four-stroke engines are more capable in uphill drive and take longer to heat up.

Average daily net income ranged from Php268 to Php336 for drivers and driver-operators respectively. The drivers remarked that they would have made bigger income if not for the global increase of oil prices. The drivers also mentioned that they no longer smell the nauseating emissions.

DENR-EMB Region 1's ambient air quality monitoring revealed that average TSP concentration in the City improved from "good to unhealthy" in 2004 to "good to fair" in 2005 and 2006. The concentration (mcg/N. cu. m) measured at the City Plaza beside F. O. Monument shows that the value decreased by 24% from 183 mcg/N. cu. m in 2004 to 148 mcg/N. cu. m. in 2007.

City Ordinance No. 2006-013 also known as "An Ordinance Enacting the Environment Code of the City of San Fernando, Province of La Union" was enacted on November 3, 2006. It consolidated all environment-related ordinances of the City. Initiatives on tricycle conversion and clean air programs were institutionalized in this Code under the chapter on Urban Air Quality Management. Under Section IV2.11 (Abatement of Urban Air Pollution from Motor Vehicles), the City, with the aim of reducing carbon dioxide emissions, will be undertaking the following:

- Strict implementation of the anti smoke belching program;
- Encourage conversion from two-stroke to four-stroke engines through loans, the mechanics of which is to be prepared by Permits and Licenses Section under the Office of the Mayor;
- Encourage the use of catalytic converters in all vehicles especially diesel-powered engines;



- Close coordination with the Land Transportation Franchising Regulatory Board in order to limit the number of public utility jeepney franchises in the City; and
- Periodic conduct of roadside (on-site) anti-smoke belching test for all types of motor vehicles.

It is interesting to note that public transportation management has been incorporated as part of urban air quality management of the City.

### Lessons Learned

The Tricycle Conversion Program has shown that it is possible to implement a local transport and environment program without enacting an ordinance. A key element is the early involvement of stakeholders, specifically, the tricycle transport groups through IEC and dialogue. The thrust of then Mayor Ortega for the program has always been anchored on capacity-building, education and advocacy.

With this, the tricycle operators and drivers became aware of the effects of air pollution on health. They also appreciated the sincerity of the efforts of the City Government in providing services such as medical check-up, preventive maintenance and interest-free loans. The firmness of the City Government in the implementation of a cap on the franchises is also seen as an important element in tricycle transport management.

The air quality monitoring conducted alongside the program also formed the framework for the Clean Air Program (CAP). The CAP indicated the City Government's recognition of the need to measure the impact of pollution on environment and health. This program has demonstrated that the City Government have the capacity to manage the local public transport system including other modes such as buses and *jeepneys*.

The Traffic Management Committee chaired by the City Government and comprised of local, and national government and transport groups will be a key institution in building on the programs for tricycle and clean air since the scale of the overall transport, traffic and environment management problem is larger. Examples of problems would be the public transport issue where there is already a cap on the tricycle franchise. With the increase in transport demand and limits on the transport and road capacities, the City may need to find higher modes of local transport (*jeepneys* and buses) to serve even intra-city routes. Other issues on public transport would be the establishment of an integrated public transport terminals and the possible rerouting within the City.

### Future Directions

Plans and targets of the City would be for continuous information education campaign (IEC) on the health hazards caused by two-stroke tricycles especially among tricycle operators and dealers; designation of tricycle terminals for loading and unloading; designation of tricycle routes per *barangay*; regular medical check-up for drivers; re-routing scheme on other public transport vehicles and vehicle reduction scheme experiments; regular trainings and seminars on vehicle maintenance and solid waste management; and tourism and values. Trainings and seminars will also be conducted on traffic enforcers and other stakeholders such as the Land Transportation Office. In addition, the City will identify and utilize vacant lots in the business district as parking areas.

In cooperation with Lorma College, a local university, on-the-job IT students have started to develop the tricycle database in June 2008 with the goal of instituting the Tricycle Regulatory Assessment and Billing System (TRABS) in the City Permits and Licensing Section.



The City is also strictly regulating privately-owned tricycles. An ordinance sets limits to 250 the allowed number of tricycles in the City. With current registration of only seven to eight units, the City is planning to conduct a dialogue with the owners and have the maximum number to 75.

There has been idea of shifting to electric tricycles through change of engines pending the verification of the price of the technology.

The City Government's priority in the next three years would focus on transportation. Included in this program of action are:

- 1) *Public Utility Vehicle (PUV) Terminals.* The plan is to construct a North PUV Terminal and a South PUV Terminal by 2009. The priority will be the North terminal to be erected in Barangay Tanqui. The site development plan was already drafted in cooperation with the Department of Public Works and Highways (DPWH). The site is currently being used as a garage of buses and jeepneys. The South terminal will be located in the abandoned Philippine National Railways (PNR) station in San Fernando. The rights were already given to the City by PNR. In the future, inter-city public utility vehicles will be prohibited to pass through or have a terminal at the city center. They will be instead rerouted to the Diversion Road and directed to the North and South PUV terminals.
- 2) *Pedestrian Overpass.* The City plans to construct three pedestrian overpasses along national highway in the city center and next to the campuses of DMMSU, Normal College and Saint Louis College.
- 3) *Bikeways.* There is also a plan to construct bikeways parallel to the Diversion Road. The right-of-way is located on the former PNR line. It will start from the town of San Juan in the north to the town of Bauang in the south. Financial support from Congress is expected for the project. With respect to the Diversion Road, Phase 1 (RTC-CSI Mall) has already been completed while the concreting of Phase 2 (San Fernando-San Juan) is on-going. Phase 3 (RTC-Bauang) has not yet started.

As manifested during the consultation meetings and workshops in 2007, the City strongly supports the "walkable city" concept since most major areas and institutions including the proposed public transport terminals are within walking distance. In 2008, the City started to clear the sidewalks in the Central Business District. The objectives of the sidewalk clearing program are outlined as follows: a) walkable city (clean and beautiful); b) lessen occurrence of crimes; c) keep pedestrians safer from vehicular accidents and away from hazardous gas emissions; and, d) promote free access to business enterprises. The City utilized the following national and local laws as legal basis: P.D. 1096 (National Building Code), Zoning Ordinance and R.A. 7160 Local Government Code.

The program consists of two following phases: 1. Phase I – Central Business District (CBD) and 2. Phase II- Major Thoroughfares (From Pagdalagan to Dalumpinas Oeste). As of July 2008, a total of 1,222 notices were issued by the City through the Permits and Licensing Section where 36% had violations. The City through its various offices has also observed other forms of obstructions, the lack of road width and uneven sidewalks.

There has been initial discussion with respect to the concept of a metropolitan area, that is, Central La Union Metro Planning Area or CELUMEPA which consists of 7 cities/municipalities including San Fernando City.

A memorandum of agreement has been drafted with Alaminos City and Dagupan City in Pangasinan with respect to the feasibility study on the proposal of sea transport between San Fernando City (Poros Port) and Dagupan and Alaminos (Hundred Islands) for tourism and commuting.

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# Marikina City:

## PROMOTING NON-MOTORIZED TRANSPORT



### Background

Marikina is a chartered city at the eastern edge of Metropolitan Manila. It occupies a land area of approximately 2,150 hectares. In 2007, it had a total population of 479,394. It is famous for its shoe industry.

Being a relatively new component city situated in the peripheries of the metropolitan, it has assumed the suburban role of “bedroom community” to its neighboring cities for a time. In recent years, however, the rapid sprawling of industries and commercial establishments from the metropolitan core spilled over into the city.

Because of urbanization and increase of population density within and around its environs, Marikina City has faced problems with traffic and traffic management. A particular challenge is the management of traffic brought by the passage of vehicles in the eastern part of the city which is close major universities.

Much of the city’s infrastructures are as old as its history dating back to Spanish colonial times. Because of this, it has suffered internal problems ranging from limited road network to lack of facilities owing to difficult regulation of public infrastructures. With its economic growth also came emblematic problems like illegal occupancy of public spaces, particularly the sidewalks.



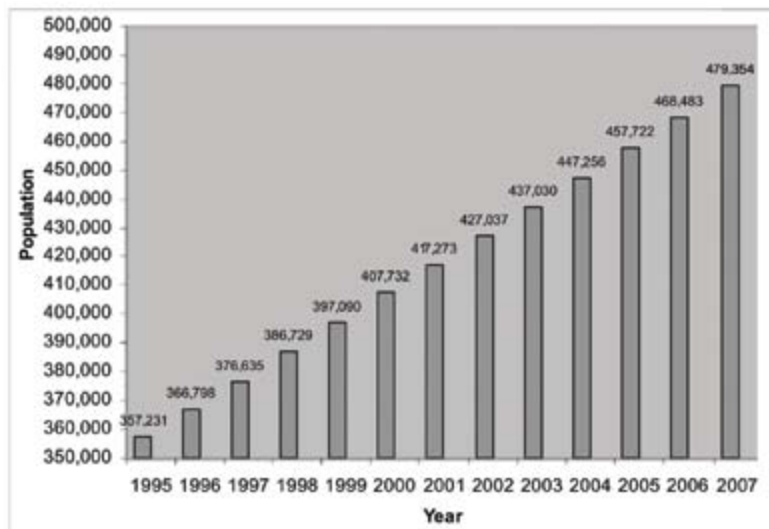
In 1992, a new wave of change has beckoned with the election into office of Mayor Bayani Fernando or BF as he is popularly known. An IATSS Project on Local Governance study stated that BF has not only “introduced a number of innovations in the city’s governance and development” but, more importantly, a “rather distinct brand of leadership in the Philippine politics and administration.”

When one has to broadly examine the transformation that has beset the city of Marikina in the last decade, one can not divert any farther from the projects piloted by then Mayor Bayani Fernando who was elected to office three times in a row until 2001 when he was succeeded by his wife Ma. Lourdes Fernando.

The continuity of the governance of the Fernandos paved the way for the subsistence of many remarkable projects. Among these is the establishment of the Marikina Bikeways Project (MBP), which was initially organized by Bayani Fernando in the late 1990s. Ma Lourdes Fernando led the full implementation of the program in 2001 when she became mayor.

### **Population**

In 2007, Marikina City had a total population of 479,394. It charted an average of 2.46% annual population growth rate in the years 1997 to 2007 (Figure 7).



**Figure 7.** Population growth of Marikina City from year 1995 to 2007  
(Source: Marikina City Website)

In the 2000 census, Marikina City ranked as the 10<sup>th</sup> most populous unit in Metro Manila. In the same census year, the population density of the city was 11,515 persons per square kilometer. Although its population density is high, this is relatively lower compared to its neighboring cities.

### **Development Challenges**

Until 1992, Marikina was largely a town of shoemakers. Other than that, the town was ordinarily like many Philippine towns which has a Spanish masterplan. The streets were typically narrow, all leading to the center of the town where most of the establishments were located.

In the context of transport management, narrow thoroughfares translate almost at all times to traffic congestion, much more if the rate of developing infrastructures is slower than the rate of population

and economic growth. Mayor Bayani Fernando was determined to solve this problem and the other imminent problems of the future that involve the ease of mobility inside his local unit. The answer came to notice along the banks of the Marikina River.

Even before Bayani Fernando was elected into office, people in Marikina were already using the river easements along Marikina River for jogging and biking purposes. The three-meter wide river easements were originally intended as a passageway for trucks used for cleaning the river. With the concreting of these easements, biking enthusiasts and joggers became more enthusiastic in using the easements which provide open spaces. This development eventually led to more people riding their bikes and biking became popular not only in the river easements but also in the sidewalks. Soon enough, albeit minority in numbers, the biking fad assumed a utilitarian purpose, and bikers eventually came out of the river easements to the sidewalks. Around this time, Bayani Fernando has started the groundwork for his street side management program.

### ***Sidewalk Management: A Look in the Past***

In a retrospective report of former Mayor Bayani Fernando regarding his projects during his term, he said that "Like many big cities, Marikina has for years suffered anarchy on its sidewalks, abetted by official neglect and indifference and blatant refusal of vendors and hawkers to be disciplined, by commercial establishments which hogged the sidewalks as if these were their own garage and by pedestrians who made a dumping ground on them by sacrilegious disposal of wastes on what should be clean and clear sidewalks." (UP-NCTSFI, 2003)

The natural course of action was to 'clean' the streets. In the course of the campaign, however, Bayani Fernando found out that restructuring and putting order in place in public places go beyond physical maneuvering. As such, his next series of projects was aligned to confront "people problems" first as a means of addressing the perennial problems on traffic, inter and outer city mobility and the environment.

In the earliest years of his term, he started the campaign "*Disiplina sa Bangketa*" (Discipline on Sidewalks), which took various forms and commenced on physical reconstruction, coupled with social reorientation and moral reformation.

Near the end of Bayani Fernando's term, the city government liberated 90% of 600 kilometers of sidewalks. The government decided to paint the sidewalk to separate it from the space intended for motorized transport. The final report of the project stated that the people felt safer to walk in short distances as compared to when the streets were heavily crowded (UP-NCTSFI, 2003).

"*Disiplina sa Bangketa*" was further bolstered by another roadside campaign "Hassle-free Roadways." This program aimed to relieve the city of congestion. According to BF, traffic is a representation of the city's economy. With this program, congestion was reduced through strict enforcement of traffic and parking regulations. To instill discipline among the people, legal parking areas were designated and traffic signs were revamped.

On these projects, "Bayani Fernando has been very articulate about his political and administrative style," which was "characterized by demonstrated political will" (UP-NCTSFI, 2003).

### ***The Bikeways Project***

On the last term of Bayani Fernando in 1999, he initiated the feasibility study of installing a bikeway system in Marikina City, which, by then, has reclaimed a lot of roadside space. At about the same time, according to the Metro Manila Urban Transportation Integration Study of MMUTIS, it was estimated that there are 10,500 bicycle trips in the city daily (JICA, 2000). This is a sizeable amount compared with the rest of the Metropolitan Manila which has 160,200 bicycle trips daily.



This project of Bayani Fernando aimed to provide the facilities for low-cost and environment -friendly alternative means of transportation within the city. This was, to a certain extent, influenced by the success of the physical reconstruction and social reorientation of Marikina's sidewalks in the early 1990s. The local officials of Marikina City believe that biking is a good form of sustainable transport and it hopes to contribute to minimizing air pollution caused by motor vehicles (UP-NCTSFI, 2000).

During the conduct of the feasibility study, an inventory of roads showed that most of the rights-of-way were narrow and sidewalks were not available outside the Central Business District (CBD) area. Although unpaved shoulders were already available in some areas, electrical posts prevent a continuous paving that could be possibly used for the bike lanes (UP-NCTSFI, 2000).

A social analysis conducted through a series of focus group discussions (FGDs) relating to the proposal of building a bikeways network in Marikina City elicited positive response from the participants; although safety was also a major concern. There was also a consensus that it would take more than building a bikeways network to mainstream cycling in the city and, even more importantly, to get people to switch from motorized vehicles to non-motorized modes (UP-NCTSFI, 2000).

The efforts of Marikina City were noticed by the World Bank (WB) and the latter gave it a Global Environment Facility (GEF) grant amounting to USD1.3 million in 2001 for the building of Marikina Bikeways as a demonstration project in the Philippines. On the same year, the leadership of the city was turned over to the wife of Bayani Fernando, Ma. Lourdes Fernando, who eventually oversaw the completion of the project.

Since 2001, the City of Marikina has modified its transport development program to actively promote greater use of bicycles and walking as alternatives to motorized transport. The World Bank grant also paved the way for the establishment of Marikina Bikeways Office (MBO), which is responsible for the supervision of the actual planning, construction and maintenance of the project.

## Key Transport and Environment Issues

### *Motor Vehicle Registration*

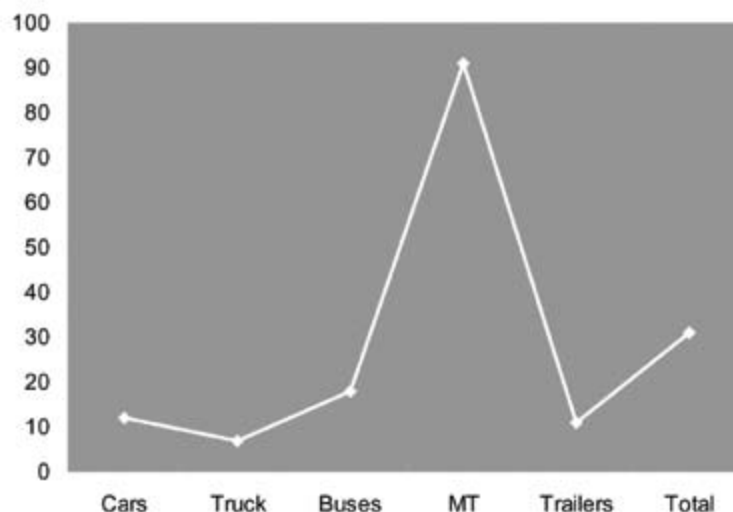
Table 9 shows the number of vehicles registered in the City for the years 2000, 2006 and 2007. A 31% increase in the overall motor vehicle registration was seen between the years 2000 and 2007. Year 2006 registered a higher number of vehicles than 2007.

**Table 9.** Vehicle registration for the years 2000,2006 and 2007  
(Source : Land Transportation Office)

Type	2000	2006	2007	% Change 2000-2007
Cars	18,244	19,551	20,469	12
SUV	-	3,076	1,885	-
Truck	2,353	2,212	2,524	7
Buses	28	20	33	18
MT	8,938	22,583	17,108	91
Trailers	175	161	194	11
Total	52,181	71,904	68,616	31



One of the biggest increases in volume of vehicles in the city was with motorcycles, which are also currently the most ubiquitous form of public transport in the city (see Figure 8). A talk with local executives revealed that this increase in motorcycle registration resulted to the proliferation of tricycles, a three-wheeled public transport. It was also reported that motorcycle dealers offer price cuts to buyers.

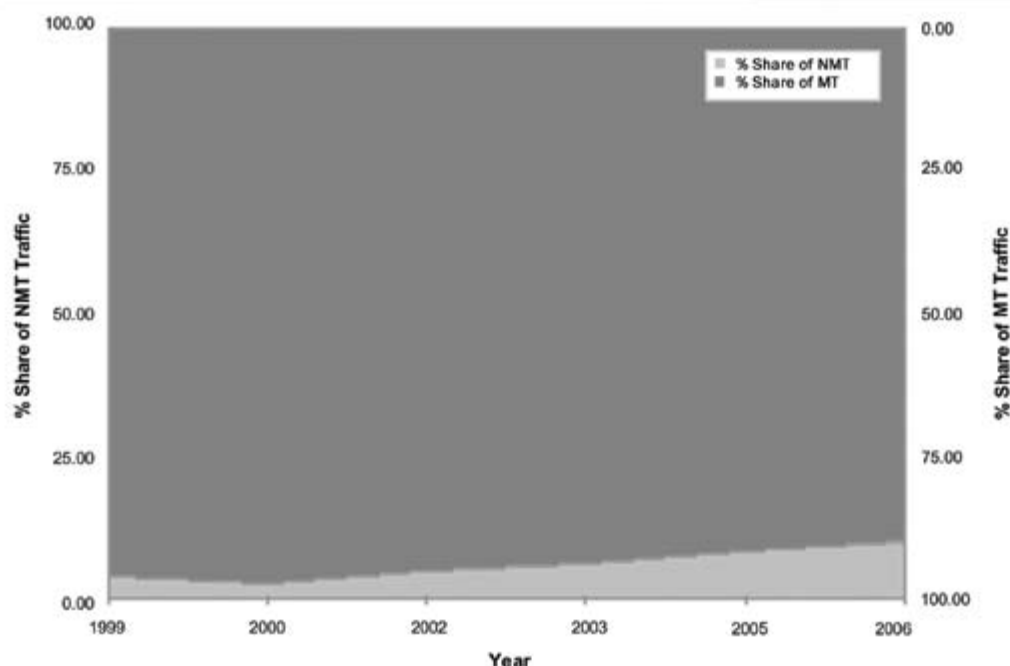


**Figure 8.** Percentage increase of registered vehicles between the years 2000 and 2007  
(Source: Land Transportation Office)

At this time, the CTMDO has expressed concern over the large volume of tricycles in the city which significantly contributed to heavy traffic congestion. The CTMDO has also received concerns from the riding public regarding the nauseating smell of engine emissions from tricycles fueled by by Liquified Petroleum Gas (LPG). Presently, plans of converting LPG-fueled to electronic engines are being considered by the city government.

#### ***Motorized Vs. Non-Motorized Traffic***

In its annual intersection traffic volume count done in March 2006, the Marikina City Bikeways Office observed a 9.54% bicycle share in the city traffic, as compared to a 4.25% share in 1999. According to the Accomplishment Report for January-April 2006 of the Marikina Bikeways Program, this considerable increase in traffic share of bicycles can be attributed to the positive results of the different bicycle promotions and campaigns and the continuous construction of bicycle lanes. Figure 3 shows a general increasing trend in the share of NMT. The year 2006 charted the highest percentage of NMT share in traffic at 9.88%.



**Figure 9.** Share of Non-Motorized Transport (NMT) in Traffic Volume from 1999 to 2006  
(Source: MBO)

The share of NMT in traffic increased significantly. At the onset of the bikeways project in 2002, a consistent increase in the use NMT can be seen on the years following thereafter. On the other hand, before the commencement of the bikeways project, the motorized component of city traffic was seen to increase only modestly (Table 10). From 2002 until 2006, however, a negative change in the percentage share of motorized transport in the city was observed. During these years, the MBO was in full motion in the implementation of the bikeways project with steadfast education and information campaigns supporting the rapid construction of the bikeways system in the city.

**Table 10.** Percentage share of Non-Motorized Transport (NMT) versus Motorized Transport (MT) from years 2000 to 2006

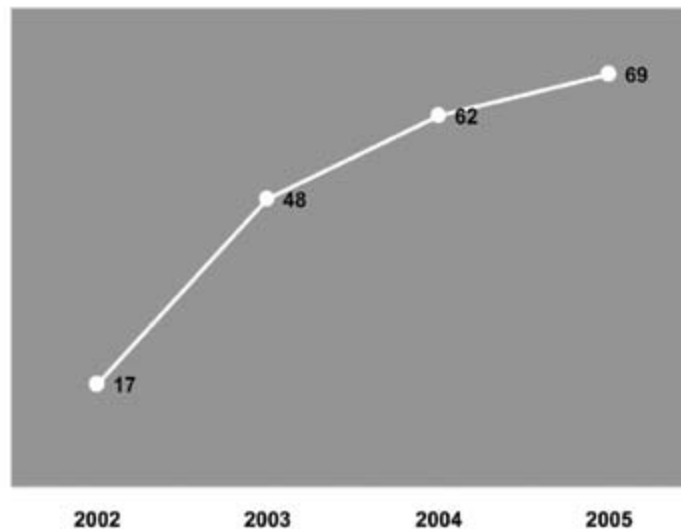
Year	1999	2000	2002	2003	2005	2006
% Share of NMT	3.98	2.8	4.87	6.06	8.87	6.06
% Change	-	-29.65	73.93	24.44	33.93	24.44
% Share of MT	96.02	97.2	95.13	93.94	95.13	93.94
%Change	-	1.23	-2.13	-1.25	-2.13	-1.25
Total	100	100	100	100	100	100
(Source: MBO)						

This trend, however, cannot provide a measured and accountable figure of the modal shift that transpired with the change in the traffic share between NMT and MT. Nevertheless, it shows that the streets are gradually used by NMT compared to when the bikeways project was not yet installed in the city.

### Road Accidents Involving Bicycles

Another issue related to transport management of the bikeways is accidents involving bicycles (see Figure 10). It can be observed that there was indeed an increase in the number of bicycle users. But the reported cases of bicycle accidents also show that the city government may have been a little deficient in its new role of protecting the cyclists. Most of the accidents happened in the major roads without bike lanes.

In the Marikina City Bikeways Feasibility Study in 2000, one of the intended impacts mentioned was the reduction of air pollution. However, ever since the bikeways system has been started, no actual assessment has been conducted to measure the supposed reduction in air pollution.



**Figure 10.** Number of bicycle-related accidents in Marikina City from the year 2002 to 2005  
(Source: Accomplishment Report for January-April 2006 of the Marikina Bikeways Program)

### *Air Quality Indicators*

In April 2006, in support to the celebration of the Philippine Environment Awareness Month, the City Government through the Bikeways Office conducted a Carless Day along the main thoroughfares of the city. This event was the first of its kind in the country. One activity in the event was the assessment of air quality. Through the assistance of the Department of Environment and Natural Resources (DENR), two air quality monitoring devices were installed. Table 11 shows the results of the monitoring.

In the Shoe Avenue station, the levels of TSP concentration before, during and after the Carless Day were fairly better than the ambient air quality standard of 230 micrograms/N.cu.m. It can be seen from this result that even on regular working days, air quality in Shoe Avenue is satisfactory. However, a significant drop was observed on the Carless Day itself, charting a three-fold difference in TSP concentration than regular days. The Bayan-Bayanan station recorded high concentration of TSP even on Carless Day. The three-day monitoring revealed very unhealthy levels of TSP concentration in the pollution index, well above the TSP standard for 24-hour exposure. It can thus be said that the Carless Day has little effect on the air quality of the Bayan-Bayanan area.



**Table 11.** TSP level before, after and during the Carless Day on Shoe Avenue Station

Sampling date	Time	Weather	
April 21-22	0930H-0930H	Sunny/Cloudy	167
April 24-25	0900H-0900H	Sunny/Cloudy	142
April 24*	0900H-1700H	Sunny	45
April 25-26	0930H-0930H	Sunny/Cloudy	153

(Source: Accomplishment Report for January-April 2006 of the Marikina Bikeways Program)

### Transport and Environment Management Context

The era of Marikina City's transformation started with a simple vision: to be an industry- and government-friendly, happy working class community. The simplicity of vision, though, took various forms: physical reconstruction, social reorientation and moral reformation. Strong governance from its executive officials resulted to a cultural change transcending the physical.

The city government began with the wider environmental challenge of "Saving the Marikina River" from the ecological death. River rehabilitation and riverside park development were carried out in 1993, which included the construction of 11 kilometers of jogging and bike lanes on the river easements. This move paved the way for the presentation of an alternative lifestyle for the city resident, especially long-time bikers.

Two complementary programs, "*Disiplina sa Bangketa*" and "Hassle-free Roadways," resulted to high-mobility pedestrianization within the business district. "*Disiplina sa Bangketa*," became the basis of the city's struggle to free its sidewalks from illegal vendors and other forms of obstructions. By October 1998, around 45 kilometers of new sidewalks have been constructed and 305 kilometers of existing sidewalks have been cleared. More important than the physical transformation is the social impact of this project. The clearing of sidewalks made people feel safer to use the streets. Before, the unavailability of sidewalk would oblige them to ride public transport even in short trips. Clear and well-managed sidewalks encourage them to walk instead. The liberation of sidewalks from general obstruction brought back a communal appeal for people who share the same sidewalk with others. The UP-NCTSFI Report (2003) referred to this effect as the instigation of more sense of community.

On the other hand, "Hassle-free Roadways" became a veritable demonstration that traffic congestion in an urban setting can be managed (UP-NCTSFI, 2003). The project imparted the strict enforcement of traffic and parking regulations, which was supported by the establishment of parking areas, upgrading of traffic signs and the opening of new access roads to decongest main thoroughfares. The self-policing policy was encouraged and self-discipline paid high dividends for the city and its people (UP-NCTSFI, 2003).

With these many in the city landscape, Marikina City adopted a new vision to "Be a Little Singapore" in 2001. In the same year, the city instituted the Marikina Bicycle network, which further strengthened the City's image as an environmentally-sustainable transport advocate.

## Specific Programs and Initiatives

### *Promotion of Non-Motorized Transport (NMT) through the Marikina Bikeways Project*

Marikina City jumpstarted the promotion of the NMT in the Philippines through the use of bicycles. As early as 1992, government officials began the city's physical reform and social reorientation. Physical reforms in Marikina involved the sidewalk clearing operation and improvement of public places. Through these changes, the city was chosen for the implementation of a pilot project aimed to promote the NMT component of the Metro Manila Urban Transport Integration Project (MMURTRIP) in 1997.

The NMT component included the construction of a 66-kilometer bikeways network aimed to reduce air pollution and traffic congestion problems. Because of the focused dedication and effective management of the city administrators and officials, the World Bank Global Environment Facility (WB-GEF) offered a grant amounting to US\$ 1.3 M to finance 19 kilometers of the Marikina City Bikeways.

Marikina City was an ideal site to establish the pilot project as the city's transport congestion has not yet reached intolerable levels. In 1999, about 10,500 daily trips (2.9% of all trips) were still made through bicycle in Marikina. Approximately 160,200 trips were made through bicycle in Metro Manila at that time. However, under the baseline or "business-as-usual" scenario, increased motorized traffic in Marikina would possibly reduce the safety of bicycle travel and the use of bicycles to the lower level just like with the rest of Metro Manila.

The NMT system or the bikeways system consisted of the following components:

- 49.7 kilometers of segregated bikeways on existing roads and 16.6 km of bikeways along the Marikina river connecting to the Light Rail Transit station;
- traffic slowing and pedestrian facilities around schools and market areas;
- lighting to ensure safety;
- bicycle parking facilities at key interchanges;
- public awareness campaign;
- bicycle safety program; and
- rigorous monitoring and evaluation program and major dissemination effort.

Presently, the bikeway network connects residential communities with schools, employment centers, the LRT station and other public transport terminals. Parking facilities will be created. The connections with the public transport terminals will promote the use of both NMT and LRT for trips between Marikina and the rest of the metropolitan area, thus reinforcing the modal shift away from cars.

Although a feasibility study and a network design study have been prepared for the bikeways project when it commenced, there was a problem in acceptance from the city engineering group and the city council in designating certain roads as bikeways. This was due to the perceived constraints that the new facility will bear on the city's narrow roads. It was feared that it will lead to limited road parking spaces and reduced road capacity for motorized traffic. The Marikina Bikeways network construction was gradually implemented adopting an "experimental approach" wherein the city engineers deployed what was only workable and acclimatized them to inevitable specificities. The intent was to allow opportunity of evaluation and adjustment in the course of the bikeway construction.

The project followed three major components and its sub-components:

#### *Component 1: Allocation and delineation of bikeways in suitable existing roads*

- Delineation and marking of bikeways in existing roads
- Upgrading of road condition through repairs and scarifying of road pavement surface for asphalt topping in the designated bikeways



- Putting up signages, markers and lane barriers in critical areas to protect bikers
- Identification of suitable roads for widening to accommodate bikeways
- Widening of roads through construction (land grading, compaction and laying out of concrete pavement and drainage improvement)

**Component 2: Identification and construction of parking facilities for bicycles**

- Identification of suitable parking spaces
- Requesting private landowners and establishment to provide small parking area for bicycles. An ordinance may be passed by the City of Marikina requiring commercial, industrial and institutional establishments to allot parking space for bicycles
- Putting up bicycle racks and parking sheds

**Component 3: Upgrading of existing riverside bike lanes and their extension through construction of new bike lanes to cover the entire stretch of both riversides**

- Rehabilitation of dilapidated segments of existing jogging/bike lanes through laying out of new pavement and rip rapping of riverbanks frequently eroded
- Construction of new bike lanes through land grading, concreting, drainage improvement and bank stabilization through engineering means
- Construction of hazard protection barriers (e.g., chain links, fence) in critical stretches
- Planting of shade trees in riverside

**Marikina City Bikeways Office**

The City government created an office to manage and supervise the bikeways system. It was called the Marikina City Bikeways Office (MCBO) and it was placed under the City Planning and Development Office and the Office of the City Engineer. The office was designated to develop the plan for the city's bike lanes project and supervise its construction and maintenance in coordination with the City Engineering Office (CEO) and World Bank. It was also responsible for the provision of safe and strategic parking facilities, road signage and maps and planting of trees in designated areas of the bikeways network. During its operation, the MCBO forged partnerships with local and foreign organizations to facilitate easy access to bicycles for local residents. As advocates of EST, the MCBO staff also conducted a series of Bicycle Education & Safety Clinics for the youth and other activities that promote NMT lifestyles.

Strong support from the executive and legislative branches of the city government strengthened the MCBO. For instance, to assist the MCBO in imparting and sustaining the advocacy, the city government included in the traffic management codes the rules and regulations of NMT. The city government also constructed a cycling track at the city's main sports park to support cycling enthusiasts and encourage others to get into this sport. The city government also administered a Bicycle Loan Project that gives city employees and students an opportunity to own a bike through an interest-free bike loan payable within 6 to 12 months. The city government handed over 150 mountain bikes to its Bantay Bayan volunteers.

The Marikina Bikeways Office was dissolved in December 2007 when the World Bank assistance ended. Most of the MCBO personnel were distributed to different sections of the city hall. The bikeways infrastructures were put under the custody of the City Transportation Management and Development Office (CTMDO). Currently, there is no separate bikeways office under the CTMDO. The bikeways program is introduced under the NMT. Several NMT ordinances have already been implemented to support the sustainable existence of the bikeways.

At the moment, the CTMDO, being more of an implementing and law-enforcing agency than planning, has yet to come up with plans on how to further sustain the bikeways project. Certainly, the CTMDO will continue to advocate NMT and EST, but they lack the necessary tools and technical knowledge on such



matters. Currently, the CTMDO is contemplating on advancing EST principles by developing mass public transit for the city.

With the dissolution of the MCBO, the advocacies and activities of the said project have been integrated to different offices in the city. For instance, the bikeways infrastructure has been included under the tourism office. Private groups and entities sometimes avail of a promotional package of the bikeways which includes a tour and a biking try-out in the city.

### **Successes Achieved**

The widespread physical transformation of Marikina's sidewalks has left not only an orderly city with a strong sense of community. This transformation has also paved the way for the advent of many lifestyle changes among its citizens, particularly in the way people move within the city. Highly-focused management, coupled with strong political will from the executives of the city through time has made many projects successful.

#### ***Sidewalk Clearing***

The project "Disiplina sa Bangketa," has liberated 90% of its 600-kilometer sidewalks for public use. In a sense, this project has renewed the city at the most critical time of its growth, shortly before becoming a highly industrialized city in mid-1990s. Consequently, the project also directed the future growth and expansion of the city by ensuring a walkable environment to subsequent infrastructure developments. The project infused the culture of walking as a form of transport among city dwellers by maintaining a safe and well-connected network of sidewalks in the business district.

"Hassle-free Roadways" has prevented imminent traffic problems through the strict enforcement of traffic and parking regulations, provision of parking areas upgrading of traffic signs and the opening of new access roads to decongest main thoroughfares. The self-policing policy was encouraged and, once again, self-discipline paid high dividends for the city and its people. There is now a marked discipline and order in the streets — the sidewalks are safe and clean and the vehicular traffic is now gentle on the nerve." (UP-NCTSFI, 2003)

#### ***Marikina Bikeways***

The success of the first two projects proceeded concomitantly with the success of the Marikina Bikeways Program. Marikina's recent Bicycle Ownership Survey showed that 55% of families in Marikina owned or has access to a bicycle, majority of which uses the bike in going to work. Although the percentage of modal shift from motorized transport to non-motorized mode in Marikina is yet to be known, the city government has been successful in installing the necessary facilities to sustain the culture and growth of NMT in the years to come.

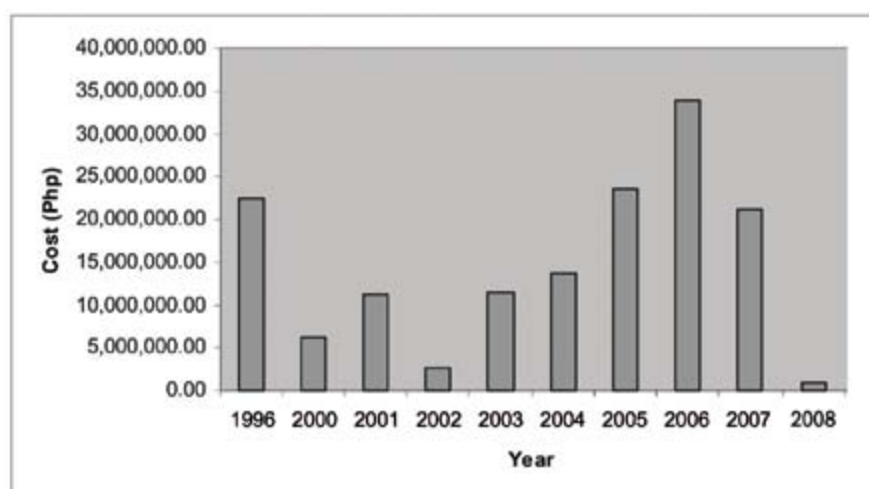
As of 2008, the city has already constructed 52 kilometers of bikeways. The bikeways network offers a direct and safe connection from residential areas to major transport terminals, markets, schools, employment centers and commercial and industrial establishments. Early this year, the city government has opened a bikeway between the established city network to the new LRT station in Santolan. Through the provision of bike parking facilities, it makes it possible for people to conveniently use the mass transit through biking from their homes.

Figure 11 shows the annual cost of the constructed bike lanes in Marikina City. A 12.2 kilometer bikeway was constructed in 1996 along the west and east sides of the Marikina River. In the late 1990s until 2001, 20,734.36 meters of bikeways were constructed through funding support by the local government amounting to PhP 39,898,318.94. But even during the full implementation of the WB-GEF project, the government has continually funded the construction of the bike lanes (Table 11). As a matter of fact, the city government has spent a total of PhP 82.9 million (56.45% of the total cost) in the construction of the

bikeways as of 2008. The budget for the bikeways construction was appropriated in the general construction/repair and maintenance of roads and drainages and land expropriation.

Figure 11 shows that the bikeways were heavily constructed between the years 2005 to 2007. 53.4% of the total expenditures in the construction of the 52 kilometers of bikeways were spent on these years alone. These were also the years when most of the funding for the construction of the bikeways came from the WB-GEF grant. Figure 12 shows the location of the yearly construction of the bikeways system from 1996 to 2007.

In recognition of the city's efforts, the Marikina Bikeways Project was Awarded by the Gawad Galing Pook as an "Outstanding Program in Local Governance" in 2005. In addition, the World Bank has also cited Marikina as one of the four Model Cities in the World during its Annual Bank Conference on Development Economics in June 2006 in Tokyo.



**Figure 11.** Cost of constructed bikeways from 1996 to 2008  
(Source: MBO)

Year Completed	Length (m)	Marikina Fund (Php)	WB-GEF Fund (Php)	Share (%) City Govt.	Share (%) WB-GEF	Total Cost (Php)
1996	12,200.00	22,432,440.76	-	100	-	22,432,440.76
2000	2,566.80	6,242,793.13	-	100	-	6,242,793.13
2001	5,967.56	11,223,085.05	-	100	-	11,223,085.05
2002	472.50	-	2,634,124.44	-	100	2,634,124.44
2003	3,209.33	11,454,456.78	-	100	-	11,454,456.78
2004	2,779.76	4,383,220.21	9,195,391.60	32.28	67.72	13,578,611.81
2005	4,295.22	9,241,463.82	14,266,327.65	39.31	60.69	23,507,791.47
2006	4,866.34	7,890,670.56	25,868,958.77	23.37	76.63	33,759,629.33
2007	15,223.13	9,094,355.95	11,949,052.22	43.22	56.78	21,043,408.17
2008	57.50	892,480.30	-	100	-	892,480.30
<b>TOTAL</b>	<b>51,638.44</b>	<b>82,854,966.56</b>	<b>63,913,854.68</b>	<b>56.45</b>	<b>43.55</b>	<b>146,768,821.24</b>



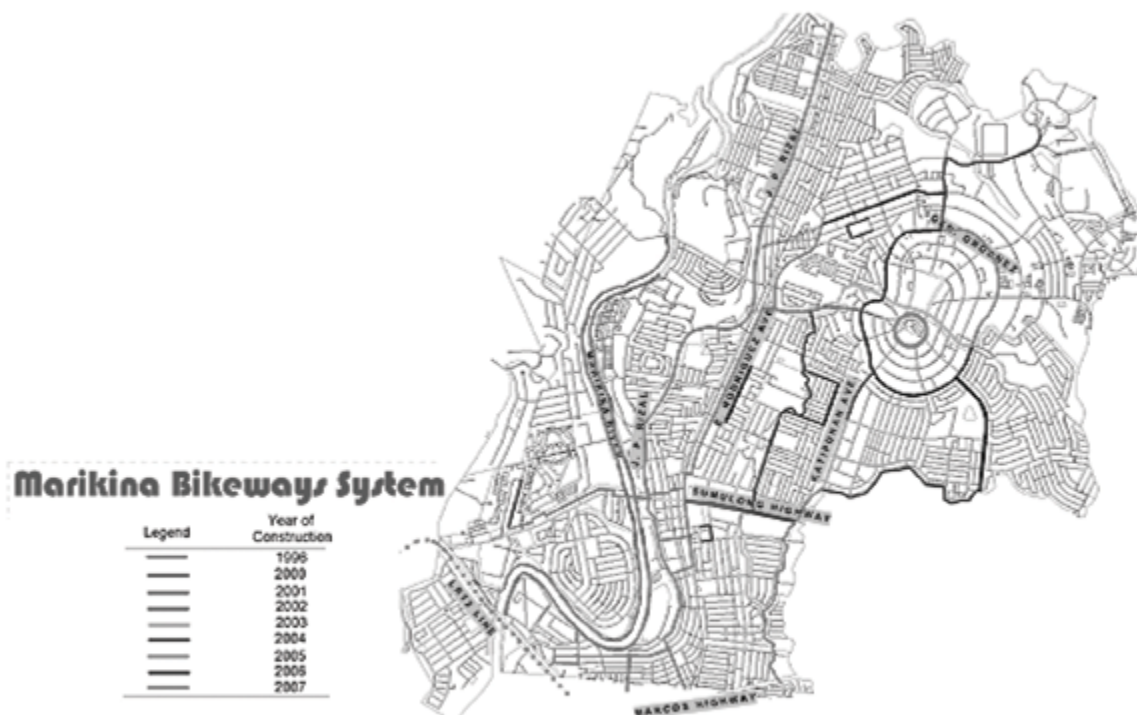


Figure 12. Location of the constructed bikeways from 1996 to 2007 in Marikina City

### Lessons Learned

A strong political will from the executive officers of Marikina City became the steering force in the management and implementation of the successful projects in the city. A post-evaluative study of Bayani Fernando's style of management, revealed that his strong political will was also "marked by an unusual decisiveness and determination supported by vision, good ideas, sound information, a patience for persuading and acculturating the public and the bureaucracy and a penchant for the organizational as well as technical details of implementation." (UP-NCTSFI, 2003)

Another factor for the smooth conduct of many projects was the independence of the city government from higher authorities. This has been shown by the enactment of local codes, referred to as "landmark legislation" on crucial local issues, even when corresponding national codes existed to use the often untapped or underutilized powers of the LGUs (UP-NCTSFI, 2003).

In the installation of the Bikeways Project, a comprehensive preparation of the city was initiated not just physically, but as well as culturally and socially. The preparation for the eventual construction of the Marikina Bikeways has tackled many obstacles and resistance.

Education and information campaign on all echelons of the society can be an effective means of bringing social acceptance. Participative activities like "Marikina City Carless Day," "Bicycle Camp" and "Cycling Festival," to name a few, can also be used as social marketing tools with wider scope of effects. It is also worthy to note the importance of instituting a working committee, in this case the Marikina Bikeways Office, whose exclusive responsibility was to run and man the project to generate its intended benefits.

The success of the project can be based solely on the adaptive rate of the people upon the inoculation of an alternative and its sustainability. On the first aspect, the city has not accounted the rate of shift from motorized to non-motorized mode, but relied only on traffic count survey. While it is observable that a considerable percentage of traffic has been using bicycles, this can not translate to an effective rate of modal shift, much so with the recent proliferation of registered motorcycles in the city. What can be said



presently is that the city, with its 52 kilometers of existing bikeways network, has installed sufficient facilities to cater to the NMT traffic in the years to come. However, with the increasing motorized traffic that is not properly regulated, the intended space for NMT may lessen in the years to come.

### *Future Directions*

With the dissolution of the Marikina Bikeways Office (MBO), the bikeways program is being integrated under the City Transportation Management and Development Office (CTMDO), which is vested with the powers to manage, supervise, execute, enforce and implement all national and local laws, rules and regulations governing the operations/activities of all motorized and non-motorized vehicles within the city.

Although such integration is an indication that the city is determined in pursuing NMT, the CTMDO currently lacks the necessary tools and technical knowledge on matters involving the bikeways system. Most personnel of the MBO were distributed to different sections of the city hall except the CTMDO. To sustain the gains of the MBO, personnel of the CTMDO should be trained on the technical skills required by the job.

Another way of sustaining NMT even with the termination of the WB-GEF funding is through creation of NMT policies. There have been several municipal ordinances which support the bikeways program in the past and the full and strict implementation of these ordinances should maintain the NMT culture even with the change in city leadership. The legislation of the Bicycle Code of Marikina should then be pursued.

Currently, thorough education and information campaign pertaining to bicycle use is being planned out by the CTMDO. There are still some people who perceive the bikeways as restrictions on the road rather than an environmentally-sustainable form of transportation. The growing number of motorcycles in the city should also prompt the city government to create measures of control before the numbers reach an intolerable level that could threaten the biking culture.

Furthermore, the city government, out of its own initiative should continuously share the Marikina Bikeways experience to internal communities and other local government units through conferences and that NMT advocacies may spread and generate ideas for replication in other parts of the country.

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# Cagayan de Oro City:

## REVIVAL OF THE CITY CENTER



### Background

Cagayan de Oro City is the capital city of the province of Misamis Oriental. It has a total land area of 48,885 hectares. It is located along the central coast of Northern Mindanao. It is bordered in the south by Bukidnon Province, the food basket of Mindanao, in the west by the Municipality of Opol, Misamis Oriental, and to the east by Tagoloan, Misamis Oriental. It is connected to Iligan City, touted to be the Industrial Center of the South, through the 187-kilometer Cagayan-Iligan Corridor (CIC).

### Socio-Demographic Profile of Citizens

According to the 2000 census, there are 470,000 individuals in 200,000 households in the city. 44% of the population is composed of young people aged 0-17 years. It is ranked 9<sup>th</sup> most populous city in the country with an average population growth rate of 4.45%, much higher than the regional average of 2.32%. An estimated 94% of the population resides in urban *barangays*.

Forty-four percent (44%) of the population in the City classify themselves as Bisaya, 22.15% Cebuano, 4.38% Boholano, and 28.07% as other ethnic groups. The city's major languages are Cebuano/Visayan, English and Tagalog. Cebuano and Visayan are the main dialects used in everyday transactions. Literacy rate is pegged at 98.74%, much higher than the regional average of 85%.

Although the presence of women in the workforce has increased from 40.94% in 1990 to 45% in 1995, men still dominate the workforce at 55%. The Cagayan de Oro City Comprehensive Land Use Plan



for 2000-2010 (CLUP 2000) estimates a 30,000-strong workforce available in the City. Its manpower is considered by the City as one of its major strengths. Figure 13 shows the population of the city from 1970 to 2000.

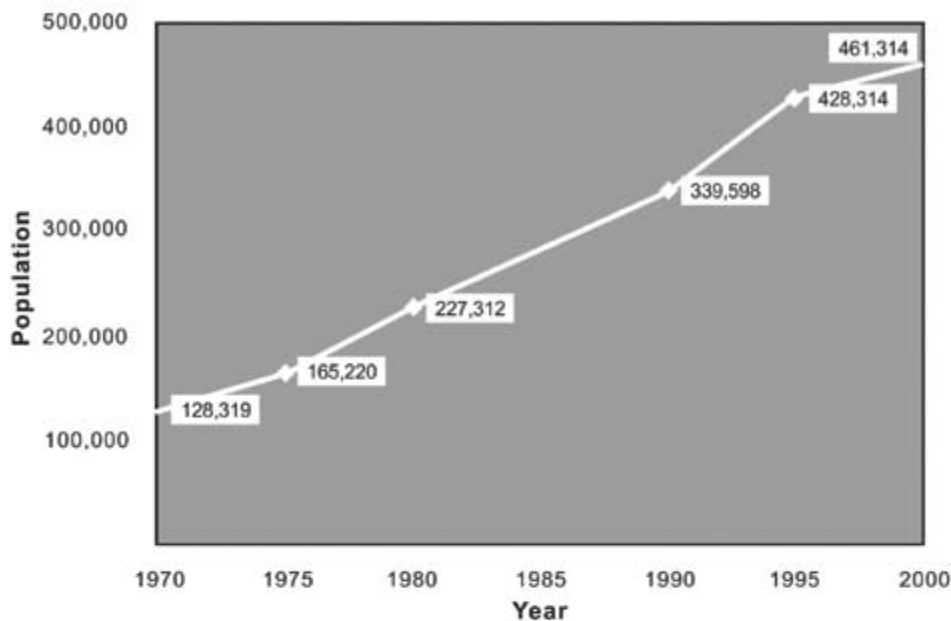


Figure 13. Population of Cagayan de Oro City, 1970-2000

### Development Challenges

The vision of Cagayan de Oro City as stated in CLUP 2000 is to become *“A peaceful, orderly, livable city with a modern trading and services center where there are equal opportunities for its disciplined citizens to develop and prosper in a clean and healthy environment”* by 2010.

Cagayan de Oro City is strategically located between two major corridors in Northern Mindanao connecting major growth areas. These are the Iligan-Cagayan-Butuan Highway and the Bukidnon-Davao Highway. As such, it serves as a transshipment point as well as an agro-industrial and trading center. The CIC Master Plan of 1991 as stated in the CLUP 2000 envisions that through the development of the CIC, Cagayan de Oro will serve as the service center that will support and complement the development of the other towns and cities of Northern Mindanao.

The city's development potential is heightened by the fact that Northern Mindanao is a principal stakeholder of the North Coast Economic Growth Cluster of Mindanao. It has two Area Development Zones (ADZs): the CIC and the Panguil Bay-Mt. Malindang ADZ.

One of the challenges for transport development in Cagayan de Oro is the presence of seven rivers, with Cagayan de Oro River being the main tributary cutting through it. As such, the role in trade of transport infrastructures like bridges is very important. The number of registered motor vehicles increased by 67% between 1990 and 1998 and resulted to the inadequacy of the existing road system and the two bridges (Kagay-an and Maharlika) to handle traffic.

Another problem identified by local stakeholders is the narrow roads with mostly asphalt pavement or overlay in the city central area. These roads also have heavily built-up sections alongside the existing road network. Inadequate parking spaces and encroachment of sidewalk vendors in the central business

district (CBD) also reduce the capacity of the existing road system. Consequently, it also degrades the appearance of the city as a trade and services center. In some areas, transportation infrastructure development is delayed due to conflicts in road right-of-way (ROW).

### Key Transport and Environment Issues

#### Transport

Based on the concerns articulated by the stakeholders during the Environmentally Sustainable Transport (EST) Conference in Cagayan de Oro City, transport problems in the City are caused by the following:

- Rapid increase of vehicles plying the city (PUVs/Private)

**Table 13.** Comparison of Vehicle Registration in Cagayan de O between Years 1998 and 2006

Type of Vehicle	Year		
	1998	2006	
<b>Cars</b>	6,209	5,765	-7.15
<b>UV</b>	13,136	14,883	13.30
<b>SUV</b>	-	1,618	na
<b>Trucks</b>	3,136	3,397	8.32
<b>Buses</b>	1,152	435	-62.24
<b>MC</b>	9,301	12,334	32.61
<b>Trailers</b>	284	121	-57.39
<b>Total</b>	33,218	38,553	16.06

- Narrow roads with poor pavement conditions

Cagayan de Oro City's existing road system is constricted by built-up areas in most areas. As of 1999, 83.32% of the city roads are unpaved. National roads passing through the City, which runs for 81.181 kilometers, are only 89.69% paved.

**Table 14.** City Roads by Category (1999)

Road Category	Length (in kilometer)	Percentage (%)
1.) Concrete	102.589	27.08
2.) Asphalt	27.529	7.26
3.) Gravel	239.866	83.32
4.) Earth	8.802	2.32
<b>Total</b>	<b>378.786</b>	<b>100.00</b>

Table 15. National Roads within Cagayan de Oro City (1999)

Road Category	Length (in kilometer)	Percentage (%)
1.) Concrete	39.636	48.82
2.) Asphalt	33.181	40.87
3.) Gravel	8.371	10.31
Total	81.185	100.00

- Limited physical connection between East and West districts

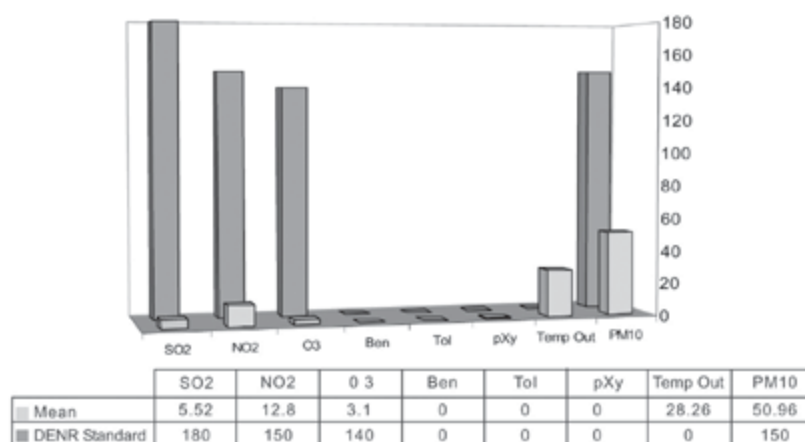
One of the main causes of traffic congestion in the City was the lack of bridges. For a long time there were only two bridges connecting the east and west districts: the Kagay-an Bridge in Carmen and Maharlika Bridge along the National Highway.

- Number of PUVs exceeds the demand for available passengers
- Presence of unauthorized/illegal terminals and stalled vehicles along restricted streets
- Presence of vendors and stockpiles in the street and alleys/walk-ways/shoulder of the road and in front of establishments
- Presence of out-of-line and off-route PUJs, *motorelas* (motorcycles with side cars) and *tricycad* (bicycles with side cars)
- Duplicated lines or service routes of *motorelas*
- Lack of traffic lights, traffic signs and road/street markings/directional signs in some parts
- Lack of discipline and education among drivers, motorists, conductors, riding public and pedestrians as manifested in indiscriminate loading and unloading.

### Environment

According to the data collected by the Department of Environment and Natural Resources-Environmental Management Bureau (DENR-EMB) in cooperation with Xavier University, Cagayan de Oro's Total Suspended Particles (TSP) exceeded the standard set by the DENR. This was observed in the monitoring station located near the transport terminal in Agora Market in Lapasan. It was also monitored that SO<sub>2</sub> concentration was within the standard. The environmental condition, specifically air quality, is considered to be generally good. Figure 14 shows the concentrations of air pollutants.





**Figure 14.** Inventory of Air Pollutants in the City

## Transport and Environment Management Context

The local government of Cagayan de Oro City acknowledges the importance of an efficient traffic management in economic development. It created the Roads and Traffic Administration through Ordinance No. 6535-98. It has also diligently prepared a comprehensive land use plan for 2000-2010. It is set to revise the aforementioned plan by 2008. Before the CLUP, physical framework plans were used to guide transportation infrastructure development. However, it was also very dependent on foreign funding. Thus, it can be surmised that the management context of the city is a combination of conscious planning in the part of the local government unit and availability of grants. Projects with foreign funding are implemented faster.

### Specific Programs and Initiatives

To address urban transportation issues, the following programs and initiatives are being pursued by the local government unit:

#### *Land Use Strategy to Decongest the CBD*

Based on the 2000 Comprehensive Land Use Plan, apart from the Central Business District (CBD), there are also four secondary urban growth centers envisioned to support the vision of Cagayan de Oro City as a trade and services center. One is the western urban expansion area located in Barangays Bulua and Bayabas covering 220 hectares. It serves as one of the main loading points for goods, people and transport movements to and from the Western part of Mindanao, including Iligan City. To be developed in the area are the Intergrated Bus and Jeepney Terminal and a 100-hectare commercial complex to decongest the CBD. Another is the West-Uptown Urban Expansion Area located in Barangays Carmen and Canitoan near the Lumbia Airport. This area is to be developed into a low density residential and business area. To date, there are two major developments in the area, the Pueblo de Oro Township, a golf course cum residential development, and Xavier Estate. Third is the East-Uptown Urban Expansion Area comprised of Barangays Camaman-an and Indahag. It will be the site of the proposed 100-hectare high-end residential area to be developed by Fil Estate Development. Last is the Eastern Urban Growth Area comprised of Barangays Agusan, Puerto and Bugo. This is the regional industrial center adjoining the eastern portion of the city. Nestle Philippines, Pepsi Bottling Company, Legaspi Oil, Del Monte Philippines, Inc. and Vitarich are located in this area. About 15% of the population of the City resides in this area and it constitutes the labor force for the aforementioned companies. To facilitate development, the International Containerized Port Terminal will be constructed. This area is linked to other major cities in Mindanao such as of Davao and Butuan.

### *Terminal Development*

In line with the identified urban growth areas, terminals have also been strategically positioned to handle inter-city traffic. The West Bound Integrated Terminal located in Barangay Bulua handles traffic from Iligan City and other urban growth centers in Western Mindanao. The East Bound Integrated Terminal in Barangay Gusa handles traffic from nearby municipalities and the cities of Davao and Butuan.

### *Revitalization of the Divisoria Area*

Mayor Constantino Jaraula signed Executive Order 2007 CGJ 018 ordering, among others, the clearing of the sidewalks along Gen. Capistrano Street leading to St. Augustine Metropolitan Cathedral and around Gaston Park. This initiative has revitalized Divisoria, the traditional CBD where most businesses and financing institutions are concentrated. The City also started the practice of closing the roads in this area during Friday nights for the Night Café where the citizens of the City join in a night of food and music. According to discussions with the City Planning and Development Office, it is envisioned that the Divisoria area will become a pedestrian-friendly area in the future.

The City is serious in its intent to create a pedestrian-friendly environment. Part of its plan is the construction of the Golden Mile connecting the City Hall area to Divisoria and onwards.

### *Professionalization of the Road Traffic Administration (RTA)*

The Road Traffic Administration (RTA) was created through Codified Ordinance No. 4373-94 as the Traffic Management and Enforcement Bureau (TMEB). The ordinance provides that TMEB is to be supported by a Traffic Management Board (TMB) which includes the Land Transportation Office (LTO) Regional Director, Philippine National Police City Director and Land Transportation Franchising Regulatory Board (LTFRB) Director. Although the functions of TMEB were identified, there were no complimentary positions created. The subsequent Ordinance No. 6535-98 renaming TMEB to Roads and Traffic Administration (RTA) likewise did not have provisions for positions.

This oversight was addressed by Ordinance No. 8019-2002 which created the organizational chart of the RTA. However, there are still no permanent positions existing for the RTA to date. All employees are either from other units of the local government offices detailed to RTA or contractual workers. The proposal by the current head of RTA is to professionalize the organization in line with its operational and administrative systems. There are two components of the proposal: 1) organizational transformation which would entail the establishment of standards for recruitment, promotion and salary; and 2) operational transformation, including a system for recruiting volunteers to augment RTA workforce at lower cost to the government and setting up of an environmental-friendly traffic system.

### *RTA Comprehensive Traffic System Program*

One of the programs of the RTA is the Comprehensive Traffic System Program, which hopes to address transport woes through the use of education and enforcement. Strategies under this program include dismantling of illegal terminals, removal of stalled vehicles, towing of illegally parked vehicles, sidewalk clearing, apprehension of out-of-line public transport modes, removal of barkers and smokers and education and discipline of drivers, commuters, and pedestrians.

### *River taxi*

Taking advantage of the fact that the main tributary of the Cagayan de Oro River passes through the heart of the City, the local government unit intends to open a river taxi along the rivers banks that separate the city's east and west districts. This is in coordination with the general aim of decentralizing the transportation haywire that begets the city proper.



**Bridge Development**

Because of the City's topography, bridge development is of paramount importance. There are now three new bridges connecting the east and west parts of the city: Ysalina Bridge, Kauswagan Bridge, and South Diversion-Pelaez Bridge. This brings to five the total number of bridges servicing the City.

**Successes Achieved**

The relocation of bus terminals to outside the Central Business District resulted to a decrease in the number of buses when the west and east integrated terminals were constructed and operated.

Moreover, the program of revitalizing the Central Business District (Divisoria) through the clearing of sidewalks and the Night Café increased urban amenities and private sector participation. The local government officials have noticed the eagerness of the private sector to participate and contribute to the re-development of the area.

**Lessons Learned**

The terminal system has shown relative success and the following issues still needs to be resolved:

- Although the infrastructure is now in place, there are still operational concerns that must be addressed such as the presence of barkers and undisciplined drivers and operators
- Government subsidy for the project
- Sanitation in the area
- Choice of a strategic location

**Future directions**

There are several best practices in the city under consideration. These are:

- Construction of Integrated Terminals at the main entry points to the city to handle inter-city traffic movement
- Institutionalization of the Roads and Traffic Administration
- Openness of the local government unit and the universities to cooperate with one another, bringing the possibility of a research-based planning

To enhance the successes achieved, the challenges for Cagayan de Oro are:

- To develop a clear integrated plan for the city which would include transport infrastructure as well as soft mobility measures
- Continue the strong political will of the government
- Elicit strong support from the civil society and private sector
- Training of manpower to strengthen capability to pursue programs geared towards promoting EST

**References**


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An aerial photograph of a dense urban area, likely in Asia, showing multi-story buildings and a busy street with various vehicles including cars, trucks, and a bus. The image is overlaid with a semi-transparent blue filter.

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