E4178 v2

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

Environmental Impact Assessment of Cebu Bus Rapid Transit Project

FINAL REPORT

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ABBREVIATIONS

$\mu g/m^3$	Microgram per cubic meter
AM	Amplitude Modulation
ATCS	Area Traffic Control System
AUV	Asian Utility vehicle
BP	Batas Pambansa
BPH	Buses Per Hour
BRT	Bus Rapid Transit
CA	Commonwealth Act
CAI-Asia	Clean Air Initiative for Asian Cities
CATV	Cable Television
CBD	Central Business District
CBRT	Cebu Bus Rapid Transit
CCENRO	Cebu City Environment and Natural Resources Office
CCF	Cebu City Forestry
CCG	Cebu City Government
BRT-PIU	Bus Rapid Transit- Project Implementation Unit
CCPL	Central Cebu Protected Landscape
CCMC	Cebu City Medical Center
CEBECO	Cebu Electric Cooperative, Incorporated
CH4	Methane
CIT	Cebu Institute of Technology
CITP	Cebu IT Park
CITOM	City Traffic Operations Management
CLUP	Comprehensive Land Use Plan
CMTS	Cellular Mobile Telephone Service
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	CO2 equivalent
COHb	Carboxyhemoglobin
CPPC-EAUC	Cebu Private Power Corporation-East Asia Utilities Corporation
CSR	Corporate Social Responsibility
dB	decibel
DENR	Department of Environment and Natural Resources
DENR-EMB	Department of Environment and Natural Resources-Environmental Management Bureau
DFO	District Forestry Office
DFR	Design For Reliability
DOTC	Department of Transportation and Communication
National BRT-PMO	National Bus Rapid Trasit - Project Management Office
DPWH	Department of Public Works and Highways
EA	Environmental Assessment
ECA	Environmentally Critical Areas
ECC	Environmental Compliance Certificate
ECPs	Environmentally Critical Projects
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
ESC	Environment and Safety Committee
ESOs	Environment and Social Officers
ESS	Environment and Safety Specialists
ESSU	Environmental and Social Safeguard Unit
Et al	And others
Etc.	And other things/ and the rest
FM	Frequency Modulation
FMB	Forest Management Bureau

FS	Feasibility Study
GHG	Green House Gas
GIS	Geographic Information Systems
GOP	Government of the Philippines
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
g/km	Gram per kilometer
HIS	Household Interview Survey
HIV-AIDS	Human immunodeficiency Virus infection-Acquired Immunodeficiency Syndrome
HLURB	Housing and Land Use Regulatory Board
i.e.	That is
IT	Information Technology
ITP	Integrated Transport Planning, Limited
ITS	Intelligent Transportation Systems
IVE	International Vehicle Emissions
JDCECC	Joint DOTC and CCG Environmental Complaints Committee
LGU	Local Government Unit
MCWD	Metro Cebu Water District
MECO	Mactan Electric Company
MW	Megawatt
NAAQGV	National Ambient Air Quality Guideline Values of Philippines
NGOs	Non-Government Organizations
NM	National Museum
N2O	Nitrous Oxide
NOx	Nitrogen Oxide
NPCC	National Pollution Control Commission
OD Survey	Origin Destination Survey
OP	Operational Policy
PC	Public Consultation
PCR	Physical Cultural Resources
PD	Presidential Decree
PEISS	Philippine Environmental Impact Statement System
PLA	Philippines Labor Act
PM	Particulate Matter
PME	Powered Mechanical Equipment
PMO	Project Management Office
PMU	Project Management Unit
PPE	Personal Protective Equipment
ppm	Parts per million
PUJ	Public Utility Jeepneys
PVR	Peak Vehicle Requirement
PWD	People With Disability
RA	Republic Act
ROW	Right-Of-Way
SIA	Social Impact Assessment
SMP	Social Management Plan
SPAR	Social and Poverty Assessment Report
SPC	Special Purposes Committee
SPO	Special Purposes Organization
SRs	Sensitive Receivers
SRP	South Road Properties
SUV	Sport Utility Vehicle
TOR	Terms Of Reference
TSCs	Technical Support Consultants
TSP	total suspended particulates
UN ECE	United Nations Economic Commission for Europe
USD	United States Dollar

USJR	University of San Jose Recoletos
VECO	Visayan Electric Company
veh/hr.	Vehicle per hour
VOC	Volatile Organic Compound
WB	World Bank
WHO	World Health Organization

1.0 EXECUTIVE SUMMARY

1. An environmental assessment was made for the proposed Cebu Bus Rapid Transit (BRT) Project of the Department of Transportation and Communications (DOTC) and the Cebu City Government (CCG). The Cebu BRT project would be the first BRT in the Philippines. The Environmental Impact Assessment was carried in accordance with pertinent WB's Safeguards Policy, OP 4.01on Environmental Assessment and OP 4.12 on Involuntary Resettlement in particular.

2. The environmental and social assessments for the Project have successfully identified potential positive and adverse environmental impacts. The adverse environmental and social impacts are addressed through the formulation of an environmental management guidelines, social management plan, and resettlement action plan. The environmental management guidelines will be incorporated in the terms of reference for the detailed engineering design consultants to ensure that environmental management plans are prepared as part of the detailed engineering design. Positive impacts are expected to provide significant improvements on traffic conditions, vehicular emissions, public health, greenhouse gas emissions, travel time and economic productivity.

Policy, Legal and Administrative Framework

3. The assessment was carried out within the policy, legal, and administrative frameworks relevant to the environmental assessment of transport-related projects in the Republic of the Philippines.

4. Under the Philippines' environmental framework, the following laws and regulations are considered: (i) PD 1586 - Establishing the Philippine Environmental Impact Statement System, (ii) Republic Act No.9275 - Philippine Clean Water Act of 2004, (iii) RA 6969 -Toxic substances & Hazardous & Nuclear Waste Control Act of 1990, (iv) RA 8749 - Philippine Clean Air Act of 1999, and (v) RA 9003 - Act Providing for an Ecological Solid Waste Management Program. The Project when implemented should be able to comply with pertinent provisions of these national environment laws which govern the management of solid waste, water quality, air quality and hazardous wastes.

5. The social framework considers all policies that govern all aspects of land acquisition, compensation and resettlement with emphasis on key legal and administrative instruments most relevant to involuntary resettlement that are currently enforce locally.

6. Under administrative policy, DOTC is the national government office that is constitutionally tasked to provide road-based public transport including the responsible of carrying out planning, regulation, investment, and implementation of BRT Project. In the overall institutional framework plan, DOTC is the executing agency while CCG is the implementing agency.

Project Description

7. *Project Background.* Cebu City has a land area of 326 km^2 with 2010 population of about 866,171 and population density of 2,657 persons per km^2. About 66 percent of the total city population is concentrated within 15 percent of land area. The number of vehicle registrations in Cebu City has displayed an annual growth rate of seven percent for the period 1994 to 2000 and four percent for the period 2000 to 2006. Cebu City is now experiencing an increased rate of person-trips due to rapid population growth and urbanization.

8. The average travel speed for major corridors is around 10km/h indicating severe congestion for most times of the day. The PUJ network is struggling to keep pace with the changing nature of demand. Population growth has increased the demand for travel and will do more so in the future. In parallel the car has become a viable mode of transport for a greater proportion of the population. Cebu City for now are faced with the following issues on public transportation:

- Too many PUJs/vehicles with no new infrastructure improvements in the City
- Uncontrolled/ unlimited issuance of franchises for PUJs
- Slow travel times
- Undisciplined drivers and pedestrians on the streets
- Large scale use of motorcycles for public transport i.e. "habal-habal"
- Illegal parking/ Illegal Terminal
- Sidewalk encroachment and sidewalk vendors
- Vehicular accidents
- Air pollution

9. The need to address these issues and problems together with the changing aspirations of the travelling public for improved transport system create a context for intervention of which BRT can play a central role.

10. ***Project Rationale and Objective***. As one of the fastest urbanized cities in the country, Cebu City and its constituents demand for transport infrastructure improvement to accommodate target economic development and milestones and live up with its function as an engine of growth in Metro Cebu. The challenge lies on the prioritization and integration of more efficient public transport system into its local development and investment plans to improve mobility of goods and services including the forward and backward market linkages. The implementation of the proposed BRT for Cebu City will play vital part on the City's sustainable economic growth and urbanization.

11. In making the proposed BRT project effective in Cebu City, the separation of public transport vehicles from mixed traffic and the improvements to pedestrian crossings and traffic signalization are important elements to consider. This consideration is expected to produce significant safety benefits to include reductions in vehicle and pedestrian accidents. In addition, the Project has the objective to (i) reduce travel time wherein average public transport route from origin to destination is reduced (ii) increase economic productivity through mobility of goods and services, (iii) reduce air emissions through reduction in average energy consumption and GHG emissions and (iv) provide equitable access, convenient, comfortable, safe and secured public transport system.

12. The proposed Cebu BRT Project will help improve passenger mobility in project corridors by providing a mass transport system that is safer, more secure and more efficient. Other equally important benefits that may be generated by Cebu BRT project include environmental benefits through reduced CO_2 and GHG emissions, reduced traffic congestion, improved traffic safety, potential reduction in travel times, and transport cost savings accruing to the public as end users.

13. *The **BRT Corridor and Components' Location***. The BRT corridor will have an approximately 23-km long corridor extending from Talamban in the northeast to Bulacao in the southwest of Cebu City. BRT services would be supplemented by Jeepneys operating in a "feeder" mode and providing lateral access/egress to/from adjacent communities. At full build-out, there would be passenger interchange terminal at Talamban, Bulacao and Ayala Mall) and 31 other terminal stations and bus stops. The project would incorporate footpaths, both parallel and penetrating the neighborhoods in the corridor as well as improved street lighting. During BRT operation, the project will employ substantial Intelligent Transportation

Systems (ITS) to provide real time passenger information, assist in managing andoperating public transport services, collect fares and manage general traffic.

14. The project shall include the following: (i) a segregated busway between Bulacao and Ayala Mall; (ii) stations and terminals along the segregated busway route, (iii) a depot for the garaging of buses designated to operate as BRT services, (iv) an Area Traffic Control System (ATCS) to facilitate priority run times within the corridor and give citywide benefits of improved traffic flow, (v) an open service plan that ensures BRT services between Bulacao and Ayala, and Talamban, (vi) traffic management measures to improve traffic flow outside of the corridor that are seen to complement the BRT and maximizes its impacts, (vii) parking management measures that will similarly complement BRT and improve traffic flow, (viii) interchange improvements to offer enhancement to the level of service received by all public transport passengers irrespective of whether they are BRT or not, and (ix) urban planning improvements consisting of public realm augmentations and enhanced integration of transport and land use. These components are illustrated in **Figure ES-1**.

15. The proposed Segregated Busway from Bulacao to Ayala is sub-divided into separate highway links. With these links, boundaries are defined where the cross-section of the highway changes in its dimension. The highway links are as follows:

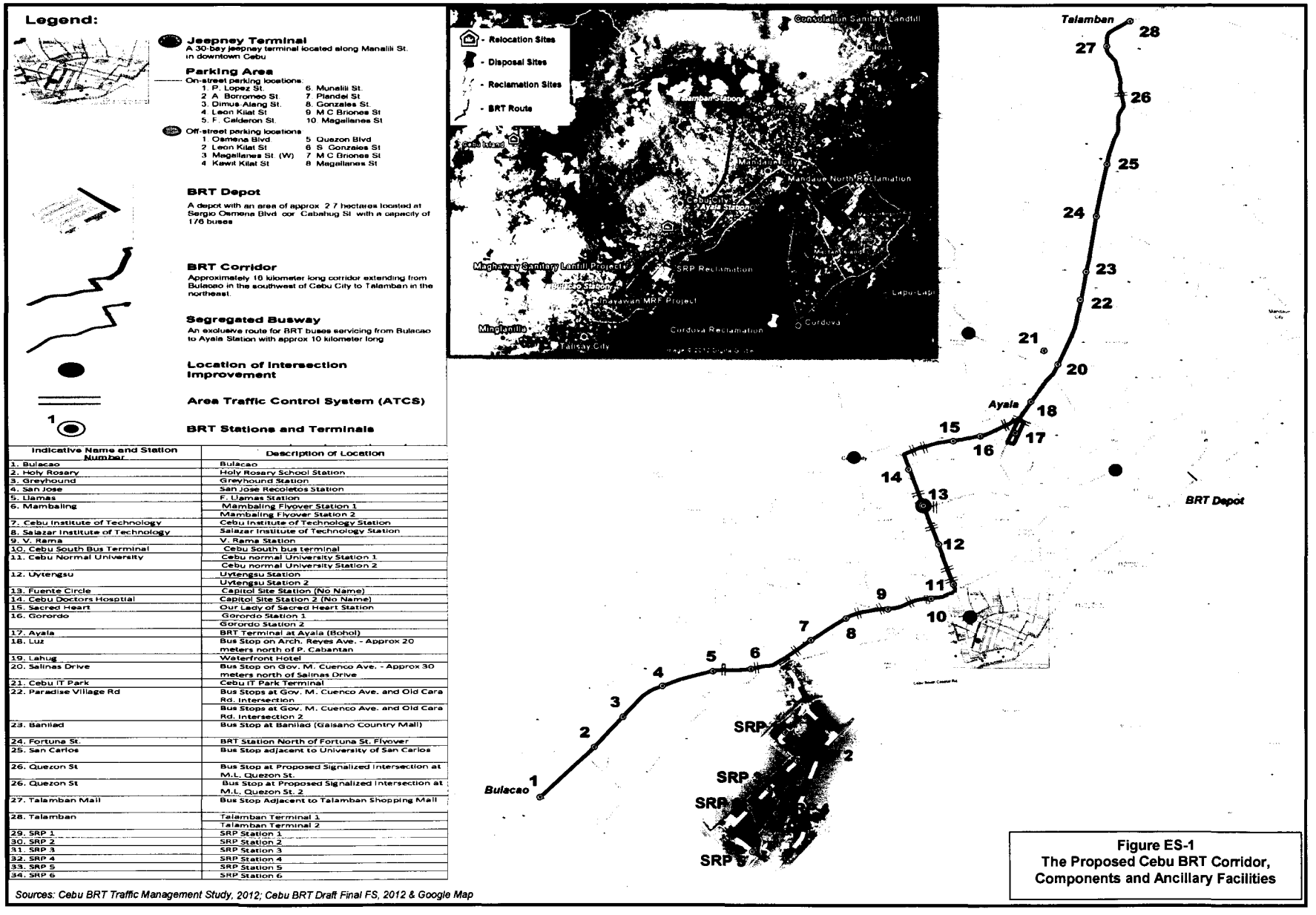
- Bulacao Terminal - Cebu Road South - F. Jaca
- F. Jaca - Cebu Road South - Mambaling Flyover
- Mambaling Flyover - Cebu Road South - V. Rama
- V. Rama - N. Bacalso - Jones' Intersection
- Jones' Intersection - Osmeña Boulevard - Osmeña Circle - Escario
- Escario - Gorordo - Arch Reyes Ave

16. The alignment of the bus priority route from Ayala to Talamban of the BRT corridor will follow Gov. M. Cuenco Avenue. Along the corridor, improvements to two key intersections that currently generate peak congestion will be subject to geometric reconfiguration and traffic signal control. These intersections are located at Gov. M. Cuenco Ave / Paradise Village Road; Gov. M. Cuenco Ave / M. L. Quezon Ave; Beyond these two intersections, it is proposed that the BRT alignment will utilize the existing flyovers at Salinas Drive and A. S. Fortuna Street.

17. Along the bus priority route, new high-quality bus stops will be provided to service the predicted passenger demand along this section of the BRT corridor. These stops will be provided at the following locations:

- Luz Barangay (adjacent to Cabantan Street)
- North of Salinas Drive flyover
- Paradise Village Road
- Banilad
- North of A. S. Fortuna flyover
- San Carlos University
- M. L. Quezon Street
- Talamban Shopping Mall (currently under construction)
- Talamban Terminal

18. Each stop has been designed to a sheltered waiting area for the predicted peak passenger boarding demand and will provide a ticket selling kiosk / ticket validation areas and seating area. The Stop will be open in design and benefit from a cantilever roof structure, which will extend out over the bus waiting area and adjoining sidewalk, which will run in-front of the waiting area.



Indicative Name and Station Number	Description of Location
1. Bulacao	Bulacao
2. Holy Rosary	Holy Rosary School Station
3. Greyhound	Greyhound Station
4. San Jose	San Jose Recoletos Station
5. Llamas	F. Llamas Station
6. Mambaling	Mambaling Flyover Station 1
	Mambaling Flyover Station 2
7. Cebu Institute of Technology	Cebu Institute of Technology Station
8. Salazar Institute of Technology	Salazar Institute of Technology Station
9. V. Rama	V. Rama Station
10. Cebu South Bus Terminal	Cebu South bus terminal
11. Cebu Normal University	Cebu normal University Station 1
	Cebu normal University Station 2
12. Uytengsu	Uytengsu Station
	Uytengsu Station 2
13. Fuente Circle	Capitol Site Station (No Name)
14. Cebu Doctors Hosptial	Capitol Site Station 2 (No Name)
15. Sacred Heart	Our Lady of Sacred Heart Station
16. Gorordo	Gorordo Station 1
	Gorordo Station 2
17. Ayala	BRT Terminal at Ayala (Bohol)
18. Luz	Bus Stop on Arch. Reyes Ave. - Approx 20 meters north of P. Cabantan
19. Lahug	Waterfront Hotel
20. Salinas Drive	Bus Stop on Gov. M. Cuenco Ave. - Approx 30 meters north of Salinas Drive
21. Cebu IT Park	Cebu IT Park Terminal
22. Paradise Village Rd	Bus Stops at Gov. M. Cuenco Ave. and Old Cara Rd. Intersection
	Bus Stops at Gov. M. Cuenco Ave. and Old Cara Rd. Intersection 2
23. Banilad	Bus Stop at Banilad (Gaisano Country Mall)
24. Fortuna St.	BRT Station North of Fortuna St. Flyover
25. San Carlos	Bus Stop adjacent to University of San Carlos
26. Quezon St	Bus Stop at Proposed Signalized Intersection at M.L. Quezon St.
26. Quezon St	Bus Stop at Proposed Signalized Intersection at M.L. Quezon St. 2
27. Talamban Mall	Bus Stop Adjacent to Talamban Shopping Mall
28. Talamban	Talamban Terminal 1
	Talamban Terminal 2
29. SRP 1	SRP Station 1
30. SRP 2	SRP Station 2
31. SRP 3	SRP Station 3
32. SRP 4	SRP Station 4
33. SRP 5	SRP Station 5
34. SRP 6	SRP Station 6

Sources: Cebu BRT Traffic Management Study, 2012; Cebu BRT Draft Final FS, 2012 & Google Map

Figure ES-1
The Proposed Cebu BRT Corridor, Components and Ancillary Facilities

19. ***Proposed Cebu BRT Operations***. The proposed BRT's operational service planning is based on projected forecasts that meet the public transport demand of Cebu City. As proposed, the BRT system will operate in dedicated infrastructure throughout the central urban area. Within the segregated BRT way, payment will be made upon entry to stations (closed station system) for tributary operation there should be a retained option for the driver to control passenger boarding, which would be made through a front doorway.

20. *Service Plan*. The BRT service plan design emanates from passenger forecasts which seek to provide an optimum means of serving origins and destination of trips in the volumes forecast with respect to different time periods. In developing the service plan and determining the frequencies in each route, a balanced approach was taken such that where demands were particularly high on one link, then supply was not necessarily provided to meet all of this demand as this would not be an efficient use of vehicle resources, and would also be placing too great an emphasis on the accuracy of the forecasts. In practice, it will be relatively simple to increase frequency on a particular service through the provision of additional vehicles.

21. *Pedestrian Accessibility.* The design process has adopted the principle that the BRT should be accessible for all within the constraints of the environment in which it is placed. Relevant design guidance is taken from existing local regulations and ordinances including those that are required by the World Bank. The approach likewise adopted those guidelines contained within BRT Guidelines handbook published by Lloyd Wright2 and focuses upon ensuring safety, security, directness, ease of entry, comfort; and aesthetics. For persons with limited mobility, scheme development involved multiple meetings with disability groups to understand specific local needs and issues.

22. *Operational Management.* Operational management pertains to the management of the transportation services and the infrastructures, which are primarily of the operations management and the collection of revenues. Each of these consists of strategic and tactical decisions, operational procedures, and technology and human-centered systems that cover the following:

- BRT System Management
- BRT Operations Management
- Service Contracting
- Fares Structure
- Interchange Options, Penalties and Rebates
- Fares Levels
- Revenue Collection
- Revenue Protection

Infrastructure development approach. Its infrastructure design is guided by consultation with users, specialist interest groups and stakeholders together with ethnographic study of transport use within the study. It is designed to avoid competition with jeepney routes. Some jeepney routes will serve as feeders to the BRT where passengers can easily interchange between BRT and jeepney services at designated zones at certain stations. For instance, between Talamban and Ayala on the unsegregated section, jeepneys shall continue to operate alongside BRT vehicles.

Environmental Baseline Data

23. With the context of the environmental and social impact studies for the proposed BRT Project, project implementation is expected to generate social and environmental

impacts since the proposed BRT corridors from Bulacao to Ayala to Talamban are presently residential, business-commercial, and institutional areas. An important fact to consider is that the BRT corridors are within highly urbanized section of Cebu City. These are areas touched by human activities over the years resulting to their present residential, institutional and business commercial uses. Implementation of an infrastructure project like the proposed BRT project in these highly urbanized areas shall generate negative social and environmental impacts that require specific mitigation measures.

24. Cebu City is the second highly urbanized and populated city and the main center of development of Metro Cebu. As almost all the major public transport modes in Metro Cebu are passing through Cebu City, it strongly indicates the need to come up with an efficient public transport system in order to meet the present and future travel demand in Cebu City and that of Metro Cebu in general. As discussed in a number of transport studies in Cebu City and the Metropolis, the efficient public transport system that is capable of serving and meeting the present and future travel demand is one that is of high occupancy system, a low-carbon mass transit system that can support the interaction between land use and transport system network. In this case, a bus rapid transit, the subject of this environmental study.

25. Air quality in Cebu City exhibits deteriorating patterns. Based on the results of the air quality survey conducted on July and August 2012 along the proposed BRT corridor, the results showed the following observations:

- The PM2.5 levels on both the weekend and weekdayare eight times higher than the WHO daily averageguideline value of 25 $\mu g/m^3$.
- The measured concentrations of benzene and 1,3-butadiene exceeds the European ambient air quality standards for benzene (5 $\mu g/m^3$) and 1,3-butadiene (2.4 $\mu g/m^3$).
- Extremely high levels of CO and CO_2 during the sampling period in July 2012 registered very high values. The measured CO levels exceed National Ambient Air Quality Guideline Values of the Philippines (NAAQGV, 9 ppm daily average), on the weekends and weekdays.

26. In terms of flora and fauna, the whole project corridor lies within urbanized and well-developed areas. There are no rare, threatened or endangered species of terrestrial and aquatic flora and fauna in the impact zone of the Project. The main BRT corridor, the depots and terminals are not near areas protected for the natural habitats for rare or endangered species. There is no national park or nature reserve near BRT and none of the land in the ROW is a protected area or production forest or protected forest.

Potential Environmental and Social Impacts Associated with the Project

27. Environmental Impacts. Screening for environmental impacts is made through a review of the parameters associated with bus rapid transport system against the existing mode of public transport in Cebu City which are dominated by full-sized buses, jeepneys, mini-buses and shuttle services, taxis to as small as multi-cabs, tricycles, and pedicabs.

28. An important consideration in analyzing the environmental impacts of the proposed project is the fact that the project shall introduce significant improvements in the existing transport system in an already congested and highly urbanized environment of Cebu City. In this context, the introduction of a bus rapid transport system and its appurtenances are not new incursions to the highly developed landscapes of Cebu City.

29. The project has nine components which includethe construction of the segregated busway, bus terminals along the segregated busway, bus stops along the bus priority route and the depot shall exert environmental and social impacts to the environment. The rest of

the components comprising of an Area Traffic Control System (ATCS), an open service plan, traffic management measures, jeepney parking management measures, interchange improvements, and urban planning improvements are those components that would positively contribute to the improvement of urban planning and traffic conditions in Cebu City.

30. Sources of physical environmental impacts during the construction period are as follows:

- construction of the BRT dedicated busway, stations, terminals and depot;
- installation of the traffic control systems;
- construction of access arrangements for BRT buses to existing flyovers;
- demolition and reconstruction of the existing road and associated earthworks to utilize the full width of the ROW only in portions fronting the stations and terminals as needed;
- construction of extensions to existing road bridges;
- obtaining construction materials, delivery and storage;
- casting of concrete components for bridges;
- noise and dust generation from various civil works;
- generation of wastes and spoils and their disposal; and,
- air and water pollution during construction period.

31. To address these environmental impacts, environmental guidelines are described and provided in this document which will form part of the TOR and the Environmental Code of Practice (ECoP) in the Detailed engineering design (DED) Consultant and the bid documents for the Contractor to ensure that these guidelines are updated into the Environmental management plan. This means that specific and/or detailed management plans for each area of concern shall be formulated and customized by the Contractor based on the results of the DED subject to the final approval of the Project Proponent.

32. Although there are no issues related to historical and cultural assets, a precautionary measure shall be taken by inclusion of provisions in tender and construction contract documents requiring the contractor to immediately stop excavation activities and promptly inform the authorities if archaeological and cultural assets are discovered.

33. During operation phase, the following environmental impacts are to be generated by the project: (i), noise and vibration, (ii) dust and gaseous emissions, and (iii) waste generation. The project will provide mitigation measures to address these operation-related environmental impacts.

34. *Social Impacts.* The following stakeholders, among others were consulted during the conduct of the FS and environmental assessment: (i) commuters, (ii) settlements and establishments along the corridor, (iii) public transport jeepney and bus drivers and operator, iv) vendors and business establishments within the BRT corridor. Inventory of potential losses of affected stakeholders were also conductedto be updated during the DED. On the same manner, RAP and SMP will likewise be updated.

Analysis of Alternatives

35. *No-Project Alternative.* In the No-Project Scenario, the current public transport system will continue to be dominated by inefficient buses, jeepneys, mini-buses and shuttle services, and taxis to as small as tricycles, multi-cabs and pedicabs reasonably represents the anthropogenic emissions by sources of greenhouse gases (GHG) that would occur in the

absence of the proposed BRT project. Without the BRT project, Cebu City and its people will be continue to experience escalating transportation problems which have seriously hampered their economic development. For these reasons, the No-Project Alternative does not satisfy the project purpose of providing safe and efficient mass transport system in Cebu City. Therefore, the No-Project Alternative is found not viable.

36. *Project with BRT Alternative.* One pro-active approach in addressing traffic congestion in Cebu City is the introduction of an efficient high occupancy public transport system in the form of a BRT system. Among the various types of mass transit systems, the proposed BRT system is considered as appropriate to the requirements of Cebu City. A BRT system can be considered as a public transport mode that provides almost same levels-of-service (LOS) of a mass transit system that is rail-based (e.g., LRT). The proposed BRT system can satisfy the integration of land use and transport by providing at the interim connectivity of accessibility to major land use patterns and concentrations. The benefits that may be generated by Cebu BRT project include reduced carbon dioxide (CO_2) and GHG emissions, reduced traffic congestion, improved traffic safety, potential reduction in travel times, and transport cost savings accruing to the public as end users.

37. The selection of a BRT system for Cebu is based on the Feasibility Study (FS, 2012) made by the Integrated Transport Planning, Limited (ITP). According to the FS, the traffic growth in Cebu City are projected to be 38,000 person trip/day for the year 2015 to as high as 253,000 000 person trip/day for the year 2030 Average projected traffic demands in Cebu City for years 2015 to 2030 are less than 0.4 million. Under this scenario, BRT system appears to be the most suitable and sufficient mass transit system. The proposed BRT system could meet the travel demand of Cebu City. This therefore indicates that for the current and future travel demand, rail-based mass transit system is not yet warranted; and that a BRT system will be sufficient enough.

38. On air quality improvement, the BRT system can provide same levels of mitigation similar to that of a rail-based system, as experienced in various cities with BRT systems. Given the experiences in other countries, it has been proven that the BRT system can significantly reduce the carbon footprint of metropolitan areas. Likewise, it also contributes to providing a better environment-friendly and pleasant ambiance to the urban setting compared to the current public transport systems. Thus the BRT system is a plus factor in the overall transport system in Cebu City.

Environmental Guidelines and Social Management Plan

39. *Environmental Guidelines.* This document provides Environmental Guidelines which enumerate salient features of the EMP. The environmental guidelines described in this document include:

- Tree-cutting and replanting to avoid indiscriminate tree-cutting;
- Utilities and telecommunications reprovisioning to minimize interruption to power, water and gas supply and telecom systems;
- Traffic management to minimize disturbance of vehicular traffic and pedestrians during construction
- Waste management and spoil disposal for handling, storage, treatment, transport and disposal of wastes and excavation spoils. The disposal sites were also the subject of the assessment (shown in Fig. ES-1);
- Materials management providing arrangements to be made to facilitate the timely production and supply of construction materials to avoid impacts due to unnecessary stockpiling inside and near the Project site area;

- Drainage management to ensure that construction works will not cause ponding/flooding within the Project site, construction camps, borrow/quarry areas, other areas used for project-related activities and areas adjacent to the Project;
- Excavation protection and runoff control to ensure that construction works are protected and will not cause excessive runoff and siltation of waterways adjacent or within the Project site;
- Noise and dust control to minimize impacts to sensitive receptors (educational establishments, hospitals, residential areas, etc.) due to construction works; and,
- Workers and public safety to identify interfaces between the works and public and ensure worker and public safety, prevent accidents due to the construction works and report all accidents due to the Project activities.

40. Environmental monitoring to determine compliance on various provisions of the EMP shall be undertaken during pre-construction, construction and operation phases. During construction, most of the mitigation measures and monitoring works shall be implemented by the Contractors and their environmental performance, in terms of implementation of such measures and works, shall be closely monitored by National BRT PMO and Cebu BRT PIU with active participation of regulatory offices such as the DENR and CCG CENRO. During operation phase, the EMP implementation shall be the responsibility of the BRT Operator. Compliance monitoring shall be done by National BRT PMO and Cebu BRT PIU with DENR and CCG CENRO.

41. *Social Management Plan (SMP) and Resettlement Action Plan (RAP).* The social impacts to activities like business establishments operating within the ROW, jeepney operations and existing infrastructure will be mitigated through the implementation of the RAP and SMP.

42. Salient features of the SMP include (i) accessibility to vulnerable groups, (ii) affordability, (iii) safety and security, and, (iv) livelihood measures for PUJ drivers, operators and business owners.

43. As to the livelihood measures, priority will be given to the project-affected persons. The various options discussed with the PUJ operatiors and drivers include: (i) transfer to new routes, (ii) transfer to underserved routes and route restructuring, (iii) form a company and transport cooperative, (iv) retrain for other productive skills.

44. The RAP identified no cluster of shanties along the BRT route. The CCG through the Division for the Welfare of Urban Poor (DWUP) has proposed resettlement sites in Barangay Sinsin (shown in Fig. ES-1) which have been the subject of an assessment as well.

45. *Institutional Arrangement.* The institutional set-up presents the requirements and responsibilities during pre-construction, construction, and operation phases. At the national level, DOTC shall provide the overall sight through the National BRT Project Management Office which will operate under the guidance of the Steering Committee (SC). At the local level, there is Cebu Project Implementation Unit (PIU) that will oversee the works of the Contractor and the BRT Operator.

46. The Contractor and the BRT Operator are tasked to carry-out implementation of the environmental and social management plan under day-to-day supervision by PIU. Overall regulatory compliance of the project shall be continuously and independently monitored by DENR and Cebu City Environment and Natural Resources Office.

47. *Consultation and Participation.* Project planning and the subsequent impact assessment document preparation for the proposed project recognized the need for public

consultation and participation as central to effective environmental safeguard. Within the context of "meaningful consultation", DOTC and the Cebu City government (CCG) initiated a process of consultation during project preparation and intend to continue it during the construction phase. During the environmental impact study phase, DOTC and CCG conducted the first public consultation and information disclosure on 16 July 2012 with concerned individuals, barangay officials, non-government organizations (NGOs), and local government unit (LGU) planning officials. The second public consultation was conducted on 31 August 2012 with concerned project stakeholders. Details of the project components were presented to the stakeholders and their views on the respective proposals were requested. Stakeholders expressed support to the proposed project.

48. Project disclosure activities were also done during the conduct of the Feasibility Study from January 2012 to July 2012. More than 1,000 key stakeholders have participated in all of these consultation works. During detailed design, DOTC and CCG will conduct public consultations and information disclosure. Affected stakeholders and property owners are invited to attend to these proposed consultations since detailed mode and scheme of property and structure acquisition and compensation will also be presented and discussed. DOTC and CCG shall keep records of environmental and social complaints received during consultations, field visits, informal discussions, and letters, together with the subsequent follow-up and resolutions of issues.

49. ***Grievance Redress Mechanism***. Implementation of the proposed Cebu BRT project will be fully compliant to WB's safeguards requirement on grievance redress mechanism. DOTC and CCG shall disclose the proposed mechanism in public consultations during detailed design and in meetings during the construction phase. Complaints and concerns about environmental performance of the project during construction phase would be handled by an ad-hoc Joint DOTC and CCG Environmental Complaints Committee for expeditious resolutions, while complaints during the operation phase would be brought to the attention of DENR-Environmental Management Bureau (EMB). DOTC and CCG would address promptly, at no costs to the complainant and without retribution, any complaints and concerns. The joint committeewould be co-chaired by DOTC and CCG and would have members from the contractor, barangay level LGU, concerned NGOs, and women's organizations. DENR-EMB is mandated by PD 1586 to act on complaints about environmental performance of projects issued with environmental compliance certificates.

50. *Conclusion and Recommendation*. The BRT project is essential for Cebu City's economic development as it will address the City's sustainable urban transport development. Once the project is implemented, Cebu BRT project will serve as a catalyst in the development of an efficient seamless public transport system not only in Cebu City but in the entire country, where it will service more commuters and eventually encourage the modal shift to efficient low-carbon emissions public transport system. The Project includes nine components to complement and improve Cebu City's urban traffic sustainability. The estimated construction period is three (3) years. Possible alternatives, including a no-action alternative, have been examined and the optimal physical implementation plan was selected.

51. The social and environmental measures and guidelines in the EIA, SMP and RAP will reduce adverse environmental impacts arising from the location, design, construction, operation, and maintenance of the proposed project. The social and environmental measures and guidelines are doable which include site-specific environmental protection measures for all potential social and environmentally impacts and detailed monitoring plan. It also designates each relevant organization's environmental protection responsibilities.

2.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 Environment

52. The policy, legal, and administrative frameworks relevant to the environmental assessment of transport-related projects in the Republic of the Philippines have long been established by the following laws and regulations: (i) PD 1586 - Establishing the Philippine Environmental Impact Statement System, (ii) Republic Act No.9275 - Philippine Clean Water Act of 2004, (iii) RA 6969 -Toxic substances & Hazardous & Nuclear Waste Control Act of 1990, (iv) RA 8749 - Philippine Clean Air Act of 1999, and (v) RA 9003 - Act Providing for an Ecological Solid Waste Management Program The frameworks apply to the Cebu BRT Project.

53. Presidential Decree 1584 or the Philippine Environmental Impact Statement System (PEISS) established the Environmental Impact Assessment (EIA) process to enhance planning and decision making in projects involving transport-related investments. The Philippine environmental assessment system conforms to WB's OP 4.01 on environmental assessment requirements.

54. Through the EIA process, adverse environmental impacts of proposed project are considerably reduced through the formulation and subsequent implementation of applicable Environmental Management Plan (EMP). Under the PEISS, a project categorized as "not covered" shall be issued a "Certificate of Non-coverage" when necessary by DENR and for "covered" project, an Environmental Compliance Certificate (ECC) is issued. The Cebu BRT Project falls under "covered" project.

55. For any project that requires the acquisition of an ECC, it is contingent that it should be able to comply with pertinent provisions of other national environment laws governing the management of solid waste, water quality, air quality and hazardous wastes.

2.2 Social

56. Under the Philippine setting, there is no single policy that governs all aspects of land acquisition, compensation and resettlement. Below are the enumeration of key legal and administrative instruments most relevant to involuntary resettlement that are currently enforce locally:

- The Bills of Rights of the Constitution of the Republic of the Philippines states: In Article III, Section 1, "No person shall be deprived of life, liberty, or property without due process of law, nor shall any person be denied the equal protection of the laws." In Article III, Section 9, "Private property shall not be taken for public use without just compensation."
- Executive Order No. 1035 (1985) requires conducting of feasibility studies, public information campaign, parcellary survey and assets inventory. It also provides for compensation for acquired land at fair market value based on negotiations between owner and appraiser; relocation assistance to tenants, farmers and other occupants; financial assistance to farmers and agricultural tenants equivalent to the average harvest for the last three years but not less than P15,000/hectare; disturbance compensation to agricultural lessees equivalent to 5 times the average gross harvest during the last 5years; and compensation for improvement on land acquired under Commonwealth Act No. 141 (CA 141).
- Commonwealth Act No. 141 (CA 141) and Public Land Act (1936) institute classification and means of administration, expropriation and disposition of alienable lands of the public domain.

- Supreme Court Ruling (1987) defines just compensation as fair and full equivalent to the loss sustained to enable affected household to replace affected assets at current market prices.
- Republic Act No. 6389 provides for disturbance compensation to agricultural teases equivalent to 4 times the average gross harvest in the last 5 years.
- Republic Act No. 8974 (2000) which facilitates the acquisition of Right of Way (ROW), site or location for National Government Infrastructure Projects and for other Purposes. Implementing Rules and Regulations of RA8974 was also issued. This mandates the use of replacement value of land and structures (without depreciation).
- Republic Act No. 7279 (1992) "Urban Development and Housing Act" mandates the provision of a resettlement site, basic services and safeguards for the homeless and underprivileged citizens.
- Republic Act No. 7160 (1991) "Local Government Code" which allows the local government units to exercise the power of eminent domain for public use.

2.3 Administrative

57. Under administrative policy, DOTC is the national government office that is constitutionally tasked to provide road-based public transport. In this case, DOTC is responsible in carrying out planning, regulation, investment, and implementation of BRT Project. DOTC may likewise take the role of an executing agency while CCG may take the role of an implementing agency.

58. DOTC and CCG have overall responsibility for project coordination, implementation, and liaison with WB and other pertinent government offices such as DENR and DPWH (for the ROW issues and concerns).

2.4 Relevant World Bank Safeguard Policies

59. Operational Policy (OP) 4.01 (Environmental Assessment) is triggered in this project since there are potential adverse environmental impacts that are necessary to address and minimize. Cebu BRT Project is an environmentally enhancing project that has the potential to reduce CO_2 and GHG emissions. However, negative environmental impacts during its construction and operation phases need to be assessed and addressed.

60. Operational Policy (OP) 4.12 (Involuntary Resettlement) is triggered since the Project requires land acquisition and/ or clearing of structures and other developments. Although meant to put order for more efficient transport and traffic management, those affected by the project during implementation will need to be given fair and humane arrangements.

3.0 PROJECT DESCRIPTION

3.1 Project Background

61. As of 2010 NSO Census, Cebu City has a population of about 866,171 and a land area of 326 km^2 with the overall population density of 2,657 persons per km^2. About 66 percent of the total City population is concentrated within 15 percent of land area.

62. For the past few years, the number of vehicle registrations in Cebu City has displayed an annual growth rate of seven percent for the period 1994 to 2000 and four percent for the period 2000 to 2006. It is anticipated that Metro Cebu will experience an increasing rate of person-trips due to rapid population growth and urbanization.

63. The average travel speed for major corridors is around 10km/h indicating severe congestion for most times of the day. The PUJ network is struggling to keep pace with the changing nature of demand. Population growth has increased the demand for travel and will do more so in the future. In parallel the car has become a viable mode of transport for a greater proportion of the population.

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

- Too many PUJs/vehicles with no new infrastructure improvements in the City
- Uncontrolled/ unlimited issuance of franchises for PUJs
- Slow travel times
- Undisciplined drivers and pedestrians on the streets
- Large scale use of motorcycles for public transport i.e. "habal-habal"
- Illegal parking/ Illegal Terminal
- Sidewalk encroachment and sidewalk vendors

65. The number of recorded accidents in Cebu City in 2000-2006 ranged from a level of 14,000 cases in 2000 to around 10,000 cases in 2006. The number of accidents is quite high in comparison to Metro Manila (population of approximately 11,500,000), which recorded a maximum of 11,185 accidents in 2005.

66. 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 on major roads.

67. Land use change has created a largely polycentric City that is oriented by the traditional down town and up town areas but also new malls and business parks. The nature of demand will be further distorted by the South Reclamation Project. The changing nature of demand, the changing aspirations of the travelling public together with the need to address air quality and safety problems create a context for intervention of which BRT can play a central role.

3.2 Project Rationale and Objectives

68. Cebu City is one of the fastest urbanized cities in the country. As urbanization progresses in Cebu City, it demands for transport infrastructure readiness in order to accommodate target economic development and milestones. At present, Cebu City is in a situation where introduction of better mode of public transport system is warranted in order to live up with its function as an engine of growth in Metro Cebu. The challenge lies on the prioritization and integration of more efficient public transport system into its local

development and investment plans. It should be recognized that economic growth is directly proportional to the mobility of goods and services including the forward and backward market linkages. For Cebu City to spur sustainable economic growth and urbanization, the recognition of the importance of transport planning and traffic management should be undertaken on a more strategic, broader and holistic perspective.

69. In making the proposed BRT project effective in Cebu City, the separation of public transport vehicles from mixed traffic and the improvements to pedestrian crossings and traffic signalization are important elements to consider. This consideration is expected to produce significant safety benefits to include reductions in vehicle and pedestrian accidents. In addition, the Project has the objective to (i) reduce travel time wherein average public transport route from origin to destination is reduced (ii) increase economic productivity through mobility of goods and services, (iii) reduce air emissions through reduction in average energy consumption and GHG emissions and (iv) provide equitable access, convenient, comfortable, safe and secured public transport system.

3.3 The BRT Corridor and Components' Location

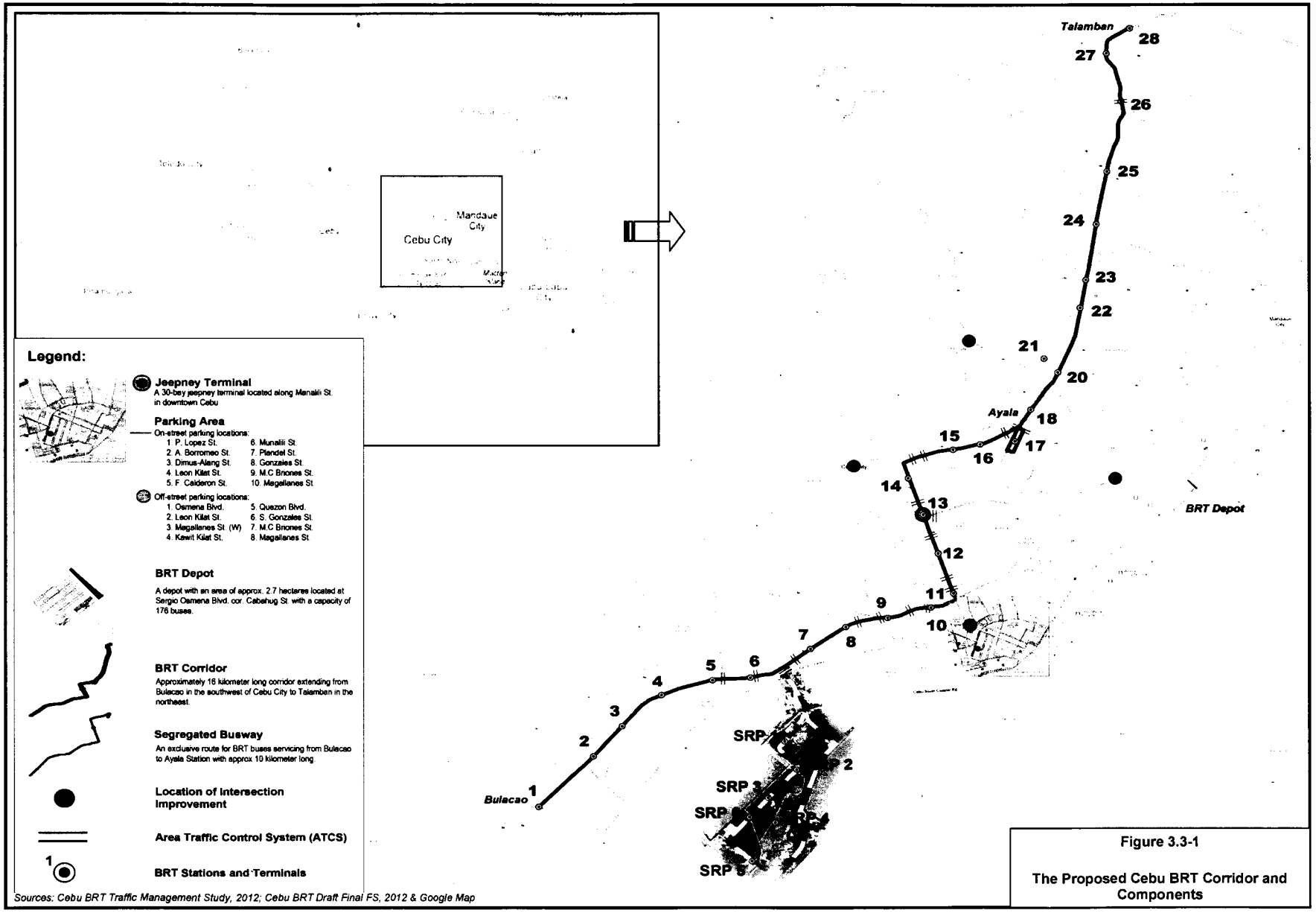
70. The BRT corridor will have an approximately 23-km long corridor extending from Talamban in the northeast to Bulacao in the southwest of Cebu City. At full build-out, there would be three major passenger interchange terminals (Talamban, Bulacao and Ayala Mall) and 31 other terminal stations and bus stops.

71. The overall project components are depicted in **Figure 3.3-1.** Details of each components as described in the Feasibility Study (August 2012) are the following: (i) a segregated busway between Bulacao and Ayala Mall **(Figure 3.3-1)**, (ii) stations and terminals along the BRT busway route **(Figure 3.3-2)**, (iii) a depot for the garaging of buses designated to operate as BRT services **(Figure 3.3-3)**, (iv) an Area Traffic Control System (ATCS) to facilitate priority run times within the corridor and give citywide benefits of improved traffic flow **(Figure 3.3-4)**, (v) traffic management measures to improve traffic flow outside of the corridor that are seen to complement the BRT and maximizes its impacts **(Figure 3.3-5)**, (vi) jeepney parking management measures that will similarly complement BRT and improve traffic flow **(Figure 3.3-5)**, (vii) interchange improvements to offer enhancement to the level of service received by all public transport passengers irrespective of whether they are BRT or not **(Figure 3.3-6)**, (viii) an open service plan that ensures BRT services between Bulacao and Ayala, and Talamban, and (ix) urban planning improvements consisting of public realm augmentations and enhanced integration of transport and land use. Components (viii) and (ix) are embodied in combinations of two or more project components.

3.4 Proposed Cebu BRT Operations

72. The operational service planning is based on projected forecasts that meet the public transport demand of Cebu City. As proposed, the BRT system will operate in dedicated infrastructure throughout the central urban area. In order to minimize the land-take required for BRT insertion in the proposed corridor, a decision has been taken to select median operation with median stations for the core infrastructure. However tributary operation on the general highway will utilize traditional kerbside bus-stops, and this will therefore require that the buses to be fitted with passenger doors on both sides.

73. Within the segregated BRT way, payment will be made upon entry to stations (closed station system) for tributary operation there should be a retained option for the driver to control passenger boarding, which would be made through a front doorway.



Sources: Cebu BRT Traffic Management Study, 2012; Cebu BRT Draft Final FS, 2012 & Google Map

Figure 3.3-1

The Proposed Cebu BRT Corridor and Components

Indicative Name and Station Number	Description of Location
1. Bulacao	Bulacao
2. Holy Rosary	Holy Rosary School Station
3. Greyhound	Greyhound Station
4. San Jose	San Jose Recoletos Station
5. Llamas	F. Llamas Station
6. Mambaling	Mambaling Flyover Station 1
	Mambaling Flyover Station 2
7. Cebu Institute of Technology	Cebu Institute of Technology Station
8. Salazar Institute of Technology	Salazar Institute of Technology Station
9. V. Rama	V. Rama Station
10. Cebu South Bus Terminal	Cebu South bus terminal
11. Cebu Normal University	Cebu normal University Station 1
	Cebu normal University Station 2
12. Uytengsu	Uytengsu Station
	Uytengsu Station 2
13. Fuente Circle	Capitol Site Station (No Name)
14. Cebu Doctors Hosptial	Capitol Site Station 2 (No Name)
15. Sacred Heart	Our Lady of Sacred Heart Station
16. Gorordo	Gorordo Station 1
	Gorordo Station 2
17. Ayala	BRT Terminal at Ayala (Bohol)
18. Luz	Bus Stop on Arch. Reyes Ave. - Approx 20 meters north of P. Cabantan
19. Lahug	Waterfront Hotel
20. Salinas Drive	Bus Stop on Gov. M. Cuenco Ave. - Approx 30 meters north of Salinas Drive
21. Cebu IT Park	Cebu IT Park Terminal
22. Paradise Village Rd	Bus Stops at Gov. M. Cuenco Ave. and Old Cara Rd. Intersection
	Bus Stops at Gov. M. Cuenco Ave. and Old Cara Rd. Intersection 2
23. Banilad	Bus Stop at Banilad (Gaisano Country Mall)
24. Fortuna St.	BRT Station North of Fortuna St. Flyover
25. San Carlos	Bus Stop adjacent to University of San Carlos
26. Quezon St	Bus Stop at Proposed Signalized Intersection at M.L. Quezon St.
26. Quezon St	Bus Stop at Proposed Signalized Intersection at M.L. Quezon St. 2
27. Talamban Mall	Bus Stop Adjacent to Talamban Shopping Mall
28. Talamban	Talamban Terminal 1
	Talamban Terminal 2
29. SRP 1	SRP Station 1
30. SRP 2	SRP Station 2
31. SRP 3	SRP Station 3
32. SRP 4	SRP Station 4
33. SRP 5	SRP Station 5
34. SRP 6	SRP Station 6

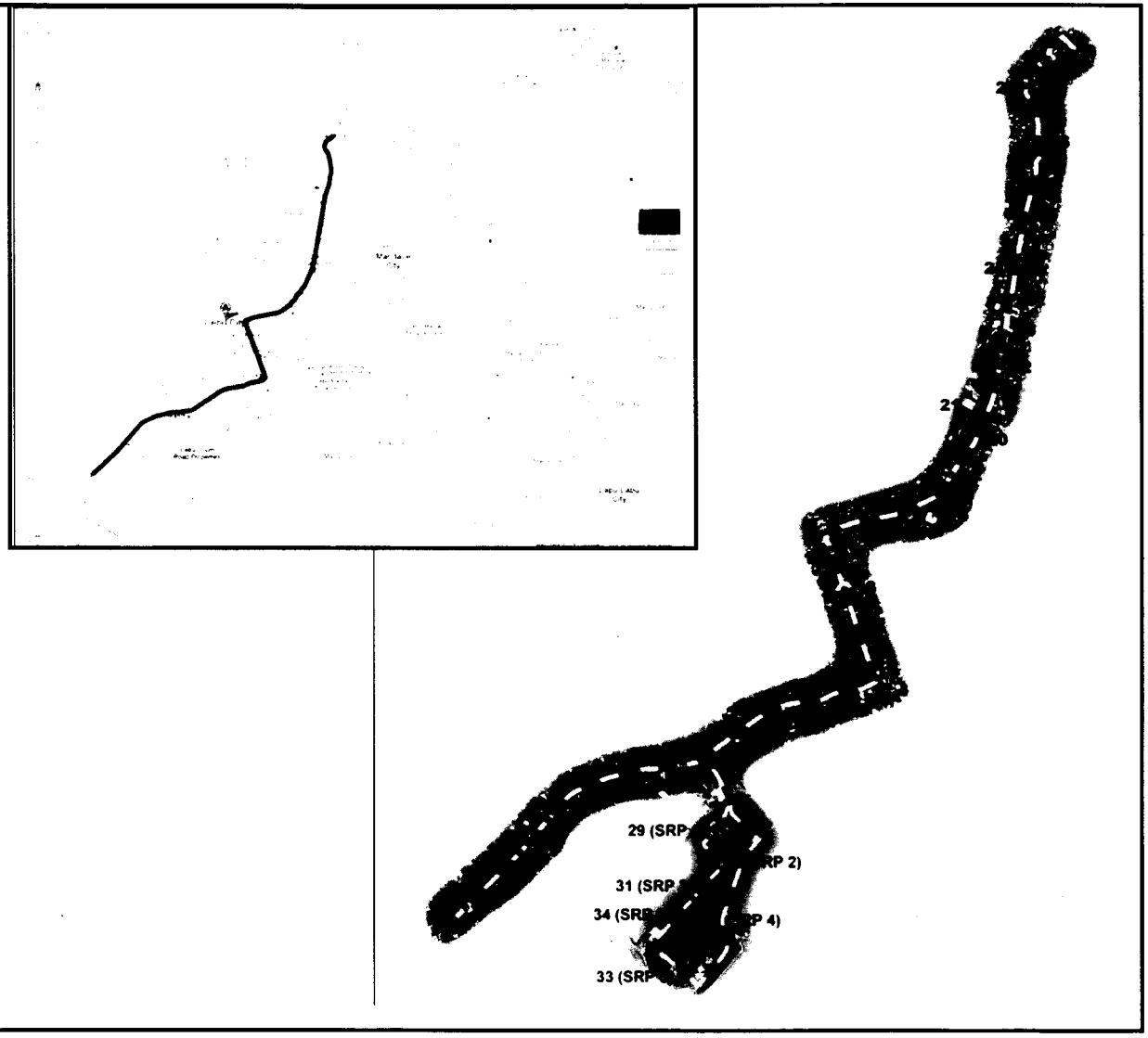
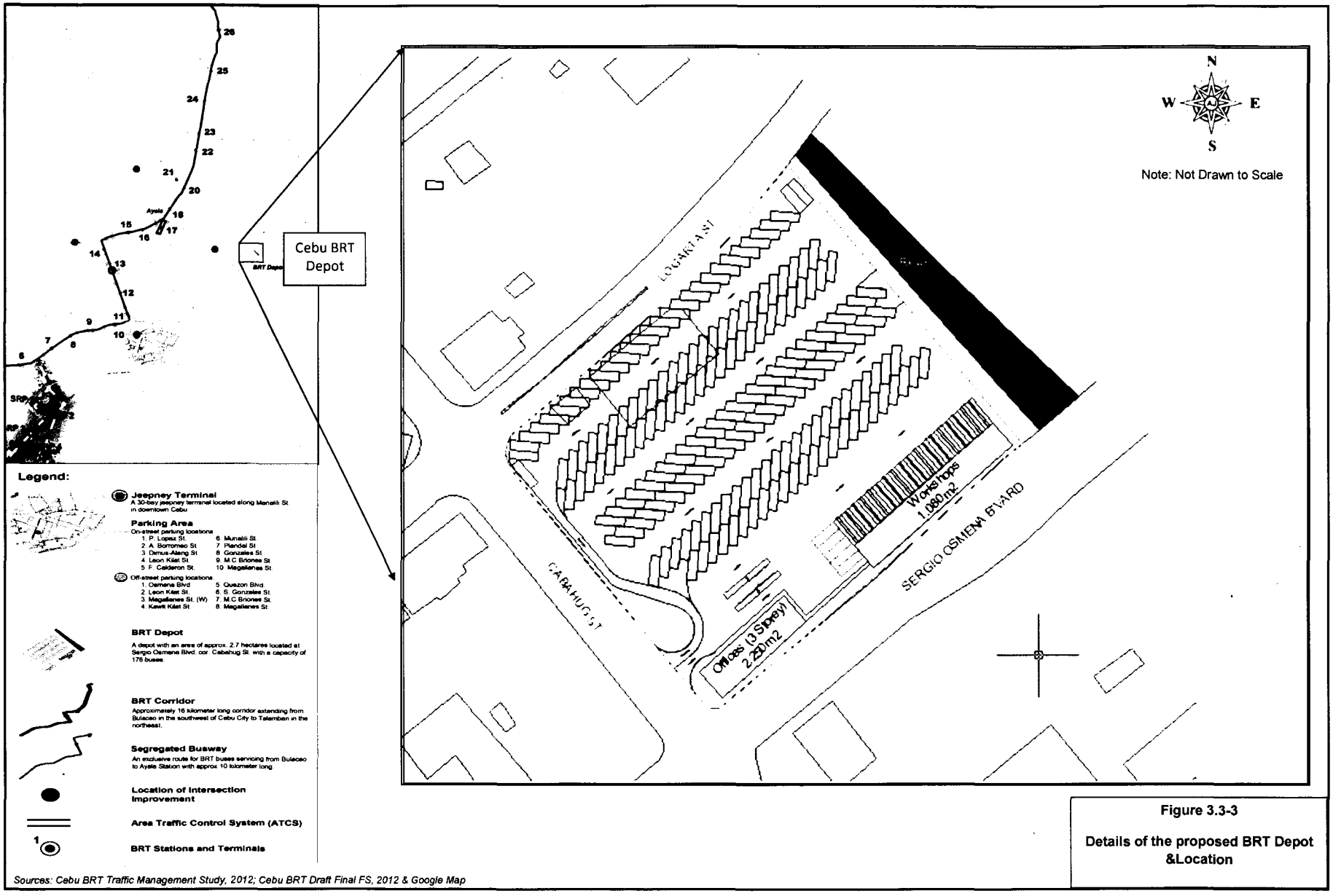


Figure 3.3-2

Proposed Stations and Terminals along BRT Busway Route

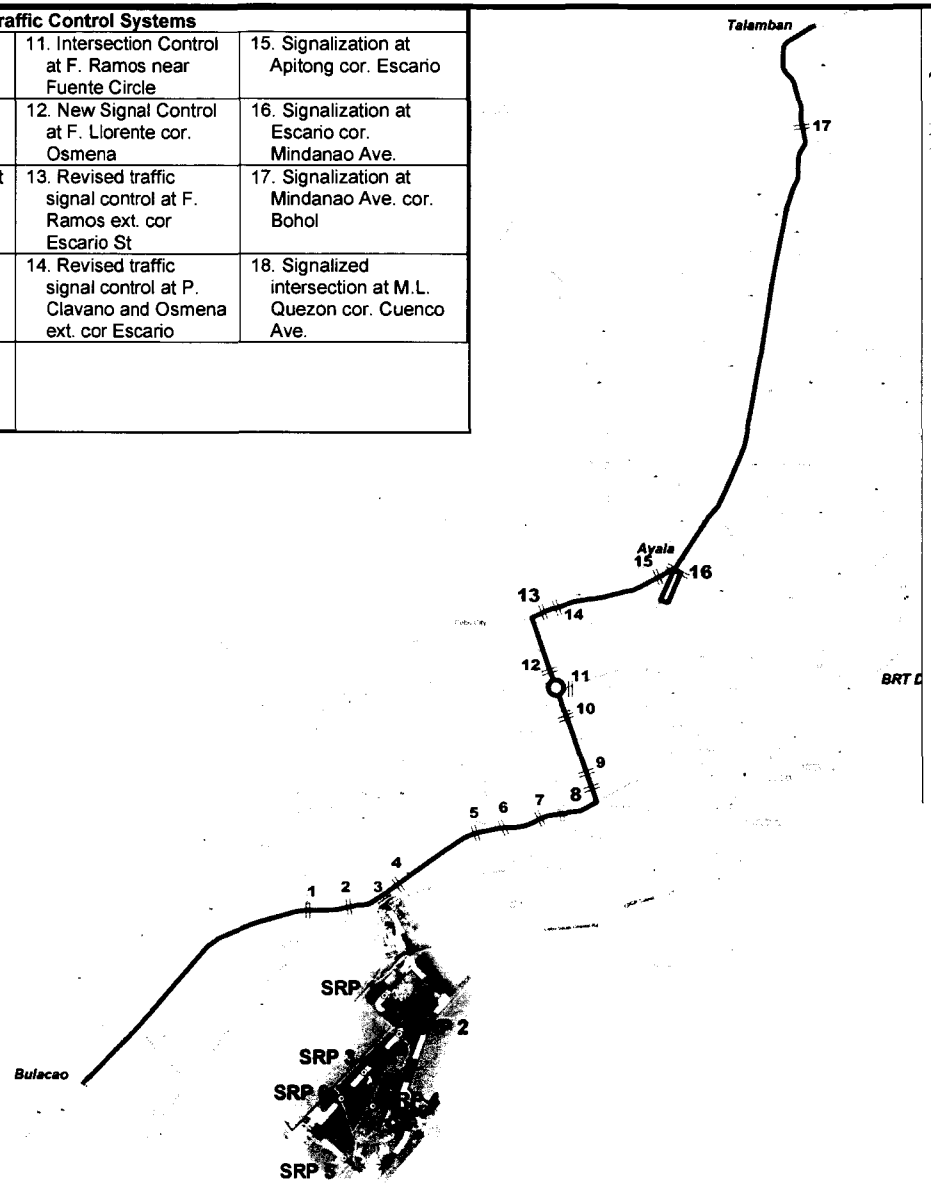


Sources: Cebu BRT Traffic Management Study, 2012; Cebu BRT Draft Final FS, 2012 & Google Map

Figure 3.3-3

Details of the proposed BRT Depot &Location

Location of Area Traffic Control Systems			
1. Existing Signalized Intersection at F. Llamas	6. Existing signalized intersection at V. Rama	11. Intersection Control at F. Ramos near Fuente Circle	15. Signalization at Apitong cor. Escario
2. New Signal Control before Mambaling Flyover	7. Existing signalized intersection at Cebu Medical Center	12. New Signal Control at F. Llorente cor. Osmena	16. Signalization at Escario cor. Mindanao Ave.
3. New Signalization at Mambaling Junction (SRP Rd. cor. C. Padilla St.)	8. New Signal Control at Cebu Normal University to replace existing foot bridge	13. Revised traffic signal control at F. Ramos ext. cor Escario St	17. Signalization at Mindanao Ave. cor. Bohol
4. New Signal Control after Mambaling Flyover	9. Reconfigured traffic Intersection at R. Landon St. cor. Osmena	14. Revised traffic signal control at P. Clavano and Osmena ext. cor Escario	18. Signalized intersection at M.L. Quezon cor. Cuenco Ave.
5. Existing signalized intersection at Tres de Abril	10. Reconfigured traffic Intersection at Arlington Rd. cor. Osmena		



Legend:

Jeepney Terminal
A 30-bay jeepney terminal located along Manalili St in downtown Cebu

Parking Area
On-street parking locations:
1. P. Lopez St
2. A. Borromeo St.
3. Dimus-Alang St.
4. Leon Kilat St.
5. F. Calderon St.
6. Manalili St
7. Plandel St
8. Gonzales St
9. M.C. Briones St
10. Magallanes St

Off-street parking locations:
1. Osmena Blvd
2. Leon Kilat St
3. Magallanes St. (W)
4. Kawit Kilat St
5. Quezon Blvd
6. S. Gonzales St
7. M.C. Briones St
8. Magallanes St

BRT Depot
A depot with an area of approx. 2.7 hectares located at Sergio Osmena Blvd. cor. Cabahug St. with a capacity of 176 buses

BRT Corridor
Approximately 16 kilometer long corridor extending from Bulacao in the southwest of Cebu City to Talamban in the northeast

Segregated Busway
An exclusive route for BRT buses servicing from Bulacao to Ayala Station with approx 10 kilometer long

Location of Intersection Improvement

Area Traffic Control System (ATCS)

BRT Stations and Terminals

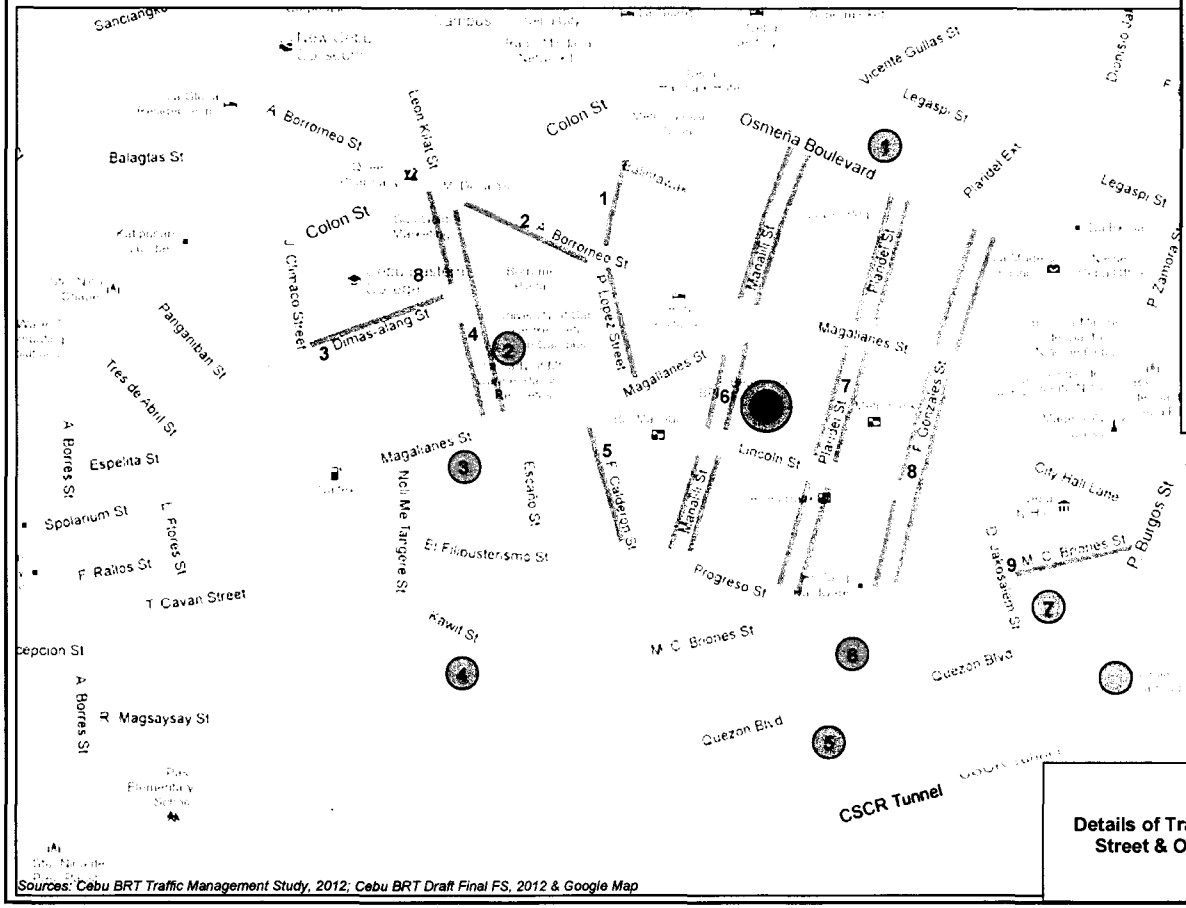
Note: Not Drawn to Scale

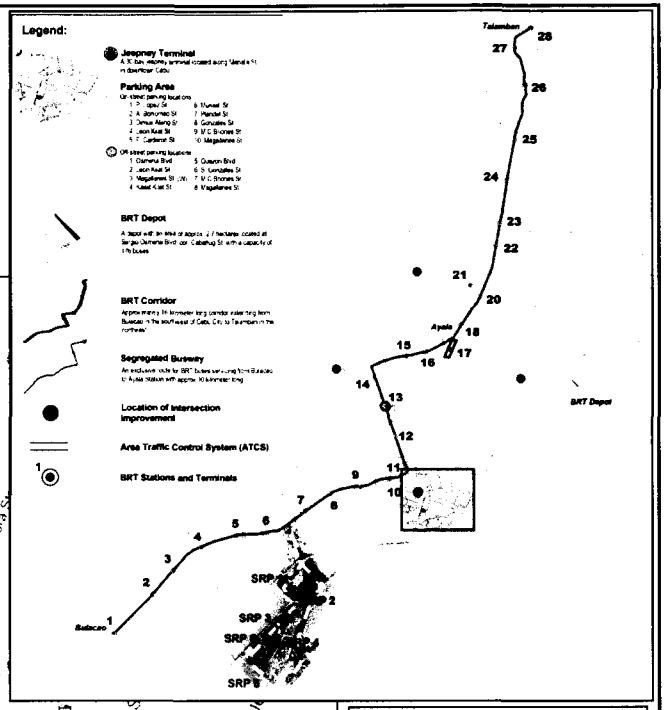
Sources: Cebu BRT Traffic Management Study, 2012; Cebu BRT Draft Final FS, 2012 & Google Map

Figure 3.3-4

Proposed Locations of the Area Traffic Control System (ATCS)

Parking Locations			
On-Street Parking		**Off-street Parking**	
1. P. Lopez St.	6. Munalili St.	1. Osmena Blvd.	5. Quezon Blvd.
2. A. Borromeo St.	7. Plandel St.	2. Leon Kilat St.	6. S. Gonzales St.
3. Dimus-Alang St.	8. Gonzales St.	3. Magallanes St. (W)	7. M.C Briones St.
4. Leon Kilat St.	9. M.C Briones St.	4. Kawit Kilat St.	8. Magallanes St.
5. F. Calderon St.	10. Magallanes St.		





LEGEND:

- BRT Corridor
- On-Street Parking
- Off-Street Parking
- Jeepney Terminal

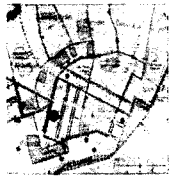
N W E S

Sources: Cebu BRT Traffic Management Study, 2012; Cebu BRT Draft Final FS, 2012 & Google Map

Figure 3.3-5

Details of Traffic ManagementMeasures (On-Street & Off-Street Parking and Jeepney Terminal)

Legend:



Jeepney Terminal
A 30-bay jeepney terminal located along Manalili St. in downtown Cebu

Parking Area

On-street parking locations:

1. P. Lopez St.
2. A. Borromeo St.
3. Dimus-Alang St.
4. Leon Kilat St.
5. F. Calderon St.
6. Munalili St.
7. Plandel St.
8. Gonzales St.
9. M.C Briones St.
10. Magallanes St.

Off-street parking locations:

1. Osmena Blvd.
2. Leon Kilat St.
3. Magallanes St. (W)
4. Kawit Kilat St.
5. Quezon Blvd.
6. S. Gonzales St.
7. M.C Briones St.
8. Magallanes St.

BRT Depot

A depot with an area of approx. 2.7 hectares located at Sergio Osmena Blvd. cor. Cabahug St. with a capacity of 176 buses.

BRT Corridor

Approximately 16 kilometer long corridor extending from Bulacao in the southwest of Cebu City to Talamban in the northeast.

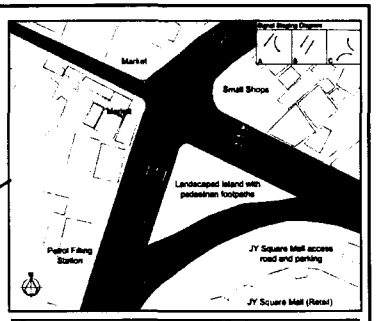
Segregated Busway

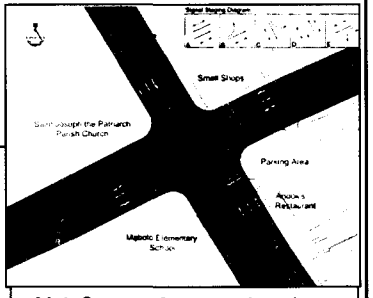
An exclusive route for BRT buses servicing from Bulacao to Ayala Station with approx 10 kilometer long.

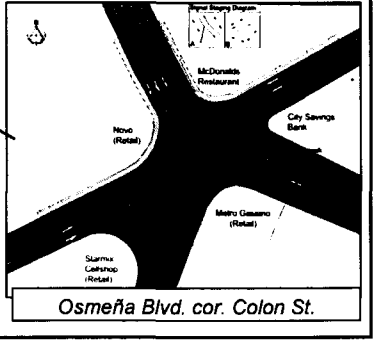
Location of Intersection Improvement

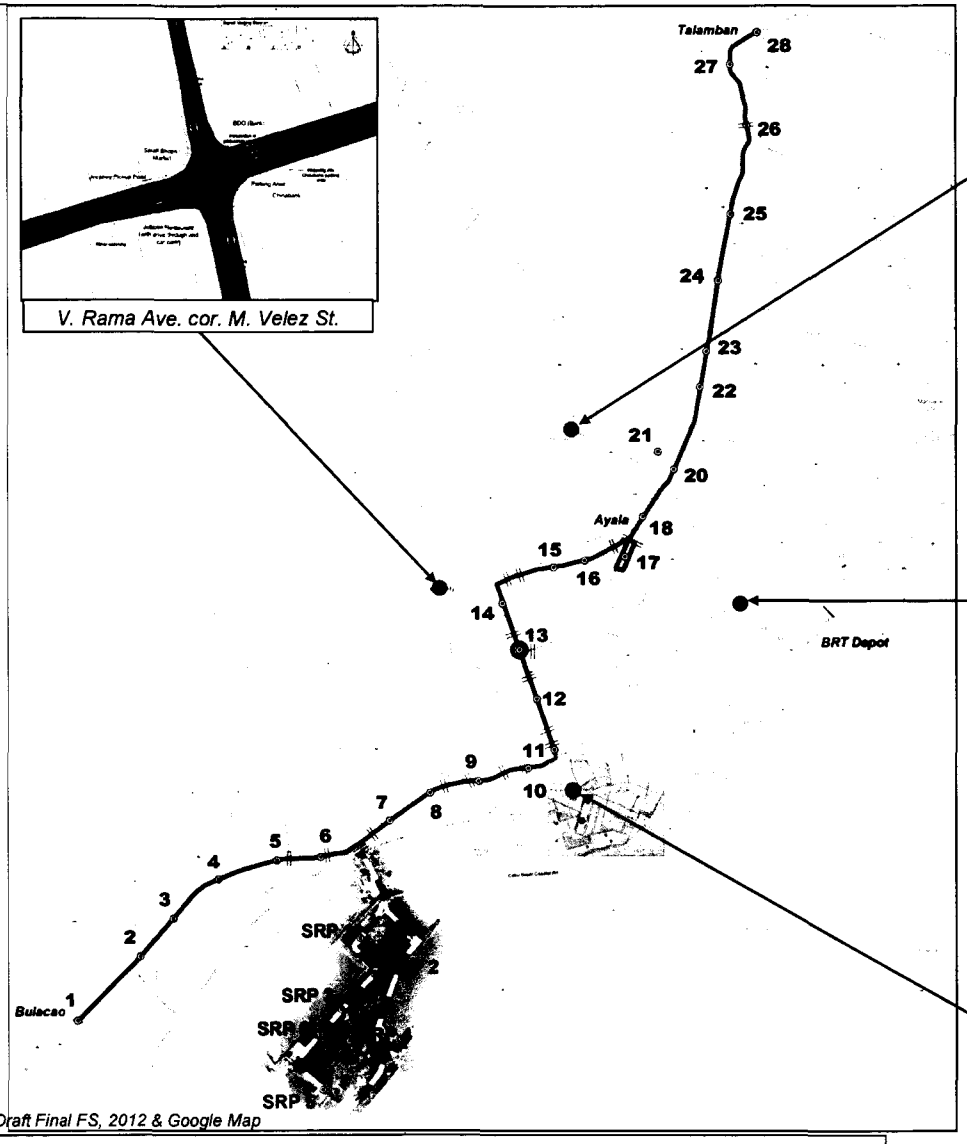
Area Traffic Control System (ATCS)

BRT Stations and Terminals









Sources: Cebu BRT Traffic Management Study, 2012; Cebu BRT Draft Final FS, 2012 & Google Map

Figure 3.3-6

Details and Location of Intersections Improvement Plan

3.4.1 Road Traffic Regulations Considerations

74. The maximum permissible weights for axles and axle groups will prove restrictive in specifying a high capacity bus. However the Presidential Decree establishing these limits prohibits any provincial, city or municipal authority from enacting any resolution regulating or prescribing the maximum gross weight of any motor vehicle, and so local dispensation cannot be sought.

75. The maximum permissible dimensions for the width, height and length of passenger vehicles are also somewhat restrictive. A length limit of 11.0m for a two-axle bus, and a width limit of 2.5m, are low by international standards, but not exceptionally so. The Decree places no prohibition on local dispensation from these regulations, but it would be prudent to plan only on relatively minor adjustments - such as perhaps a 2% increase in permitted width to 2.55m.

76. The dimensions set for each seat space are low by current standards, such as those being adopted for international harmonization based on United Nations Economic Commission for Europe (UN ECE) Regulation 36. However the characteristics of the Philippines population suggests that meeting the full standards espoused in Europe is unnecessary, and that a compromise would be appropriate in meeting both local aspirations and real needs. For this purpose, it is proposed that the minimum dimensions per seat are a width of 450 millimeters for a single seat and 850 millimeters for a twin seat, with a seat pitch of 650 millimeters.

77. The space allowed for standing passengers, though, is relatively generous by international standards and computes at 4.76 passengers per square meter of available floor space. Further, the Circular suggests that each standing passenger should be provided with a space of 600 millimeters by 350 millimeters, rather than just an area of 0.21 square meters. Accordingly it is deemed prudent to require an aisle width of 600 millimeters to allow for efficient packaging of standee spaces; this is compatible with both the proposed seat dimensions and the permissible overall width of the vehicle.

78. The regulations are silent on the remaining factors governing passenger accessibility, such as entry step heights and doorway width, and also on vehicle maneuverability. In these cases, the setting of recommended standards has again been based on UN ECE Regulation 36.

3.4.2 Recommendations for Vehicle Configuration

Saloon floor height

79. Given that the bus will have doorways on both sides, two sets of entrance steps would act to curtail the floor area available for standing passengers to a significant extent. In order to avoid this problem it is therefore proposed that stepped-boarding be adopted at the nearside for the tributary services, but that level-boarding be adopted at the offside for passenger access to the median BRT stations.

80. The preferred floor height is no more than 860 millimeters, accessed by two entry-step risers on the nearside. Such buses can be of the traditional body-on-chassis type, or of semi-integral construction depending on their country of origin. The former provides greater flexibility in adapting the bus to specific local requirements, such as alternative fuels and power-train options.

Door numbers and positions

81. There needs to be an organized flow of passengers through the vehicle from boarding at one end to alighting at the other. Conventional practice, where the driver verifies fare validation at bus-stops, is for the near-side entry door to be opposite the driver in the front over-hang of the bus.

82. With a 900 millimeter wide doorway (800 millimeters between handrails), this enables an angle of approach of up to 10 degrees as would be required where good road conditions cannot be guaranteed on the tributary routes. In turn, this suggests that the front overhang of the bus be in the order of 2,250 millimeters so as to provide for a deformable structure ahead of the doorway to absorb minor accident damage.

83. The off-side front entry door needs to be located behind the driver's cabin, and hence behind the front axle and associated wheel-box. Clearly the driver cannot participate in fare validation under such circumstances, and that task would need to be assigned to station staff. Exit doors would be conventionally located in the rear overhang of the bus.

Vehicle size and capacity

84. An 11.0m twin-axle bus would have an estimated capacity of 76 passengers, of whom 42 could be seated; in this case the governing factor is the tare weight of the bus in relation to permissible axle weights.

85. A 13.7m three-axle bus would have an estimated capacity of 95 passengers, of whom 55 would be seated; capacity could be increased to 100 passengers by restricting seat numbers. In this case the governing factor is the available floor area for standing passengers, and there would be considerable spare capacity in relation to permissible axle weights.

86. An 18.0m articulated bus would have an estimated capacity of 121 passengers, of whom 64 could be seated; in this case the governing factor is again the tare weight of the bus in relation to permissible axle weights.

87. All three sizes of bus have similar efficiency in the utilization of road space, at around 7 passengers per meter of body length, when configured with the maximum possible number of seats. However the tri-axle bus has the potential to raise this level if a higher standee ratio is adopted, whereas the other two bus types do not.

88. Further, as the tri-axle bus has unutilized axle capacity, either alternative-fuel or hybrid power-train options could be pursued without reducing passenger numbers. Again, this potential is not available for either of the other two bus types. Accordingly, the 13.7m three-axle bus is the recommended option.

89. However it should be recognized that the 11.0m twin-axle bus might offer a lower capital cost per passenger place, and hence the potential for competitive operating costs. The 18.0m articulated bus, on the other hand, would have a higher capital cost per passenger place, but could raise BRT system capacity where there are restrictions on station length.

3.4.3 Recommendations for Power-train Specification

Power-plant rating

90. The primary power requirement is taken as enabling a steady speed of 80km/h up a 2% grade at the predicted gross vehicle weight; for the 13.7m tri-axle bus, that equates to 166kW. To that must be added the power consumption of the air-conditioning and electrical systems, totaling 21 kW for this size of bus. The total power requirement of 187kW equates to 250 horsepower nominal.

91. However the selected performance parameter might be perceived as generous, and 122kW would provide for 1% gradeability at 80km/h; this would still be practicable in a relatively flat city such as Cebu. The total power requirement would reduce to 143kW, or 190 horsepower nominal, and that would be the target rating for a hybrid bus.

Power-plant fuelling and emissions standards

92. At this point in time, there is no realistic alternative to conventional diesel fuelling for the primary power plant. Natural gas is not yet available in Cebu, though provision could be made for conversion to this fuel in the future. Pure electric vehicles are precluded by the axle weight restrictions, and are not a particularly 'green' option with the current power mix in the Philippines.

93. Given that national regulations will shortly (2016) mandate Euro IV emissions standards, and that the necessary 50ppm sulfur fuel will be made available accordingly, it makes sense to specify this level of environmental performance. A side benefit would be that the necessary electronic control of fuel injection would then enable hybrid operation, CNG dual-fuel conversion, and also automated mechanical transmissions, should those be desired.

Hybrid options

94. Hybrid bus development has been driven by the desire to reduce fuel consumption, and greenhouse gas emissions, in intensive stop / start urban operation. However BRT systems are designed so as to minimize such service characteristics and the potential benefit is hence much less than examples quoted from other cities.

95. Nevertheless there may be a case for a limited procurement of mild-parallel hybrid buses within the initial fleet to investigate the costs and benefits of this technology in the Cebu circumstances. The means of energy storage adopted may depend on the research and development initiatives of the selected bus supplier, but would probably focus on the use of electrical super-capacitors or hydraulic accumulators.

Transmission

96. The operational characteristics of a BRT system in a relatively flat city suggest that an appropriately rated clutch and mechanical transmission should provide adequate durability whilst minimizing fuel consumption. However, experience with rear-engined buses suggests that an automated mechanical transmission be selected for this configuration.

Functional and technical specification

97. The following table represents the recommended outline specification for buses operating within the proposed BRT system in Cebu (**Table 3.4-1**):

Table 3.4-1
Recommended Outline Specification for Buses Operating within the Proposed BRT System

Specification Parameter	Cebu BRT requirement
International classification - UN ECE R36	Class I
Overall length, m	13.7 + 0.3
Overall width, m	2.50 + 0.05
Front overhang, m	+ 2.25
Wheelbase (to bogie turning center), m	+ 7.65
Turning circle radius, outer / inner, m	12.5/5.3
Angles of approach / departure (laden), deg.	> 10/8
Number of doorways - curbside	2, in overhangs
Number of doorways - offside	2, behind axles
Width of doorway(s), between handrails, mm	>800
Height of first step above road (unladen), mm	<360
Height of internal step risers, mm	<250
Number of internal step risers	2
Seating configuration (where feasible)	2x2
Seat pitch, mm	>650
Width of individual seating space, mm	>450
Width of twin seating space, mm	>850
Width of gangway, mm	>600
Clear height in aisle, mm	>2000
Driver compartment ventilation	Fan-assisted A/c
Passenger saloon ventilation	Air-conditioned
Destination display	Dot matrix
Maximum governed road speed, km/h	<80
Minimum gradeability in 2nd gear, %	>15
Engine environmental standard	Euro IV
Engine rating, kW	+ 190
Engine rating, parallel hybrid, kW	+ 145
Engine location	Front or rear
Clutch diameter, mm	>380
Transmission type, front engine	Mechanical
Transmission type, rear engine	Automated mechanical
Suspension characteristic, front axle	Full air, rear engine only
Suspension characteristic, rear axle	Full air, with anti-roll bar
Fuel tank capacity, l	> 210
Driver information display	Electronic

3.5 Service Plan

98. The BRT service plan design emanates from passenger forecasts. It seeks to provide an optimum means of serving origins and destination of trips in the volumes forecast with respect to different time periods.

99. Key principles and assumptions adopted in the development of the service plan included:

- Although the proposed vehicles have capacity for 95-100 passengers, for the purposes of service planning, 80 passengers per vehicle was assumed. This provides some capacity for fluctuations within the peak period, reflects the inherent variability in model forecasts, and also provides some leeway on the busiest links in the network for supply to be planned slightly below demand.

- Services not serving terminating at Ayala bypass that station, i.e. a service from Talamban to Bulacao does not call at Ayala
- a Movements between keep stations and groups of stations were analyzed to ensure that direct services were provided for the most important demands
- Clock face frequencies are provided where possible to provide ease of understanding to the user.

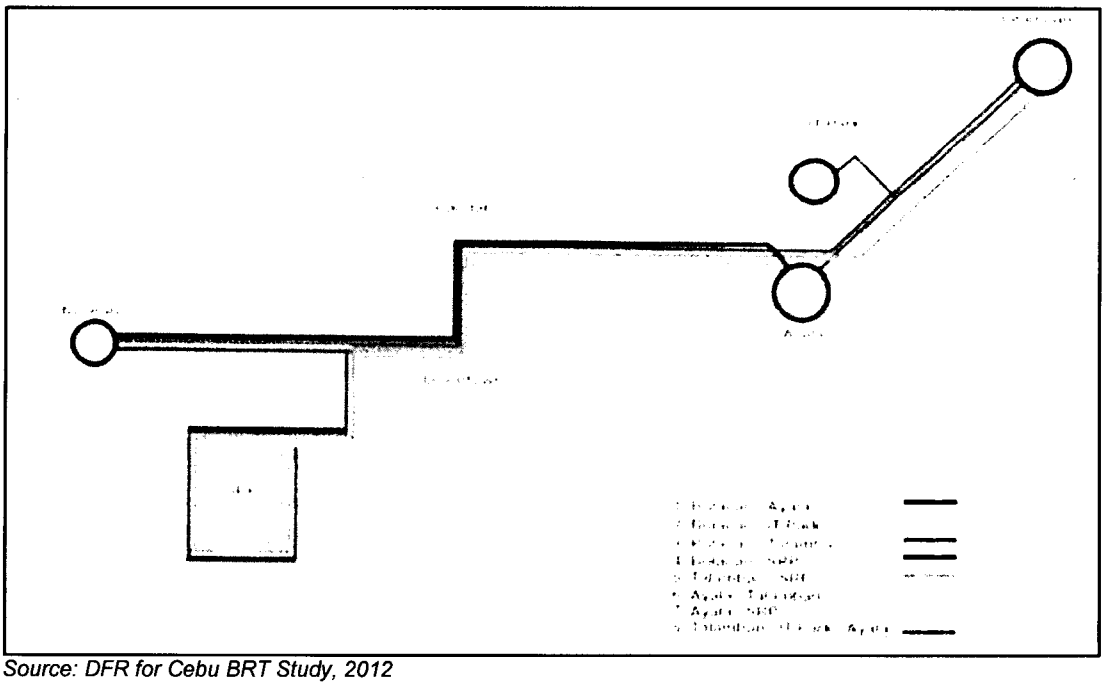
100. In developing the service plan and determining the frequencies in each route, a balanced approach was taken such that where demands were particularly high on one link, then supply was not necessarily provided to meet all of this demand as this would not be an efficient use of vehicle resources, and would also be placing too great an emphasis on the accuracy of the forecasts. In practice, it will be relatively simple to increase frequency on a particular service through the provision of additional vehicles.

3.5.1 AM Peak Service Plan

101. BRT services are proposed on the following routes

- Bulacao - Ayala
- Bulacao - IT Park
- Bulacao-Talamban
- Bulacao - SRP
- Talamban-SRP a Talamban -Ayala
- Ayala-SRP
- Talamban - IT Park – Ayala

102. These routes are illustrated in **Figure 3.5-1**. Apart from journeys between SRP and IT Park, all trips can be made without interchange on the BRT, providing high levels of convenience and accessibility to the Cebu public.



Source: DFR for Cebu BRT Study, 2012

Figure 3.5-1
Cebu BRT Service Plan

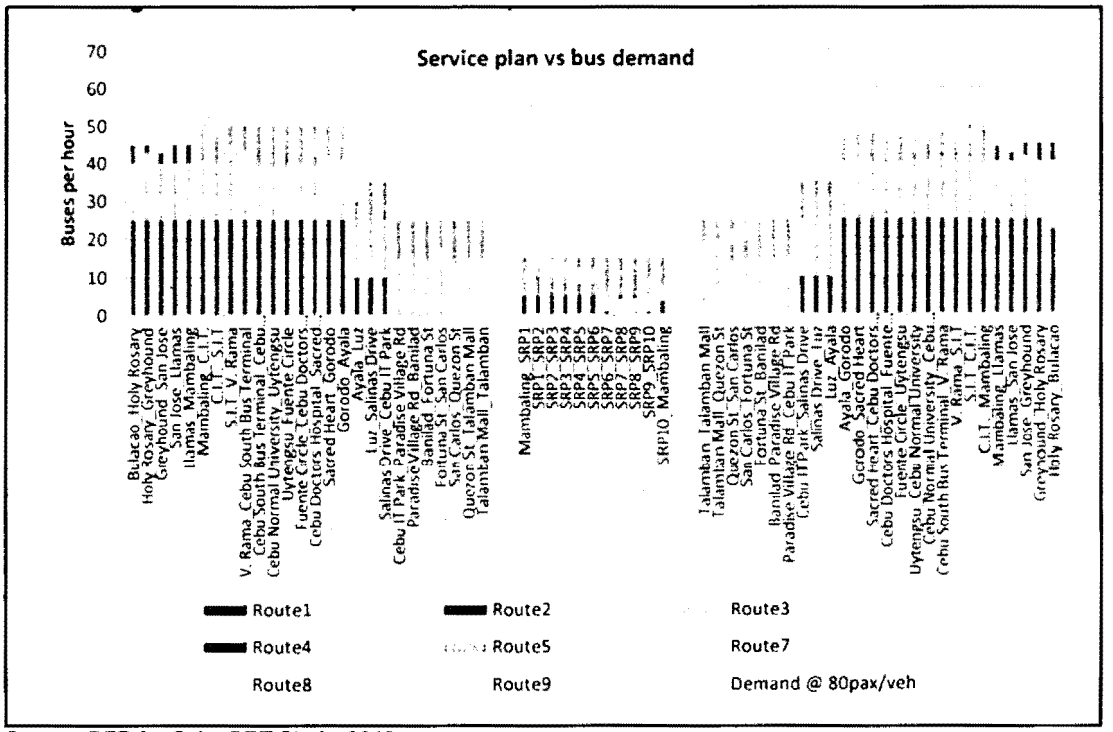
3.5.2 Bus Frequencies

103. Frequencies on each of these services have been determined using the principles and assumptions set out above, and are presented in **Table 3.5-1**.

Table 3.5-1
2015 AM Peak BRT Frequencies

Service	Buses per hour	Headway
Bulacao-Ayala	15	4 mins
Bulacao - IT Park	10	6 mins
Bulacao -Talamban	15	4 mins
Bulacao-SRP	5	12 mins
Talamban-SRP	10	6 mins
Talamban-Ayala	10	6 mins
Ayala-SRP	5	12 mins
Talamban - IT Park - Ayala	5	12 mins

104. **Figure 3.5-2** shows how the service frequency plan compares with the forecast demand on each link across the network. It shows that for the majority of the route there is sufficient capacity to meet demand at occupancy of 80 persons per vehicle. However, there are a few short sections - San Jose-Mambaling, Salinas Drive-Ayala, and V.Rama-Mambaling - where demand exceeds 80 passengers per bus, but can be accommodated within the maximum capacity of vehicles.



Source: DFR for Cebu BRT Study, 2012

Figure 3.5-2
2015 AM Peak Service Provisions and Demand

105. In order to estimate the required frequencies on each service during other periods of the day, and at weekends, trip matrices for these different periods were developed and assigned to the network. This allowed the particular demands of SRP, and other major

leisure/retail attractions such as Ayala, to be reflected in the service plan and therefore in the operating requirements. **Table 3.5-2** summarizes the estimated frequencies by time of day for weekdays and weekends.

Table 3.5-2
2015 BRT Frequencies (bph)

Route	Day	Pre-AM 6am-7am	AM 7am-10am	IP 10am-4pm	PM 4pm-7pm	Post-PM 7pm-11pm	Night 11pm-12am
Bulacao-Ayala	Weekday	8	15	10	15	15	8
	Weekend	6	11	11	10	10	5
Bulacao-IT Park	Weekday	5	10	5	10	5	3
	Weekend	3	3	3	3	3	3
Bulacao-Talamban	Weekday	8	15	10	10	6	3
	Weekend	2	2	2	2	2	2
Bulacao-SRP	Weekday	3	5	10	10	12	6
	Weekend	1	2	7	15	15	8
Talamban-SRP	Weekday	5	10	20	15	20	10
	Weekend	2	3	14	15	15	8
Talamban-Ayala	Weekday	5	10	10	10	10	5
	Weekend	4	7	7	10	10	5
Ayala-SRP	Weekday	3	5	15	20	10	5
	Weekend	1	2	7	30	30	15
Talamban-IT Park - Ayala	Weekday	3	5	5	5	5	3
	Weekend	2	4	4	5	5	3

3.5.3 Interaction with Jeepneys

106. A number of amendments to the jeepney network were assumed in the modeling. The effect of these amendments is to remove competition from the BRT segregated corridor and to restructure some of the jeepney routes so that they act as feeders to the BRT. Passengers will be able to interchange easily between BRT and jeepney at designated zones at certain stations, as illustrated in **Figure 3.5-3**.

107. Between Talamban and Ayala on the unsegregated section, the modeling assumes that jeepneys continue to operate alongside BRT vehicles, hence shows the potentialforinterchange at all stops along this section. In practice, this may not be practical and theactual relationship between BRT and jeepney operations between Ayala and Talamban will be influenced and determined by operational, regulatory and policy considerations.

There are eight separately defined services which overlap and provide higher frequency levels in sections with high levels of demand. The service plan is focused on the five primary destinations of Bulacao, Ayala, Talamban, SRP and IT Park.

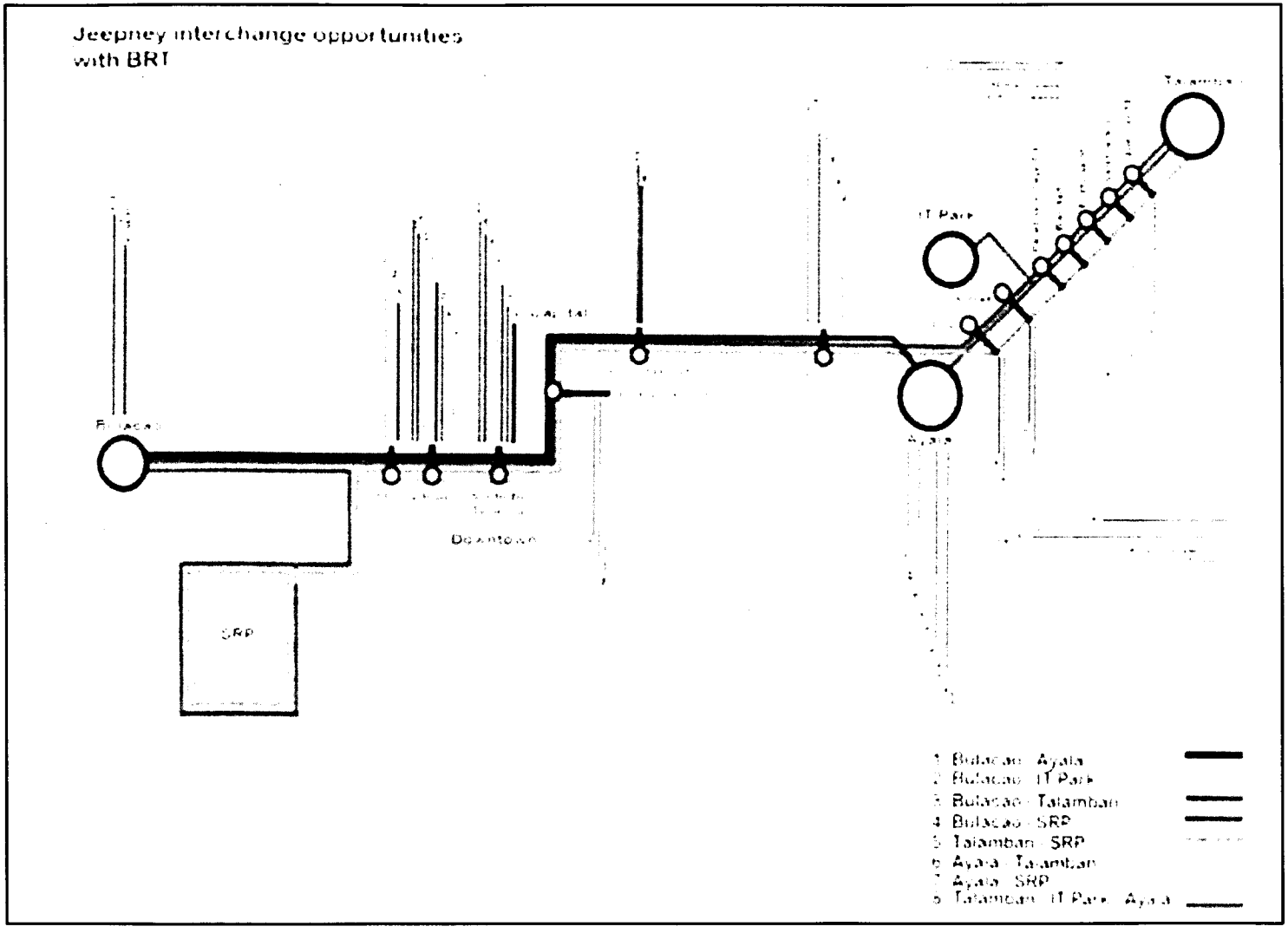


Figure 3.5-3
BRT-Jeepney Interchange Opportunities

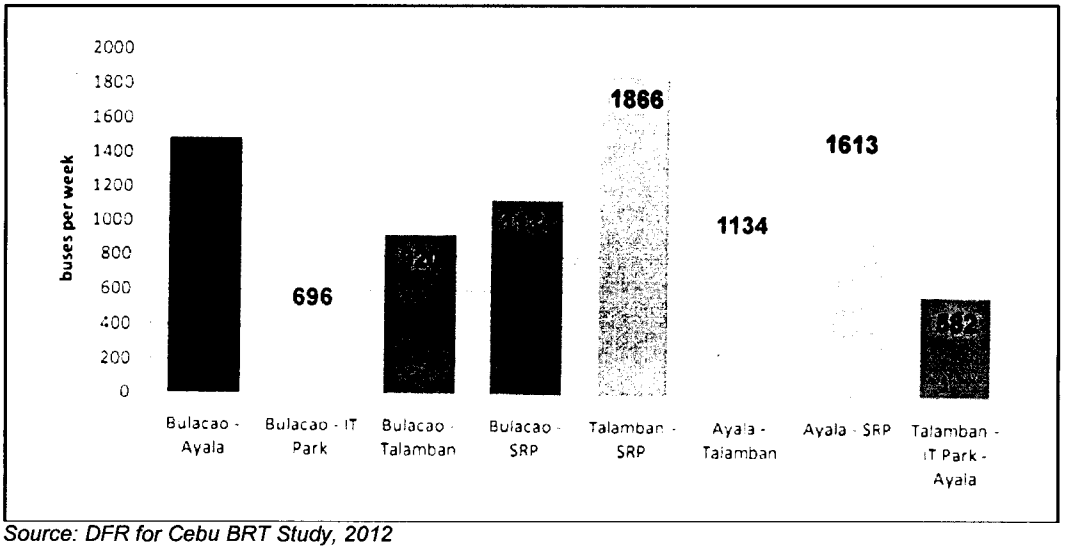
108. The service level offers approximately 9,500 buses per week which underpins the operating cost profile of the BRT scheme. The three prominent services are Talamban - SRP (approx. 1850 buses per week forming 20% of total), Ayala - SRP (approx. 1600 buses per week forming 17% of total) and Bulacao - Ayala (approx. 1500 buses per week forming 16% of total). This scenario is depicted in **Figure 3.5-4**.

3.5.4 Peak Vehicle Requirement (PVR) and Bus Fleet

109. To estimate the Peak Vehicle Requirement (PVR) and the Bus Fleet the above service plan requires projection against operating speeds and the route length. Route length is accurately available. Operating speeds are estimated by the transportation demand model with 10% added to layover requirements.

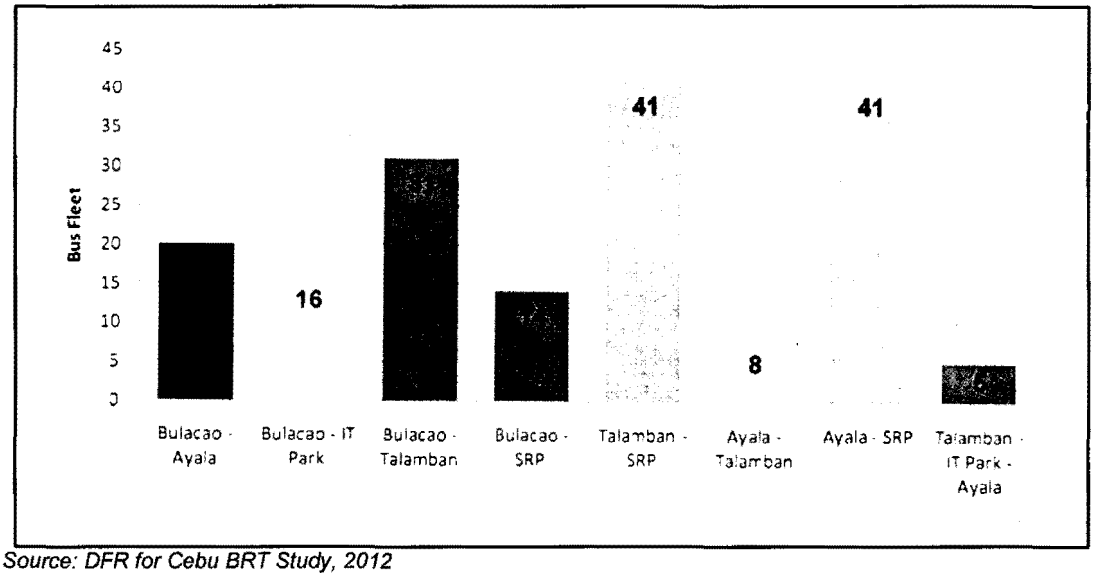
110. The PVR is proportional to the maximum bph and route length and inversely proportional to operating speeds. Therefore the PVR is higher when i) the maximum bph is higher, ii) route length is longer; and/or iii) the operating speed is shorter.

111. To calculate the Bus Fleet, 10% uplift over the PVR is applied and the number is rounded up to the nearest unit bus. Because of the rounding requirement, this analysis is required on a per route basis. Overall, the total Bus Fleet is 176 buses. This scenario is depicted in **Figure 3.5-5.**



Source: DFR for Cebu BRT Study, 2012

Figure 3.5-4
Bus Frequencies, Services per Week, 2015

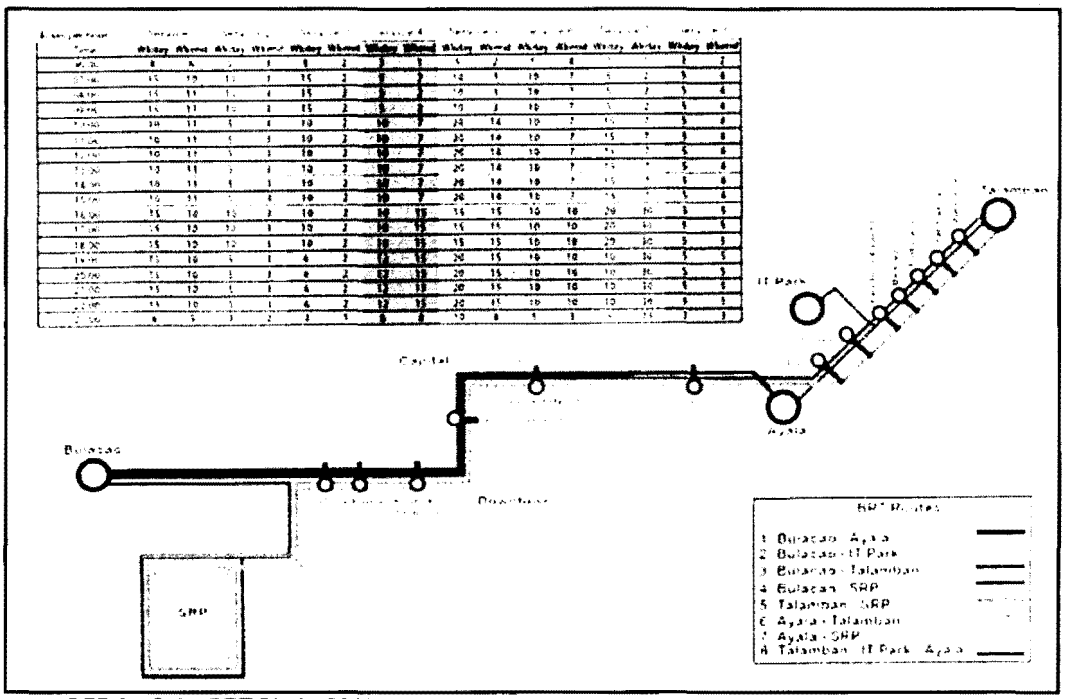


Source: DFR for Cebu BRT Study, 2012

Figure 3.5-5
Bus Fleet Frequencies, Services per Week, 2015

3.5.5 Service Plan Summary

112. **Figure 3.5-6** presents the service plan for the BRT routes, measured in frequency – bph (buses per hour). It has been carefully designed to accommodate 330,000 passengers in the first year of the BRT operation, 2015.



Source: DFR for Cebu BRT Study, 2012

Figure 3.5-6
Proposed Service Plan

3.6 BRT Road Infrastructure

3.6.1 Infrastructure Development Approach

113. As BRT is a road based form of mass transit, it must recognize Philippine national design standards. However BRT also involves infrastructure not before experienced in the Philippines. Where design is required for which standards are not available, international best practices is adopted. Infrastructure design is further guided by consultation with users, specialist interest groups and stakeholders together with ethnographic study of transport use within the study. The consultation process is detailed both within this report and within the Pre-Feasibility Study.

114. In developing the engineering (horizontal) design proposals the following design criteria have been adopted as desirable:

- Median based BRT running lanes: 2 x 3.5m (International standard)
- General traffic lane: 3.25m (DPWH minimum standard)
- Sidewalk: 2.0m
- Landscaping incorporated where possible
- Station platform: 4.0m minimum
- Segregation kerbing between BRT and general traffic lane: 0.3m
- BRT overtaking lane at all stations (3.5m)
- Pedestrian crossings at-grade unless seen to overtly compromise safety or capacity

115. At this stage of design these standards are seen as the minimum requirement. All drawings which accompany this chapter, including the full suite of Outline Engineering Designs, include references to the critical design dimensions along the entire corridor, and annotation. These should be referenced in conjunction with this chapter of the report to avoid misinterpretation.

3.6.2 Pedestrian Accessibility

116. Effective accessibility to BRT is essential in order to meet its full potential in terms of serving the travelling public and meeting objectives relating to economic development and poverty alleviation. The approach adopted for Cebu BRT is based upon the guidelines contained within BRT Guidelines handbook published by Lloyd Wright2 and focuses upon ensuring the following key issues are addressed and included within the infrastructure design:

- Safety;
- Security;
- Directness;
- Ease of entry;
- Comfort; and
- Aesthetics.

3.6.3 Designing for Persons with Limited Mobility

117. Scheme development has involved multiple meetings with disability groups to understand specific needs and issues. The design process has adopted the principle that the BRT isaccessible for all within the constraints of the environment in which it is placed. Relevant design guidance exists both within Philippine National Ordinance and the World Bank. In particular, the following local and international laws on accessibility were considered in the overall project designs:

- Accessibility Law (BP344) sets out statutory requirements for designing for persons with disability;
- Bus Rapid Transit Accessibility Guidelines (January 2007), and,
- World Bank Accessibility Guidelines (March 2007)

3.6.4 Segregated Busway: Bulacao - Ayala

118. The proposed corridor has been sub-divided into separate highway links, with these link boundaries defined where the cross-section of the highway changes in its dimension, and are summarized as follows:

- Bulacao Terminal - Cebu Road South - F. Jaca
- F. Jaca - Cebu Road South - Mambaling Flyover
- Mambaling Flyover - Cebu Road South - V. Rama
- V: Rama - N. Bacalso - Jones' Intersection
- Jones' Intersection - Osmeña Boulevard - Osmeña Circle - Escario
- Escario - Gorordo - Arch Reyes Ave

119. An overview of each of the highway link sections are illustrated for convenience and reference in **Figure 3.6-1**.

120. Illustrative cross-sections representing the existing and proposed configurations are presented to confirm the critical dimensions in **Figure 3.6-2 to 3.6-7**. For clarification, existing dimensions quoted are those taken by ITP team members, and not extracted from the GIS database due to concern over its reliability.

121. Based on the GIS data and on-site measurements, it is not considered possible to insert cycle lanes alongside the BRT. However, if at the detailed design stage it is considered possible to provide cycle lanes alongside the BRT which are of suitable length and width to make them fully usable, then this should be fully encouraged. Through the consultation process it was established that there is a strong desire for cycle infrastructure within Cebu.

3.6.5 Bus Priority Route: Ayala to Talamban

122. Due to the dimensions of the current highway cross-section, equaling 21 meters, the Ayala to Talamban, via Gov. M. Cuenco Avenue will not be subject to the insertion of BRT running lanes. In doing so, this would require significant land assembly beyond the limits of the existing Right-of-Way, and within the scope of this Feasibility Study, and proposed implementation timetable, this has deemed unachievable.

123. The alignment of the Ayala to Talamban section of the BRT corridor will follow Gov. M. Cuenco Avenue. Along the corridor, improvements to two key intersections that currently generate peak congestion will be subject to geometric reconfiguration and traffic signal control. These intersections are located at:

- Gov. M. Cuenco Ave / Paradise Village Road
- Gov. M. Cuenco Ave / M. L. Quezon Ave
- Beyond these two intersections, it is proposed that the BRT alignment will utilize the existing flyovers at Salinas Drive and A. S. Fortuna Street.

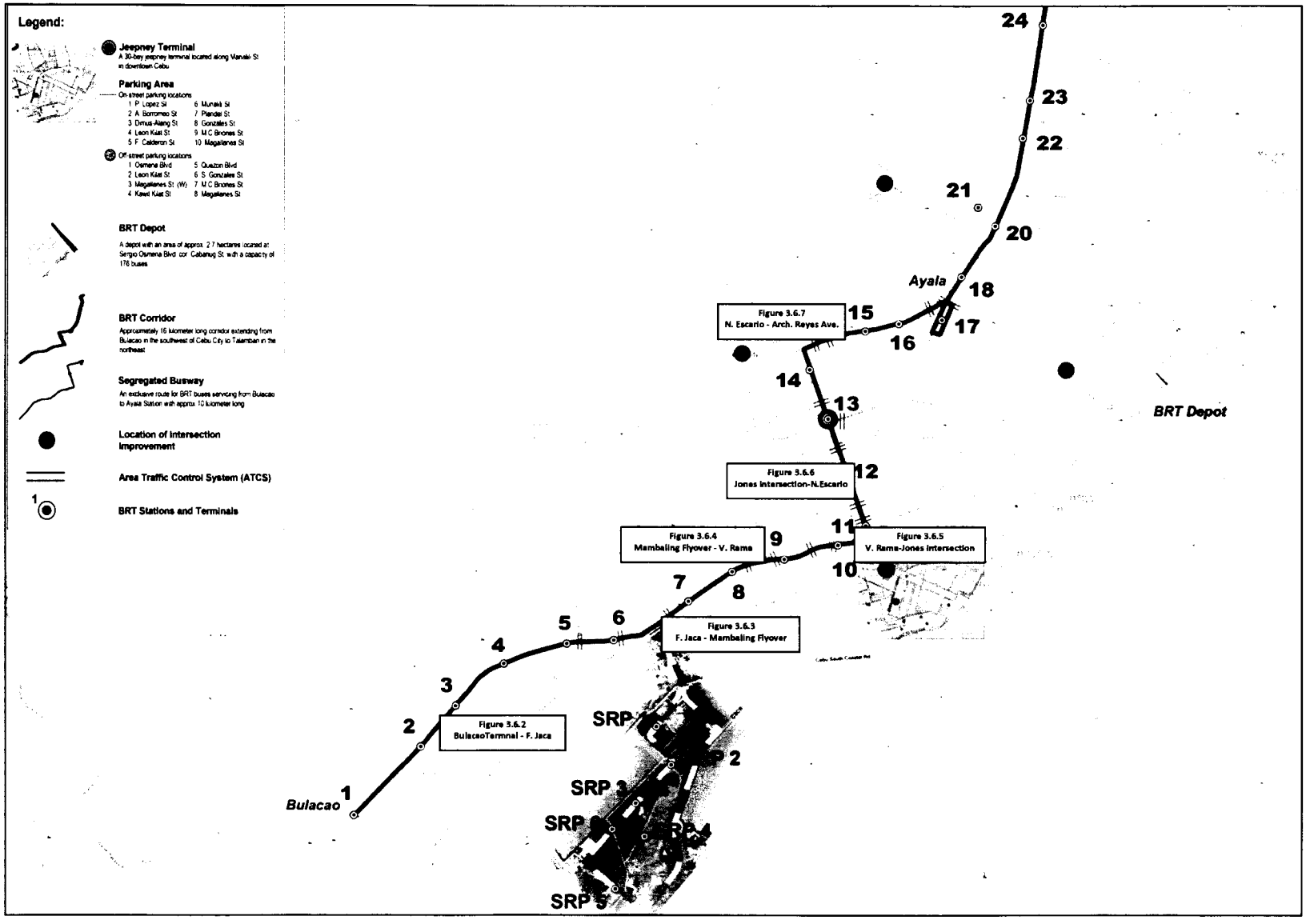


Figure 3.6-1
Overview of Each of the Highways Link Sections

Provision of High-Quality Bus Stops

124. New high-quality bus stops will be provided to service the predicted passenger demand along this section of the BRT corridor. These stops will be provided at the following locations:

- Luz Barangay (adjacent to Cabantan Street)
- North of Salinas Drive flyover
- Paradise Village Road
- Banilad
- North of A. S. Fortuna flyover
- San Carlos University
- M. L. Quezon Street
- Talamban Shopping Mall (currently under construction)
- Talamban Terminal

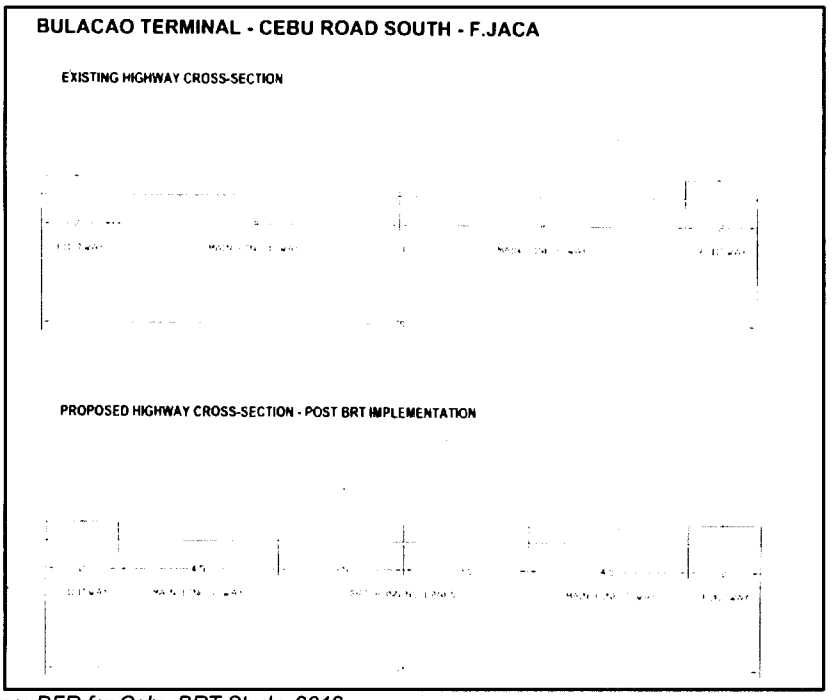
125. Each of stop has been designed to a sheltered waiting area for the predicted peak passenger boarding demand. Each stop will provide a ticket selling kiosk / ticket validation areas and seating area. The Stop will be open in design and benefit from a cantilever roof structure, which will extend out over the bus waiting area and adjoining sidewalk, which will run in-front of the waiting area.

Cebu IT Park (CITP)

126. Cebu IT Park provides a major employment zone in the north-west of the City and provides accommodation for numerous high-technology and finance companies. Primary access into CITP is provided on Salinas Drive, and due to its constrained cross-section and vehicle demand is subjected to congestion during peak periods.

127. As a major employment zone and trip generator, it is proposed that CITP is served as a spur route on the Ayala - Talamban corridor. In order to avoid the peak time congestion an alternative and bespoke route for bus access only is proposed. The bus-only access will be formed by the construction of a new signal-controlled intersection on Gov. M. Cuenco Ave, and located within CITP, the BRT service follow a route which loops around the internal highway network and provide a stopping facility located at the current PUJ stop. BRT service will egress CITP again via the bus-only link, and link back onto Gov. M Cuenco.

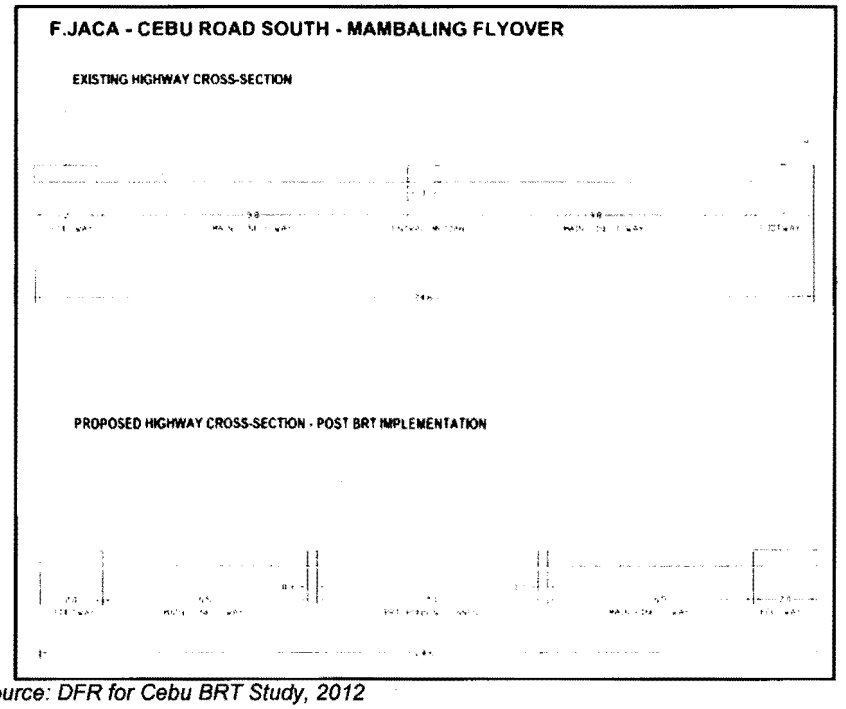
128. With the above proposal, BRT services are able to access, service and egress CITP without the need to be subjected to congestion and delay generated by Salinas Drive.



Source: DFR for Cebu BRT Study, 2012

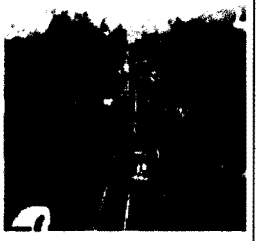
Figure 3.6-2
Standard BRT Median Running – Cebu South Road (Bulacao Terminal - F. Jaca)

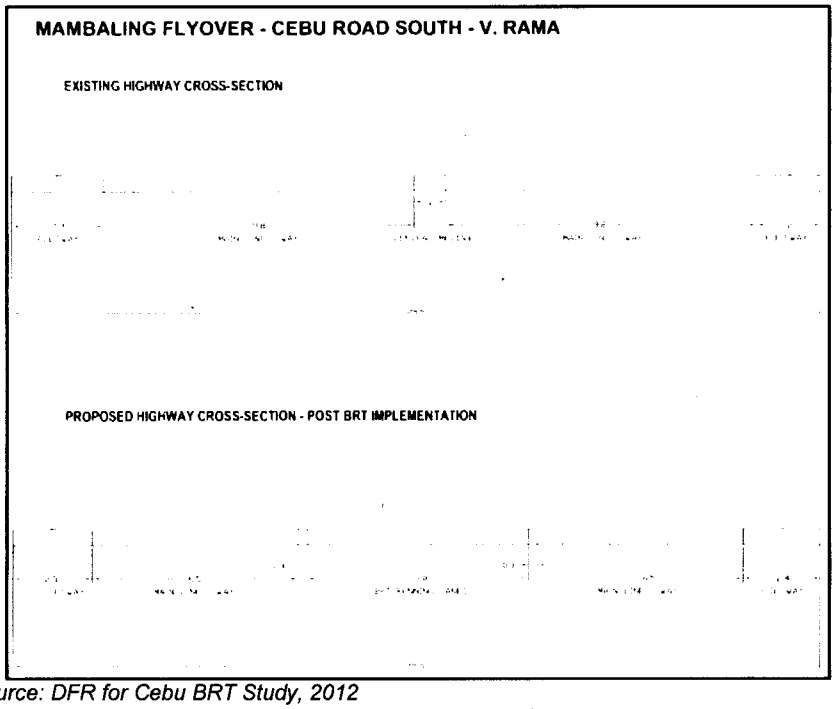
Link Description	Photo	Existing Highway Configuration	Proposed Configuration
Bulacao Terminal – Cebu Road South – F. Jaca		Cross-section approximately 20 metres (inclusive of sidewalks). No kerbed central median	2 x BRT Lanes at 3.5m (7.0m) 2 x general traffic lane at 4.5m (9.0m) 2 x sidewalks at 2.0m (4.0m) Total = 20m Due to the constrained cross-section BRT will still have a dedicated running lane, but no formal (hard-standing) segregation will be provided. Delineation of the BRT running lanes will be by raised yellow thermoplastic delineation; forming a raised convex hump. Due to the reduced width of the general traffic lane, general traffic will be allowed to temporarily cross into, and navigate along the BRT lane to either bypass a parked vehicle, or avoid an obstruction. In all other circumstances, road traffic will be expected to remain within, and navigate along the general traffic lane.



Source: DFR for Cebu BRT Study, 2012

Figure 3.6-3
Standard BRT Median Running – Cebu South Road (F. Jaca - Mambaling Flyover)

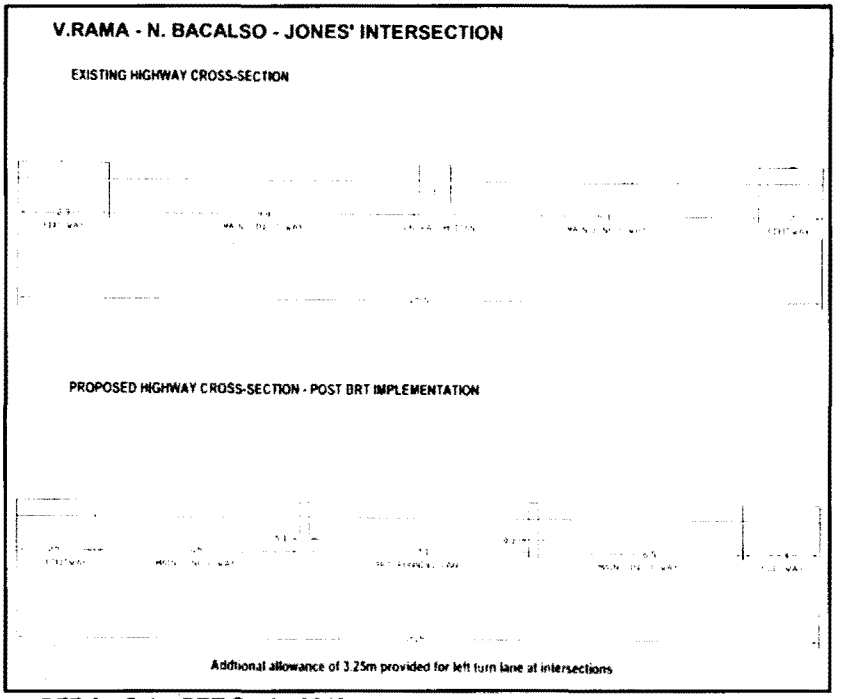
Link Description	Photo	Existing Highway Configuration	Proposed Configuration
F. Jaca - Cebu Road South - Mambaling Flyover		Cross-section with a minimum dimension of 24.6 metres, equalling dual three lane highway and kerbed central median. Dimension of sidewalks ranges between 2.0m and 2.5m.	2 x BRT Lanes at 3.5m (7.0m) 2 x BRT segregation at 0.3m (0.6m) 4 x general traffic lane at 3.25m (13m) 2 x sidewalks at 2.0m (4.0m) Total = 24.6m BRT to operate in segregated median running lanes, each measuring 7.0m. Main-line carriageway reduced to dual operation, measuring 3.25m for each stream of traffic. Segregation barrier to measure 0.3m



Source: DFR for Cebu BRT Study, 2012

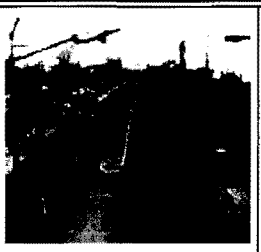
Figure 3.6-4
Standard BRT Median Running – Cebu South Road (Mambaling Flyover - V. Rama)

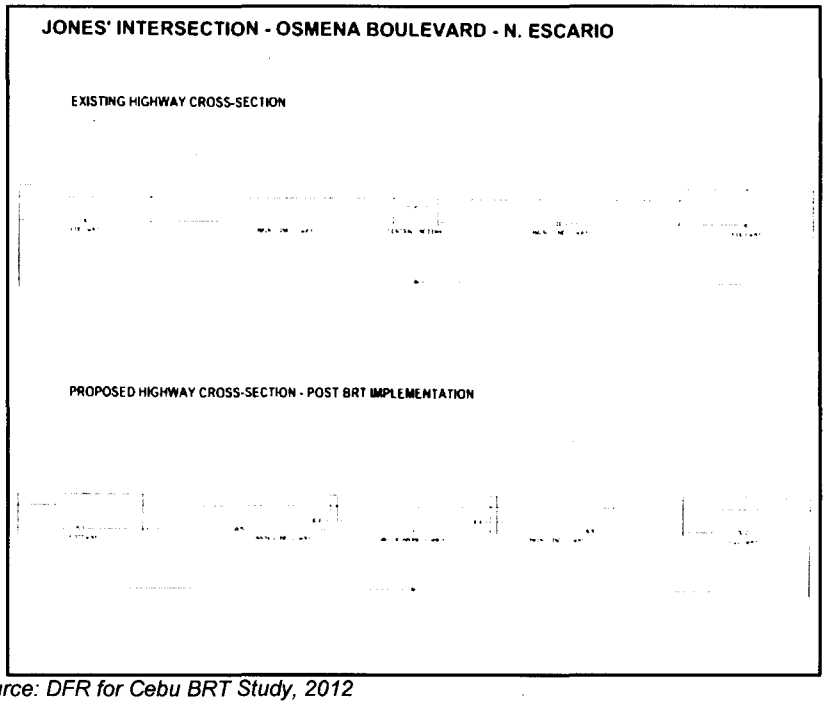
Link Description	Photo	Existing Highway Configuration	Proposed Configuration
Mambaling Flyover - Cebu Road South – V. Rama		Cross-section with a minimum dimension of 25.5 metres, equalling dual three lane highway and kerbed central median. Dimension of sidewalks ranges between 2.0m and 3.0m.	2 x BRT Lanes at 3.5m (7.0m) 2 x BRT segregation at 0.3m (0.6m) 4 x general traffic lane at 3.25m (13m) 2 x sidewalks at 2.0m (4.0m) Total = 24.6m BRT to operate in segregated median running lanes, each measuring 7.0m. Main-line carriageway reduced to dual operation, measuring 3.25m for each stream of traffic. Segregation barrier to measure 0.3m



Source: DFR for Cebu BRT Study, 2012

Figure 3.6-5
Standard BRT Median Running – Cebu South Road (V. Rama - Jones Intersection)

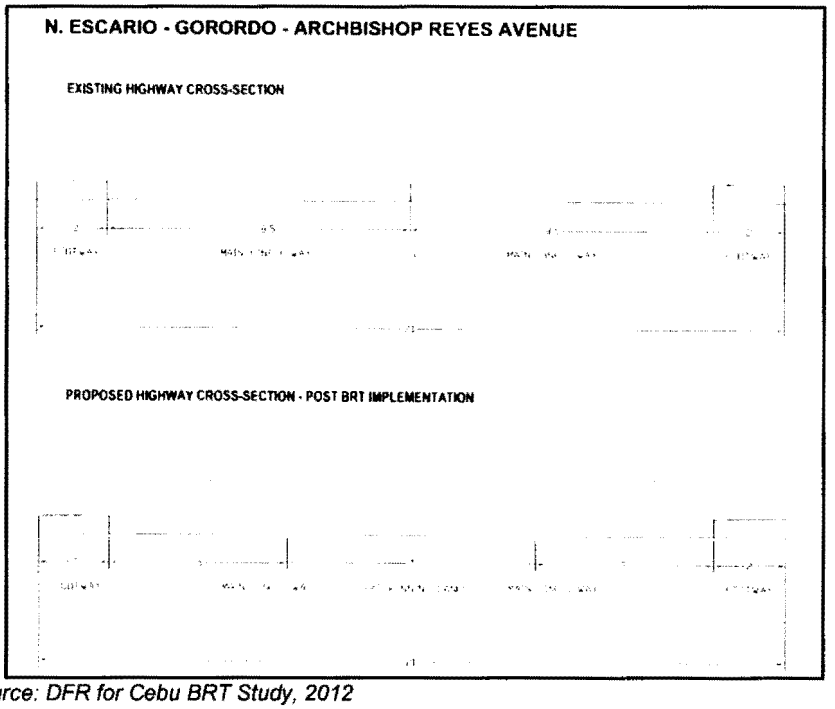
Link Description	Photo	Existing Highway Configuration	Proposed Configuration
V. Rama – N. Bacalso – Jones' Intersection		Cross-section with a minimum dimension of 30 metres, equalling dual three lane highway and kerbed central median. Additional width in cross-section at intersections and generated by the introduction of bespoke left-turn filter lanes on N. Bacalso. Dimension of sidewalks ranges between 2.0m and 2.2m.	2 x BRT Lanes at 3.5m (7.0m) 2 x BRT segregation at 0.3m (0.6m) 4 x general traffic lanes (two lanes in each direction at 3.25m (13m) 2 x sidewalks at 2.0m (4.0m) Total = 24.6m BRT to operate in segregated median running lanes, each measuring 7.0m. Main-line carriageway reduced to dual operation, measuring 3.25m for each stream of traffic. Segregation barrier to measure 0.3m



Source: DFR for Cebu BRT Study, 2012

Figure 3.6-6
Standard BRT Median Running – Osmeña Blvd. (Jones Intersection – N. Escario)

Link Description	Photo	Existing Highway Configuration	Proposed Configuration
Jones' Intersection – Osmena Boulevard – Escario		Cross-section of approximately 24m metres (minimum), equalling dual three lanes highway and kerbed central median Sidewalks provided at 2 x 6m. Total ROW equaling 36m.	2 x BRT Lanes at 3.5m (7.0m) 4 x general traffic lanes (two lanes in each direction) at 4.25m (17m) 2 x sidewalks at 6m (12.0m) Total = 36m BRT to operate in dedicated running lanes, but without formal (hard-standing) segregation. Delineation of BRT running lanes by continuous yellow line marking, which also includes the application of thermoplastic humps onto the yellow delineation; this forming a raised convex hump. No formal (hard-standing) segregation is proposed
			along Osmena Boulevard in order minimise the insertion of BRT operations along a culturally significant highway within Cebu city. Main-line carriageway reduced to dual- lane, with each lane measuring 4.25m. Sidewalks to remain unchanged.



Source: DFR for Cebu BRT Study, 2012

Figure 3.6-7
Standard BRT Median Running – N. Escario (N. Escario - Arch. Reyes)

Link Description	Photo	Existing Highway Configuration	Proposed Configuration
Escario – Gorordo – Arch Reynes Ave		Minimum cross-section of 21metres, equalling dual two lane highway with no kerbed central median. Sidewalks provided at 2 x 2m	2 x BRT Lanes at 3.5m (7.0m) 2 x general traffic lane at 5.0m (10.0m) 2 x sidewalks at 2.0m (4.0m) Total = 21m Due to the constrained cross-section BRT will still have a dedicated running lane, but no formal (hard-standing) segregation will be provided. Delineation of the BRT running lanes will be by virtue of a continuous yellow line, which also includes the application of thermoplastic humps ontop of the yellow delineation: this forming a raised convex hump. Due to the reduced width of the general traffic lane, vehicles will be allowed to temporarily cross into, and navigate along the BRT lane to either bypass a parked vehicle, or avoid an obstruction. In all other circumstances, road traffic will be expected to remain within, and navigate along the general traffic lane.

3.6.6 Terminals

129. The need for terminals has currently been identified in Bulacao, Ayala Mall and Talamban.

3.6.7 BRT Depot

130. The depot will be the BRT operating base. It will provide parking accommodation, servicing and maintenance facilities for vehicles, an administrative function, and facilities for staff. Depending upon procurement and operating structure it may be a facility provided by the operator.

3.6.8 Means of Segregation

131. An alternative means of segregation was used for Rea Vaya BRT in Johannesburg (South Africa). This consists of a concrete section embedded in the road surface with raised bars at 30-40mm height, this is illustrated below. The effect of the transverse bars is to violently affect the steering of any vehicle which seeks to intrude even at the lowest of speeds however a BRT vehicle might be towed out of the segregation if required. The use of a bright yellow pigment within the casting of the sections and its low profile offer a highly visual but low impact solution.

3.6.9 Highway Signage, Road Markings and Street Lighting

132. The management of the existing highway is of equal importance to providing BRT priority in its own right. By the very nature of BRT implementation will see a radical change in the highway environment. In this context management and movement of vehicles and pedestrians, within a safe environment, is required.

133. In parallel with revised highway signage, revised carriageway markings serve an important role in conveying road user's specific information and requirements that might be possible using vertical signage. In the context of BRT new road marking will form an integral part in the operation of new traffic intersection as they aim to manage vehicle pedestrian flow in a more efficient and safe manner.

134. The creation of a physically segregated BRT busway also has an effect upon drainage. Where cross fall is present storm water drainage to the road channel could be prevented by the presence of a continuous linear (segregation) kerb. To overcome this allowing water to drain as it does at present, breaks should be placed in the kerb on road side. These breaks should be restricted in width being large enough to prevent silting but narrow enough to prevent an entry point.

3.7 Traffic Management

135. Elements of traffic management involve the following:

- Intersection optimization. Capacity optimization at key intersections.
- Parking Management. A review of the city's approach to parking management and the development of proposals where specific problems exist.
- Jeepney Terminals. Optimization of arrangements at Jeepney terminals where there is delay to Jeepneys, conflict with passengers and adverse effects upon other road users.

136. For intersection optimization, the study focused on the following four intersections:

- Osmeña Boulevard / Colon Street
- V. Rama Avenue / M. Velez Street / R. Duterte
- M.J. Cuenco Avenue / J. Luna Avenue
- Gorordo Avenue / Salinas Drive

137. The parking management was investigated particularly in Downtown Cebu where there is a high demand for car parking. It was found that public car parking in Downtown Cebu is well organized and well controlled. It was observed during the survey periods that there is spare capacity for those wishing to park in the area. Overall it was found that car parking within the study area shown on these plans was 74% occupied during the time of the survey, which was undertaken between 10am and 12 noon. Based on these results it is not considered that the level of car parking should be increased.

138. Jeepney terminal facilities were investigated in two locations away from the proposed BRT corridor. One location was the jeepney terminal at SM Mall, located off Juan Luna Avenue Extension, and the other location was within the Downtown Cebu area.

139. Downtown Cebu lacks any one particular terminal location. The potential introduction of such a facility has been discussed, along with the rationalization of routes through the area to provide higher concentrations of routes along particular corridors.

3.8 Operational Management

140. Operational management pertains to the management of the transportation services and the infrastructures, which are primarily of the operations management and the collection of revenues. Each of these consists of strategic and tactical decisions, operational procedures, and technology and human-centered systems.

141. Later in the project implementation, DOTC and CCG may undertake analysis issues and best suitable operation management based on the work of the Prefeasibility and Feasibility Studies and on international practice to cover the following:

- BRT System Management
- BRT Operations Management
- Service Contracting
- Fares Structure
- Interchange Options, Penalties and Rebates
- Fares Levels
- Revenue Collection
- Revenue Protection

3.9 Project Cost

142. The project cost is estimated at Two Hundred Eleven Million Dollars ($ 211 M). It includes capital cost, resettlement cost, mitigation/monitoring/evaluation, project management and BRT concept dissemination.

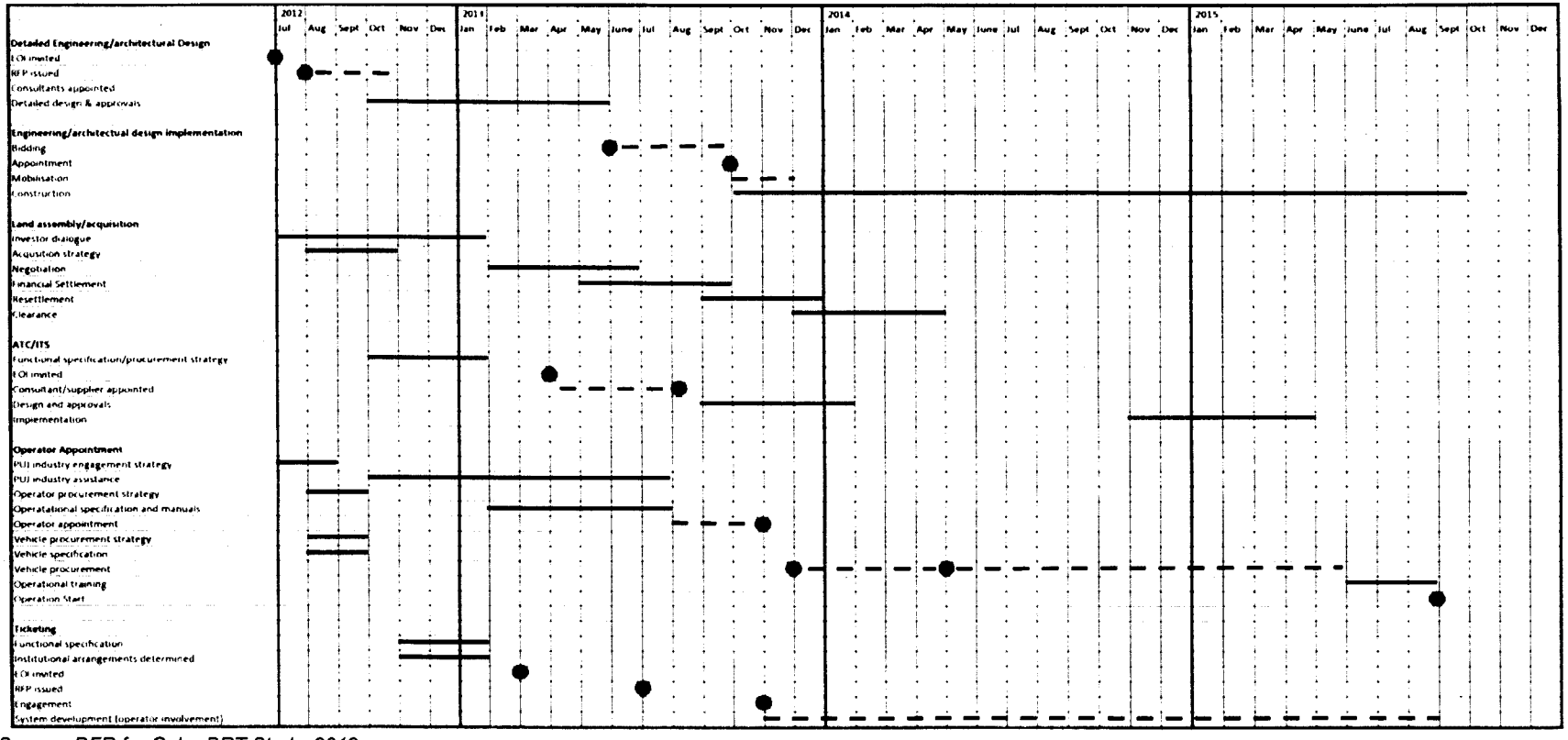
3.10 Implementation Schedule

143. The target date for operation is October 2015; this will be prior to Christmas/Sinulog and within the current Presidential term. To achieve this the following key dates must be adhered to:

- Detailed design starts February 2013
- Construction starts October 2013
- Construction finishes on or before 2015
- Project operates 2015

The time table showing the schedule of project implementation is shown in T**able 3.10-1**.

Table 3.10-1
Key Program Dates to Project Implementation



Source: DFR for Cebu BRT Study, 2012

4.0 ENVIRONMENTAL BASELINE DATA

4.1 Physical Environment

4.1.1 Geology and Geomorphologic Characteristics

144. According to previous studies conducted for Cebu (Holman & Palmer, 1999), Cebu City is underlain by a variety of sedimentary and igneous rocks that have undergone various degrees of metamorphism **(see Table 4.1-1)**. The region near the coast is covered by alluvial and recent unconsolidated sediments forming the flat land areas (Scholze, 2001). Sedimentary rocks constitute 60 percent of the city that include the Cebu Coal Measure, Malubog Formation, Barili Limestone, Carcar Limestone and the Recent Alluvium. Underlying these alluvial sediments is a semi-consolidated to consolidated limestone. Further inland, up to 8 km from the sea, the Carcar Limestone forms a hilly part of the coastal area with elevation up to 200 m. The Carcar Limestone Formation is a coralline limestone, which builds an almost continuous margin around the island. The Carcar Limestone is the major aquifer in the Metro Cebu region. See **Figure 4.1-1** for the Geologic Map.

Table 4.1-1
Geology of the Cebu

Age	Formation	Lithology
Quaternary	Alluvium	Highly variable
Late Pliocene- early Pleistocene	Carcar Formation	Coralline limestone (occasional mudstones and sandstones)
Middle Miocene	Bulacao Andesite &Talamban Diorite	Andesite Diorite
Early Miocene	Malubog Formation	Pyroclastic rocks and lavas
Cretaceous	Mananga Group	As above
Pre-Cretaceous	Tunlob Schist	

4.1.1.1 Seismic activity

145. Philippines is seismically and volcanically active and has experienced numerous large earthquakes during the past 200 years. Recent experience was on February 6, 2012 wherein Cebu and other surrounding islands in Central Visayas experienced the effects a magnitude 6.7 earthquake with epicenter on the neighboring island of Negros Oriental. This is followed by the August 31, 2012 with 7.6 magnitude earthquake and was the largest quake in the area for 90 years covering most provinces from Bicol of Southern Luzon up to Davao in Mindanao. The tremor shook buildings and caused fear however there were no reports of major building damage or loss of life in Cebu.

4.1.2 Soil Characteristics

146. According to Cebu City Profile, soil in Cebu City is generally classified into five types: (1) Baguio type soils which are characteristic upland soils that cover highly rugged and mountainous landscape having slope of 50% and above and where erosion is severe to very severe due to the steep slope; (2) Mantalongon type soils, which is formed from the sedimentary materials of shale and sandstone found particularly in seventeen (17) hilly land barangays ranging over 8% slope and can be found in any elevation over 100 meters and where erosion is moderate to severe, worsening as the slope increases; (3) Faraon type

soils, which are developed from limestone are found generally in areas of undulating to rolling and hilly to mountainous relief with slope ranging from 30 to 50%.

147. These soils have higher organic matter contents (2.0 to 2.2 %), as compared to other soil types; (4) Mandaue type soils can be generally found in areas below 100- meter elevation and within a slope range of 0 to 5.0%. The soil is also rich in organic matter (2.0-2.9%) and fertile and erosion is only slight; and, (5) Lugo type soils, are residual soils derived from sedimentary materials of shale and sandstone with a granular structure and moderately eroded. Although silty to clayey or sticky and strongly plastic when wet, the surface soil seldom hardens up when dried and is very friable.

4.1.3 Topography and Slope

148. The topography of Cebu City is rugged and mountainous with elevation reaching up to 900 meters above mean sea level. Flat lands are found only along the shorelines that extend a few kilometers inland. Cebu City's flat land occupies about 23 square kilometers, representing eight (8%) percent of its total land area but it contains over 40 barangays and about two thirds of its population. The elevation from project area from Bulacao Station to Talamban lies at less than 50 masl. The Topographic Map of Cebu City is shown in **Figure 4.1-2**.

149. Any land surface with steeply inclined slopes under climatic condition where rainfall exceeds the water absorption capacity of the soil would suffer from soil erosion. This applies to Cebu City, a larger part of which is subjected to severe erosion. This includes the critical watershed areas that are mostly above 50 percent in slope (see Slope Map in **Figure 4.1-3**).

4.1.4 Drainage Pattern

150. Cebu city is traversed by the following river systems: Bulacao River to the south, Guadalupe River to the west, Subangdaku River to the east and Mandaue River to the north. The project area major surface water body near the project is the coastal canal on the SRP (a T River tributary) that passes within 500m near the BRT Project at Mambaling Km C-3+850 to Km C3+950. The coastal canal is navigable by shallow draft transportation where it comes nearest to the Project at coastal canal. Most of the streams and creeks discharge all year round.

151. The river channels crossing the BRT project in Cebu enter into the Mandaue River. Rapid urbanization has modified the hydrological system. Water extraction and blocking of some drainage channels has caused localized flooding and water logging, accumulated pollution, localized land subsidence and building collapse in parts of the metropolitan area.

152. The hinterland of the project area beyond 100m landward from the alignment has no aquatic resources for subsistence and trade, but provides water for crop irrigation. There are numerous surface ponds and ditches within about 50m either side of the Project. Many of these ponds and ditches catch the drainage from either side of the road upon which the Project will be constructed.

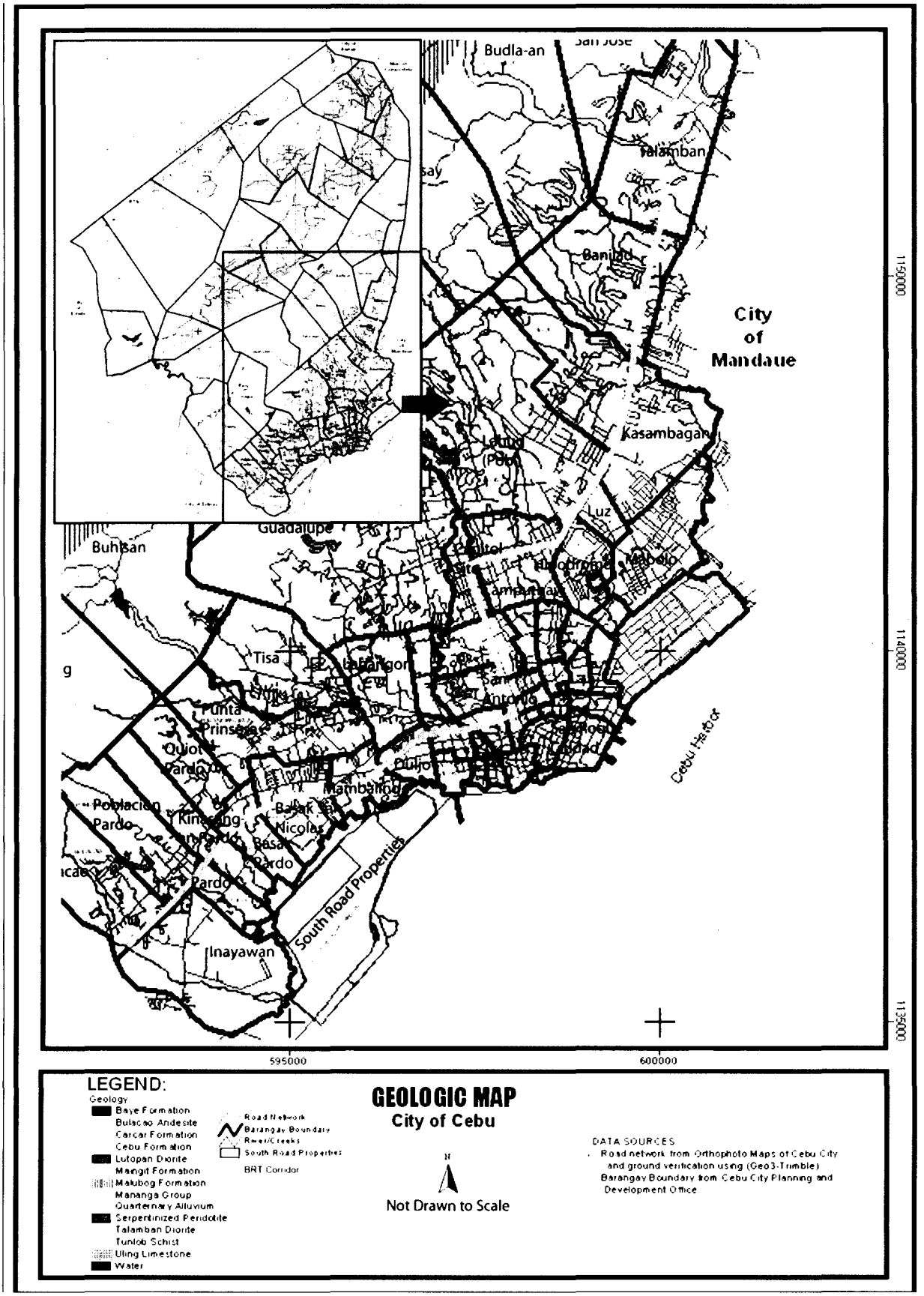


Figure 4.1-1
Cebu City Geologic Map

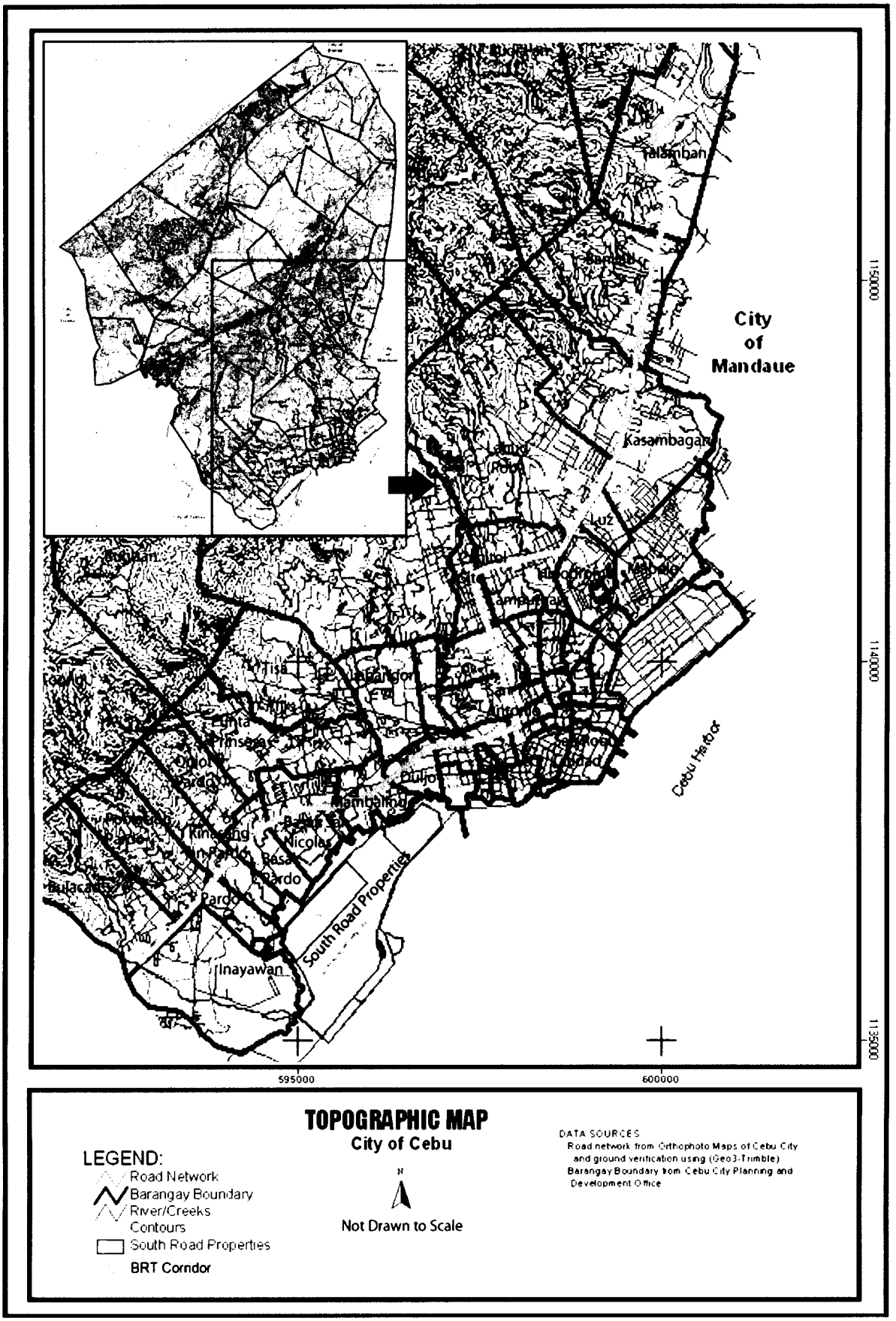


Figure 4.1-2
Cebu City Topographic Map

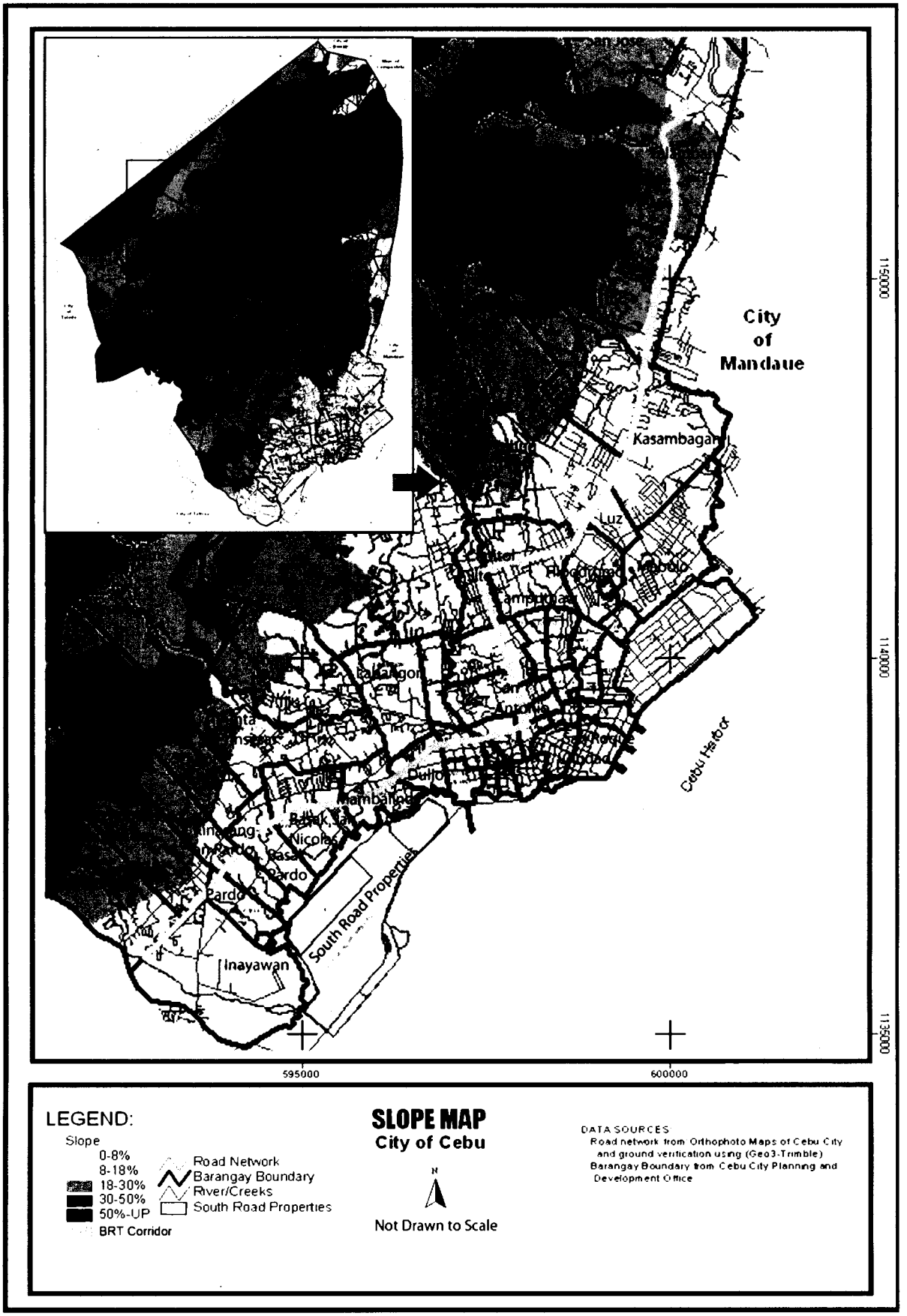


Figure 4.1-3
Cebu City Slope Map

4.1.5 Flooding

153. Flooding in Cebu is a recurring phenomenon but flood water generally subsides quickly with one hour. There are no catastrophic floods on record. The surface drainage by gravity is limited but the land in the Project area is above the prevailing flood levels except in certain areas. According to the landslide and flood susceptibility map, however, majority of the project area has low susceptibility to landslides and low to moderate susceptibility to flooding; except at the northern portion where Mandaue River traverses, the area is highly susceptible to flooding and prone to greater than 1 meter flood height (see **Figure 4.1-4** for Hazard Map of Cebu City).

154. The disrepair of some canalized sections of the important traditional river channels within Cebu City has also aggravated the situation and caused drainage congestion. It has enhanced localized flooding from rainfall due to drainage system failure. The combination of heavy periodic rainfall in areas surrounding Cebu City and localized drainage problems has aggravated the flooding situation. On the other hand, the project area is largely free from flooding problems in the Escario and Osmeña boulevard areas.

4.1.6 Climatology

155. The Philippines is located in a tropical climate zone Philippines climate is characterized by high temperature, heavy rainfall, frequent high humidity and seasonal variations and has two distinct seasons: the rainy and the dry. The rainy season is from June to November. The beginning of the rainy season can vary from year to year depending on typhoons. Heavy rains typically commence in late July, but usually set in from August to October, and are caused mainly by typhoons. The dry season is from December to May.

156. In Cebu winds of about 10km/h are typical, and usually from the northeast (Amihan, November to May) and southeast (Habagat, June to September). Cyclonic storms occurring in the Cebu Sea usually taking place in October to December can penetrate as far as the Project area and the Central Business District and South East Cebu City, and they may occasionally cause damage to property.

4.1.7 Ambient Air Quality

4.1.7.1 On-site Air Sampling and Measurement

157. In the air quality study report (August 2012), the air sampling and measurement were conducted at selected locations on July 1 to 3, 2012 (Sunday to Tuesday). Two locations were identified, Location A is located at the signal-controlled junction of Escario Road - Osmeña Boulevard off Provincial Capitol; and Location B is along a straight road section of N. Bacalso Avenue off the South Bus Terminal. **Figure 4.1-5** shows the relative location of the sampling stations along the proposed BRT corridor.

158. The air sampling and measurements were carried out for 3 hours during the morning and evening rush hours for two working days and a weekend day. The air pollutants measured are Particulate Matter (PM), CO_2, CO, temperature, humidity, and volatile organic compounds (VOC). Onsite conditions such as weather and existing traffic flow were also assessed during the time of sampling. These air sampling and measurements results are presented in **Table 4.1-2**.

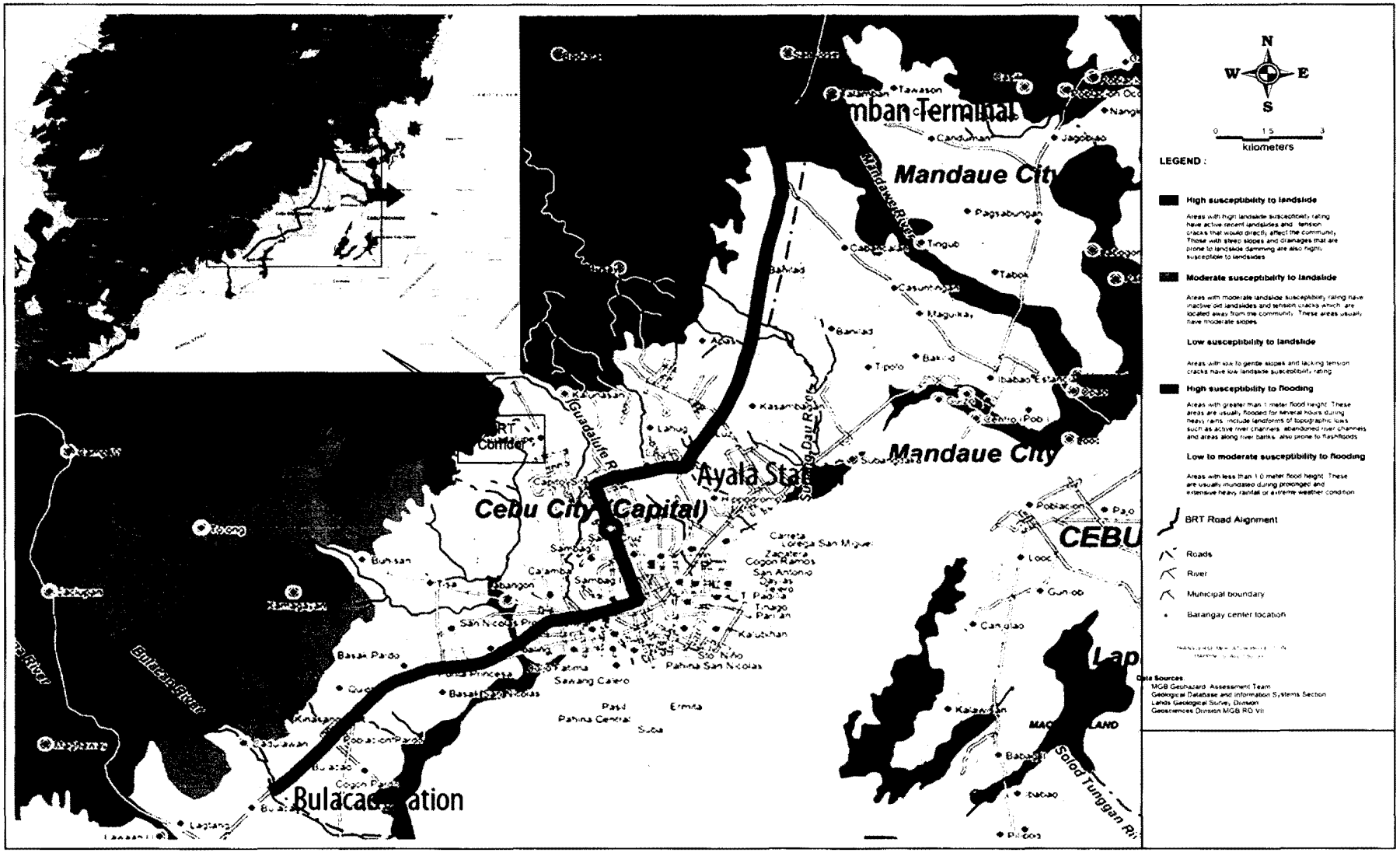


Figure 4.1-4
Cebu City Hazard Map

4.1.7.2 Results of Air Quality Survey

159. The air quality data presented in this section are extracted from the Draft Environmental and Health Benefits of the Cebu City BRT Corridor Report (22 August 2012) prepared by Clean Air Initiative for Asian Cities (CAI-Asia) Center for Cebu BRT Project.

Particulates

160. Based on the results of the survey, PM2.5 concentrations were measured using the Mini-Volume over a 3-hour period. The measured concentration of PM2.5 at Location A is high at 200 $\mu g/m^3$ (see **Figure 4.1-6**). As the standard for PM2.5 in Philippines is pending approval, the WHO guideline value (25 $\mu g/m^3$ for daily average) is used as a reference. The PM2.5 levels on both the weekend and weekday far exceed the reference level; eight times higher than the WHO guideline value. Studies show that every 1 $\mu g/m^3$ increase in PM2.5 levels causes an increased health risk of 8×10-6. Even with the Philippine standard of PM10 (150 $\mu g/m^3$) as a reference, the PM2.5levels in the evening peak on a Monday still exceed this level. It is reasonable to expect that PM10 concentration can also far exceed this regulatory limit because PM2.5 is part of PM10. The PM2.5 concentration on Sunday is about 60% lower than that on Monday and especially in the evening period, the difference could be more than 70%. This is most likely due to the traffic decrease on weekends. The traffic in the Monday morning peak was 11,610 vehicles per hour compared to 2,796 vehicles per hour on Sunday morning. Another factor which cannot be ignored is that it drizzled during the sampling period on Sunday; a relatively low PM2.5 might have been measured.

Table 4.1-2
Site Observations during Air Sampling Activities

Date	Period	Duration	Location	Site Observations
01 July 2012 (Sunday)	Morning	0900-1200	A	Intermittent rain showers from 0500 to 0800 prior to sampling start. Traffic flow is 2,796 veh/hr.
	Evening	1730-1830	A	Sampling was stopped due to change in weather (i.e., from drizzle to rain shower). Traffic flow is 3,388 veh/hr.
02 July 2012 (Monday)	Morning	0630-0930	A	No rain but the sky was overcast. Traffic flow is much higher at 11,610 veh/hr.
	Evening	1730-2030	A	Intermittent drizzles. Traffic flow is 3,533 veh/hr.
03 July 2012 (Tuesday)	Morning	0630-0900	B	Clear skies with light to moderate winds (easterly-southeasterly). Traffic flow is 3,404 veh/hr.
	Evening	1700-2000	B	Clear skies at first; heavy rain clouds blown by easterly winds started to cover the area around sunset (6PM), but it never rained during the sampling exercise. Traffic flow is 3,043 veh/hr.

Source: Table 1 & 3 Air Quality and Traffic Flow, Assessment of Roadside Air Quality in Cebu City. Environmental and health Benefits of the Cebu City BRT Corridor. August 2012.

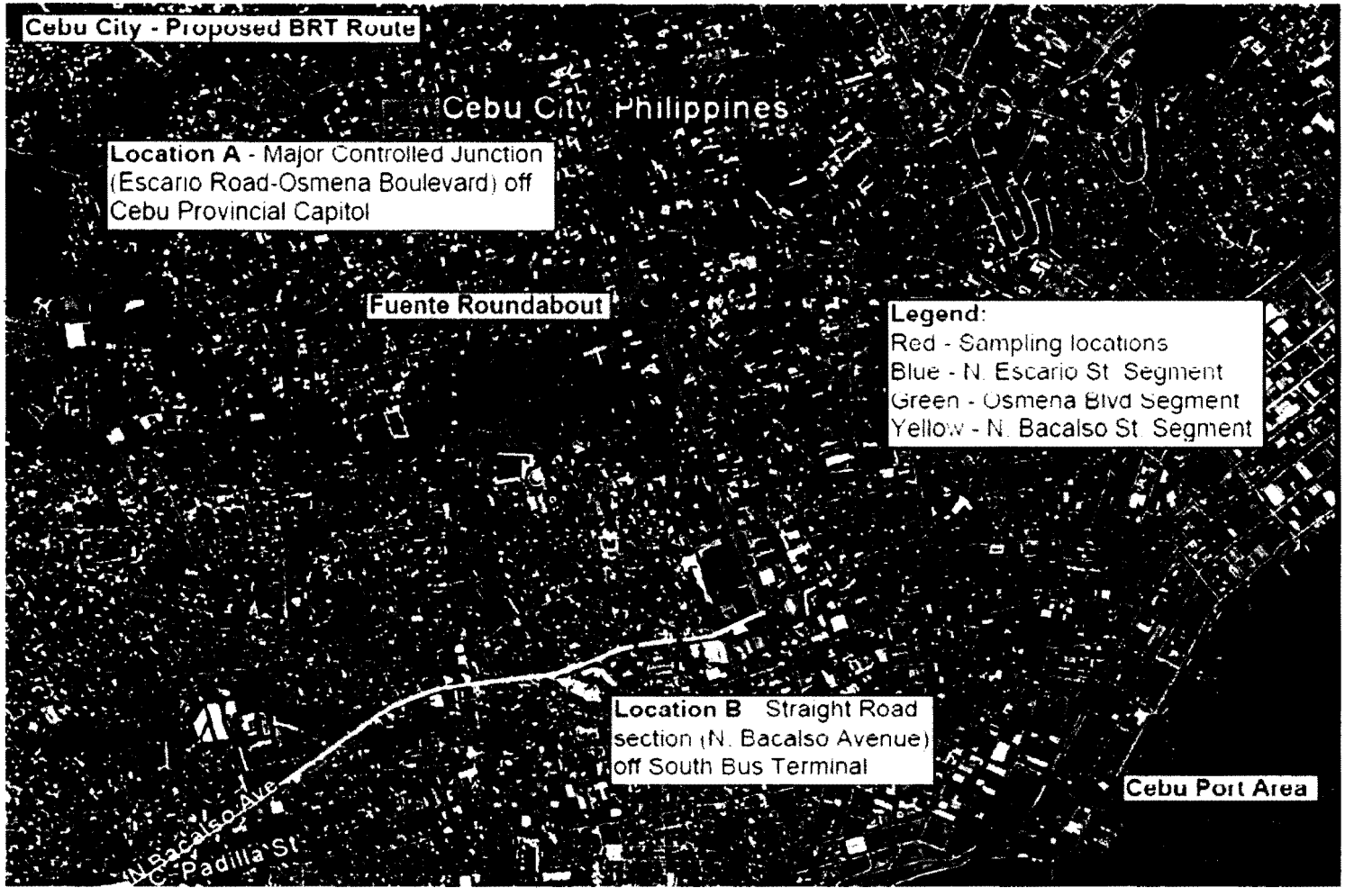
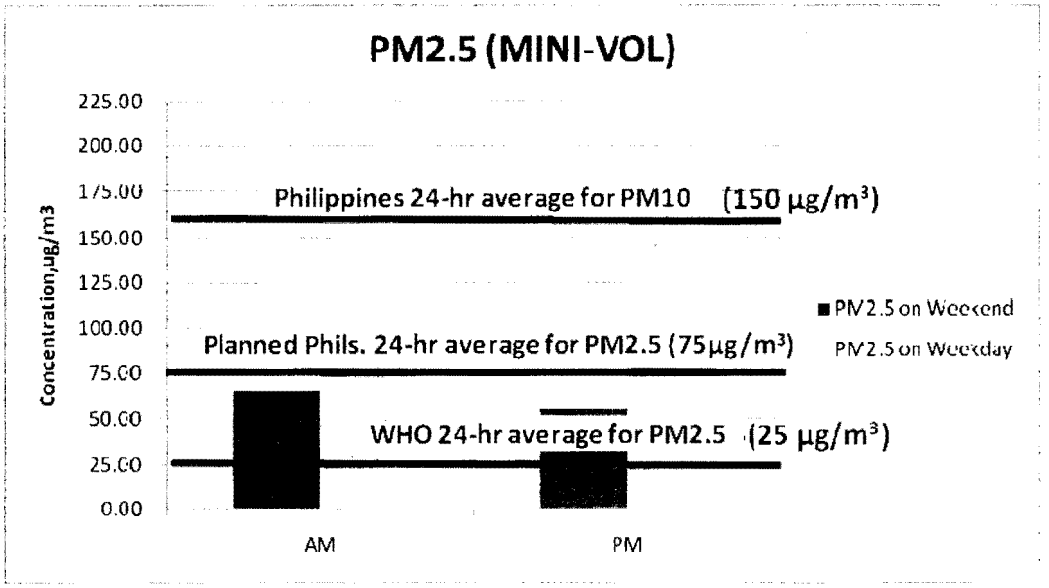


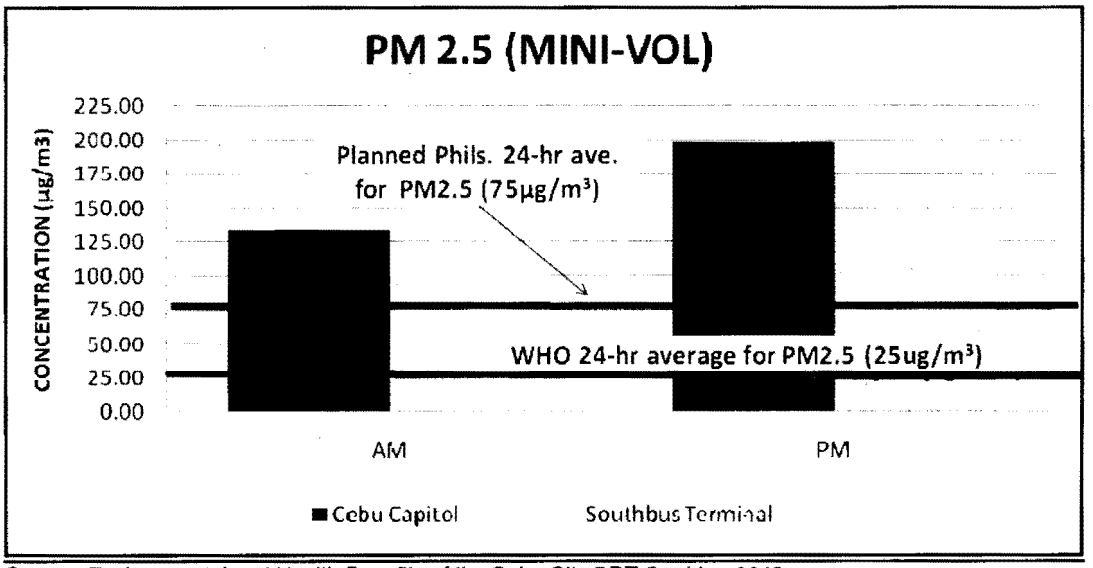
Figure 4.1-5
Location of Air Quality Sampling Stations



Source: Environmental and Health Benefits of the Cebu City BRT Corridor, 2012

Figure 4.1-6
$PM_{2.5}$ Level at Location A

161. **Figure 4.1-7** compares the PM2.5 levels at the two sites namely at Escario Road/ Osmeña Boulevard off the Provincial Capitol (Location A) and the straight road section off the South Bus Terminal (Location B). Location A has 31% and 51% more PM2.5 concentration than that of Location B at AM and PM periods respectively. The PM2.5 levels at both sites exceed the World Health Organization PM2.5 guideline values. With reference to the traffic flows at these two locations, traffic flows are much higher at Location A in particular the number of Jeepneys. Jeepneys in Cebu City, like most jeepneys in the Philippines, are diesel fueled and usually run on aged second-hand engines which can be a major source of roadside PM2.5.



Source: Environmental and Health Benefits of the Cebu City BRT Corridor, 2012

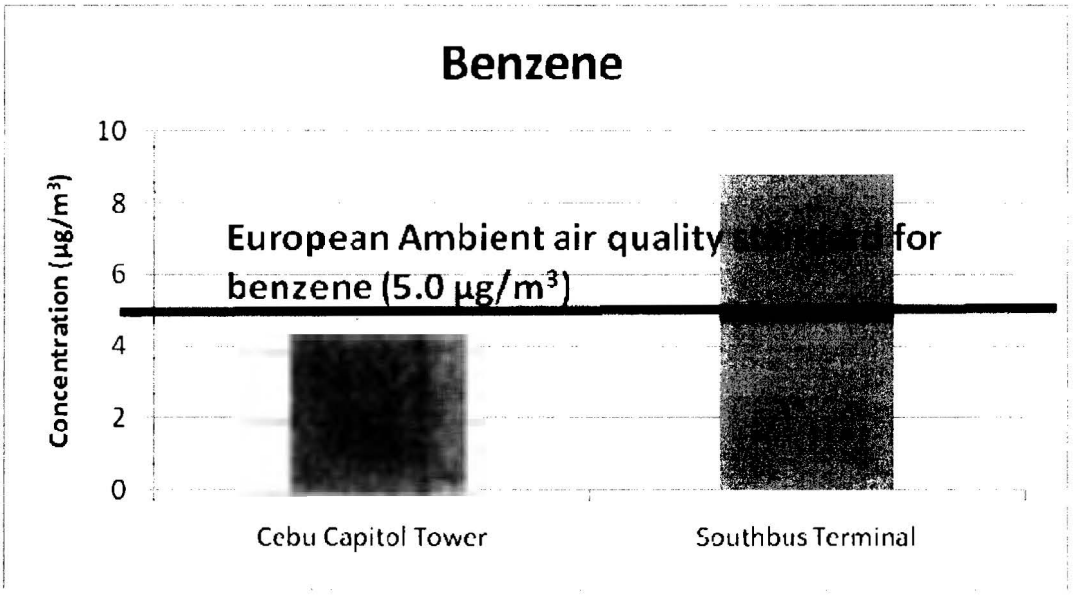
Figure 4.1-7
$PM_{2.5}$ Levels at Locations A and B

Volatile Organic Compounds (VOCs)

162. The measured concentrations of two toxic compounds under VOCs such as benzene and 1,3-butadiene are shown in **Figures 4.1-8** and **4.1-9** at the two sampling location. The European ambient air quality standards for benzene (5 $\mu g/m^3$) and 1,3-butadiene (2.4 $\mu g/m^3$) are adopted as references because Philippines does not have guidelines for ambient levels of these pollutants. The mean concentrations of benzene at location A and location B are 4.39 $\mu g/m^3$ and 8.82 $\mu g/m^3$. While the concentrations of 1,3-butadiene are 8.35 $\mu g/m^3$ and 1.61 $\mu g/m^3$ at Location A and B respectively. Exceedance to the relevant standards indicates health threatening situations such as carcinogenic effect in blood and increase the risk for leukemia in both sites.

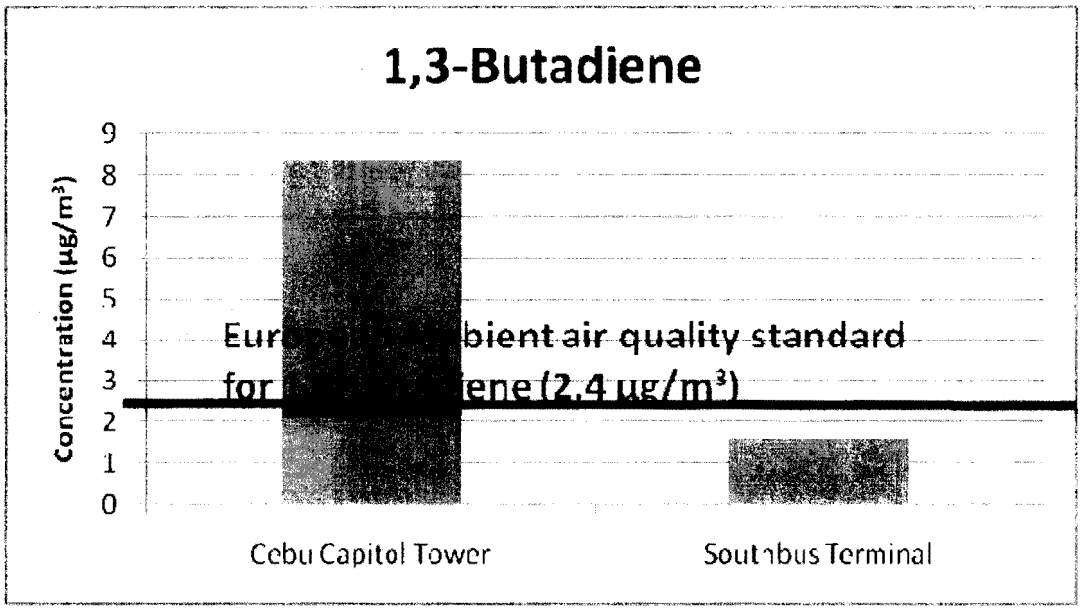
Carbon monoxide (CO) & Carbon dioxide (CO_2)

163. Carbon monoxide (CO) and carbon dioxide (CO_2) were measured in this pilot study. CO_2 is one of the important greenhouse gases in the atmosphere and is produced by fuel combustion. Anthropogenic production by combustion of fossil fuel is the most important contributor of CO and CO_2 in urban areas. Among ambient pollutants, CO is known for its biological toxicity of binding with hemoglobin in the lungs and forming carboxyhemoglobin (COHb) to decrease the oxygen-carrying capacity of the blood, reducing the availability of oxygen to body tissues and resulting in tissue hypoxia. A recent study in Guangzhou, one of the Chinese mega-cities, showed that per 0.5 ppm increase in the average lag 1–2 (previous two days) exposure to CO was associated with 3.04%, 3.62% and 3.72% increases in excessive risks of total, cardiovascular and respiratory mortality. CO is mostly produced by the incomplete combustion of fossil fuel and biomass burning. In urban areas, industrial emissions and vehicular emissions are the main contributors to CO.



Source: Environmental and Health Benefits of the Cebu City BRT Corridor, 2012

Figure 4.1-8
Benzene Levels at Locations A and B



Source: Environmental and Health Benefits of the Cebu City BRT Corridor, 2012

Figure 4.1-9
1,3-Butadiene Levels at Locations A and B

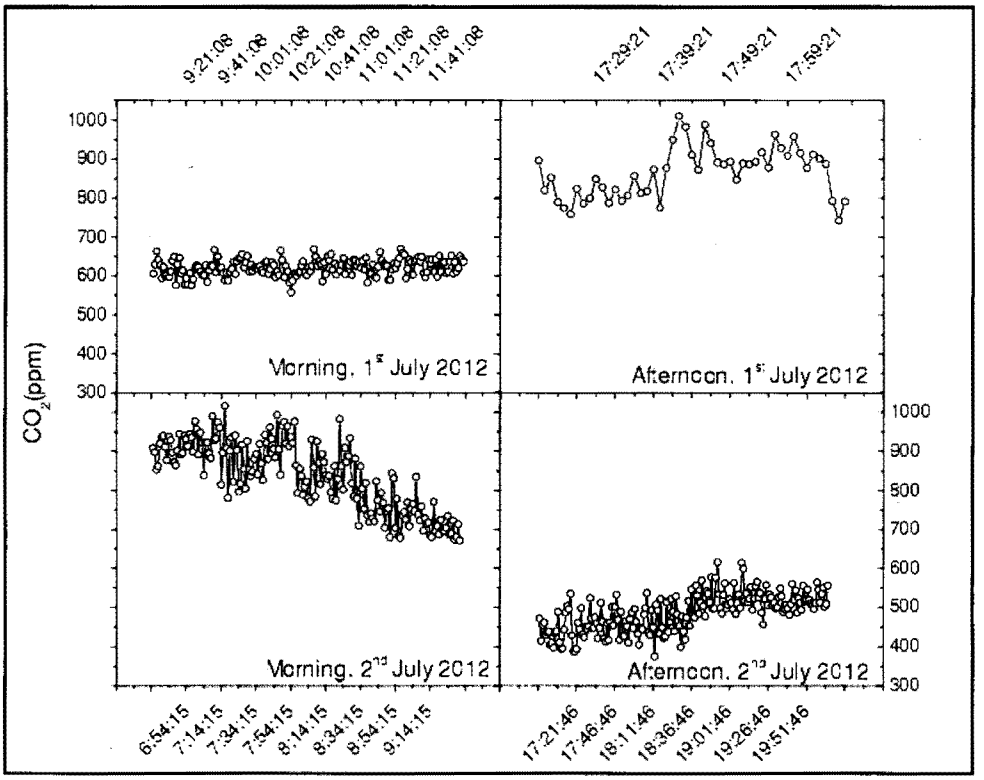
164. In this study, the project team measured extremely high levels of CO and CO_2 during the sampling period in July 2012 (**Figures 4.1-10** to **4.1-13**). The elevated CO_2 levels in the roadside environments as well as the high traffic flow recorded definitely show that CO_2 was mainly emitted by vehicles. The range of CO varied from 8-30 ppm and 6-13 ppm at the two roadside stations, Locations A and B, respectively.

165. The results of the instantaneous continuous measurements of CO are shown in **Figures4.1-12** and **4.1-13**. The measured CO levels exceed National Ambient Air Quality Guideline Values of Philippines (NAAQGV, 9 ppm daily average) no matter during weekends or weekdays. Although the results were based on 3 days monitoring, CO levels at both sites were higher than those measured in the roadside environment in many other Asian cities (Beijing, Hong Kong, Seoul, Bangkok etc., ranging from <1 to ~10 ppm) [Wang, T. et al, (2009); Oh, I. et al, (2010); Jinsart, W. et al,(2010); Tao, W. et al, (2011)]. It suggests that CO pollution in the roadside environment in Cebu should not be neglected and it also calls for a more in-depth study on this subject matter. One obvious reason for high CO levels is the wide use of inefficient vehicle engines, either implying a lack in maintenance, use of outdated/obsolete engines, or vehicle overloading (i.e., overworked engines). Specific analysis has been conducted to determine the possible source of such high levels of CO. In this study, CO has evident correlations with CO_2 in most cases at both sites **(Figure 4.1-14).**

Location A: $C_{(CO)} = 0.0254\ C_{(CO2)} - 4.745$, $R^2 = 0.6426$ (Weekend)
$C_{(CO)} = 0.0229\ c(CO_2) - 5.5216$, $R^2 = 0.3666$ (Weekday)
Location B: $C_{(CO)} = 0.0437c(CO_2) - 9.0247$, $R^2 = 0.5193$ (Weekday)

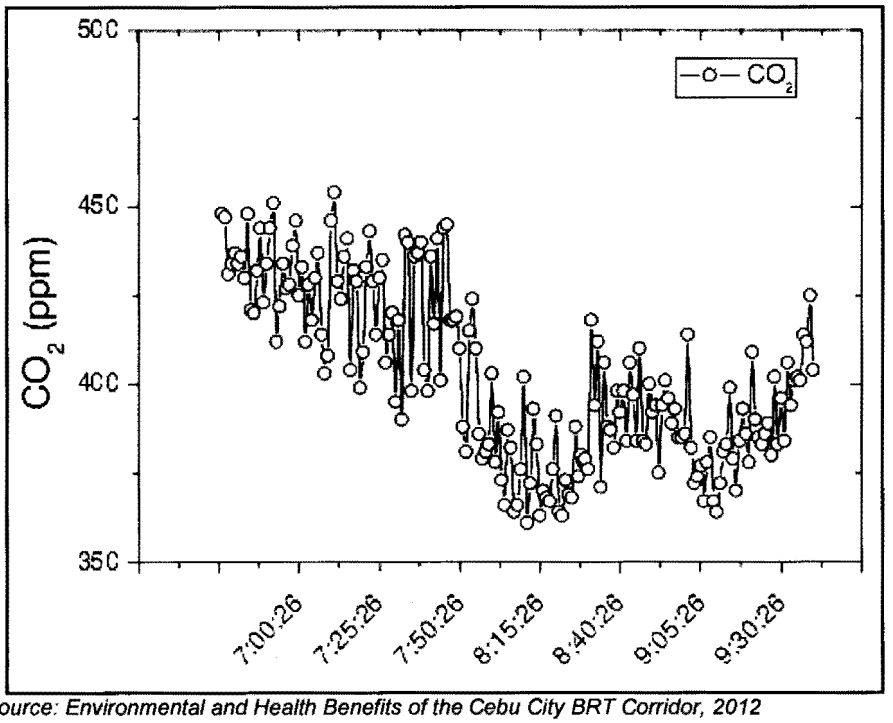
166. The correlations show the connection between CO and CO_2, pointing to the contribution of vehicular emissions in the roadside environments. At Location A (off the Cebu Capitol), we observed similar ratios of $\Delta CO/\Delta CO_2$, which were 0.0254 ppm/ppm and 0.0229 ppm/ppm. However, the $\Delta CO/\Delta CO_2$ ratio at Location B (off the South Bus Terminal) was 0.0437 ppm/ppm, higher than that at Location A. It suggests that the emission of CO was higher at the roadside environment outside the bus terminal. In other words, many vehicles

at this site have worse combustion efficiency. During the sampling period, the categories and numbers of the vehicles were noted. This site had more buses and the traffic speed was lower. The higher CO emissions would be attributed to the difference of driving patterns at the two sites. More vehicles off the bus terminal can easily cause worse traffic conditions which induce higher chance of incomplete fuel combustion. An effort to reduce traffic jam and to bring an unimpeded traffic flow would also be beneficial to the local air quality.



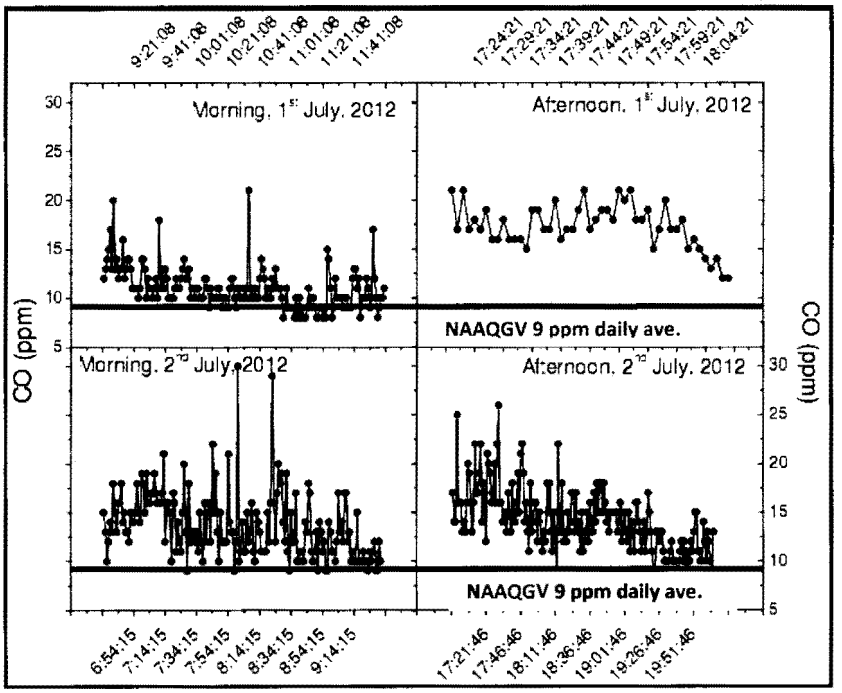
Source: Environmental and Health Benefits of the Cebu City BRT Corridor, 2012

Figure 4.1-10
CO_2 Concentration at Location A during 1-2 July 2012



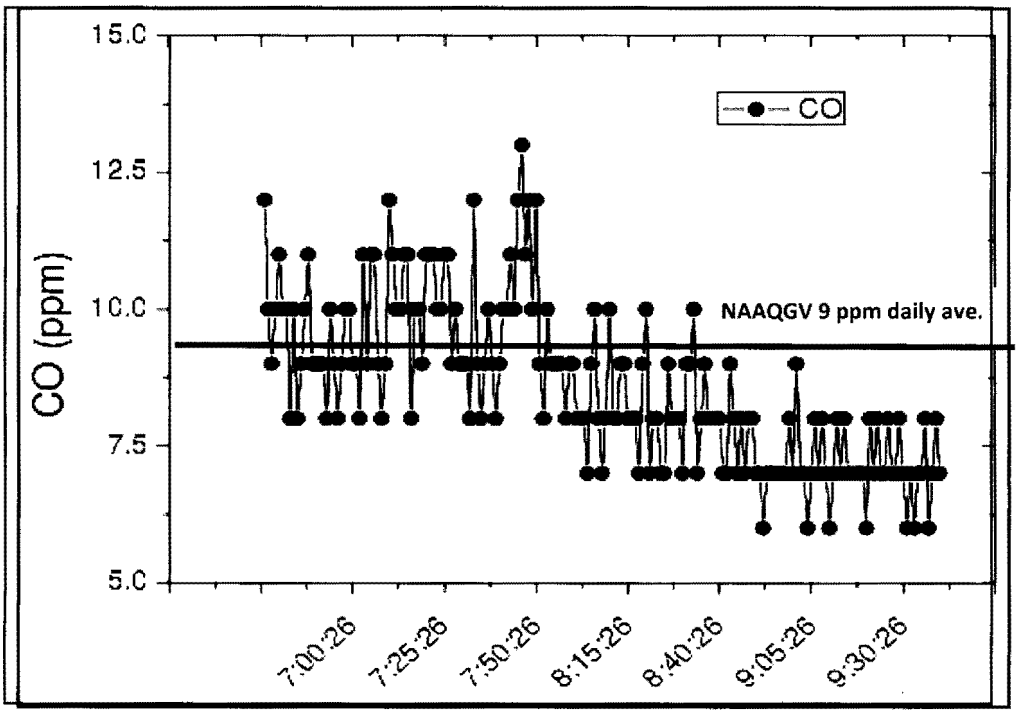
Source: Environmental and Health Benefits of the Cebu City BRT Corridor, 2012

Figure 4.1-11
CO_2 Concentration at Location B on 3 July 2012



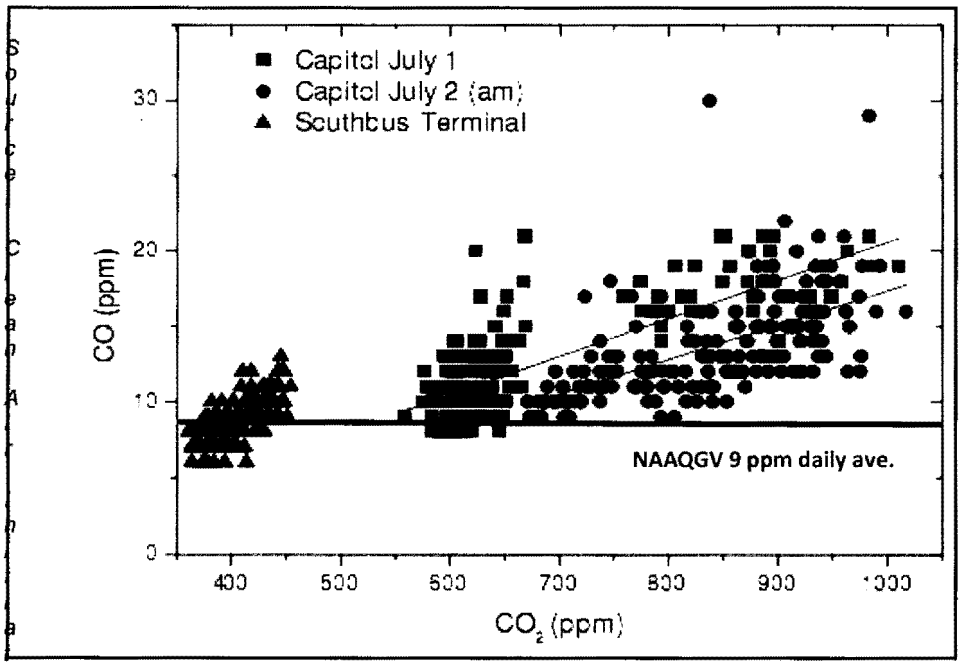
Source: Clean Air Initiative for Asian Cities (CAI-Asia) Center. Environmental and Health Benefits of the Cebu City BRT Corridor, 2012

Figure 4.1-12
CO Concentration at Location A during 1-2 July 2012



Source: Clean Air Initiative for Asian Cities (CAI-Asia) Center. Environmental and Health Benefits of the Cebu City BRT Corridor, 2012

Figure 4.1-13
CO Concentration at Location B on 3 July 2012



ive for Asian Cities (CAI-Asia) Center. Environmental and Health Benefits of the Cebu City BRT Corridor, 2012

Figure 4.1-14
Relationship between CO_2 and CO at both Locations A and B

4.1.8 Noise

167. Noise from vehicles is a major feature of the streets around the BRT route at present as vehicular traffic is more or less continuous during the day and lorries also run at night. There is no specific criterion for road traffic noise in Philippines therefore the World Bank criteria will also be applicable. The national standards and World Bank standards will be applied to the Project.

168. In the Philippines, laws and standards on noise were provided by the defunct National Pollution Control Commission (NPCC, [13]) through Presidential Decree No. 1152. Section 5 indicates that community noise standards shall be established considering among others, location, zoning and land use classification, as shown in **Tables 4.1-3** and **4.1-4**. The project is on a 4 lane road therefore the criteria in **Table 4.1-5** are relevant. **Figures 4.1-15-16** presents the summary of the measurement of ambient air along the BRT corridor against its standard.

Table 4.1-3
Noise Standards in General Areas

Category of Areas	Daytime	Morning & Evening	Nighttime
	(9AM-6PM)	(5-9AM&6-10PM)	(10PM-5AM)
AA – section or area which requires quietness, such as an area within 100 m from school sites, nursery schools, hospitals and special homes for the aged	50 dB	45 dB	40 dB
A – residential purposes	55 dB	50 dB	45 dB
B - commercial area	65 dB	60 dB	55 dB
C – light industrial area	70 dB	65 dB	60 dB
D – reserved as a heavy industrial area	75 dB	70 dB	65 dB

Source: Rules and Regulations of the National Pollution Control Commission (NPCC)

Table 4.1-4
Noise Standards in Areas Directly Fronting/Facing a Four Lane Road

Category of Areas	Daytime	Morning & Evening	Nighttime
	(9AM-6PM)	(5-9AM&6-10PM)	(10PM-5AM)
AA	55 dB	50 dB	45 dB
A	60 dB	55 dB	50 dB
B	70 dB	65 dB	60 dB
C	75 dB	70 dB	65 dB
D	80 dB	75 dB	70 dB

Source: Rules and Regulations of National Pollution Control Commission

169. Background spot noise measurements were made at several places along the route at nighttime and daytime on the 28th and 29th June 2012. For convenience and safety the locations chosen were the bridges across the Project corridor. Background noise measurements were in all cases in excess of the criteria proposed by NPCC. Spot measurements of background noise were taken as 5 minute LeqdB(A) over an hour long period at eleven locations

Table 4.1-5
Ambient Noise Measurements along Corridor 28th & 29th June 2012

Footbridge Location and SRs	Chainage	Category of Areas	Criteria NPCC		Time	Leq 5mins dB(A)	
			Day	Night	Start	Day	Night
Bulacao Citi Hardware	C-6155	B	70	60		75	70
Holy Rosary Ch. Pardo Market	C-5350	B	70	60		70	60
U S J R - Basak Elem. School	C-3800	AA	55	45		50	40
Mambaling School (demolition DPWH)	C-2715	AA	55	45		60	45
Cebu Institute Technology.	C-1830	B	70	60		50	50
Salazar C.I.T.	C-1600	B	70	60		55	45
Osmeña Boulevard Cebu Normal U.	C+0070	AA	55	45		65	60
Osmeña South of Fuente Osmeña	C+1110	B	70	60		60	50
Escario St Camputhaw Bridge	C+2770	B	70	60		70	60
Gaisano Country Mall	C+	B	70	60		65	50
Talamban Terminus Talamban School	C+	AA	55	45		60	50

*Source: Consultants. Footbridge = skyway. * = NPCC Memorandum Circular No. 002 (May 12, 1980), Amendments to Noise Control Regulations of the NPCC Rules and Regulations of 1978.*

170. The World Bank criterion for residential, school and hospital sensitive receivers is Leq55dB(A) or background +3dB(A)) where background exceeds the criterion. Therefore in the Project area where traffic runs throughout the day both the World Bank and Philippines criteria are potentially exceeded at times by the existing noise therefore a criterion of background +3dB(A)) will be applied in the assessment. The Philippines criterion of Leq45dB(A) (day time) and Leq35dB(A) (night time) can be used at noise hospital sensitive receptors if background is below Leq45dB(A)1hour in daytime or Leq35dB(A)1hour in nighttime (however this seems to be an unlikely eventuality in the developed areas near the Project). However it is noted that there is a general presumption that there will be no night time working except in exceptional circumstances.

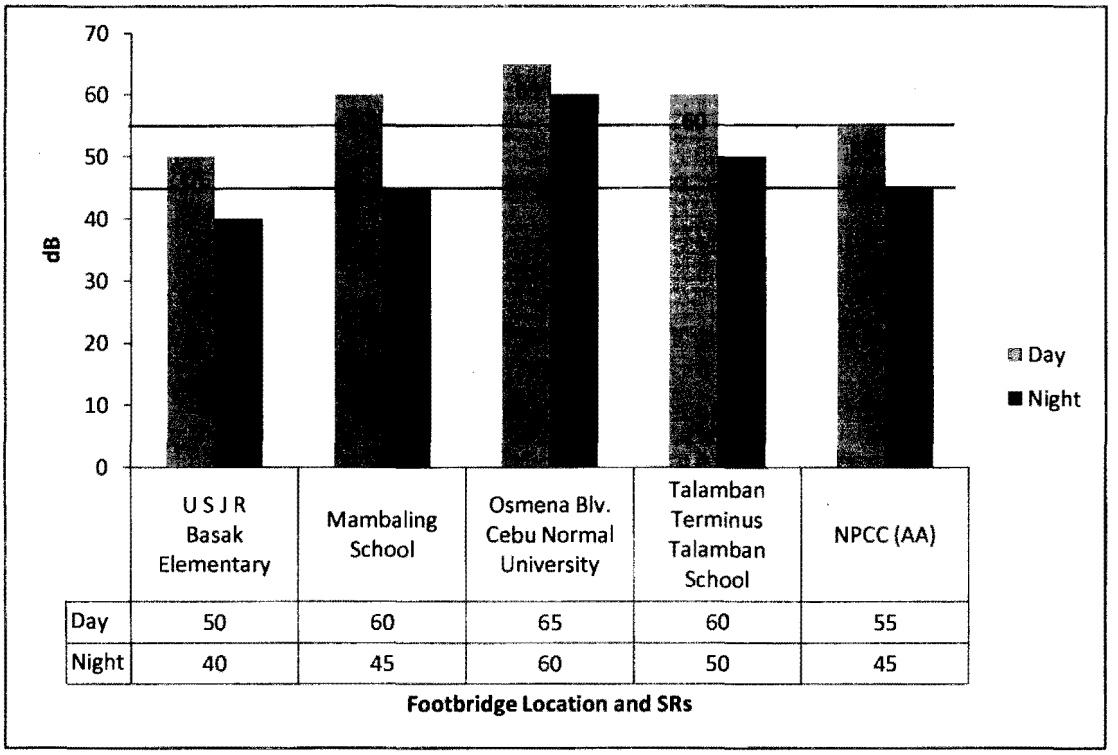


Figure 4.1-15
Summary of Ambient Noise Measurement along the Corridor (Class AA)

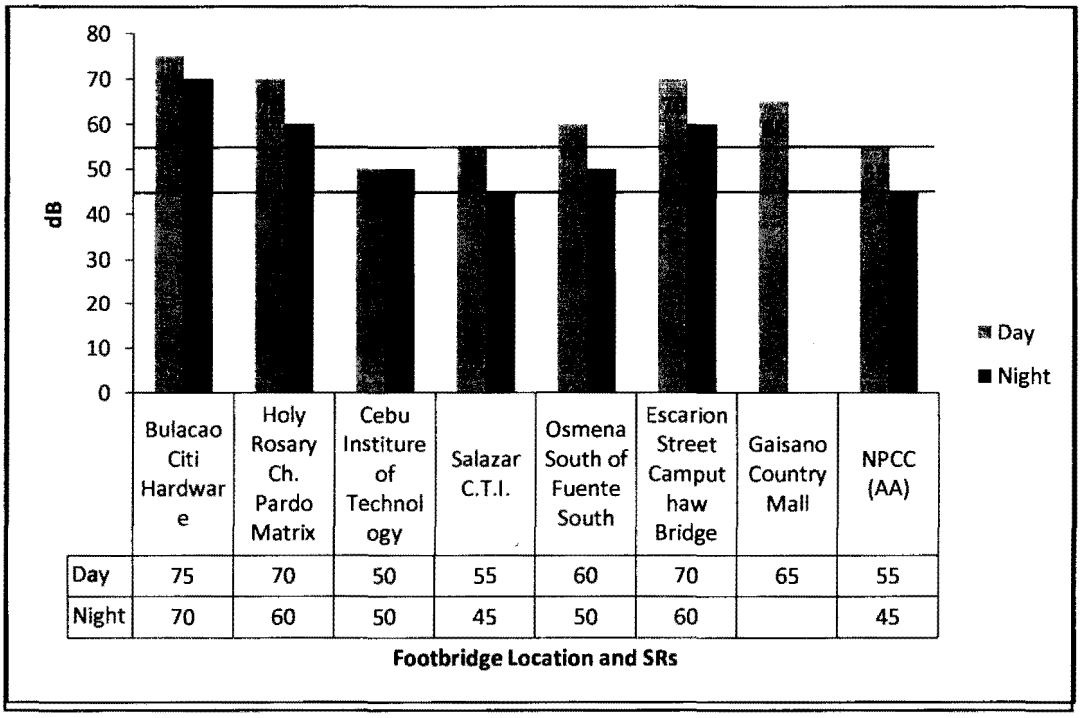


Figure 4.1-16
Summary of Ambient Noise Measurement along the Corridor (Class B)

4.1.9 Current Year GHG Emissions

171. An Urban Transport Greenhouse Gas Emissions Study was conducted in Cebu City on July 2012 by ITP to prepare a greenhouse gas emissions inventory for the urban transport sector in Cebu City, as well as a corridor-specific inventory, based on a proposed bus rapid transit (BRT) route; and develop a descriptive baseline urban transport growth scenario for the city.

Vehicle – kilometer calculation

172. The study has calculated the vehicle – kilometer calculation, wherein, the number of vehicle-km travelled by different vehicle types within the defined study boundary area was a key input to the current year (2012) emissions inventory calculation and to future year forecasts. **Tables 4.1-6** and **4.1-7**present the calculated 2012 vehicle-km travelled by different vehicle types, based on the transport model outputs. These tables relate to vehicle-km on the Cebu City road network and on the proposed BRT corridor (a subset of the city network) respectively. In **Table 4.1-6**, car vehicle-kilometer figures are split between three different road types that align with those used in deriving emission factors for private cars in Cebu City. In **Table 4.1-7**, only the highway road type is used, since the BRT route only runs on this type of road.

Table 4.1-6
2012 Annual Vehicle-km Travelled in Cebu City by Vehicle Type

Vehicle type	Road type	Cebu City veh-km		
		Peak hour	Weekday	Annual
Car / light vehicle	Highway	26,590	385,363	121,774,573
	Arterial	33,982	492,494	155 628,103
	Residential	15,159	219,696	69,424,019
Taxi		28,110	407,390	128 735,201
Jeepney		27,959	405,206	128,045,077
Bus		617	8,946	2,827,079
Motorcycle/ tricycle		55,637	806,335	254,801,966
Truck		6,913	100,186	31,658,857
Totals		194,968	2,825,617	892,894,876

Source: ITP Study of Cebu City Urban Transport Greenhouse Gas Emissions, 2012

Table 4.1-7
AnnualVehicle-km Travelled on the Proposed BRT Corridor by Vehicle Type

Vehicle type	Road type	Cebu City veh-km		
		Peak hour	Weekday	Annual
Car / light vehicle	Highway	16,162	234,237	74,019,002
	Arterial	0	0	0
	Residential	0	0	0
Taxi		6,265	90,792	28,690,252
Jeepney		8,428	122,140	38,596,396
Bus		599	8,946	2,743,147
Motorcycle/ tricycle		12,019	174,194	55,045,280
Truck		1,343	19,462	6,149,840
Totals		44,816	649,506	205,243,917

Source: ITP Study of Cebu City Urban Transport Greenhouse Gas Emissions, 2012

Current year emission factor determination

173. Determination of appropriate greenhouse gas (GHG) emission factors to use in the Cebu analysis was undertaken using the International Vehicle Emissions (IVE) model. This took account of the drive cycle and vehicle technology fleet breakdown characteristics determined for Cebu.

174. Greenhouse gas emission factors for the six main current vehicle types were derived from the IVE emissions model based on the analysis of current driving conditions in Cebu, as shown in **Table 4.1-8**. The final column of the table shows the overall greenhouse gas emission factor as "CO_2 equivalent" (or CO_2e) based on widely accepted values of the relative global warming power of each individual gas.

175. All emission factors used are average values across the day (in general, higher factors are appropriate when conditions are busiest and lower factors at other times). The IVE model analysis yielded different values by road type for cars, which were applied to the vehicle-km travelled on those road types.

176. For trucks, the emission factors shown are a weighted average of factors determined using the IVE model for medium duty trucks and heavy duty trucks. This was based on an estimated split of two-thirds medium trucks and one-third heavy duty trucks. This split appears reasonable in the light of the limited amount of detailed classified count data available to the team from previous studies.

Table 4.1-8
Current Greenhouse Gas Emission Factors Derived from IVE Model

Vehicle type	Road-type	Current Emission factors (g/km)			
		CO_2	N_2O	CH4	CO_2equiv
Car / light vehicle	Highway	357.496	0.002	0.933	377.826
	Arterial	386.081	0.003	1.021	408.317
	Residential	466.568	0.003	1.244	493.648
Taxi		393.020	0.001	2.246	440.632
Jeepney		1563.799	0.008	0.000	1566.359
Bus		1876.469	0.004	0.000	1880.853
Motorcycle/ tricycle		61.854	0.000	2.794	120.532
Truck		1164.752	0.008	0.000	1167.078

Source: ITP Study of Cebu City Urban Transport Greenhouse Gas Emissions, 2012

Total GHG emissions

177. The resulting 2012 greenhouse gas emission calculations for 2012 are shown in **Tables 4.1-9** and **4.1-10**, for Cebu City and the BRT corridor respectively. For the Cebu City road network, around 474,000 tonnes of CO_2e are currently being produced by some 893 million vehicle-km of travel. For the proposed BRT corridor, 120,000 tonnes of CO_2e are being produced by 205 million vehicle-km.

Table 4.1-9
2012 Urban Transport Greenhouse Gas Emissions in Cebu City

Cebu City						
Vehicle type	Road-type	Veh-km 2012	Emissions (tonnes) 2012			Emission (kg) 2012
			CO2	CH4	CO2 equiv	N2O
Car / light vehicle	Highway	74,019,002	26,461	69	27,966	200
	Arterial	0	0	0	0	0.0
	Residential	0	0	0	0	0.0
Taxi		28,690,252	11,276	64	12,642	0.0
Jeepney		38,596,396	60,357	0	60,456	300
Bus		2,743,147	5,147	0	5,159	0.0
Motorcycle/ tricycle		55,045,280	3,405	154	6,635	0.0
Truck		6,149,840	7,163	0	7,177	0.0
Totals		205,243,917	113,810	287	120,035	600

Source: ITP Study of Cebu City Urban Transport Greenhouse Gas Emissions, 2012

Table 4.1-10
2012 Urban Transport Greenhouse Gas Emissions in the BRT Corridor

Vehicle type	Road-type	Cebu City				
		Emissions (tonnes) 2012				
		Veh-km 2012	CO_2	N_2O	CH_4	CO_2equiv
Car / light vehicle	Highway	74,019,002	26,461	0.2	69	27,966
	Arterial	0	0	0.0	0	0
	Residential	0	0	0.0	0	0
Taxi		28,690,252	11,276	0.0	64	12,642
Jeepney		38,596,396	60,357	0.3	0	60,456
Bus		2,743,147	5,147	0.0	0	5,159
Motorcycle/ tricycle		55,045,280	3,405	0.0	154	6,635
Truck		6,149,840	7,163	0.0	0	7,177
Totals		205,243,917	113,810	0.6	287	120,035

Source: ITP Study of Cebu City Urban Transport Greenhouse Gas Emissions, 2012

GHG emissions per person-km

178. The transport model also provided data for 2012 on the number of person-kilometers travelled. This allowed us to calculate values for the second key performance indicator defined for the study – GHG emissions per person-km for passenger transport. Freight movements (truck-km) and the corresponding emissions were excluded from this indicator as it relates to passenger transport only.

179. **Table 4.1-11** shows the calculated current annual person-km travelled using the different vehicle types in Cebu City and the BRT corridor. From these figures, the overall current greenhouse gas emissions per person-km (passenger transport only) are:

- Cebu City: 135.6 grams CO_2e per person-km
- BRT corridor: 131.1 grams CO_2e per person-km

Table 4.1-11
2012 Person-kilometers Travelled by Vehicle Type

	Car	Taxi	Jeepney	Bus	Motorcycle	Total
Cebu City	867,066,739	305,102,426	1,615,928,877	35,677,734	400,039,0873	3,223,814,863
BRT Corridor	185,047,504	67,995,898	487,086,520	34,618,515	86,421,090	861,169,527

Source: ITP Study of Cebu City Urban Transport Greenhouse Gas Emissions, 2012

4.1.10 Land Use

180. The Project is located mainly along National Highways that form busy commercial urban thoroughfares. The project starts at Cebu South Road and runs along N Bacalso Avenue, Osmeña Boulevard, and Escario Street for about 10km to Ayala Mall and north along Gov M Cuenco Avenue for about 5km to Talamban. The whole of this section of the alignment is built up on either side. The dominant land use activity is commercial that has been developed over many years. There are also a few industrial factories, schools, colleges, shopping complexes, and occasional churches and mosques. At intervals there are also drainage channels and structures some way off the main thoroughfare. Very occasionally there are undeveloped lots with trees and jeepney stopping lay-bys.

181. According to the city's profile, the increasing urbanization of Cebu City now leads to the increasing use of its land for housing, commercial, industrial, institutional and other related activities. Farmlands remained only in the upland or hilly land areas of Cebu City. Presently the city's upland areas and watersheds are mostly covered with grass and shrubs with patches of corn, coconuts, bananas, cassava and vegetables. Fruit trees are also planted, notably the exotic mango, which is an export product of Cebu. Very little (9.6%) of the natural forest are left in the upland areas of the city. The city's catchment areas and watersheds are lacking in trees that are necessary for their protection. **Figure 4.1-17**presentsthe existing Land Use Map of Cebu City.

4.1.11 Archaeological and Cultural Resources

182. Cebu City plays a significant role in the political, economic, social, cultural and sporting life and activities of the region. Cebu City is one of the most important centers of entertainment in the country, with numerous cinemas, theatres and musical entertainments. The city is dotted with museums, libraries, art galleries, clubs and restaurants. With more than 2 million populations, Cebu has 7 public universities plus numerous private study colleges in and around the greater metropolitan area. There are several hundred schools and colleges and over hundred primary, middle and high schools covering the metropolitan area. Cebu is known for its churches, many of which are built in the Cebuano-Spanish style and date back to the Spanish period. Cebu is also famous for its archeological and historical sites such as the Fort San Pedro, also built during Spanish period. The Capitol Building is widely regarded as a feature of local architecture. The memorial statue at Fuente Osmeña Circle will not be affected by construction.

4.2 Biological Environment

4.2.1 Flora and Fauna

183. The vegetation of Cebu city has a variety of indigenous and exotic species especially in parks and gardens. There are many municipal parks and gardens in Cebu City as supervised by the Parks and Playgrounds Committee of CCG. Of these parks and gardens,

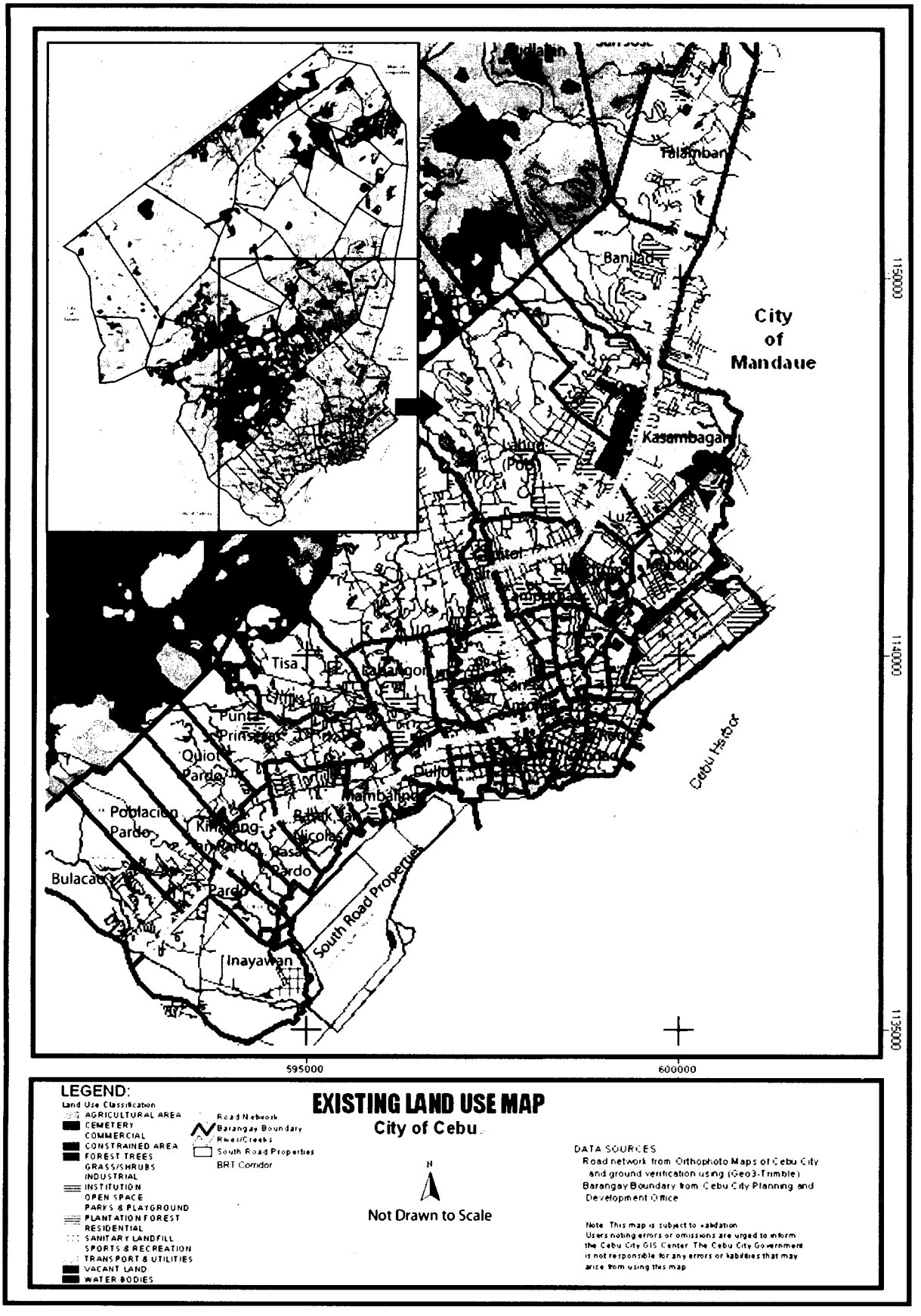


Figure 4.1-17
Cebu City Existing Land Use Map

those directly affected by the project works include Fuente Osmeña, which has over 100 trees. Besides local species, some exotic species were planted along the roadside especially along the Osmeña Boulevard and in residential bungalow area. The goal is for the beautification of the city in the early 19th and 20th century. Nevertheless, most poisonous snakes and non-poisonous snakes have disappeared but a few species including cobra are occasionally encountered. Reptiles, amphibians and fishes have also declined. The biodiversity of fish species has been reduced severely due to pollution of surface water.

184. The nearest protected forests are several kilometers north of the Capitol. There are many individual trees and street trees planted for street beautification either side of the BRT within the ROW and just outside the ROW.

185. In August 2003, Presidential Proclamation 441 consolidated the 5 Protected Areas of Central Cebu (the Mananga Watershed Forest Reserve, Kotkot-Lusaran Watershed Forest Reserve, Central Cebu National Park, Sudlon National Park and Buhisan Watershed Forest Reserve) into the Central Cebu Protected Landscape covering 29,060 hectares or 40% of 73,175 hectares. Metro-Cebu's total land area comprising of 61 barangays are within Protected Areas. The Central Cebu Protected Landscape, (CCPL) is a protected area located in the mountains of Central Cebu. CCPL covers what used to be known as the Central Cebu National Park, Buhisan Dam, Mananga Watershed Forest Reserve, Kotkot-Lusaran Watershed Forest Reserve, and the Sudlon National Park. The protected area spans 29,062 hectares (71,810 acres) of adjoining forestlands and watersheds located in the middle of the province. The CCPL houses many of Cebu's endemic and indigenous species but is more than and is over 5 km north from the nearest point.

186. The whole project area is urban development and there are no rare, threatened or endangered species of terrestrial and aquatic flora and fauna in the impact zone of the Project. The main BRT corridor, the depots and terminals are not near areas protected for the natural habitats for rare or endangered species.

187. The fauna of Cebu Island has suffered from deforestation and growing population pressure. Birds are still abundant in some parts of the mainland and islands, but many species have become rare or have disappeared. Parrots, parakeets, bleeding heart doves, cuckoos, owls and numerous small birds can still be seen. An occasional hawk or an eagle may occasionally be seen on the west coast.

188. To stop the downward trend in bird population the local government has declared parts of Olango Island, on the west side of Mactan Island, a bird sanctuary. Because of its remoteness, it is an ideal place for bird watching being reachable only by native canoe.

189. The most endangered bird of Cebu is the Black Shama (*Copsychuscebuensis*) locally called Siloy. The Black Shama is an eight-inch songbird and the only remnant 13 species and sub-species in the genus. Only about 15 Black Shamas remain. They can be found around Consolacion, some fifteen kilometers north of Cebu City and well away from the project corridor.

190. In Cebu, only domesticated mammals remain, such as carabaos, cows, horses and goats. Among the reptiles, snakes and ghekos are common. Common dangerous snakes are the venomous cobras and pit vipers. Both prey on mice and rats are therefore common around the urban area. Fatalities due to snakebites are however very rare. The most dangerous King Cobra is not found in Cebu. The python is dangerous because of its size and is also quite common. They can be found in bushy areas, even within city limits. Sea snakes are common in the seas around Cebu Island, but no fatal accidents have been reported recently.

191. Along the BRT corridor, there are existing trees and landscapes that would be affected by project construction. Most of these trees and vegetation were part of the City greening program. Tree and vegetation inventories along the 30-meter ROW along the BRT corridor is presented in **Table 4.2-1**. A total of around 2,000 trees are potentially to be affected during BRT construction. The most important tree species inventoried are Narra numbering to about 749. **Annex 3** provides the detailed profiling of the Cebu BRT Corridor.

4.2.2 Ecologically Sensitive Landscape

192. There is no national park or nature reserve near BRT and none of the land in the ROW is a protected area or production forest or protected forest as shown in **Figure 4.2-1**. Consultations with the FMB Chief in Cebu also confirmed there are no protected forest areas in the Project area.

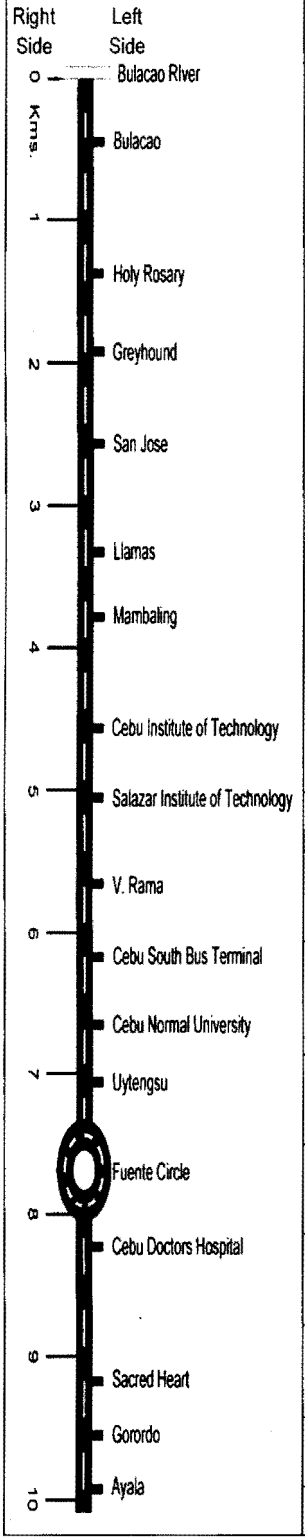
193. The requirements of Presidential Decree 953 (1978) Executive Order 23 (2011) and various exemptions and prohibitions made under Executive Order 23 will govern the removal of timber. Whether this is cutting or removal and balling for transplanting these rules will apply. The authority nationwide is DENR and DENR Region 7 acting with advice from the Forest Management Bureau will be the authority to permit the removal of trees and timber. Whereas the trees within ROW can be trimmed by DPWH Cebu City acting with assistance from the Parks and Playgrounds division there are administrative orders that require DENR to be consulted for removal of any trees.

194. The Memorandum from the Secretary of DENR of November 2009 called "Guidelines and Procedures on the Planting, Maintenance and Removal of Trees in Urban Areas and in Areas Affected by Government Infrastructure Projects was issued pursuant to Presidential Decree 953 and there is currently a moratorium on the cutting of all trees. Therefore exemptions will need to be obtained and permission from DENR and DPWH and compensatory planting will be required in line with the Memorandum from the Secretary of DENR November 2009.

195. In order to obtain permission from the forest authority all trees to be affected by the Project must be subject to a detailed inventory carried out by FMB and DENR and also Parks and Playgrounds Commission of CCG. Therefore it is recommended by the FMB that a detailed inventory be carried out as soon as practicable to identify all trees within the BRT footprint (including the depot, terminals and stations). A Tree Replacement and Compensatory Planting Plan will need to be developed at the detailed design stage. The first stage will be the presentation of the EIA and the identification of the locations where trees must be replaced based on the up to date designs.

196. The necessary permits must be obtained before tree cutting. However the tree locations and ownership (if in private lots) will need to be identified at the detailed design stage and agreed between FMB and DENR and also Parks and Playgrounds Commission of CCG. For infrastructure projects in the metropolis the requests that specimen or centennial trees or champion trees be avoided wherever possible and that the project proponent (DOTC-CCG) should plant replacement trees such as on any available land under DOTC-CCG control. Therefore a tree cutting and compensatory plan will need to be agreed between DOTC-CCG and FMB and DENR at the detailed design stage. Any cut trees will probably go for local use but if trees are to be cut for the BRT there will be a need for the forest authority to mark and agree with DOTC-CCG during the detailed design stage.

Table 4.2-1
Vegetation along the Segregated Busway (Bulacao – Ayala) of the Proposed Cebu BRT Corridor

BRT Corridor Reference Map	Station to Station Surveyed & Distance	Left Side (15-m corridor from the center line)	Right Side (15-m corridor from the center line)	Center Island
	BulacaoRiver to Holy Rosary Distance: 1.4 km.	Subtotal: 61 (33 Indian trees, 14 mahogany, 1 mango, 2 guava, 11 gemelina)	Subtotal: 92 (18 gemelina, 5 Indian trees, 9 mahogany, 3 Black plum, 4 neem tree, 45 narra,1 calachuchi,1 pomelo, 1 canistel tree, 1 tambis, 1 coconut, 1 Tamarind, 1 Jackfruit, 1 star apple)	Subtotal: 290 (290 Indian Trees)
	Holy Rosary to Greyhound Distance: 0.55 km.	Subtotal: 23 (1 gemelina, 13 Indian trees, 8 mahogany, 1 mango)	Subtotal: 56 (4 mahogany, 1 tamarind, 3 jackfruit, 2 black plum, 2 star apple, 1 neem tree, 42 narra, 1 tambis)	Subtotal: 82 (82 Indian Trees)
	Greyhound to San Jose Distance: 0.65 km.	Subtotal: 43 (24 Indian trees, 6 mahogany, 4 mango, 6 guava, 1 star apple, 2 coconut)	Subtotal: 70 (2 Indian trees, 1 mahogany, 2 mango, 65 narra)	- No vegetation found
	San Jose to Llamas Distance: 0.65 km.	Subtotal: 71 (4 gemelina, 17 Indian trees, 7 mahogany, 14 mango, 4 guava, 16 star apple, 4 coconut, 5 talisay)	Subtotal: 65 (1 tamarind, 64 narra)	- No vegetation found
	Llamas to Mambaling Distance: 0.60 km.	Subtotal: 68 (18 Indian trees, 12 mahogany, 9 mango, 10 guava, 6 jackfruit, 7 narra, 6 coconut)	Subtotal: 48 (1 mango, 1 jackfruit, 1 star apple, 45 narra)	Subtotal: 53 (53 Indian Trees)
	Mambaling to CIT Distance: 0.75 km	Subtotal: 46 (8 gemelina, 10 mahogany, 1 mango, 10 guava, 17 star apple)	Subtotal: 34 (2 gemelina, 2 tamarind, 1 black plum, 29 narra)	Subtotal: 1 (1 Indian Tree)
	CIT to SIT Distance: 0.50 km.	Subtotal: 21 (2 gemelina, 9 mahogany, 10 guava)	Subtotal: 25 (1 gemelina, 7 mahogany, 1 mango, 1 tamarind, 1 jackfruit, 12 narra, 1 talisay, 1 balete)	Subtotal: 92 (92 Indian Trees)
	SIT to V. Rama Distance: 0.55 km.	Subtotal: 59 (3 gemelina, 4 Indian trees, 3 mahogany, 3 mango, 5 guava, 3 tamarind, 3 jackfruit, 3 black plum, 3 cucumber, 3 star apple, 3 neem tree, 3 narra, 3 calachuchi, 3 pomelo, 3 canistel, 2 coconut, 3 talisay, 3 balete, 3 cotton tree)	Subtotal: 25 (1 gemelina, 7 mahogany, 1 mango, 1 tamarind, 1 jackfruit, 12 narra, 1 talisay, 1 balete)	Subtotal: 80 (80 Indian Trees)
	V. Rama to CSBT Distance: 0.55 km	- No vegetation found	- No vegetation found	Subtotal: 29 (29 Indian Trees)
	CSBT to CNU Distance: 0.45 km.	Subtotal: 78 - 78 narra	Subtotal: 75 (1 gemelina, 2 mahogany, 6 black plum, 66 narra) Landscape: (30m Saging, 40m Duranta)	Subtotal: 50 (50 Indian Trees)
	CNU to Uytengco Distance: 0.45 km.	Subtotal: 60 - 60 narra Landscape: - 3m grass - 10m duranta	Subtotal: 61 (2 black plum, 47 narra, 8 coconut, 2 talisay, 2 balete) Landscape: (10m san francisco, 15m bombil)	- No vegetation found
	Uytengco to Fuente Circle Distance: 0.65 km.	Subtotal: 56 - 56 narra	Subtotal: 43 (41 narra, 2 talisay) Landscape: (5m anahaw, 5m duranta, 30m duranta)	- No vegetation found
	Fuente Circle to CDH Distance: 0.55 km.	Subtotal: 71 - 71 narra Landscape: - 5m duranta	Subtotal: 53 (1 black plum, 1 star apple, 51 narra) Landscape: - Duranta	- No vegetation found
	CDH to Sacred Heart Distance: 0.90 km.	Subtotal: 5 (2 mango, 1 guava, 2 star apple) Landscape: - Duranta	Subtotal: 12 (1 gemelina, 5 mahogany, 1 star apple, 5 narra) Landscape: - 35m carabao grass	- No vegetation found
	Sacred Heart to Gorordo Distance: 0.35 km.	- No vegetation found	Subtotal: 9 (7 mahogany, 1 black plum, 1 star apple)	- No vegetation found
	Gorordo to Ayala Distance: 0.25 km.	Subtotal: 2 - 2 talisay	Subtotal: 16 (4 Indian trees, 2 mahogany, 1 mango, 1 star apple, 2 coconut, 3 balete, 2 cotton tree, 1 ipil-ipil)	- No vegetation found
	Total = 9.80 kms.	**Total (LS)= 664 trees**	**Total (RS)= 683 trees**	**Total (CI)= 677 trees**
			Grand Total (LS + RS + CI) = 2,024 trees	

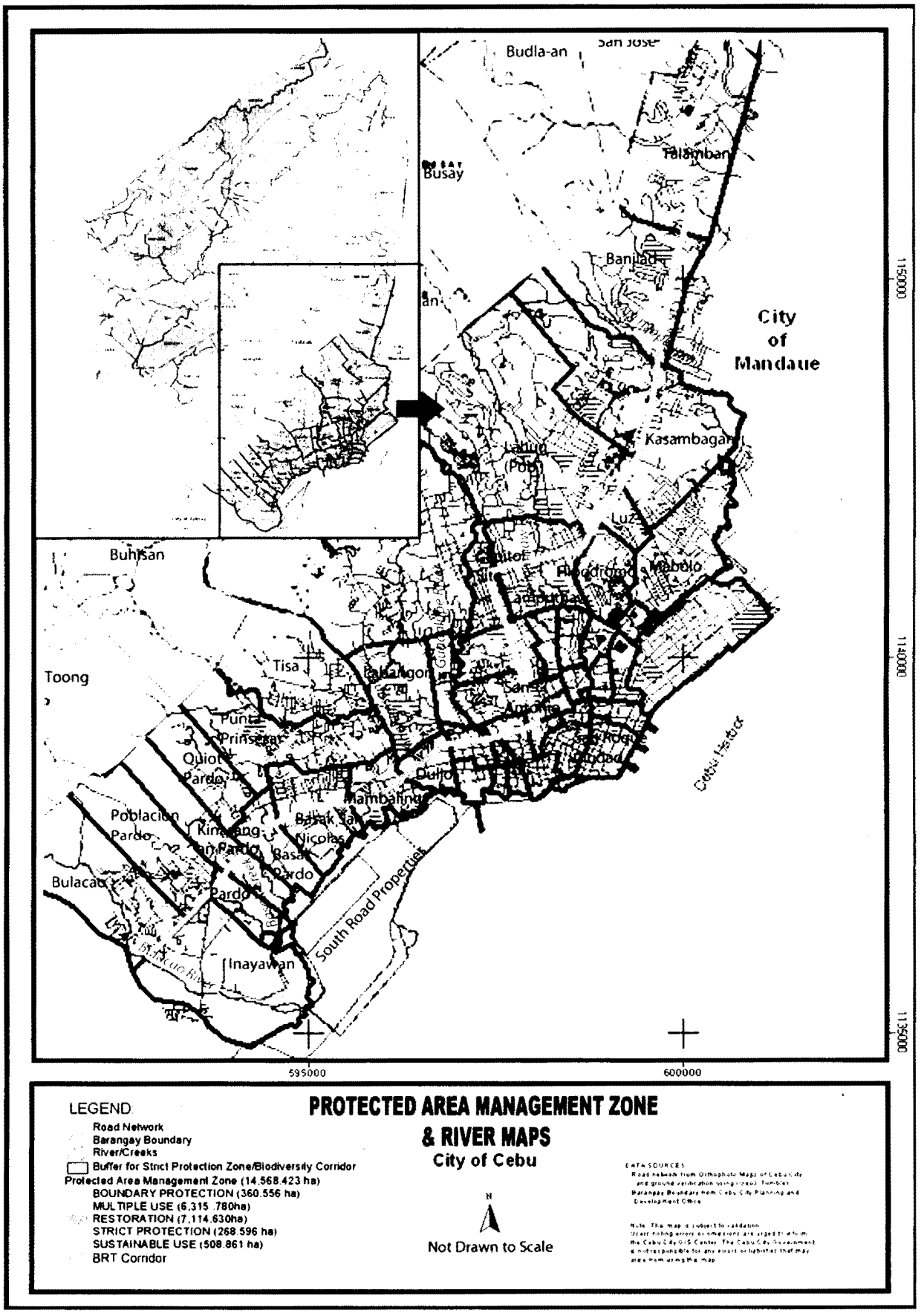


Figure 4.2-1
Cebu City Protected Area Management Zone and River Maps

4.3 Social Environment

4.3.1 Population Dynamics

As of the 2010 census, the total population of Cebu City was counted at 866,171. It was equivalent to 38.27%of the total population in Metro Cebu (Compostela in the North, to Naga in the South) and 20.78% of the entire population of the province. The population of the city was greater by 147,350 over the census population of the city in 2000. This represented an annual growth rate of 1.88% from 2000 to 2010, the lowest among the cities and towns in Metro Cebu during this period.

4.3.1.1 Population Distribution

Cebu City has an average of 5 (4.9 household size) persons per household. Meanwhile, in 2010, the city's population has increased to 866,171. Barangay Guadalupe marked as the highest in population with 60,400 persons while Barangay Kalubihan has the lowest with 563 persons. There were more females than males in the city.

4.3.1.2 Population Density

In 2010, the population density of the city was 2,974 persons per square kilometer. Metro Cebu only had an average density of 2,659 persons per square kilometer in the same period while the whole province only had 603 persons. Within Metro Cebu, Mandaue City had the highest density of 8,601 persons per square kilometer, followed by Cordova with 4,654 and Talisay with 4,151.

4.3.2 Economic Structure

197. The economic foundation of Cebu City is based on its trade and service activities. This 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 the presence of 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 for processing and redistribution to other parts of the country and abroad. Because of its vibrant trading activities many financial institutions and other supporting business activities also are located in the City. Allied with the trading and financial services in the city is the growing tourism industry. The presence of many services and amenities makes Cebu City one of the most livable cities in Asia. Cebu City became the second biggest growth center in the country next to Metro Manila.

198. Structurally, most of the employed workers in Cebu City are now engaged in service activities. Census data showed that 73.2% of the city's employed labor force was found in trade and other related service activities such as banking, real estate, and insurance, community and personal services and others. Some 18.8 % were employed in industry while only 7.8% were engaged in agriculture and related activities.

4.3.3 Health

4.3.3.1 Local Health Resources

199. The city maintains 32 rural health centers and 50 urban health centers, a total of 82 health stations. The city employs 872 government health personnel including 49 doctors, 66 nurses and 98 midwives assigned in the different barangays of the city. This excludes the health personnel that run the Cebu City Medical Center (CCMC).

200. For provision of the public health services, the City of Cebu has a total of sixteen (16) existing hospitals with a total number of about 3,363 beds, the biggest of which is Chong Hua Hospital, a private hospital with 1,073 bed capacity and the smallest is the Guba Emergency Hospital which has only 20 bed capacity.

4.3.3.2 Environmental Health and Sanitation

Solid Waste Management

201. Cebu City is one of the few fortunate cities in the country that has implemented an environmentally sound method of waste disposal. The City has not only shown its concern but has likewise adopted a solution to its hounding garbage problem with the construction and operation of a sanitary landfill in Barangay Inayawan, based on the semi-aerobic landfill design.

Drainage and Sewerage Management

202. According to the Cebu City Profile, Metro Cebu generally has a combined drainage and sewerage system. This means that storm water and domestic sewage are conveyed through a single pipeline, culvert or open canal and is directly discharged to rivers or into the sea with minimal treatment. Compounded with the uncollected solid waste, a number of these drainage systems are clogged and silted rendering them almost useless. Flooding of the City streets and low-lying areas are a common sight even during a slightly heavy rain.

203. While having embarked on implementing quite a number of drainage system projects in the past several years, Cebu City still could not satisfy the overall drainage requirements even up to the level of the existing development. At present, there are still areas without drainage, much more sewerage facilities.

204. Sewerage, however, is included in the mandate of Metro Cebu Water District (MCWD) although at this point in time, MCWD has not yet undertaken any sewerage implementation, operation and much more maintenance in any of the Metro Cebu LGUs, Cebu City's sewerage system is not even serving a tenth of the requirements of the existing development.

205. As of 2005, 84% of the household in the city has access to sanitary toilet or 116,064 houses in Cebu City have clean toilets to dispose their wastes.

4.3.4 Social Services / Utilities

4.3.4.1 Transportation

206. Metro Cebu has a well-integrated transport system, consisting of roads, ports and airports. Intra-provincial movements are catered for mainly by land transport and to a lesser extent by water transport. The Mactan International Airport and Port of Cebu, which are part of the national truck line system, provide for inter-provincial and even international movements. The airport and port has been greatly improved to an international standard while the port has an on-going rehabilitation.

207. Cebu City has a complex mode of intra-city transportation system. It consist of public utility jeepneys (includes mini buses), taxi, vehicles for hire (SUVs) and motorized tricycles. These modes of transportation are essentially the basic system in transporting residents, employees and students of Cebu City to their destination within and outside the city. Buses are the primary mode of public transportation in going to other cities/municipalities in the province of Cebu.

4.3.4.2 Power Supply

208. Power supply in Cebu, including the City of Cebu and the four other component cities is being generated by National Power Corporation, CEBECO (12MW for Toledo), VECO (75 MW) CPPC-EAUC. These are being distributed through various power distribution utilities. Metro Cebu's power supply is being distributed by two private utilities, the Visayan Electric Company (VECO) for Cebu City and nearby municipalities and the Mactan Electric Company (MECO) for the island of Mactan.

4.3.4.3 Communication Infrastructure

209. Cebu City has eighteen (18) telecommunications provider offering a variety of services from basic telephone service, cellular mobile telephone service, broadband service, domestic and international record carrier to public coastal service. Cellular Mobile Telephone Service (CMTS) coverages for Cebu City are Globe, Islacom, Smart, Piltel, Extelcom and Digitel. It also has nested twenty-four (24) FM Radio stations, twelve (12) AM Radio stations and five (5) television stations. The Pacific CATV, Inc. (Sky Cable) has catered the cable television of the entire city serving also the areas of Mandaue City, Consolacion, Talisay City and Minglanilla. In terms of postal communication, the City has a total number of twelve (12) post offices.

4.3.4.4 Water Supply

210. For Cebu City, water supply is the responsibility of the Metro Cebu Water District. Metro Cebu's water supply covers the water produced by water systems, their treatment, transmission and distribution to the different consumers namely: domestic, commercial, industrial and institutional. The classification of water supply systems generally follows the HLURB planning standard.

4.3.4.5 Roads and Traffic

211. Cebu City has twenty-eight (28) national bridges and an annual average daily traffic of 40,210. Generally, the condition of roads and bridges in the city has satisfactorily served the fundamental function to the public commuters and drivers. The public transport system in Cebu is currently largely based on jeepneys and taxis - there are no standard buses for intra city transport. There are some 8,000 jeepneys and 6,000 taxis operating in Cebu, which in some areas of the city form the major part of traffic flows.

212. The traffic situation in Cebu City conforms to the economic activities of the city. Based on the recent traffic survey conducted, the average traffic flow ranges from 2,796 veh/hr during a Sunday to 11,610 veh/hr during a Monday peak morning hours. At the selected traffic survey locations, the major mode of transport comprised mostly of 2-wheelers, followed by Asian Utility Vehicles (AUV)/Pick-up, Jeepneys, Taxis and Sedans. There is very small number of buses.

213. During BRT construction, existing road features may be changed and possible road widening and improvement of its existing features may be made during accommodation of the BRT carriageway. Road features inventory specifically along the BRT corridor are presented in **Table 4.3-1**.

4.3.4.6 Inventory of Utilities Along BRT Corridor

214. Along the BRT Corridor are utilities that are mostly located within the rightful 30-m ROW for a city road. **Table 4.3-2** presents the inventory of utilities along the BRT corridor.

215. Prior to construction of the Project, it is necessary to implement a utility reprovisioning program to minimize and avoid inconveniences with the affected stakeholders. The proposed reprovisioning program is presented in the EMP section of this document.

4.3.4.7 Inventory of Physical and Cultural Resources Along BRT Corridor

216. Cebu City is rich in cultural resources. These are sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The loss of such resources is irreversible, but fortunately, it is often avoidable. **Table4.3-3** provides the inventory of important physical resources that can be potentially affected by the BRT construction. In the project design and planning, potential adverse impacts are avoided and/or minimized to a larger extent.

Table 4.3-1
Road Features along the Segregated Busway (Bulacao – Ayala) of the Proposed Cebu BRT Corridor

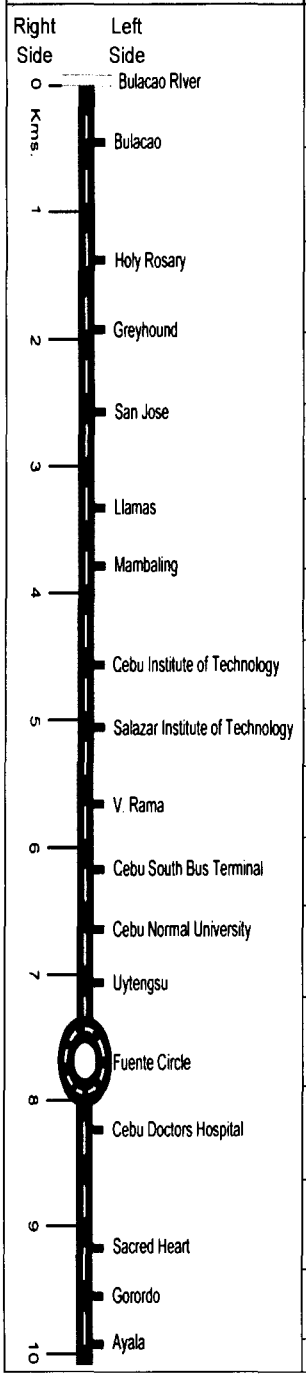
BRT Corridor Reference Map	Station to Station Surveyed & Distance	Left Side (15-m corridor from the center line)	Right Side (15-m corridor from the center line)
	BulacaoRiver to Holy Rosary Distance: 1.4 km.	Subtotal: 2 (Aznar road, Sabellands St.)	Subtotal: 11 (Charlie Ville Street I, Charlie Ville Street II, San Antonio de Padua St., Fatima St, St. Jude Acres Federation Communities St., San Vicente St., San Roque St., Sunrise St, Cogon A. Gabuya St. I, Gabuya St. II, Tabura St.)
	Holy Rosary to Greyhound Distance: 0.55 km.	Subtotal: 2 (Kinasang-anBabao, Back Cres. Com.)	Subtotal: 1 - Inayawan Street
	Greyhound to San Jose Distance: 0.65 km.	Subtotal: 1 - E. Corro St. to Brgy. Quiot	Subtotal: 2 (UbosPundok St., Brotherhood St.)
	San Jose to Llamas Distance: 0.65 km.	Subtotal: 4 (J. N. Jumalon St., Macopa St., Ramp Comp. Lemon St., HP Baclay St.)	Subtotal: 2 (Bontores Street, Cabreros Streets)
	Llamas to Mambaling Distance: 0.60 km.	Subtotal: 6 (F. Llamas Mambaling, Encalyptus St., Dapdap St., Caimito St., Bayabas St., Avocado St.)	Subtotal: 1 - Tabada St.
	Mambaling to CIT Distance: 0.75 km	Subtotal: 2 (Ma. Gochian St., JedanBabao St.)	Subtotal: 1 - SRP Street
	CIT to SIT Distance: 0.50 km.	No major intersections	Subtotal: 4 (Fatima St., B. Aranas St, B. Aranas St. Ext., TresDeabric St.)
	SIT to V. Rama Distance: 0.55 km.	Subtotal: 2 (Labangon St., V.Rama St.)	Subtotal: 2 (Rama St., Pahina Central Street)
	V. Rama to CSBT Distance: 0.55 km	Subtotal: 2 (Rallos St., Urgelio St.)	Subtotal: 1 - Leon Kilat St.
	CSBT to CNU Distance: 0.45 km.	Subtotal: 2 (P. Del Rosario Cor. Osmeña Blvd., R.R. Landon St.)	Subtotal: 2 (Osmeña Blvd., R.R. Landon St.)
	CNU to Uytengsu Distance: 0.45 km.	Subtotal: 2 (Uytengsu St., Urgelio St.)	No major intersections
	Uytengsu to Fuente Circle Distance: 0.65 km.	Subtotal: 2 (B. Rodriguez St., G. Garcia St.)	Subtotal: 4 (Arlinto Pond Street, Gen. Mayilom St., Llorente St., MP Yap St.)
	Fuente Circle to CDH Distance: 0.55 km.	Subtotal: 3 (Jasmin St., Jose Avila, Escario St. Cor. Osmeña)	Subtotal: 1 - Aura St.
	CDH to Sacred Heart Distance: 0.90 km.	Subtotal: 5 (Clavano St., Villalon Drive, Escario St., JuanaOsmeña, Rosal St.)	Subtotal: 4 (Ramos Ext. St., Gov. M.Roa St., Juana Osmeña St., Lower Camputhaw St.)
	Sacred Heart to Gorordo Distance: 0.35 km.	Subtotal: 3 (Tojong St., Acacia St., Gorordo St.)	Subtotal: 1 - Gorordo Ave.
	Gorordo to Ayala Distance: 0.25 km.	Subtotal: 3 (Kamagong St., Apitong St., Molave St.)	No major intersections
	Total = 9.80 kms.	**Total (LS)= 41 Streets/ Intersections**	**Total (RS)= 37 Streets / Intersections**

Table 4.3-2
Utilities along the Segregated Busway (Bulacao – Ayala) of the Proposed Cebu BRT Corridor

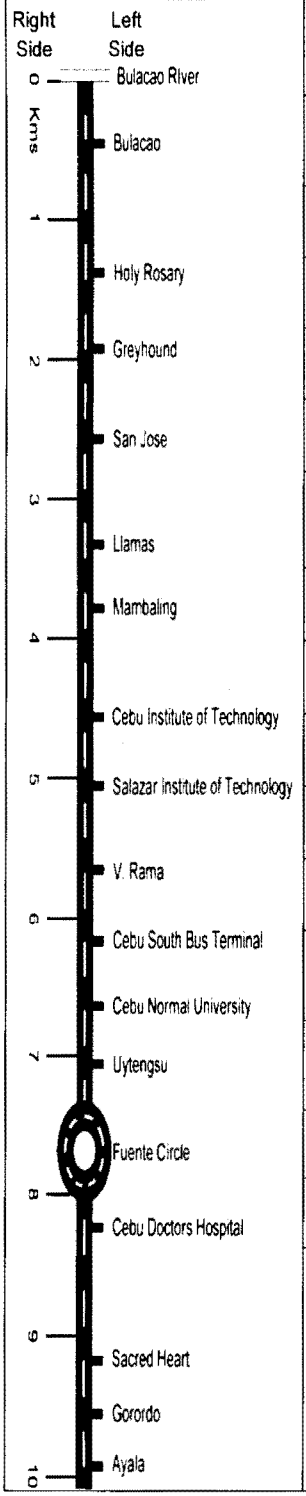
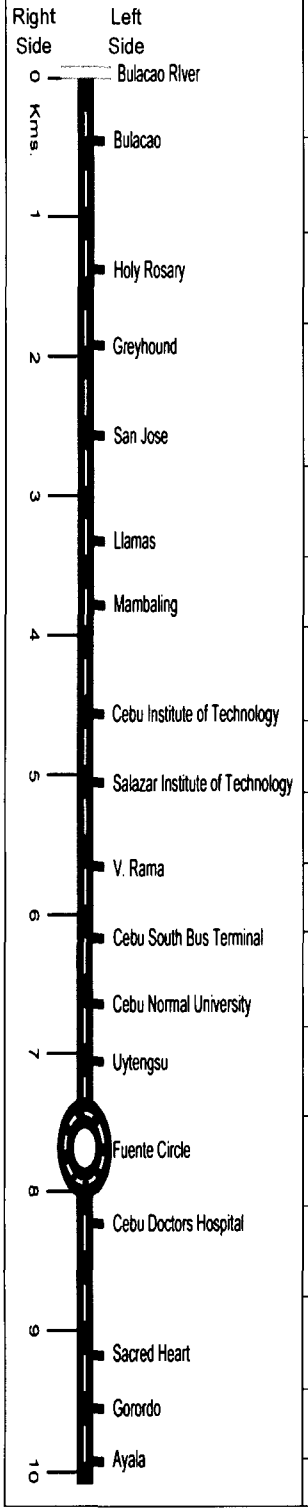
BRT Corridor Reference Map	Station to Station Surveyed & Distance	Left Side (15-m corridor from the center line)	Right Side (15-m corridor from the center line)	Center Island
	Bulacao River to Holy Rosary Distance: 1.4 km.	- 84 electrical posts - 23 electrical transformers	- 117 electrical posts - 14 electrical transformers	-19 flags - 42 lamp posts - 1 electrical post - 5 traffic lights
	Holy Rosary to Greyhound Distance: 0.55 km.	- 28 electrical posts - 17 electrical transformers	- 36 electrical posts - 14 electrical transformers	- 8 lamp posts - 2 traffic lights
	Greyhound to San Jose Distance: 0.65 km.	- 43 electrical posts - 20 electrical transformers	- 48 electrical posts - 13 electrical transformers	- No utilities found
	San Jose to Llamas Distance: 0.65 km.	- 54 electrical posts - 14 electrical transformers	- 45 electrical posts - 6 electrical transformers	- No utilities found
	Llamas to Mambaling Distance: 0.60 km.	- 50 electrical posts - 17 electrical transformers	- 65 electrical posts - 1 electrical transformer	- 1 electrical post - 3 traffic lights
	Mambaling to CIT Distance: 0.75 km	- 60 electrical post (17 concrete, 43 log) - 13 electrical transformers	- 54 electrical posts - 10 electrical transformers	-21 electrical post
	CIT to SIT Distance: 0.50 km.	- 39 electrical post (24 concrete, 15 log) - 21 electrical transformer - 2 traffic lights	- 39 electrical posts - 11 electrical transformer - 4 traffic lights	- 21 lamp posts - 8 traffic lights - 1 electrical transformer
	SIT to V. Rama Distance: 0.55 km.	- 35 electrical posts - 3 electrical transformers - 10 traffic lights	- 44 electrical posts - 10 electrical transformers - 2 traffic lights	- 19 lamp posts - 2 traffic lights
	V. Rama to CSBT Distance: 0.55 km	- 46 electrical posts - 21 electrical transformer - 3 traffic lights	- 42 electrical posts - 15 electrical transformers - 3 traffic lights	- 15 lamp posts - 2 traffic lights
	CSBT to CNU Distance: 0.45 km.	- 40 electrical posts - 8 electrical transformers - 6 traffic lights	- 14 electrical posts - 3 electrical transformers - 12 traffic lights	- 1 lamp post - 3 electrical posts - 1 traffic light
	CNU to Uytengsu Distance: 0.45 km.	- 44 electrical posts - 15 electrical transformers - 7 traffic lights	- 29 electrical posts - 12 traffic lights	- No utilities found
	Uytengsu to Fuente Circle Distance: 0.65 km.	- 48 electrical posts - 22 electrical transformers	- 45 electrical posts - 3 electrical transformers - 10 traffic lights	- No utilities found
	Fuente Circle to CDH Distance: 0.55 km.	- 58 electrical posts - 32 electrical transformers - 8 traffic lights	- 21 electrical posts - 2 electrical transformers - 12 traffic lights	- No utilities found
	CDH to Sacred Heart Distance: 0.90 km.	- 68 electrical posts - 20 electrical transformers - 4 traffic lights	- 61 electrical posts - 2 electrical transformers	- No utilities found
	Sacred Heart to Gorordo Distance: 0.35 km.	- 31 electrical posts - 9 electrical transformers	- 20 electrical posts - 3 electrical transformers	- No utilities found
	Gorordo to Ayala Distance: 0.25 km.	- 13 electrical posts - 1 electrical transformer	- 6 electrical posts - 7 traffic lights	- No utilities found
	Total = 9.80 kms.	**- 741 electrical posts - 256 electrical transformers - 40 traffic lights**	**- 686 electrical post - 107 electrical transformers - 62 traffic lights**	**- 19 flags - 106 lamp posts - 26 electrical posts - 23 traffic lights - 1 electrical transformer**
		Overall Total =	**- 1,453 electrical posts - 364 electrical transformers - 125 traffic lights - 19 flags - 106 lamp posts**	

Table 4.3-3
Sensitive Areas along the Segregated Busway (Bulacao – Ayala) of the Proposed Cebu BRT Corridor

BRT Corridor Reference Map	Station to Station Surveyed & Distance	Left Side (15-m corridor from the center line)	Right Side (15-m corridor from the center line)
	Bulacao River to Holy Rosary Distance: 1.4 km.	Subtotal: 9 (Bulacao River , Villa Bulsita Subdivision, Villa Mangga Elem School, Newton Estate Subd., Newbery Interactive School, SitioRosimba, Pardo Church , Holy Rosary of Pardo, Baptist Church)	Subtotal: 6 (Bulacao River, St. Paul College Foundation, Inc., SNR. San Antonio de Padua Chapel, Bulacao Envangelical Free Church, The Church of God Christian Service, Pardo Elementary School)
	Holy Rosary to Greyhound Distance: 0.55 km.	Subtotal: 1 - Tan-Chua Dental Clinic	Subtotal: 4 (Rainbow village, Greyhound Subdivision, Sto. Nino Community School, Upper Kauswagan Street)
	Greyhound to San Jose Distance: 0.65 km.	Subtotal: 3 (Dental Clinic, San Jose Recolletos, Dental Clinic)	Subtotal: 3 (Cebu Trinity Christian School, Cabreros Compound, Basak Creek)
	San Jose to Llamas Distance: 0.65 km.	Subtotal: 6 (Catholic Church of Holy Cross Parish, Vicente Rama Elem School, BasakPardo Elem School, United Pentecostal Church, Cebu Evangelism Center, Friendship Village)	Subtotal: 2 (Messenger of hope community center, BeyonesPantinople Optical Clinic)
	Llamas to Mambaling Distance: 0.60 km.	Subtotal: 2 (Dental Clinic, Mambaling Elem School)	Subtotal: 1 - Alkhairiah Mosque
	Mambaling to CIT Distance: 0.75 km	Subtotal: 1 - Kinalumsan Creek	Subtotal: 2 (Sr. Sto. Niño Chapel, Kinalumsan River)
	CIT to SIT Distance: 0.50 km.	Subtotal: 2 (Cebu Institute of Technology, Salazar Institute of Technology)	No Structure of cultural sensitivity and ecological importance
	SIT to V. Rama Distance: 0.55 km.	Subtotal: 4 (Dr. Uy Clinic, Jesus Saves, Christian Fellowship, Guadalupe River)	Subtotal: 3 (Mother of Perpetual Help Chapel, Guadalupe River, Cebu City Medical)
	V. Rama to CSBT Distance: 0.55 km	Subtotal: 4 (Sta. Cruz Chapel , Dr. Della Oriel, Rizwood College, Cyber Medical Clinic)	Subtotal: 1 - ACT School
	CSBT to CNU Distance: 0.45 km.	Subtotal: 1 - City Central	Subtotal: 1 Cebu Normal University
	CNU to Uytengsu Distance: 0.45 km.	No Structure of cultural sensitivity and ecological importance	Subtotal: 2 (Bradford United, Visayan Community Medical Center)
	Uytengsu to Fuente Circle Distance: 0.65 km.	Subtotal: 2 (DOH Building, SHI Nursing Home)	Subtotal: 1 - Caritas Health Shield
	Fuente Circle to CDH Distance: 0.55 km.	Subtotal: 1 - Rizal Memorial Cebu City Museum	Subtotal: 2 (Cebu Gospel Church, Cebu Doctors)
	CDH to Sacred Heart Distance: 0.90 km.	Subtotal: 1 - Atillo Medical Clinic	Subtotal: 2 (Seventh Day Adventist, Camputhaw River)
	Sacred Heart to Gorordo Distance: 0.35 km.	Subtotal: 1 - Escario Br.	No Structure of cultural sensitivity and ecological importance
	Gorordo to Ayala Distance: 0.25 km.	No Structure of cultural sensitivity and ecological importance	No Structure of cultural sensitivity and ecological importance
	Total = 9.80 kms.	**Total (LS)= 38 cultural structures**	**Total (RS)= 30 cultural structures**

5.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 Environmental Settingwithout the Project

217. Cebu City has a population of about 866,171 and a land area of 326 sq. kms, with the overall population density of 2,657 persons per sq. km. About 66 percent of the total City population is concentrated within 15 percent of land area.

218. In terms of motorization, the number of vehicle registrations in Cebu City has displayed an annual growth rate of seven percent for the period 1994 to 2000 and four percent for the period 2000 to 2006. It is anticipated that Metro Cebu will experience an increasing rate of person-trips due to rapid population growth and urbanization.

219. The average travel speed for major corridors is around 10km/h indicating severecongestion for most times of the day. The PUJ (Public Utility Jeepney) network is struggling to keep pace with the changing nature of demand. Population growth has increased the demand for travel and will do more so in the future. In parallel the car has become a viable mode of transport for a greater proportion of the population.

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

- Too many PUJs/vehicles with no new infrastructure improvements in the City
- Uncontrolled/ unlimited issuance of franchises for PUJs
- Slow travel times
- Undisciplined drivers and pedestrians on the streets
- Large scale use of motorcycles for public transport i.e. "habal-habal"
- Illegal parking/ Illegal Terminal
- Sidewalk encroachment and sidewalk vendors

197. The number of recorded accidents in Cebu City in 2000-2006 ranged from a level of 14,000 in 2000 to around 10,000 in 2006. The number of accidents is quite high in comparison to Metro Manila (population of approximately 11,500,000), which recorded a maximum of 11,185 accidents in 2005.

198. 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 on major roads. Carbon monoxide (CO) levels exceed National Ambient Air Quality Guideline Values of Philippines (NAAQGV, 9 ppm daily average) during weekends or weekdays. Likewise, concentrations in volatile organic compounds, benzene, butadiene as well as CO levels are higher than those measured in the roadside environment in many other Asian cities.

199. At present, around 474,000 tonnes of CO_2e are currently being produced by some 893 million vehicle-km of travel across the Cebu City road network. In terms of GHG emissions per person-km, 135.6 grams CO_2e are being produced per person-km across Cebu City by passenger transport and 131.1 grams CO_2e per person-km in the proposed BRT corridor. Current urban transport greenhouse gas emissions across Cebu City per GDP per capita are 323.1 tonnes of CO_2e per US dollar[4] GDP per capita.

200. Land use change has created a largely polycentric City that is orientated by the traditional down town and up town areas but also new malls and business parks. The nature of demand will be further distorted by the South Reclamation Project. The changing nature of

demand, the changing aspirations of the travelling public together with the need to address air quality and safety problems create a context for intervention of which BRT can play acentral role.

5.2 Potential Environmental Impacts Associated with the Project

201. This section discusses the potential environmental impacts of the proposed BRT Project and identifies mitigation measures and guidelines to minimize the impacts during the design, construction and operational phases. Environmental analysis covered potential direct, indirect, cumulative, and induced impacts but primarily focusing on the physical impacts within the BRT corridor from Bulacao along Cebu South Road – N Bacalso Avenue – Osmeña Boulevard – Escario Street – Ayala Mall – Gov. M Cuenco Ave to Talamban.

202. ***Physical Impacts***. The project has nine components as follows: (i) a segregated busway between Bulacao and Ayala Mall; (ii) bus stations and (iii) a depot (iv) an Area Traffic Control System (ATCS), (v) an open service plan, (vi) traffic management measures, (vii) jeepney parking management measures, (viii) interchange improvements, and (ix) urban planning improvements. Among these components, the constructions of the segregated busway, the bus terminals and bus stops and the depot shall exert physical impacts to the environment. The rest of the components are those that would positively contribute to the improvement of urban planning and traffic conditions in Cebu City. Physical impacts would be attributable to activities such as the mobilization of materials and men to site, preliminary works such as vegetation stripping and grubbing, initial civil works; construction and surfacing of the road, construction of the bus stops, terminals and other ancillary such as the depot.

203. The main physical issues relate to impacts such as new construction of the BRT transitway, reconstruction of the road and associated earthworks to utilize the full width of the ROW, construction of the BRT roadway and stations at grade, terminals and depot, installation of the traffic control systems and access arrangements for BRT buses to existing flyovers, construction of extensions to existing road bridges, obtaining rock based construction materials and delivery of construction materials, supply and installation of bitumen surfacing, casting of concrete components for bridges, noise, dust and spoil disposal, disposal of other waste, and water quality. The construction for the civil works will create some unavoidable dust, noise and vibration and all require to be addressed. The terminal at Bulacao will overlap on to a parcel of unused commercial land. The depot near the port area / SM Mall will use a parcel of land with temporary commercial uses. However most of these impacts are temporary and reversible and will result in the improvements during the operational phase.

204. *Management Issues.* The main management issues relate to impacts such as re-provisioning electric power lines, water mains, drains and telecommunication cables, planning temporary traffic management measures, management of waste and spoil disposal, materials supply, temporary drainage, prevention of flooding and protection of the construction works, managing tree-cutting and replanting, controlling noise and dust and managing workers and public safety.

205. Biological Impacts. The main biological issues relate to removal of trees at the roadside and in the median along the work areas and compensatory planting, acquisition of land and properties and small parcels open amenity spaces near the alignment and impacts to rivers. There is no issue of interference with sites protected for their biodiversity as the Project is more than 30km from the nearest area protected for its biodiversity and landscape properties. There will be no interference with protected forests as the works for the Project will be in the urban area, mostly within the roads' ROW.

206. Social Impacts. The social and human impacts to street level activities, jeepney operations and impacts to social infrastructure will be mitigated through implementation of the Resettlement Plan and other social interventions. Most adverse impact is on the livelihood of PUJ operators and drivers who would have to be re-routed with the introduction of BRT. A detailed mitigation plan is developed in the Social Management Plan.

5.3 Cumulative, Indirect and Induced Environmental Impacts

207. The transportation network that the BRT will be part of is already well developed Planning aims are to completely overhaul mass transportation modes in line with the Strategic Transport Plan for Cebu. Traffic in Cebu will increase gradually after BRT Project completion but there will be other benefits for the public in improved traveling conditions and vehicle cost savings that will offset the impacts due to increasing traffic.

208. *Indirect impacts*: There may be some adverse and beneficial environmental impacts which cannot be immediately traced to the project activities but can be causally linked. For example, a project's pollution may directly impact air quality. Overall the improvement in the road system in Cebu will potentially lead to growing traffic and commercial activities that may indirectly lead to additional pollution. Conversely the use of more fuel efficient vehicles, more efficient running cycles and the development of better sealed roads will improve the system overall and reduce some of the pollution arising and therefore have some indirect benefits on the respiratory health of some of those living near the roads.

209. *Induced impacts*: The BRT will be carried out on existing roads and there will be many more traveling passengers as the BRT system develops. The origins and destinations of the traveling public may remain much the same in the existing transport corridor but overall pattern of movements will change and the BRT and road upgrading should make that travel more efficient. The statutory provisions under the laws of Philippines cover pollution control. These laws are established but institutional strengthening is required and improvements in resources are needed to achieve better enforcement to support strategic management of pollution control in the long term. The controls on the BRT operations will provide a good example of a clean efficient mass transport. Therefore overall, there would appear to be some opportunity for beneficial induced impacts although it is difficult to foresee unplanned developments caused by the project that may occur later or at different locations, that would bring about any negative impacts caveat there will be better strategic transport planning and an area wide traffic management system and general improvement to the road and transportation network overall.

210. The potential environmental impacts in the design, construction and operational phases are assessed below. Where impacts exceed accepted environmental standards, mitigation measures are proposed in order to reduce residual impacts to acceptable levels and achieve the expected outcomes of the project. The criteria for assessment are in line with WB Policy OP 4.01, or if the GOP standard is stricter, the national standards and criteria set by GOP. Where GOP has no set of standard or guideline, the standards given in World Bank's Environmental Health and Safety Guidelines (2007) are used. The EIA (Chapter 7) provides a set of guidelines and a matrix of mitigation and monitoring measures to prevent or minimize the impacts. For purposes of this assessment it is assumed that the National BRT-Project Management Office (National BRT-PMO) and the BRT-Project Implementation Unit (BRT-PIU) will engage consultants to cover all detailed Engineering, Procurement, Construction Management and Supervision during both the detailed design and construction supervision phases.

5.4 Design / Pre-Construction Phase

211. The proposed project involves design and construction and operation of the first (pilot) line of the bus rapid transit system (BRT) for Cebu that will share the ROW with multiple carriageways of the existing road. As the existing alignment of the road will be followed, route selection is established but there may be some later adjustment of alignment to avoid existing structures in the ROW. There are a number of mitigation measures that will need to be carried out by the design and supervision consultant to avoid construction impacts and by good design to minimize operational environmental impacts.

212. Detailed design will be required to ensure that the BRT can cope with flooding from a 100 year return storm event. In line with WB policy on environmentally responsible procurement, opportunities to provide environmental enhancements will also be identified in the detailed design as well as routine matters such as avoiding unnecessary removal of trees and compensatory and enhancement planting. The opportunities for design, construction and operational enhancements have been included in the Environmental Management Plan (EMP).

5.4.1 Design Measures and Project Disclosure

213. The environmental guidelines outlined below will form the basis of detailed Environmental Management Plans to be prepared by DED consultants as part of the detailed design. (***Table 7.2-1 in Section 7***):

i) Land acquisition, resettlement and environmental impacts will be avoided or minimized by basing the detailed designs within the ROW as proposed in the feasibility designs.
ii) Potential solution spaces to ensure sufficient disposal space for cut surface spoil materials and to avoid fly-tipping will be identified in advance by the TSC and approved by BRT-PIU and the local community before bidding.
iii) Arrangements will be made to facilitate the timely production and supply of rock and bitumen based materials for construction and to avoid impacts due to unnecessary stockpiling near the BRT route.
iv) Hydrological and drainage impacts during construction will be minimized by including a hydrological study prior to the detailed design phase in order to plan the early phasing of replacement of side drains, culverts and other infrastructure.
v) Extensions and improvements of drainage culverts for BRT drainage and the adjacent road will be based on the hydrological study and designed to account for increased rain due to a once in 100 year return storm event.
vi) Disruption to current facilities for water supply will be avoided and facilities will be retained or re-provisioned before construction works commence; provisions will be made to preserve the operation of current facilities for water supply in sufficient quantity in agreement with the local community.
vii) Disruption to current power supply will be avoided and movement of power lines and supporting pylons and poles will be planned well in advance. Power distribution circuitry will be re-provisioned before construction works commence; provisions will be made to preserve the operation of current facilities for power supply in sufficient quantity in agreement with the local power supply company.
viii) Disruption to telecommunications will be avoided and movement of telecommunication lines will be planned well in advance and especially to take account of where telecom lines are supported (or piggy-backed) on power pylons and poles will be planned well in advance. Telecommunications lines will be re-provisioned before construction works commence; provisions will be made to preserve the operation of current facilities for telecommunications in sufficient quantity in agreement with the local telecommunication companies.

ix) Plans to minimize disturbance of vehicular traffic and pedestrians during construction will be included in the detailed designs as embodied in the Traffic Management Guidelines. These guidelineswill be discussed and agreed with the police authorities and other local authorities along the project corridor. Plans to avoid or minimize disturbance of vehicular traffic and pedestrians during construction will be included in the detailed design. Phasing and programming for construction will retain passing lanes along the road during construction and avoid community severance.
x) Acquisition of land will be minimized for temporary facilities (if needed) by selecting preferred locations in the detailed designs for construction yards and asphalt plant on barren or marginal land and agree terms with local community.
xi) Enhancements will be provided in line with good practice and WB policy on environmentally responsible procurement and negative impacts due to unnecessary removal of trees will be avoided. Compensatory tree planting and cutting will be implemented in line with the statutory requirements and a required by DENR and Forest Management Bureau. Where necessary DENR central office will be consulted.

214. The roads upon which the BRT will run requiring improvement are part of the existing road corridor and although the ROW is wide enough for the implementation there are some encroachments and there will be some requirement for land acquisition and resettlement particularly at the stations where the footprint is wider. This is confirmed in the Resettlement Plan.

215. The final alignment plan will be disclosed to DENR under the EIS requirements and to WB and a check will be made at the detailed design stage that the BRT alignment has been designed as planned to avoid and mitigate impacts. The EIA/EMP shall be updated by the DED consultants and resubmitted to WB incorporating any recommendations and requirements from the DENR, should there be additional environmental impacts not identified in this EIA.

5.4.2 Project Boundaries Change near SensitiveReceivers

216. The alignment runs mainly through mixed commercial areas and will not run through a residential developed area but the alignment is subject to detailed design and some affected persons may have their land acquired or be resettled. The places of worship, educational institutions and residential sensitive receivers (SRs) on the roads either side of the BRT are set back sufficiently for traffic fumes to be dispersed and road traffic noise will not increase sufficient to affect the sensitive receivers. The World Bank criterion of 3dB(A) above background at the sensitive receiver for new noise sensitive developments such as residences, schools, colleges and hospitals will be achieved. Noise and dust in construction will need to be controlled. There are some medical facilities near and along the BRT corridor. The roadside vendors and tea and food stalls will be relocated away from the likely working areas on the BRT road. There are many educational establishments and places of worship along the corridor but the sensitive facades are also generally set some way back from the road.

217. As with most, all transportation projects there may be some as yet unidentifiable refinements to the alignment at the detailed design stage that mean the works must take place over a slightly different area. Therefore the assessment will need to be updated at the detailed design stage when the final footprint and alignment and the relative location of the SRs is known. As mentioned above, an updated EIA will be prepared and submitted to the Bank for review and approval.

5.4.3 Environmental Capacity Development of BRT-PIU

218. Trianing would be provided to BRT-PIU and Environment and Social Safeguard Specialiststo ensure proper monitoring in the preparation and implementation of EMP. As the project is under implementation, BRT-PIU will engage staff as Environmental and Safety Officer (ESOs) to undertake environmental management.

5.4.4 Preparation of Site-specific EMPs

219. The contractor will include EMP in the bidding and contract documentation. Prior to bidding, the DED consultants will develop site-specific environmental management plans based on the guidelines and EIA as elaborated in this section. The broad content of the EMPs is included in the construction mitigation section. The EMPs will demonstrate the manner (location, responsibilities, schedule/ timeframe, budget, etc.) in which the Contractor will implement the mitigation measures specified in the EMP.

220. The key elements of the EIA will include:

- Tree-cutting and Replanting Guidelines to ensure indiscriminate tree-cutting shall be avoided by clearly defining areas where tree removal is necessary based on Project requirements and that replanting shall be done to compensate for lost trees;
- Utilities and Telecommunications Reprovisioning Guidelines to minimize interruption to power, water and gas supply and telecom systems;
- Traffic Management Guidelines to minimize disturbance of vehicular traffic and pedestrians during construction. Entree arrangements for vehicles accessing the Project area will be formulated based on a traffic impact assessment including requirements from the district transport police forces such that this will avoid community disturbance and severance and will at least retain necessary passing lanes along all roads used during construction;
- Waste Management and Spoil Disposal Guidelines for handling, storage, treatment, transport and disposal of solid and liquid wastes, hazardous materials, hazardous wastes and excavation spoils;
- Materials Management Guidelines detailing arrangements to be made to facilitate the timely production and supply of construction materials to avoid impacts due to unnecessary stockpiling inside and near the Project site area.
- Drainage Management Guidelines to ensure that construction works will not cause ponding/flooding within the Project site, construction camps, borrow/quarry areas, other areas used for project-related activities and areas adjacent to the Project;
- Excavation Protection and Runoff Control Guidelines to ensure that construction works are protected and will not cause excessive runoff and siltation of waterways adjacent or within the Project site, have sufficient provisions to protect the works, ensure stabilization of exposed soils and other runoff-prone areas, minimize hydrological impacts, flooding and uncontrolled runoff to adjacent areas and to protect the works under construction;
- Noise and Dust Control Guidelines to minimize impacts to sensitive receptors (educational establishments, hospitals, residential areas, etc.) due to construction works, sourcing and transport of construction materials, and other project-related activities;
- Workers and Public Safety Guidelines to identify interfaces between the works and public and ensure worker and public safety, prevent accidents due to the construction works, and report all accidents due to the Project activities.

5.4.5 Environmentally Responsible Procurement

221. The EMP will be included in contract bidding documentation. The requirements in the construction contract will include full implementation of the EMP to ensure contractors are fully aware in advance of their environmental responsibilities and obligations. National BRT-PMO and BRT-PIU shall ensure that the EMP and above plans are included in the bid and contract documents for civil works. National BRT-PMO and BRT-PIU willl require the contractor to engage capable and trained staff or site agents to take responsibility for the environmental management at the working level and to audit the effectiveness of the contractor's EMP and review mitigation measures as the project proceeds. The effective implementation of the EMP will be audited as part of the project.

5.4.6 Utilities and Telecommunication Coordinating Committee

222. Considering the number of Government and private agencies that need to be involved in implementing the reprovisioning of electrical power, water and gas supply, and telecom systems, PIU will set up a coordinating committee at the commencement of the detailed design stage. This will facilitate the identification of all foreseeable constraints and preparation of the Utilities and Telecoms Reprovisioning Guidelines. The objective will be to identify all potential hindrances to construction in the field and the lead time and processes necessary to ensure reprovisioning of the utilities and telecoms in good time. The process will establish preparedness of the utilities to facilitate reprovisioning.

5.4.7 Ambient Environmental Baseline Data

5.4.7.1 Air quality and Noise

223. Baseline data on air quality and noise levels shall be collected before commencement of civil works. Such data will help in assessing project impacts during implementation. Four locations for air quality and noise have been identified. Measurements will be taken at least two weeks before commencement of civil works. Field sampling for TSP and noise will be conducted at representative sensitive receptors (SRs), i.e., sampling stations shall be established and sampled for each SR type as follows: (i) residential area, (ii) school or educational establishment, and (iii) hospital/health center. Field measurements for TSP shall be carried out using 1-hr averaging period based on the prescribed methodology as prescribed by DENR.

224. Noise impacts would be of short duration, although they can be very intrusive if not controlled properly. Noise measurement shall be undertaken at the same sites sampled for TSP and shall follow the methodology specified by DENR. Noise shall be measured in dB (A) over a 24 hours covering the different periods (i.e., 6h to 18h, 18h to 22h and 2h to 6h). Measurement will also be taken to establish if the World Bank criterion of Leq55dB (A) 1-hour is exceeded at the measurement points and at what time of day / night it is exceeded. If the Philippines criterion is exceeded by the existing noise, (as seems very likely based on background spot measurements made for this EIA) the World Bank criterion of background +3dB (A) will be applied in the monitoring. The criterion of Leq50dB (A) can be used where background is below Leq50dB (A) 1hour. Works are not expected to be carried out at night but if this is unavoidable for unexpected reasons separate measurements will also be taken before construction commences to establish if the Philippines night time criteria are exceeded and the monitoring assessment criteria will be established accordingly.

225. Information such as recent rainfall will be documented as part of the baseline measurement. The sampling report will also specify if the sampling was undertaken during the rainy or dry season. Time and date of sampling, sources of dust and noise emissions during the sampling period, comparison of results to applicable standards shall also be

included in the report. Actual location of the sampling stations shall be described in the report and plotted on a map together with GPS readings. The noise and TSP baseline monitoring will be reported by TSC at the end of the detailed design period, either in the detailed design report or in a dedicated baseline monitoring report before the bidding documents are completed.

5.4.8 Enhancements

226. Environmental enhancements have not been a major consideration in the assessment. However it is noted that it has been common practice in many places to plant trees along Cebu streets and highways to provide visual interest in line with best international practice for highway design. Whereas water supply is not likely to be limited along much of the BRT road there will be some good opportunity sites for tree planting especially around stations, terminals, depot and parking areas. These locations may provide a chance to create some local soft landscaping where successful planting of trees and shrubs could be accomplished and should be investigated at the detailed design stage. This practice should be in addition to tree replacement required by DENR and should be encouraged as far as practicable and to foster goodwill with the local community. Other opportunities for enhancements can be assessed prior to construction and proposed enhancements should be discussed with the local population to identify stewardship of any planting and also to serve as a vehicle for further public consultation at the implementation stage and to assist in public relations.

Based on initial survey, there are around 2,000 trees that can be potentially affected by the BRT construction. In terms of mitigation, the Project Proponent must follow the DENR's Guidelines and Procedures on the Planting, Maintenance and Removal of Trees in Urban Areas and in Areas Affected by Government Infrastructure Projects. Under this regulation, for a 30-cm diameter tree and above to be cut, it has to be replaced with 50 trees while for trees with 29-cm diameter and below to be cut, it has to be replaced with 40 trees. Plantation area has to be mutually decided by DENR and the Project proponent. As a preliminary estimate, with the assumption that the Project will affect 50% to 100% of the inventoried tree along the BRT corridor, the Project Proponent may be required to plant around 50,000 to 100,000 trees.

5.5 Construction Phase

227. The source of the construction impacts from BRT will include (i) construction of the BRT pavement, stations, underpasses, flyovers, BRT viaducts, terminals and depot, (ii) excavation and reconstruction of the road and NMT lanes and associated earthworks to utilize the full width of the ROW, (iii) excavation and reconstruction of the side drains and lead off drains and upgrading road drainage, (iv) construction, repair and reconstruction of all bridges located at the intersections of BRT Alignment and rivers of Guadalupe, Bulacao, and Subangdaku. (v) ensuring drainage and access near adjacent street developments and at other key areas is unimpaired by construction/extension of numerous culverts and BRT underpasses, (vi) ensuring security of supply and reprovisioning of electrical power, gas and water supply mains and telecommunications lines to adjacent street developments and at other key areas, (vii) installing signals, signs, road markings, landscaping and accessories. Reconstruction of the adjacent BRT road will also give rise to a lot of surface cutting which will give rise to large amounts of spoil for disposal. For purposes of this assessment it is assumed that the Design and Supervision Consultant will cover both detailed design and construction supervision.

5.5.1 Activate SEMPs and Obtain Permits and Licenses

228. The contractors will carry forward the environmental mitigation measures and enhancements as identified in the detailed designs. PIU will support Contractors to prepare updates of the management guidelines/EIAs as detailed in this report. The benchmark for monitoring and reporting on the contractor's environmental performance are the updated SEMPs, all the mitigation measure in the EMP (Table 7.2.1) and any additional mitigation measures that may be included in the EMP during detailed design stage. BRT-PIU would ensure that Contractor(s) and their suppliers comply with all statutory requirements for permits from DENR with regard to use of mechanical equipment, establishment and operation of construction plants such as asphalt plant, concrete batching plant, rock crusher, spoils disposal, etc. The Contractor(s) and their suppliers will be required to use licensed sources of rock based materials that comply with all statutory permits and DENR requirements.

5.5.2 Orientation of Contractor

229. PIU will orient the Contractor(s) on implementation of construction mitigation measures in the SEMPs/management guidelines and all other construction phase mitigation measures included in the Project EMP (i.e., EMP included in the EIA) and any mitigation measures that may be included during detailed design stage. The PIU will monitor the implementation of mitigation measures by the Contractor(s) and if the required measures are not installed payments will be withheld as per the bidding documents. This will include implementation of dengue controls and HIV-AIDS education in line with social plans and the requirements for HIV/AIDS awareness and prevention program to be implemented under the Project. These requirements including the EMP table on mitigation measures (Table 7.2.1) will be included in the Particular Specification for the contract.

5.5.3 Loss of Trees/Deforestation and Impacts to Fauna

230. The Tree-Cutting and Replanting Guidelines will be agreed with DENR prior to commencement of construction. Contractors are engaged and before any tree cutting is undertaken. The TCRP shall be updated by the Contractor as part of SEMP. Road excavation will be designed not to undercut or destabilize adjacent tree lined pavements and verges and clearing of trees will be minimized in SEMP. The local DENR Forest Management Bureau (FMB) will be informed in advance and based on the tree cutting and replanting guidelines may monitor marking of trees that will be removed under its jurisdiction.

231. The PIU will supervise and monitor a ban on use of local trees for timber and workers shall be prohibited from using cut trees for firewood. During replanting/revegetation works, new alien plant species (i.e., species not currently established in the region of the project) shall not be used unless carried out with the existing regulatory framework for such introduction. All replanting and compensatory planting will be planned in full agreement with DENR-FMB

232. The contractor will not use or permit the use of wood as a fuel for the execution of any part of the works, including but not limited to the heating of bitumen and bitumen mixtures. To the extent practicable the Contractor shall utilize reusable shuttering for concrete works and shall ensure that fuels other than wood are used for cooking, and water heating in all his camps and living accommodation. The Contractor shall not buy or use wood from the illegal sources (that come from the illegal logging). The Contractor will take all precautions necessary to ensure that damage to vegetation is avoided due to execution of the works. The Contractor will keep a fire watch at all times and immediately suppress any fire, if it occurs, and shall undertake replanting to replace damaged vegetation due to fire or

execution of the works. The Tree-Cutting and Replanting Guidelines will include as a minimum consideration of:

- Identification of trees to be cut and its locations
- Ban on use of timber for fuel.
- Justification for tree cutting as an alternative to BRT realignment.
- Permissions from DENR / Forests (CCF) for tree cutting.
- Methods for marking, protection of uncut cut trees and limitations to cutting.
- Methods and timing for safe cutting to minimize interference with normal traffic.
- Methods to remove trees and cut timber and avoid stockpiling cut wood on site.
- Methods to avoid under cutting adjacent tree lined pavements.
- Program for cutting trees and enhancement planting.
- Compensatory tree planting program agreed with authorities & CCF.
- Discussion of the BRT-PIU inspection/monitoring role.
- Agreement on publicity/public consultation requirements.

5.5.4 Drainage and Hydrology

233. The drainage system and water resources on surrounding lands will be affected by construction activities as follows: a) local water supplies will need to be tapped to meet work campsite and construction requirements, so bringing project based water use into competition with local use; b) surface and subsurface water resources in the Project area could be contaminated by fuel and chemical spills, or by solid waste and effluents generated by the kitchens and toilets at construction campsites; c) rebuilding drainage channels crossing the works areas and required reprovisioning, (d) natural streams are few but adjacent drainage pathways may become silted by borrow material (earth) in the runoff from the construction area, workshops and equipment washing-yards.

234. The contractors will incorporate the following design features into the EMP after review of the detailed design to minimize alterations in the project corridor's surface drainage patterns as far as possible:

- Contractors will review the detailed designs for side and cross-drainage structures provided with the tender and assess and agree with BRT-PIU/TSC if redesign is required or if new structures will be constructed or existing ones will be repaired.
- Contractors (assisted by DCS) will update the Drainage Management Guidelines as required.
- In areas close to the sensitive receiver (SR), appropriate drains would be constructed so that the outfalls of the surface run-off from the carriageway are diverted away from the SR.
- Measures will also be taken during the construction phase to ensure that storm drains and highway drainage systems are regularly cleared to maintain storm water flow.

5.5.5 Utilities and Reprovisioning

235. Local water supplies, electrical power supply and telecommunications must be maintained during the works. Therefore the need to reprovide for power supply cables, telecommunication cables or other water supplies needs to be reassessed and reconfirmed by the contractors well before works commence. Therefore the contractor will:

- Update Utilities and Telecommunications Reprovisioning Guidelines
- Reconfirm power, water and as supply and telecommunications systems likely to be interrupted by the works.

- Contact all relevant local authorities for utilities and local village groups to plan reprovisioning of power, water supply and telecommunications systems.
- Relocate and reconnect utilities well ahead of commencement of construction works and coordinate with relevant utility company and allow sufficient lead time at the provincial and district levels for relocation and reconnection well before works commence.
- Inform all hospitals, schools, places of worship and affected communities well in advance.
- Arrange reconnection of utilities and telecommunications systems in the shortest practicable time before construction commences.
- If utilities are damaged during construction it shall be reported to the TSC and utility authority and repairs shall be arranged immediately at the contractor's expense.

5.5.6 Materials Exploitation and Management of Quarry and Borrow Areas

236. Materials Management Guidelines will seek as far as is reasonably practicable to minimize the use of non-renewable resources and rock based materials and also to balance cut and fill requirements and contribute to the minimization of impacts due to extraction of rock based materials. As a first priority, where surplus materials arise from the removal of the existing surfaces these will be used elsewhere on the project for fill (if suitable) before additional rock, gravel or sand extraction is considered.

237. The Materials Management Guidelines will include as a minimum consideration of the following:

- Required materials, potential sources and estimated quantities available.
- Impacts to identified sources and availability
- Excavated slope material for reuse and recycling methods to be employed.
- Endorsement from DENR and local groups for use of sources.
- Methods of transportation to minimize interference with normal traffic.
- Constraints of regular delivery schedule to reduce stockpiling on site.
- Program for reuse of underground excavated material for reuse
- Program for delivery of quarry and borrow materials.
- Discussion of the BRT-PIU/TSC inspection/monitoring role.
- Agreement on publicity/public consultation requirements.

238. In the detailed design stage, consultants will produce a draft mass haul chart for the aggregate and asphalt materials needed for the construction works. The mass haul chart will also be updated and modified as necessary by the Contractor(s) as part of the SEMP before construction commences. The guidelines will include mitigation for the extraction of materials, to specify (i) the methods to be employed prior to and during the extraction and transportation of rock based materials for construction, (ii) all other measures to be employed to mitigate nuisances to local residents, and (iii) any additional measures needed (such as compensatory planting when considered necessary, if trees have to be removed for gravel extraction or quarries). The Contractor will be responsible to:

- Update draft Materials Management Guidelines from the detailed design phase.
- Balance cut and fill requirements to minimize impacts from extraction of aggregates.
- Procure materials only from DENR authorized quarries and borrow sites.
- Prioritize use of existing quarry sites with suitable materials and update the list of quarries and borrow pits monthly and report to BRT-PIU and minimize impacts on other local resources.
- If the contractor shall operate the quarry site, required environmental permits shall be secured prior to operation of quarry/borrow areas.

- Borrow/quarry sites shall not be located in productive land and forested areas.
- Follow compensatory planting plan if trees have to be removed.
- Stockpile topsoil for later use and fence and re-contour borrow pits after use
- Topsoil, overburden, and low-quality materials shall be properly removed, stockpiled near the site, and preserved for.
- Use quarry with highest ratio between extractive capacity (both in terms of quality) and loss of natural state.
- Use quarry sites lying close to the alignment, with a high level of accessibility and with a low hill gradient.
- Do not use quarries in areas of natural woodland or near rivers which provide food and shelters for birds and other animals.
- Damaged access roads due to transport of quarry/borrow materials, other construction materials and due to various project-related activities shall be reinstated upon completion of construction works at each section.
- During quarry/borrow site operation; provide adequate drainage to avoid accumulation of stagnant water.
- It is preferable to avoid or reduce the sections of quarry sites located on river bed. If it is not possible to locate quarries out of river beds, quarry sites lying on small rivers and streams shall be avoided.
- Alluvial terraces or alluvial deposits which lie on the river beds but not covered by water in normal hydrological conditions, shall be preferred.
- Ensure borrow pits are left in a tidy state with stable side slopes and proper drainage in order to avoid creation of water bodies favorable for mosquito breeding
- To avoid drowning when pits become water-filled, measures such as fencing, providing flotation devices such as a buoy tied to a rope, etc. shall be implemented.
- Upon completion of extraction activities, quarry and borrow pits shall be dewatered and fences shall be installed, as appropriate, to minimize health and safety risks.

5.5.7 Spoil Disposal

239. The works will require cutting to construct CEBUBRT. It is estimated by the TA team that there will be a surplus of soil based materials for reuse or disposal as spoil elsewhere. Only a small proportion will be suitable for filling. Therefore there will be a surplus of rock and soil based materials as spoil and if disposal is not planned in advance there will be impacts and environmental degradation due to the improper disposal of these materials.

240. In some locations the use of this immediately available material will minimize the need for additional extraction of rock based materials. The surplus material should be graded and the suitable cut materials directed for reuse as far as possible on BRT and subsequently on other road and other local infrastructure projects. This will reduce the need to extract other rock and gravel resources from vulnerable hillsides and river beds. The surplus can then be stockpiled at locations agreed with local authorities for use on other local district projects or other nationally planned infrastructure.

241. The surplus rock and soil based materials for disposal must be controlled to avoid potential impacts due to improper disposal. A Waste and Spoil Management Guidelines will be required to ensure waste from BRT construction is managed properly and to reduce, reuse and recycle waste wherever possible. Contractors will initially review the TSC's options for stockpiling and disposal locations for cut surface materials in the guidelines and reconfirm or propose alternative disposal locations for agreement with BRT-PIU and local authorities. The guidelines will cover all aspects of construction waste disposal. It is preferred that Government land is used for dumping of material. If private land is to be used for the purpose of dumping it shall commence only after written permission from the land owner is checked and recorded by the TSC/ BRT-PIU and agreeable to DENR.

242. Contractual clauses will be included to require the contractor(s) to update the draft WMSP one month before construction commences to identify all the agreed disposal sites and to balance cut and fill as far as practicable for the duration of the works.

243. Mitigation measures will seek to control the impacts at source in the first place. The TSC will be responsible to report the update of the cut and fill estimates in conjunction with asphalt and aggregate materials planning between the different areas and contractors and advise on overall balancing for cut and fill materials to minimize impacts on local resources. (Mitigation measures for cut areas are covered under runoff control).

244. The Waste and Spoil Management Guidelines will include consideration of the following:

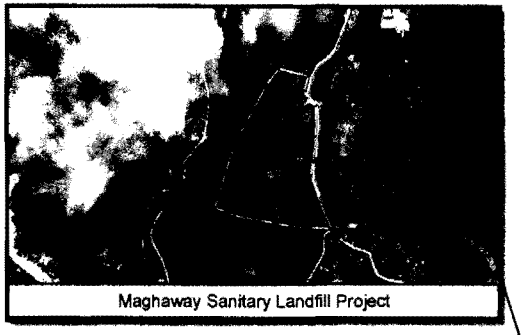
- Locations and quantities of spoil arising from the construction works.
- Agreed locations for disposal / endorsement from DENR and local groups.
- Methods of transportation to minimize interference with normal traffic.
- Establishment of acceptable working hours and constraints.
- Agreement on time scale and program for disposal and chain of custody.
- Programming issues including the time of year and available resources.
- Discussion of the BRT-PIU/TSC inspection/monitoring role.
- Establishment of complaints management system for duration of the works
- Agreement on publicity/public consultation requirements (advance signing etc.).

245. Mitigation measures will seek to prevent surface collapse impacts and control the impacts at source in the first place. The PIU will be responsible to monitor the progress of excavations and the implementation of mitigation measures, to minimize impacts. The mitigation measures in the Spoil Disposal Guidelines will include but not necessarily be limited to:

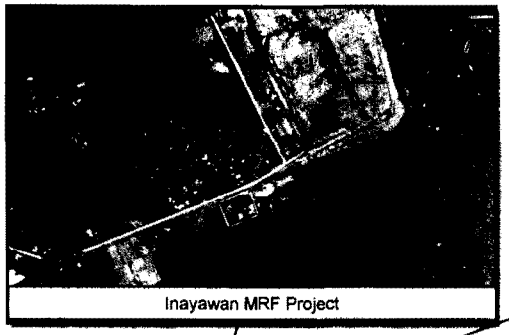
- Spoil will not be disposed of in rivers and streams or other natural drainage path.
- Spoil will not be disposed of on slopes, flood ways, wetland, farmland, forest, religious or other culturally sensitive areas or areas where a livelihood is derived.
- Surplus spoil will be used where practicable for local repair works to fill eroded gullies and depression areas and degraded land in consultation with local community.
- Spoils shall only be disposed to areas approved by local authority.
- Spoil disposal will be monitored by TSC/ BRT-PIU and recorded using a written chain of custody (trip-ticket) system to the designated disposal sites.
- Spoil will be disposed of to the disused quarries and abandoned borrow pits where practicable.
- Disposed spoil will be spread in 15cm layers and compacted to optimum moisture content, covered with topsoil, landscaped and provided with drainage and vegetation to prevent runoff in line with best practice.
- Spoil disposal shall not cause sedimentation and obstruction of flow of watercourses, damage to agricultural land and densely vegetated areas.
- Under no circumstances will spoils be dumped into watercourses (rivers, streams, drainage, etc.)
- The spoils disposal site shall be located at least 50 m from surface water courses and shall be protected from runoff by avoiding formation of steep slopes and grassing.

246. In Cebu City and vicinities, there are various reclamation projects that can accommodate construction spoils as backfill materials. These potential disposal sites are shown in **Figure 5.5-1** and include the following sites:

Reclamation Project	Brief Description
1. **Project:** Cebu South Road Properties (formerly South Reclamation Project) **Owner:** Cebu City Government **Location:** South Coastal Road, Cebu City **Status**: Partially closed **ECC Ref. No.:** 9311-004b-201C **Capacity:** 330 Has. **Aerial Distance from the nearest point of BRT Alignment:** 2.25 kms	The ECC covers the proposed Cebu South Reclamation Project located about 4 kilometers from the mouth of the Kinalumsan River in Cebu City to Tangke of Talisay City. The reclamation project covers a total area of approximately 330 hectares.
2. **Project:** Mandaue North Reclamation Area **Owner:** FF Cruz Co. Inc.& Mandaue City Government **Location:** NRA, Mandaue City **ECC Ref. No.:** ECC-R07-0902-0046-0120 **Capacity:** 21 Has. **Aerial Distance from the nearest point of BRT Alignment:** 3.12 kms	The ECC covers the IGS Labogon Reclamation Project with an area of 21 hectares located in Barangay Labogon, Mandaue City. The project includes the foreshore land development and operation of components of the following: construction of retaining walls, filling of "anapog" and aggregates, construction of roads and drainage system, loading. Leveling and hauling as stated in the submitted IEE Report.
3. **Project:** Cordova Reclamation Project **Owner:** Municipal Government of Cordova **Location:** Cordova, Cebu **ECC Ref. No.:** ECC-R07-0803-0084-210 **Capacity:** 47.87 Has. **Aerial Distance from the nearest point of BRT Alignment:** 7.150 kms	The ECC covers the Minor Reclamation Project with an area of 478,714.90 square meters to be located in Lava Island, Barangay Day-as in the Municipality of Cordova. The project falls under minor reclamation for projects with less than 50 hectares reclamation. It includes the construction of 1,002 m retaining wall and backfilling of the 478,714.9 square meter foreshore area fronting the Lava Island as indicated in the site development plan in the submitted IEE study document.

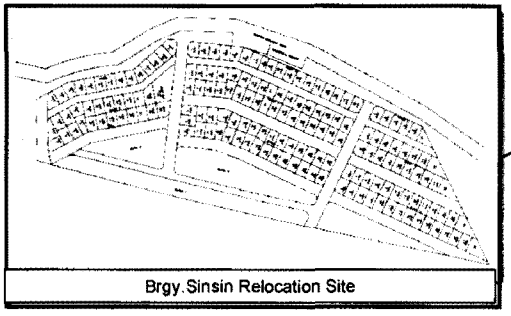


Maghaway Sanitary Landfill Project



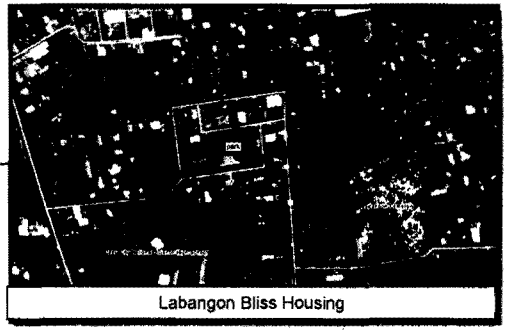
Inayawan MRF Project

Consolacion Sanitary Landfill Project

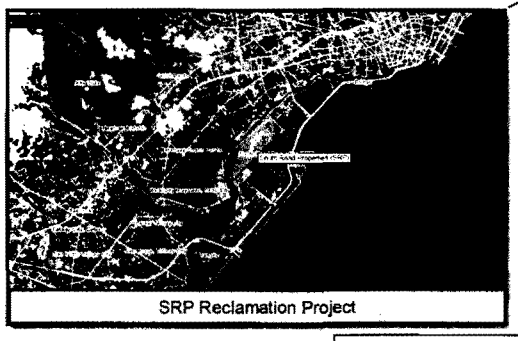


Brgy.Sinsin Relocation Site

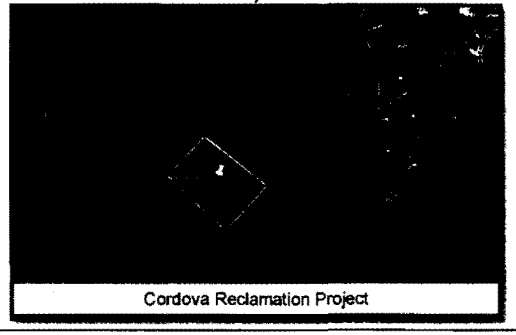
Sources: Google Earth Map, Project ECC's Issued by EM-DENR Region VII and SIA of CBRT Resettlement action Plan



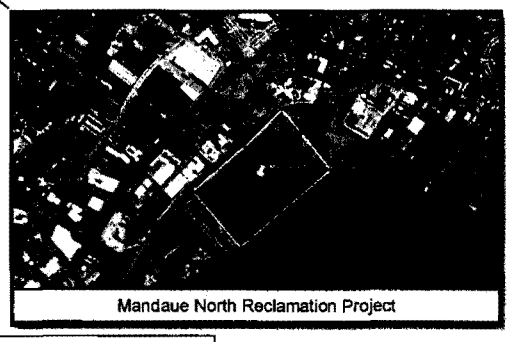
Labangon Bliss Housing



SRP Reclamation Project



Cordova Reclamation Project



Mandaue North Reclamation Project

Figure 5.5-1
Locations of Reclamation, Disposal and Relocation Facilities

5.5.8 General Construction Waste Management Guidelines

247. Uncontrolled waste disposal operations can cause significant impacts. Mitigation measures will seek to reduce, recycle and reuse waste as far as practicable. The PIU will be responsible to monitor the contractor's progress and the implementation of mitigation measures, to minimize impacts.

248. The guidelines will include consideration of all matters related to solid and liquid waste disposal including the following:

- Expected types of waste and quantities of waste arising.
- Waste reduction, reuse and recycling methods to be employed
- Agreed reuse and recycling options and locations for disposal / endorsement from DENR and local groups.
- Methods for treatment and disposal of all solid and liquid wastes.
- Methods of transportation to minimize interference with normal traffic.
- Establishment of regular disposal schedule and constraints for hazardous waste.
- Program for disposal of general waste / chain of custody for hazardous waste.
- Discussion of the BRT-PIU inspection/monitoring role.
- Establishment of complaints management system for duration of the works
- Agreement on publicity/public consultation requirements (advance signing etc.).

249. The Contractors mitigation measures in the waste management guidelines will include but not necessarily be limited to the measures listed below. The contractors shall ensure implementation of these measures.

- The guidelines to cover all aspects of waste storage, disposal and accidental spills, all to be approved in writing by the TSC one month prior to starting works.
- Areas for disposal to be agreed with local authorities and checked and recorded and monitored by the TSC/ BRT-PIU.
- Segregation of wastes shall be observed. Organic (biodegradables - such as tree trimmings) shall be collected and disposed of onsite by composting (no burning is allowed on site).
- Recyclables shall be recovered and sold to recyclers.
- Residual and hazardous wastes shall be disposed of in disposal sites approved by local authorities.
- Construction/workers' camps shall be provided with garbage bins.
- Burning of construction and domestic wastes shall be prohibited.
- Disposal of solid wastes into canals, rivers, other watercourses, agricultural field and public areas shall be prohibited.
- There will be no site-specific landfills established by the contractors. All solid waste will be collected and removed from the work camps and disposed in local waste disposal sites.
- Waste disposal areas approved by local authorities shall be rehabilitated, monitored, catalogued, and marked.

250. In Cebu, there are a number of operational disposal sites that the Project can avail of in its disposal of wastes. These potential disposal sites are shown in **Figure 5.5-1** and are enumerated below:

Disposal Site, Owner, Location and Status	Brief Description
1. Project: Consolacion Sanitary Landfill **Owner:** ASEAN / Engr. Cipriano P. Abdon **Location:** ASEAN / Engr. Cipriano P. Abdon, Brgy. Polog, Consolacion **Status:** Operational **ECC Ref. No.:** ECC-R07-1001-0012 **Capacity:** 1,200 tons/day **Aerial Distance from the nearest point of BRT Alignment:** 4.800 kms	The ECC covers the Consolacion Sanitary Landfill, Methane recovery and power generation facility project with a total land area of 69,536 square meters located at Brgy. Polog, Consolacion, Cebu Province. The project includes the development, installation and operation components of the following: Landfill operation center/compound consisting of the following: administration building, equipment and repair buildings, material recovery facilities, leachate treatment plant, pre-treatment lagoon covering an area of 5,661 square meters, Landfill cell phase 1 covering an area of 11,005 square meters, landfill cell phase 2 covering an area of 17,090 square meters, landfill cell phase 3 covering an area of 19,422 square meters, landfill cell phase 4 covering an area of 11,652 square meters, and all landfill cells are provided with methane gas recovery pipeline system leading to the power plant having an area of 4,706 square meters as indicated in the submitted EIS document. It has a total landfill capacity of 1.8 million metric tons of municipal domestic solid wastes only at a daily input of 1,200 metric tons and 4 megawatts power plant using methane gas generated by the methane recovery facility.
2. Project: Material Recovery Facilities Project **Owner:** Ma. Emma Ramas **Location:** White Road, Inayawan, Cebu City **Status**: Operational **ECC Ref. No.:** **Capacity:** 15 tons/day **Aerial Distance from the nearest point of BRT Alignment:** 1.900 kms	The ECC covers the **Material Recovery Facilities Project** with a total land area of two thousand three hundred seventeen (2,317) square meters located in White Road, Brgy. Inayawan, City of Cebu with corresponding geographic coordinates 10°15'54.82" North Latitude and 123°51'57.40" East Longitude. The Project includes the development and operation components of the following: 1. Trommel Consisting the following: Conveyors, Screw Conveyors, Roths Blower, Choppers; 2. Bulb Eater; 3. Densifiers; 4. Boilers; 5. Bio-digester; and 6. Composting Cell as indicated in the submitted IEE Report.
3. Project: City of Talisay **Owner:** Hon. Socrates Fernandez **Location:** Brgy. Tapul, City of Talisay, Province of Cebu, Region VIII **Status**: Operational **ECC Ref. No.:** ECC-R07-1004-0118 **Capacity:** 14.94 m^3/day **Aerial Distance from the nearest point of BRT Alignment:** 3.900 kms	The ECC covers the SANITARY LANDFILL PROJECT with a total land area of Ninety Six Thousand Two Hundred One (96,201) square meters located at Brgy. Tapul,City of Talisay. The project includes the development, installation and operation components of the following: 1. Three (3) Units Disposal Cells-30,000 m^2 2. Six units drainage facility- 50 linear meter 3. Leachate collection area- 16 m^2 4. Leachate treatment/Leachate recirculation area - 48 m^2 5. Admin Building - 450 m^2 6. Wastewater Treatment Area - 50 m^2 7. Monitoring pond - 100 m^2 8. Ten units catch basin 9. Six units monitoring wells 10. Gas venting as indicated in the submitted IEE Report. It has a total landfill capacity of 92,684 m^3 of domestic wastes for a lifespan of 6,205 days at daily input of approximately 14.94 m^3 of collected domestic wastes.

5.5.9 Relocation Site

251. For the project, the relocation site is depicted in **Figure 5.5-1**. These relocation sites are located in Barangay Sinsin.

252. The resettlement site in Barangay Sinsin is around 2 hectares and is moderately priced. Features of these relocation stes are provided below:

Relocation site in Barangay Sinsin:

- Project: Proposed Regional Resettlement Project
- Proponent: City of Cebu
- Lot Nos.: 15628, Cadastre 12, Extension
- Total Land Area: 18, 998 sq. m.
- OCT No.: O-985
- Registered Owner: City of Cebu
- Offered Selling Price: 50.00/sq. m. (more or less)
- Prevailing Market Value: 200.00/sq. m. (more or less)
- Zonal Valuation: 200.00/sq. m. (more or less)
- Declared Use: Agricultural
- Actual Land Use: Agricultural
- Topography: Moderately rolling with mountainous/highly elevated portion
- Total Home Lots: 173
- Present Status of Lot: Idle, with fruit-bearing trees. No settlements yet. (so it is safe to assume that it can still accommodate 173 families).
- Topography: moderately rolling, with a portion in mountainous/highly elevated areas. This barangay is more or less 500-600 meters above sea level. The DENR-MGB has identified a landslide-prone area and has cordoned a 2-hectare danger zone over the affected area.
- Neighborhood: The area surrounding the site is underdeveloped to sparsely developed (blighted). The Peace and Order situation is stable.
- Water Supply: deepwell (neighboring areas) +/- 100meters
- Drainage: Outfall thru creek/river
- Power: with power lines within the property; with power lines 10meters from access road
- Type of Road that Services the Area: 1st class paved road (Talisay City) (Trans-Central Highway)
- Asphalt Road (Lagtang-Lutopan Road-"Manipis Road"; cemented/asphalted but not well maintained (Road from Camp 7 site)
- Accessibility: less than 1km for PUV
- 1-2 kilometers: Camp7 to Cebu City
- more than 3km: Metro Cebu routes
- Availability of Public Utilities:
- Jeepney/Bus: Sinsin to Cebu City; Fare is 50 pesos, frequency is twice per day
- Taxi: Cebu City to Sinsin, fare is 600 pesos, frequent
- Van for Hire: Toledo City to Cebu City, 100 pesos, 1 per 2hrs
- Motorcycles: Sinsin to Talisay City, 50 pesos, frequent
- Distance of Site to Services/Facilities:
- Barangay Hall: 1km
- Health Center: 1km
- Elem School, Public: 1km
- High School, Public: 1km
- Trans-Central Hway: 5.9km
- JY Square-Uptown: 11.40km
- Fuente Osmena Circle - 10.90km
- Cebu City Hall - 12.00km
- Talisay City Hall - 8.30km
- SRP: 11.00
- Toledo City Proper: 18.10km

Source: Cebu City DWUP and NHA Website

5.5.10 Hazardous Materials and Hazardous Waste Disposal

253. Use of hazardous substances such as oils and lubricants operations can cause significant impacts if uncontrolled or if waste is not disposed correctly. Mitigation measures will seek to control access to and the use of hazardous substances such as oils and lubricants and control waste disposal. The PIU will be responsible to monitor the contractor's progress of updating the Spoil and Waste Management Guidelines to include implementation of mitigation measures, to minimize impacts from hazardous substances such as oils and lubricants.

254. The guidelines will include but not necessarily be limited to the following measures. The contractors shall ensure implementation of such measures.

- Ensure that safe storage of fuel, other hazardous substances and bulk materials are agreed by BRT-PIU and have necessary approval/permit from DENR and local authorities.
- Hydrocarbon, toxic material and explosives will be stored in adequately protected sites consistent with national and local regulations to prevent soil and water contamination.
- Equipment/vehicle maintenance and refueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas shall be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency.
- The Contractor shall identify named personnel in-charge of these sites and ensure they are properly trained to control access to these areas and entry will be allowed only under authorization.
- Fuel and other hazardous substances shall be stored in areas provided with roof, impervious flooring and bund/containment wall to protect these from the elements and to readily contain spilled fuel/lubricant.
- Segregate hazardous wastes (oily wastes, used batteries, fuel drums) and ensure that storage, transport and disposal shall not cause pollution and shall be undertaken consistent with national and local regulations.
- Ensure all storage containers are in good condition with proper labeling.
- Regularly check containers for leakage and undertake necessary repair or replacement.
- Store hazardous materials above possible flood level.
- Discharge of oil contaminated water shall be prohibited.
- Used oil and other toxic and hazardous materials shall be disposed of in an authorized facility off-site.
- Adequate precautions will be taken to prevent oil/lubricant/ hydrocarbon contamination of drainage channel beds.
- Ensure availability of spill cleanup materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored.
- Spillage, if any, will be immediately cleared with utmost caution to leave no traces.
- Spillage waste will be disposed at disposal sites approved by local authorities and approved by TSC.
- All areas intended for storage of hazardous materials will be quarantined and provided with adequate facilities to combat emergency situations complying with all the applicable statutory stipulation.

5.5.11 Asphalt Hot Mix Plant, Rock Crushing and Bitumen Supply

255. The rock crushing activities will generate noise and dust and pavement works will generate gas and odor from the asphalt hot-mix plant and noise from the compaction of the pavement. Construction of BRT will require rock based material and asphalt. Although the

emissions from powered mechanical equipment that supply crushed rock and asphalt will be rapidly dispersed they will need to be sited carefully to avoid complaints.

256. In order to maintain the existing air quality of the project area in a condition acceptable to the local population compliance with the following mitigation measures will be needed:

- Cement batching and aggregate mixing plant shall be located as far as possible (at least 500m) from settlements and habitation near the Project corridor or as required by environmental regulations.
- All conditions of DENR permits and local guidelines shall be observed.
- Dust suppression equipment shall be installed at cement and aggregate mix plants.
- Areas of construction on the BRT roads as well as the haul road shall be maintained damp by watering the construction area.
- Where local roads are used for haulage they shall be kept in serviceable condition and any damage shall be repaired promptly without interference to local travel routes.
- Storage sites, mixing plants, and asphalt (hot mix) plants will be at least 500m downwind of the nearest human settlements or as otherwise required under DNRE permits and guidelines.
- All hot-mix plants, crushers, and batching plants will be located in agreement with the local district or municipality and installed on a sealed area only after receiving approval from the relevant local authority and DENR.

257. Fumes from asphalt chemicals are likely to be well dissipated in the wide open street and the criteria in the standards should not be exceeded. However phenol compounds in the bitumen have a very low odor threshold and extremely low concentrations can cause nuisances. These are unlikely to accumulate to toxic levels but the plant for the supply of molten bitumen should be sighted well away from rivers and streams, schools, health clinics and other sensitive receivers.

258. Bituminous materials will generally be applied using machines supplied from the asphalt plant but if bituminous compounds are to be applied by hand labor methods and melted in heaters the fuel used shall be kerosene, diesel or gas fuel. Fuel wood shall not be used for heating bitumen, neither will bitumen be used as fuel.

259. Bitumen drums will be stored in a dedicated area, not scattered along the works and any small accidental spills of bitumen or chemicals should be cleaned up immediately. The waste including the top 2cm of any contaminated soil and disposed of as chemical waste to an approved landfill or approved local authority disposal site.

260. Bitumen plant and rock crusher activities (if required) will be controlled (e.g. hot-mix plants should not be located within 500m of any sensitive receiver, river bank but located at convenient sites nearby but downwind of and at least 500m from sensitive receptors such as schools.

261. It is possible that contamination of soil may occur from oils and chemicals at asphalt / bitumen plant sites, workshop areas, and equipment washing-yards. The contamination may limit the future use of land for agricultural purposes.

262. The following practices will be adopted to minimize the risk of soil contamination:

- The contractors will be required to instruct and train their workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination.

- Debris generated by the dismantling of existing pavement will be recycled subject to the suitability of the material.
- Solid waste generated during construction and at campsites will be properly treated and safely disposed of only in demarcated off-site waste disposal sites identified and agreed with BRT-PIU, local community and local authorities.

5.5.12 Noise and Dust

263. Powered mechanical equipment such as generators, excavators, bulldozers, piling rigs, stabilizers, drills, stone crushers, graders, vibratory rollers, concrete-mixing plants, and screening plants will generate noise and vibration. Whereas various modern machines are acoustically designed to generate low noise levels and acoustically insulated plant may be available in Philippines. The cumulative effects from several machines can be significant and may cause significant nuisances.

264. To minimize impacts the contractors should be required by the BRT-PIU and TSC to (i) provide evidence and certification that all equipment to be used for construction is fitted with the necessary air pollution and noise dampening devices to meet DENR requirements, (ii) maintain and service all equipment to minimize noise levels, and (iii) locate equipment to minimize nuisances and (iv) install acoustic insulation or use portable noise barriers where practicable to limit noise at sensitive receivers. Insulation should be provided to minimize noise impacts such that the measured noise at the edge of the works nearest residential areas will be less than 50dB (A) Leq during night time (9 p.m. to 6 a.m.) and 70 dB (A) Leq at other times during the day.

265. There are some schools, educational establishments and medical facilities near the project. The commercial premises are not set back from the likely working areas for the project. Where schools are nearby, the contractor shall discuss with the TSC and the school principals the agreed time for operating these machines and completely avoid machine use near schools during examination times. Where noise is a major consideration (say outside places of worship) construction should be avoided at sensitive times. As a fall back option to control noise, portable barriers can be introduced creased using heavy thick ply-board or corrugated metal sheet. In addition to the physical effect of mitigating dust and noise the installation of such measures should be discussed with the local population and serve as a means for further public consultation during implementation and assist in public relations.

266. Earthworks and rock crushing activities will be the main sources of dust. In some locations there will be some buffer distance between the work corridor and the existing SRs such that no significant impact is expected from the construction works on residential and other sensitive receivers in terms of noise, vibration, and dust. However in many areas there will little practicable buffer distance between the work corridor and the commercial premises and common noise and dust construction impacts are expected from the construction works on numerous commercial premises that line the route, in terms of noise, vibration, and dust. At this stage there is no definite requirement for works to take place at night. Although most work is expected to be carried out during the day, some night time working will be allowed; especially in circumstances where major disruption to day time traffic can be avoided by night working.

267. Although construction noise and dust were recognized as nuisances by the local population they were also considered acceptable nuisances in view of the potential benefits from the BRT and future improved road conditions. Nevertheless it is good practice to control all dusty materials at source so that nuisances do not occur, so that visibility on the adjacent road is not impaired and so that road safety can be maintained or improved. Water is available in the study area and sufficient surplus water should be available to suppress dust at all locations in the dry season. In addition, as a general approach, it is recommended that

if works are within 10m of any sensitive receivers, the contractor should install dust barrier segregation between the works at the road edge and the sensitive receivers. A fixed metal site hoarding will not be practical in this situation at the edge of the road. The segregation should be easily erectable barrier >2.5m high and designed to retain dust and provide a temporary visual barrier to the works. The materials could be plastic or tarpaulin sheets. Where dust is the major consideration the barrier can take the form of tarpaulins or fences strung between two poles mounted on a concrete base. These can be moved along the road as the work proceeds. In some cases it will be necessary to seal the doors and windows with tarpaulins for the duration of the works to keep dust out as far as practicable. The other mitigation measure will include:

- If the surface is dry water will be sprinkled on the road and exposed surfaces when work is carried out within 50m of residences or roadside food stalls.
- No work will be carried out within during the night (2100hrs to 0700hrs).
- If works have given rise to complaints over dust, the contractor shall investigate the cause, report it to the Grievance Facilitation Unit and in the monthly progress reports and review and propose alternative mitigation measures before works recommence.
- All heavy equipment and machinery shall be fit in full compliance with the national and local regulations
- Fuel-efficient and well-maintained haulage trucks will be employed to minimize exhaust emissions. Smoke belching vehicles and equipment shall not be allowed and shall be removed from the project.
- Vehicles transporting soil, sand and other construction materials will be covered with tarpaulin sheets to avoid impact from dust. Speed limits of such vehicles within the works site and on unpaved edge areas of the Project roads will be established and agreed with the BRT-PIU.

268. The need for large stockpiles should be minimized by careful planning of the supply of materials from controlled sources. Stockpiles should not be located within 100m of educational establishments, public amenities and should be covered with tarpaulins when not in use and at the end of the working day to enclose dust. If large stockpiles (>25m3) of crushed materials are necessary they should be enclosed with side barriers and also covered when not in use.

269. PIU wouldl undertake semi-annual monitoring of TSP and noise at the stations which were sampled during pre-construction phase. Field measurements shall also be carried out, as necessary, to validate complaints.

5.5.13 Vibration

270. At this stage blasting is not expected. It is clear from discussions with the project team and observations that blasting will not be the method of choice because most of the surface materials can be removed with powered mechanical equipment (PME). It is therefore anticipated that powered mechanical equipment and a lot of local labor with hand tool methods will be used to implement the BRT.

5.5.14 Excavation and Protection, Runoff Control and Protection of Works

271. Engineering controls that include runoff protection measures will be designed and installed to control soil runoff both at all the constructed works and in peripheral areas, particularly in borrow areas and along haul tracks.

272. The Excavation Protection and Runoff Control Guidelines will include consideration of the following:

i) Climate and rainfall for the area and checking weather forecasts.
ii) Terrain and typical locations susceptible to runoff and runoff.
iii) Protection of the works and potential impacts to the environment.
iv) Runoff control methods to be employed, locations and installation timing.
v) Limits to stockpiling on sites near waterways.
vi) Discussion of the TSC/ BRT-PIU inspection/monitoring role.
vii) Agreement on publicity/public consultation requirements.

273. Mitigation measures for excavated areas will be required by the contractors to prevent surface collapse. These will include but not necessarily be limited to:

(i) Minimize damage of surrounding facilities during excavation formation.
(ii) Protect the excavation and install final structures and surfaces as soon as practicable after excavation.
(iii) Prevent runoff and protect the excavation with temporary or permanent drainage as soon as practicable after excavation.

274. In order to preserve the constructed excavations and other works from runoff.The contractors will also be required to include appropriate measures for excavation protection, i.e. finish concrete works as soon as practicable as required in the detailed construction drawings and implement them accordingly.

275. Payments will be linked to the completion of the works as indicated by the installation of runoff and excavation control measures to protect the works to the satisfaction of BRT-PIU.

5.5.15 River Protection, Bridge Extension, Demolition and Replacement

276. There are around 6 river and creek crossings along the BRT corridor as shown in Figure 4.2.1. Careless construction and poor materials control can cause blockage to rivers. Therefore in areas along and near the river the following will be carried out:

- Earth and stones will be properly disposed of so that they do not block the river, resulting in adverse impact on water quality and flow regime.
- In bridge repair and demolition sites, the bridge structure will not be dropped into the river but alternative means will be used to avoid "dropping the bridge" into rivers/streams. This will be done by "sawing" appropriate sections of the bridge and using cranes to lift these sections away, or alternatively by construction of a platform onto which the bridge could be lowered.
- Cofferdams, silt fences, sediment barriers or other devices will be used as appropriate based on the design to prevent migration of silt during excavation and boring operations within the stream. If cofferdams are used, these will be dewatered and cleaned to prevent siltation by pumping from cofferdams to a settling basin or a settling containment unit.
- Other runoff control and excavation control measures and covering open surfaces with concrete to reduce runoff will be implemented as early as possible in construction.

277. There are several foot bridges over the main road that forms the Project corridor that will be demolished in preparation for the construction of the BRT. Careless deconstruction and poor demolition control could result a cause blockage to rivers. Therefore in areas near the footbridges the following will be carried out:

- Demolition materials will be properly disposed of so that they do not block the road, resulting in adverse impact on pedestrian movements and traffic flow.
- In bridge demolition sites, the bridge structure will not be dropped to the road but alternative means will be used to avoid "dropping the bridge" into the roadway. This will be done by "sawing" appropriate sections of the bridge and using cranes to lift these sections away on to flatbed lorries for removal from the site.

5.5.16 Water Quality

278. Water quality from incidents affecting ponds and ditches near the alignment and possible sources of water supply disruption will be investigated and where the complaint can be substantiated, water samples should be taken and analyzed based on the baseline monitoring results in the preconstruction stage. Samples will be taken as soon after the complaint as possible and analyses immediately and again two weeks after the complaint to determine if water quality has been restored. The following precautionary measures will be undertaken by the contractors:

- Lubricants will be stored in dedicated enclosures with a sealed floor/base >50m from water bodies.
- Solid waste from construction activities will not be thrown in ditches or ponds or rivers and shall be disposed of as per the WMP and there will be NO BURNING of waste.
- Construction storage/stockpiles shall be provided with bunds to prevent silted run-off.
- Stockpiled materials will be covered to reduce run-off.
- Stockpiling or borrow sites will not be allowed within 50m of a water body.
- Stockpile areas and storage areas for hazardous substances shall be located away from water bodies.
- If complaints occur there will be monitoring and investigation of water quality.
- Work in rivers will be scheduled during dry season and work duration shall be as short as possible.
- Bare ground shall be stabilized immediately after works completed.
- Washing of machinery and vehicles in surface waters shall be prohibited.

5.5.17 Water Resources

279. Ample water should be available and local water resources could be used because sufficient yield is generally available. Other measures to mitigate the adverse impact on water resources and surface drainage patterns have been incorporated into the other drainage mitigation measures.

280. The contractors will carry out the following measures to mitigate the impact of using local community water resources, where required:

- In all areas availability of water will be assessed to evaluate the impact on community resources. If necessary project water will be brought in by tanker as necessary without depleting local supplies.
- The contractors will be required to maintain close liaison with local communities to ensure that any potential conflicts related to common resource utilization for project purposes are resolved quickly.
- Guidelines will be established to minimize the wastage of water during construction operations and at campsites.
- Avoid and minimize use of river bed for construction materials.
- Confine winning river materials to 20% of river width in any location and keep away from river banks.
- Reinstate river banks if necessary.

- Re-provision drainage channels affected by works two weeks before commencement of works to satisfaction of DC and local community
- In case of obstruction or damage and ponds shall be cleaned or repaired immediately.

5.5.18 Construction Camps and Canteen Facilities

281. The requirement for contractors construction camps and maintenance yards is not yet known but contractors will be required to adopt good management practices to ensure that fuels and chemicals, raw sewage, wastewater effluent, and construction debris/scarified material is disposed of in controlled conditions to reduce the risk of contamination. The proposed measures include:

- Worker camp location and facilities located >500m away from residential areas and agreed with local communities with facilities approved by TSC and BRT-PIU and camps managed to minimize impacts.
- Construction camp will be established in areas with adequate drainage in order to prevent water logging at the camp and formation of breeding sites for mosquitoes in order to facilitate flow of the treated effluents.
- Potable water, clean water for showers, hygienic sanitation facilities/toilets with sufficient water supply, worker canteen/rest area and first aid facilities will be provided. Separate toilets shall be provided for male and female workers.
- Hire and train as many local workers as possible.
- Provide adequate housing for all workers at the construction camps and establish clean canteen/eating and cooking areas.
- Portable lavatories shall be installed and open defecation shall be prohibited and use of lavatories encouraged by cleaning lavatories daily and by keeping lavatory facilities clean at all times.
- Wastewater effluent from contractors' workshops and equipment washing-yards will be passed through gravel/sand beds and all oil/grease contaminants will be removed before discharging it into natural streams. Oil and grease residues shall be stored in drums awaiting disposal in line with the agreed WSMP.
- Predictable wastewater effluent discharges from construction works shall have the necessary permits from DENR and local authorities before the works commence.
- Borrow pits and natural depressions with pre-laid impervious liners will be used to dispose of scarified/scraped asphalt, and then covered with soil. This will check potential groundwater contamination. Options for completely or partially recycling scraped scarified materials will also be taken into account.
- Camp site will be cleaned up to the satisfaction of ESC and local community after use.
- All waste materials shall be removed and disposed to disposal sites approved by local authorities
- Land used for campsites shall be restored to the original condition as far as practicable and the area shall be restored to a condition acceptable to the local community and TSC (planted with appropriate trees / shrubs as practicable) after it is vacated and cleaned.

5.5.19 Sanitation and Disease Vectors

282. Potential sanitation and impacts from disease will need to be controlled by maintaining hygienic conditions in the worker camps and along the construction sites, implementing the social and health programs for the Project. The contractor will ensure that:

- Measures to prevent dengue shall be implemented (e.g., provision of insecticide treated mosquito nets to workers, installation of proper drainage to avoid formation of stagnant water, etc.).

- Standing water will not be allowed to accumulate in the temporary drainage facilities or along the roadside to prevent proliferation of mosquitoes.
- Temporary and permanent drainage facilities will be designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water ponds.
- Dengue control will be implemented in line with social plans for the Project.
- HIV/AIDS awareness and HIV-AIDS education and prevention program shall be implemented in line with social plans under the Social and Poverty Assessment Report.

5.5.20 Occupational Health and Safety

283. Worker occupational health and safety is generally governed by the Philippines Labor Act 2006. A Worker and Public Safety Guidelines will be submitted by the contractor in the SEMP to establish routine safety measures as required by the Philippines Labor Act and by good engineering practice as well as to provide first aid facilities.

284. Mitigation measures to be implemented by contractors to ensure health and safety of workers are as follows:

- At least one month before construction commences the Contractor will demonstrate to BRT-PIU that the safety guidelines will be properly resourced and a qualified safety officer will be identified by the contractor in their bid and the safety guidelines will be approved by BRT-PIU before construction commences.
- Before construction commences the Contractor will conduct of training for all workers on safety and environmental hygiene. The contractor will instruct workers in health and safety matters as required by law and by good engineering practice and provide first aid facilities.
- The Contractor will instruct and induct all workers in health and safety matters (induction course) before they start work and site agents/foremen will follow up with toolbox talks on a weekly basis. Workforce training for all workers starting on site will include safety and environmental hygiene.
- Fencing shall be installed on all areas of excavation greater than 1m deep and at sides of temporary works.
- Workers shall be provided (before they start work) with of appropriate personnel safety equipment such as safety boots, helmets, gloves, protective clothes, breathing mask, goggles, and ear protection at no cost to the workers. Site agents/foremen will follow up to see that the safety equipment is used and not sold on.
- Ensure audible reversing signals are installed on all construction vehicles.

285. The contractor will include provisions in the Worker Safety section of the Worker and Public Safety Guidelines in the SEMP for:

- Instruction of all workers in health and safety matters.
- Provision of potable water supply in all work locations.
- Establishment of safety measures as required by law and by good engineering practice and provide first aid facilities.
- Fencing on all excavation, borrow pits and sides of temporary bridges
- Providing to all workers appropriate personal protective equipment (PPE) such as safety shoes, hard hats, safety glasses, ear plugs, gloves, etc.
- Scheduling of regular (e.g., weekly tool box talks) to orient the workers on health and safety issues related to their activities as well as on proper use of PPE.
- Where worker exposure to traffic cannot be completely eliminated, protective barriers shall be provided to shield workers from traffic vehicles. Alternatively another measure is to install channeling devices (e.g., traffic cones and barrels) to delineate the work zone.

- Construction camps shall be provided with toilets/sanitation facilities in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. These facilities shall be well maintained to allow effective operation.

286. Facilities for workers and public safety, construction site offices and canteen will be regulated in line with the Philippines Labor Act 2006. Complaints will be monitored and investigated and mitigation measures will be revised and the EMP will be updated as necessary if unexpected impacts occur. All measures related to workers' safety and health protection shall be free of charge to workers. The worker occupational health and safety guidelines to be submitted by the contractor before construction commences and in tandem can be extended to cover public safety and approved by BRT-PIU.

5.5.21 Community Health and Safety

287. Public safety, particularly of pedestrians and children can be threatened by the excavation of the trenches for side drain construction and station access tunnels. Fencing will be installed prior to excavation work commencing on all sides of temporary and permanent excavations. The guidelines will include provisions for site security and guards, trench barriers and covers to other holes and any other safety measures as necessary. The contractor will provide warning signs at the periphery of the site warning the public not to enter and define this in the EMP. The contractor will restrict the speed of project vehicles and also control traffic by contra-flow and provide flag men and warning signs at either side/end of the works areas where the traveling lanes must be temporarily reduced. The safety measures for the public in the Worker and Public Safety Guidelines will include:

- Barriers (e.g., temporary fence), shall be installed at construction areas to deter pedestrian access to the roadway except at designated crossing points.
- The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and areas where heavy equipment is in operation and these sites will have a watchman at the entrance to keep public out.
- Speed restrictions shall be imposed on Project vehicles and equipment traveling within 50m of sensitive receptors (e.g. residential, schools, temples, etc.).
- Upon completion of construction works, borrow areas will be backfilled or fenced.
- Provisions for site security, trench barriers and covers to other holes and any other safety measures as necessary.
- Provide warning signs at the periphery of the site warning the public not to enter and define this in the SEMP.
- Strict imposition of speed limits along residential areas and where other sensitive receptors such as schools, hospitals, and other populated areas are located.
- Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances (fuel and oil) and other construction materials during transport.

288. The contractor will provide information boards near the work sites to inform and instruct the public on how to conduct themselves and to be aware of their surroundings if they must approach the works. The Public Safety section of the Worker and Public Safety Guidelines will include but not necessarily be limited to the following:

- Statement of contractor's safety policy for Workers and Public.
- Legal requirements ***(Philippines Labour Act 2006)***.
- Works safety issues and public safety issues.
- Training the workforce and informing the public on works safety issues.
- Establishment and monitoring of acceptable working practices to protect safety.
- Overlap with traffic and road safety (e.g. traffic flow/delay requirements).
- Discussion of the TSC/ BRT-PIU inspection/monitoring role.

- Establishment of complaints management system for duration of the works
- Agreement on publicity/public consultation requirements.
- Reporting of accidents.
- Complaints management

5.5.22 Traffic Management

289. *Objective.* TMP is important to managed construction traffic and traffic on the existing highway network; to maximize construction efficiency and safety while minimizing risk, inconvenience and nuisance to the general public. This will be achieved through careful management, programming and coordination of all works on the existing highway network and traffic accessing the corridor, including general traffic.

290. TMP is strategic in nature and the appointed detailed design consultant and construction *supervisor* will be responsible for evolving the guidelines to ensure it considers the detail effects of the following:

- Construction materials will be supplied and removed from corridor using Cebu Road South, Bacalso, Osmeña Boulevard and Escario. In terms of transporting materials to and from site, Cebu South Coastal Road would be an appropriate and alternative route, and minimize the impact of construction traffic along south eastern section of the corridor.
- All construction works on the existing highway network will be planned outside of the peak hours and unimpeded access given to the public during peak hours whenever possible and safe to do so
- To minimize the volume of traffic accessing the corridor from outside the area, local suppliers and businesses will be used wherever practical and suitable with support from specialized companies and suppliers not located within the area
- The main access routes to and from the corridor will be signed and approved by client and all contractors/suppliers to the corridor will be advised of the haul routes
- In the interest of safety and effective management, designated accesses and routes will be defined along the corridor so construction and residential traffic are segregated as far as reasonably practical
- The safety of the public and contractors work force is foremost and therefore road closures will be sought if there is a health and safety risk to either the public or contractors workforce on the public highway
- The number, duration and length of any highway closures or diversions will be kept to a minimum
- Emergency access points will be designated and emergency services informed of these locations
- Large numbers of access points and repetitive diversions and closures will be avoided to reduce the risk of driver error and confusion
- All traffic management proposals will be free running where safe to do so (i.e. the use of temporary traffic signals will be kept to a minimum) while also operating under the existing permanent traffic regulation orders and general directions where possible
- To minimize the impact that the construction works have on the local residents and surrounding environment, the contractor shall appoint a delivery and transportation manager. This person will responsible for ensuring all construction to and from the site is managed efficiently and not cause nuisance or unnecessary disruption to the operation of the existing highway network.

291. *Construction Access*: The primary access for all construction traffic will be along the existing highway network and focus upon Cebu South Road, Bacalso, Osmeña Boulevard

and Escario. In order *to* construct the BRT corridor, the above highway links may require partial / temporary closure. In addition, adjacent sidewalks will be subject to partial / temporary closure either for reconstruction or to ensure public safety.

292. *Hours of Work*: Site working hours will be between 0800 - 1800 hours Monday to Friday and 0800 -1300 hours on Saturdays. No construction work take place during Sundays or public holidays. In order to maintain these working hours, the appointed contractor(s) may require a period of up to half hour before and up to one hour after normal working hours for start-up and close-down activities. This period should include the operations of plant machinery, giving rise to local noise and air disturbance. In *exceptional* circumstances, for safety and operational reasons it may be necessary to work outside these hours. Where this occurs the hours and duration of work would be subject to consultation with the client.

293. *Proposed Traffic Diversion Routes during Construction:* In order to minimize the traffic impact during construction, the following highway routes are proposed as alternative vehicle routes (Please see **Figure 5.5-2** and **Table 5.4-1**):

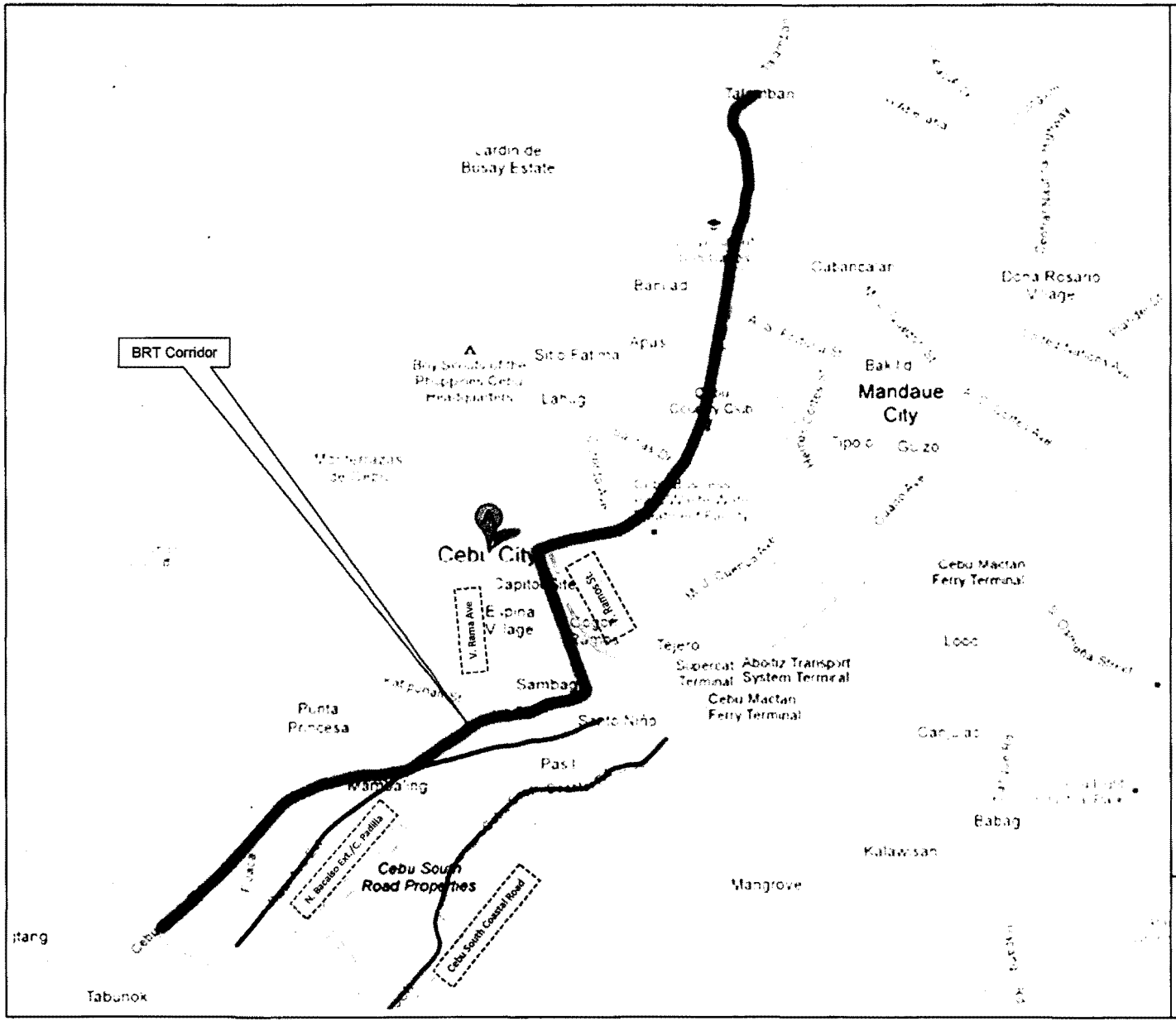


Figure 5.5-2

Proposed Traffic Diversion Route during Construction Period

Table 5.4-1
Proposed Traffic Diversion Routes

Alternative Route	Purpose
Cebu South Coastal Rd	Alternative, and strategic highway access for vehicles entering Cebu City from Talisay and Tabunok
N. Bacalso Extension / C. Padilla	Alternative local highway access, which runs parallel to Cebu South Road from F. Jaca to Colon St
V. Rama Ave	Alternative local (western) diversion route away from Osmeña Boulevard
F. Ramos St	Alternative local (eastern) diversion route away from Osmeña Boulevard

294. Highway Link Construction and Micro Management: It is proposed that the construction is phased into 9 separate phases of construction within a predefined highway link along the BRT corridor, and can be summarized as follows:

1 Divert main-line traffic (both streams) onto single side of mainline carriageway; thus releasing opposite side (non-traffic) for civil construction work
2 Clear / grub highway / sidewalk and remove central median where applicable
3 Construct busway and reconstruct adjoining highway / sidewalk
4 Re-divert main-line traffic back onto newly constructed highway, and busway
5 Clear / grub highway / sidewalk on opposite side of highway, following re-divert of traffic
6 Construct busway and reconstruct adjoining highway / sidewalk on opposite side of highway
7 Partially re-open highway in each direction
8 Install BRT segregation kerbing
9 Fully re-open highway

295. During construction and operation phase, the Contractor in coordination with the local traffic office shall review, update and provide details of the TMP. It is likewise expected that the Contractor shall factor-in the following factors which can be looked as guides for the proponent of the BRT system to ensure that the negative impacts of the BRT system during construction will be minimal if not appropriately addressed. Likewise, these can also be helpful in ensuring that the impacts on current flow of traffic, notably during construction will be minimal and that the LOS of the affected corridors will not be severely affected.

a) Traffic circulation	• Rationalize re-routing of affected PT routes (jeepneys, buses, etc.) • Re-routing of affected traffic flows of private vehicles • Provision of appropriate information guide for the temporary re-routing • Traffic enforcement support for the re-routing • Responsive traffic control to manage re-routing
b) Pedestrian circulation	• Provision of temporary pedestrian facilities along the affected corridors • Pedestrian information system • Safety measures for pedestrians • Provision of pedestrian facilities at affected

	institutions and establishments (e.g.
c) Transport of heavy equipment	• Ensure the time and route of transporting heavy equipment have minimal impacts on traffic circulation and flow in the affected corridors • Safety measures need to be in place • Traffic management in place
d) Parking facilities	• Provision of temporary parking for establishments and institutions affected by the construction • Proper management of parking to ensure minimal impacts • Separate parking facilities for construction
e) Disposal of construction wastes	• temporary location of wastes at construction site/s • Proper management of construction wastes • Ensure transport of construction waste have minimal impacts on traffic circulation
f) Other concerns	• Address concerns on PWDs, • Ensure minimal impacts on special events along affected corridors of the proposed BRT system (e.g., Sunday mass, funeral march, parades, festivals, etc. • Others that may be affected by the BRT construction/development should be addressed

5.5.23 Archaeological and Cultural Artifacts Chance Finds

296. Philippines has a rich archaeological heritage but no archaeological site is known within 100m of Cebu. However as a fall back measure the contractor will take the following precautions to avoid disturbance of any as yet undiscovered archaeologically valuable artifacts.

- Site agents will be instructed to keep a watching brief for relics in excavations.
- Should any potential items be located, the TSC will immediately be contacted and work will be temporarily stopped in that area.
- If the TSC determines that the item is of potential significance, an officer from the National Museum (NM) will be invited to inspect the site and work will be stopped to allow time for inspection.
- Until NM has responded to this invitation work will not re-commence in this location until agreement has been reached between NM and BRT-PIU/DOTC as to any required mitigation measures, which may include structured excavation.

297. Detailed Chance Find Procedure is presented in **Annex 6**.

5.5.24 Enhancements

298. Environmental enhancements such as tree planting near the road will be explored in the detailed designs and included in the Tree-cutting and Replanting Guidelines. Enhancements shall be re-assessed prior to construction and proposed enhancements should be discussed by the contractor with the local population to identify stewardship of any planting and also to serve as a vehicle for further public consultation at the implementation stage and to assist in public relations.

5.6 Operational Phase

5.6.1 Noise

299. The Philippines noise criteria are formerly presented in Section 4.1.8 Tables 4.1.3 and 4.1.4. The main noise source in most areas is traffic noise. The project is believed to be sustainable in terms of noise. No operational mitigation measures are required based on the current alignments.

5.6.2 Gaseous Emissions

300. Gaseous emission will result from the fuel consumed by the BRT buses but this will be much less than at present for the equivalent number of passengers.

301. If the BRT Project is implemented in Cebu City, it would give significant greenhouse gas emission benefits. In particular, it would (i) yield annual savings across Cebu City by comparison with the baseline scenario of 115,000 tonnes of CO2e by the year 2020 and 192,000 tonnes by 2025 (equivalent to 24% and 41% of the current total annual GHG emissions from urban transport in Cebu respectively), (ii) save a total of 3,867,000 tonnes of CO2e over a 20 year period from 2015 by comparison with the baseline scenario - the equivalent of saving over eight times the current total annual GHG emissions from urban transport in Cebu, and (iii) reduce GHG emissions per person-km below current levels and in the BRT corridor keep them below those levels for the 20 year period from 2015. Across the city, GHG emissions per person-km would be kept below current levels for around 9 years from 2015. Under the baseline scenario by contrast, emissions per person-km would exceed current levels within 3 to 4 years from 2015 and then continue to rise throughout the 20 year period.

5.6.3 Particulate Emissions

302. Vehicle emissions (particulate contamination) such as dust and fumes will also be air pollution sources during operation however toxic residues from vehicle emissions near the CEBU road should be less likely under the improved conditions with BRT implemented and are unlikely to accumulate or create worse impacts than at present under the local conditions. Dust from the existing road will be reduced due to the better asphalt surface for the sides of the new road. Therefore the project is believed to be sustainable in terms of particulate emissions and no operational mitigation measures are required.

5.6.4 Waste Generations

303. During operation phase, the Project is expected to comply with the Effluent Standards set by DENR for domestic wastewater management. On the other hand, applicable provisions of RA 9003 (Ecological Solid Waste Management Act) must be complied with for domestic solid waste management.

304. The Project operator is likewise expected to secure the necessary Discharge Permit from DENR for the management of domestic wastewater. For domestic solid waste management, it is expected that a MOA between CCG and the Project operator shall be executed to effect periodic collection of the domestic solid wastes to be generated by the Project and allow the Project to use the existing garbage disposal site of CCG.

305. The project is not expected to generate hazardous wastes during operation phase except for busted lumps. Disposal of these busted lumps can be done by employing third party waste treaters which are duly accredited by DENR for the wastes proper collection and disposal.

5.6.5 Driving Conditions and Community Safety

306. The introduction of the BRT and widening of the usable width of the existing road along the BRT corridor road will improve traveling conditions. Increases in traffic flow indicate additional future traffic should be moderate and unlikely to create many community safety issues. The road improvements will be monitored and CCG through CITOM will monitor accidents in the operational phase and conduct awareness campaigns. Overall the condition of the road facilities will be enhanced and driving conditions should improve. Routine safety measures, signage and road markings will be introduced to reduce driving risk further in accident prone areas and provide enhancements to driving conditions near and along the BRT corridor.

5.7 Social Assessment

307. A Social Assessment was likewise done which was aimed to:

a) Determine resettlement and other social impacts of the proposed Cebu BRT Demonstration Project and linked activities in order to inform design of the project;
b) Consult with persons and groups to be affected by the project; and,
c) Produce a social management plan (SMP) which will cover social impacts other than those caused by land acquisition
d) Develop a resettlement policy framework (RPF) from which a resettlement action plan (RAP) will be prepared to guide the acquisition of land and other real properties for the project and its linked activities.

308. The primary goal of the SMP is to pave the way for social acceptability, improve the project's accountability and be more responsive in attaining its social objectives. Its purpose is to mitigate the adverse impacts and enhance benefits from the project to:

a) Identifykey social issues and concerns of the identified potential PAPs;
b) Identify and recommend management and mitigating measures to respond to these issues and concerns;
c) Identify the lead government agency or organization responsible for, as well as the required resources needed, in implementing the recommended measures; and,
d) Provide timelines to implement these measures consistent with the plans and programs of lead agencies.

309. The social impacts of the Project on key stakeholders are summarized in Table 5.7-1. Positive impacts on the commuters (including senior citizens, PWDs, and women/working mothers) range between medium to high, achieving maximum benefits when Cebu BRT is operational. To address the social impacts of the project, a Social Impact Management measures and activities Matrix was presented during a series of public consultations and is summarized in Table 7.3-1.

310. The Resettlement Policy Framework (RPF) and the Resettlement Action Plan are separate documents which accompany this EIA. An Eligibility and Entitlement Matrix which is described in the RPF is summarized in Table 7.4-1.

Table 5.7-1
Social Impacts of Project on Key Stakeholders

STAKEHOLDER	TYPE OF POTENTIAL IMPACT (+/-)	CONSEQUENCE OF IMPACT (High/medium/low)	DESCRIPTION OF IMPACTS
Commuters	Positive	- High	- Reduction of in-vehicle travel time - Reduction of waiting time due to high frequency of buses - Enhanced safety - Better customer service
Senior Citizens	Positive	- Medium to high	- Easier boarding/alighting since bus floor is at the same level as station - Safer and more convenient walk to the stations due to wider sidewalks - Senior citizens' discount can be integrated in the ticketing system
Persons with Disability (PWD)	Positive	- Medium to high	- Easier boarding/alighting since bus floor is at the same level as station - Safer and more convenient walk to the stations due to wider, unobstructed sidewalks - Improved information and payment information
Women/Working mothers	Positive	- Medium to high	- Protection from undue physical harassment due to cramped space inside the public transport vehicle - Enhanced convenience and comfort when bringing small children due to step-less boarding and alighting
Residents in barangays along the BRT Route/ Community-at-large	Positive	- Medium	- Enhanced accessibility and economic/social opportunities that brings - Improvement of ambient air quality along the CBRT corridor due to the reduction of PUJ units
Residents in barangays at stations along the BRT Route	Negative	- Medium to high	- Relocation due to right-of-way acquisition to widen the carriageway
Tenured vendors along the CBRT corridor		- None to Low	- Relocation to other areas for vending will be undertaken by the Cebu City Government
PUJ Operators	Negative	- Medium to High	- Potential loss of income
PUJ Drivers	Negative	- Medium to High	- Potential loss of income

6.0 ANALYSIS OF ALTERNATIVES

311. The purpose of this section is to describe the general characteristics of the No Project alternative and the Project alternatives for analysis in this environmental assessment studies.

6.1 No-Project Alternative

312. The BRT Project will catalyze Cebu City's urban road network to cope with traffic demands expected in association with other complementary development plans. Without the BRT Project, the existing transport system and road network will be insufficient in capacity to accommodate existing and future traffic demands.

313. The No-Project Alternative would mean maintaining the status quo, meaning that only routine activities shall be undertaken by CCG and DPWH such as road maintenance and repair. Safety improvements in the existing transport system would only occur as the need arises or over the next several years. It is assumed that the No-Project Alternative does not include improvements that would increase roadway capacity, reduce congestion, or improve safety meaningfully.

314. The No-Project Scenario would likewise mean the continuation of the current public transport system which is dominated by inefficient buses, jeepneys, mini-buses and shuttle services, and taxis to as small as tricycles, multi-cabs and pedicabs reasonably represents the anthropogenic emissions by sources of greenhouse gases (GHG) that would occur in the absence of the proposed BRT project. Without the BRT project, Cebu City and its people will be completely deprived of benefits that may be generated by Cebu BRT project which include reduced $CO_2$and GHG emissions, reduced traffic congestion, improved traffic safety, potential reduction in travel times, and transport cost savings accruing to the public as end users.

315. For these reasons, the No-Project Alternative does not satisfy the project purpose of providing safe and efficient mass transport system in Cebu City. Therefore, the No-Project Alternative is found not viable.

6.2 Project with Alternatives

6.2.1 BRT over other Mode of Mass Rapid Transit

316. One approach in addressing traffic congestion (and deterioration of the environment due to impacts of transport systems) is the introduction of an efficient high occupancy public transport system that is in the form of a mass transit system. Several mass transit systems were looked it in Cebu City. Notable of these are the following:

a. Light rail transit system,
b. Bus Rapid Transit (BRT), and
c. Express Bus system.

317. Of the three proposed public transport systems, two are basically bus-based. The BRT system is one that is subject of this environmental study; while the other one, the express bus system is proposed by a comprehensive public transport study of DOTC (**Figure 6.2-1**). Furthermore, the proposed express bus system is supported by an exhaustive HIS (house hold interview survey), OD survey and employed calibrated travel demand forecasting. Similarly, the latter was introduced not only for Cebu City but also for Metro Cebu. Indicating that it not only focused on the requirements of Cebu City but that of the metropolis, to which Cebu City is the core.

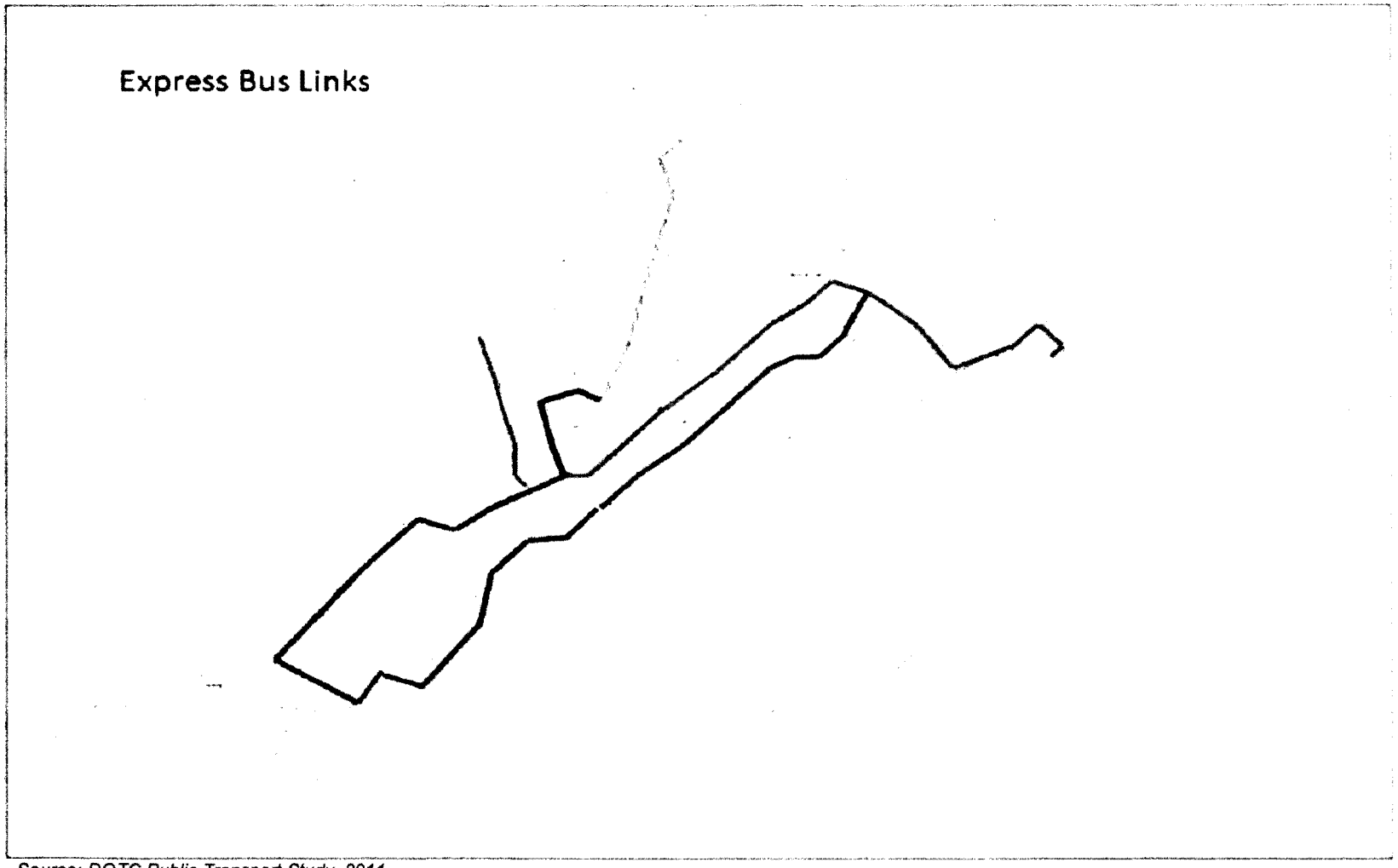
318. Though the Express Bus system was recommended in a previous study of DOTC, the assumptions for the said system were more in the context of Metro Cebu. The proposed BRT system, on the other hand, can be considered as appropriate to the requirements as a shuttle type public transport system in Cebu City. The Express Bus System is rather of a long haul transit system that meets longer OD as compared to the proposed BRT system that can be considered more of serving short-trips in Cebu City. Unlike an express bus system, a BRT system has its own right of way (ROW) The BRT system can also be considered as a feeder mode in the city serving the various land use patterns in the city, notably to mixed used developments.

319. The BRT system is considered generally as a public transport mode that provides almost same levels-of-service (LOS) of a mass transit system that is rail-based (e.g., LRT) while the proposed expressway bus network meets the requirements of integrating land use and transport. The proposed BRT system can satisfy the integration of land use and transport by providing at the interim connectivity of accessibility to major land use patterns and concentrations.

320. As already cited above, the BRT system meets the same LOS that of LRT. Though the LRT system can be contemplated as providing exclusive ROW, however, given the high costs of construction, operation and developments, the BRT system is still appropriate for Cebu City. The BRT system has almost same exclusive ROW and hence will still provide efficient commuting service to the people. Likewise, as already cited, the forecasted travel demand for public transport, supported by the previous DOTC study, does not warrant yet the introduction of a rail-based mass transit system.

321. In the context of reducing the negative impacts of transport system to the environment, specifically on air quality, the BRT system can provide, to some extent, same levels of mitigation to that of LRT, as shown in various cities with BRT systems. Given again the experiences in other countries, it was already shown that BRT system can significantly reduce carbon footprints in urban or metropolitan areas. Likewise, with respect to providing green ambiance to the urban setting, the BRT system can better contribute to this compared to the current public transport systems. As such, it can therefore be surmised that the introduction of the BRT system is a plus factor in the overall transport system in Cebu City.

322. Eventually, in the future, extend the proposed BRT system to the major land use patterns and concentrations of Metro Cebu. This will complete the development of an efficient seamless public transport system not only in Cebu City but in Metro Cebu, where it will service more commuters and eventually encourage the modal shift to efficient low-carbon public transport system.



Source: DOTC Public Transport Study, 2011

Figure 6.2-1
Proposed Expressway Bus Network

Table 6.2-1
System Components Meeting Land Use Transport Interaction

TYPE OF CHARACTERISTICS	DISTRIBUTION SYSTEMS	FEEDER SYSTEMS	LINE-HAUL SYSTEMS
1. Network	• Loops, shuttles or very small networks	• Limited network up to few miles	•
2. Typical Station Spacing	• 0.40 – 0.8 km. (1/4 – ½ mile)	• 0.40 – 0.8 km (1/4 – ½ mile)	• 0.8 – 4.85 kms (1/2 – 3 miles)
3. Service	• Scheduled or demand responsive	• High-density urban areas	• Scheduled
4. Area of Service	• High density areas of small activity centers	• Large density activity centers or low-density suburban areas	• Areas with population density above 1,930 per sq. km. (5,000 per sq. mile)

Source: DOTC Public Transport Study, 2011

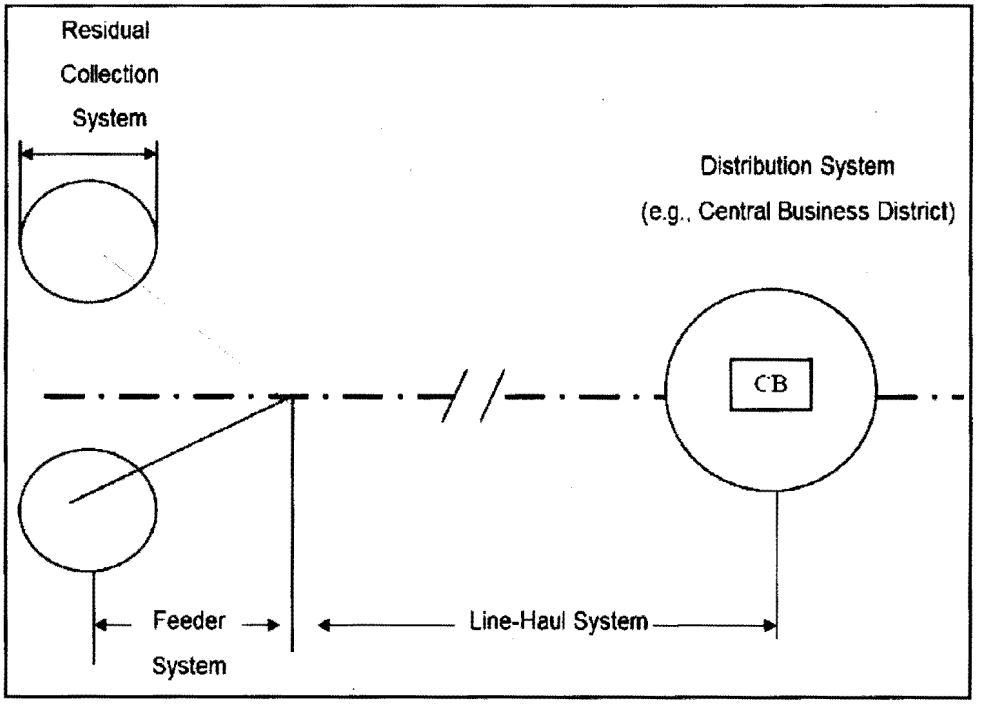
323. Based on the Feasibility Study (2012) made by ITP, the traffic growth in Cebu City are projected to be 38,000 person trip/day for the year 2015 to as high as 253,000 000 person trip/day for the year 2030. Comparing these traffic demand projections with the travel demand requirement under column 3 of **Table 6.2-2**, the projected traffic demands in Cebu City for years 2015 to 2030 are less than 0.4 million. Under this scenario, BRT system appears to be the most suitable and sufficient mass transit system. It could be surmised that the proposed BRT system meets the travel demand of Cebu City. This therefore indicates that for the current and future travel demand, rail-based mass transit system is not yet warranted; and that a BRT system will be sufficient already.

6.2.2 Alternative BRT Routes or Carriageway Inside Cebu Business District

324. The optimal and final proposed BRT Corridor runs between Bulacao in the South West and Talamban in the North as identified in the Pre-FS (2010) for the project. In the selection of this final route, criteria used were physical opportunity, integration and overall deliverability.

325. However, difficulty in selecting optimum route inside Cebu Business District was encountered. In this case, there were four (4) alternative routes studied based on the criteria of (i) potential patronage, (ii) physical opportunity, and (iii) wider policy and strategy issues. These four options are listed below and presented in **Figure 6.2-3**.

Alternative Route 1:	Osmeña Boulevard – Escario
Alternative Route 2:	Del Rosario – G. Maxilom Ave. – Gorordo Ave.
Alternative Route 3:	Pres. Osmeña Boulevard – MJ Cuenco Ave – Gorodo Ave.
Alternative Route 4:	Osmeña Boulevard – G. Maxilom Ave. – South Drive – Arch. Reyes Ave.



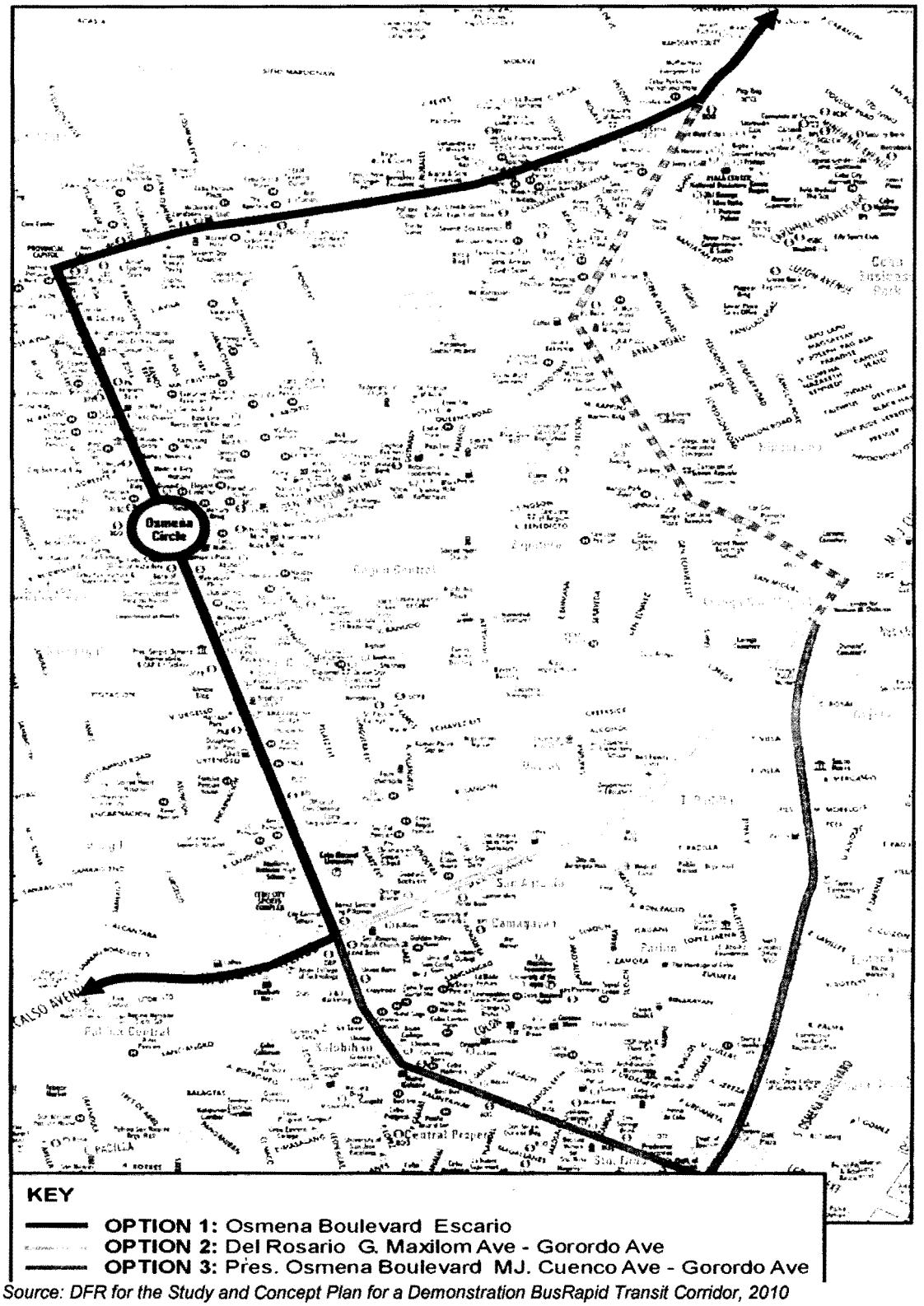
Source: DOTC Public Transport Study, 2011

Figure 6.2-2
Land Use Public Transport Interaction

Table 6.2-2
Hierarchy of Mass Transit Systems

Hierarchy	Type of Mass Transit System	Daily Traffic Demand (Person-Trips/Day)	Function
2. Trunk Line	➢ Line Haul Commuter System	1.2 million	• Inter-regional line • Rapid commuter line along progressive urban areas (Longer station interval, adjoining area of station is developed as regional core)
1. Circulation Line	➢ Medium Rail System ➢ Subway System	0.59 – 0.75 million	➢ Urban truck road to disperse to CBD, institutional and educational zones (Shorter station interval, the adjoining area as high-intensity land use zone)
1. Commuter Line	➢ Light Rail System/ ➢ Medium Rail System	0.4 – 0.75 million	➢ Line between CBD and residential areas outside urban/metropolitan areas (Long station interval with high frequency, mass transport and stable operation)
1. Feeder Line	➢ Monorail ➢ Busways ➢ BRT ▪ Jakarta ▪ Bogota ▪ Curitiba	Less than 0.4 million	➢ Complementing commuter and/or circulation lines (Short station interval with high frequency and stable operation, adjoining area as multi-functional land use)

Source: DOTC Public Transport Study, 2011



Source: DFR for the Study and Concept Plan for a Demonstration BusRapid Transit Corridor, 2010

Figure 6.2-3
Map of four (4) Alternative Routes Inside Cebu Business District

326. The appraisal process has identified the relative merits and issues associated with the four access options serving Cebu City CBD. In order to define a preferred access option the following summary table takes each of the four options and assigns a score, based on its perceived benefit to the delivery, implementation and operation of the BRT System. In providing the score, based between 1 and 5, 1 is viewed as negative, with 5 ranking as positive.

327. Using this appraisal method where each option was rated using set of criteria, results of the assessment clearly showed that Option 1 having the highest appraisal score of 17 would provide the great benefit / opportunity for accessing alignment through Cebu City CBD. Summary results of the appraisal and rating used are shown in **Table 6.2-3**.

Table 6.2-3
Summary Table of Appraisal Process

Criteria	Option 1	Option 2	Option 3	Option 4
Integration	3	2	2	3
Infrastructure	4	1	1	1
Reliability	4	1	1	2
Patronage	3	1	3	2
Accessibility / Safety	3	1	3	2
TOTAL	**17**	**6**	**10**	**10**

Source: DFR for the Study and Concept Plan for a Demonstration BusRapid Transit Corridor, 2010

6.2.3 Summary of All Alternatives Studied for the Project

328. In the Draft Final Report (DFR) for the Study and Concept Plan for a Demonstration Bus Rapid Transit Corridor (June 2010 ver.), ITP analyzed several alternatives on concept issues. The advantages and disadvantages of each of the alternatives are presented and thoroughly discussed with Cebu BRT TWG on various occasions. Using the professional engineering and planning guidance from ITP, the TWG's final judgment on the recommended alternatives became the basis for advancing the selected alternatives into the Final FS.

329. Throughout the selection of the best alternatives for the Project, reviews and in-depth analyses were conducted to ensure that the selected alternatives will avoid or minimize potential adverse impacts. The evaluated concepts issues as alternatives included (i) configuration of running lanes, (ii) pedestrian crossing, (iii) regulation, (iv) trunk (closed) or direct (open) service, (v) accessibility, (vi) ticketing, (vii) number of lanes, (viii) vehicle type, and (ix) stations.

330. **Table 6.2-4** provide the summary of various alternatives that were considered and selected in coming up with the specification of the proposed Cebu BRT project. Justifications on the recommended alternatives for each of the items were likewise provided in the table.

Table 6.2-4
Summary of Various Alternatives Studied

Concept Issue	Option	Linkage	Recommendation	Justification/Information
Configuration of running lanes	Median with median stations Median with bilateral stations Median with cross over Median with tidal flow Bilateral	Median with median stations Median with bilateral stations Median with cross over Median with tidal flow Bilateral	Median operation with median stations	Limited roadway width, lack of service lanes, proliferation of roadside activity result in median operation recommendation. Median stations recommended in order to reduce cross section and hence right of way acquisition.
Pedestrian crossing	At grade Via skywalk Mixed	Accessibility	Mixed according to Location	Minimizing passenger inconvenience is paramount with respect to issues of safety and impact upon overall road capacity
Regulation	Closed to non BRT Open to all	Configuration Trunk/direct Ticketing Vehicles	BRT way closed to all non BRT specified vehicles. BRT route has some regulatory protection.	A form of regulatory control is required to protect against competition. Some service overlap is desirable
Trunk (closed) or direct (open) service	Trunk-feeder Direct	Configuration Vehicles	A mixed trunk and direct (tributary) system	Demand has shown significant trip origins outside of the defined BRT infrastructure. Efficient service of that demand requires some direct services.
Accessibility	Step free access throughout Some steps Steps	Pedestrian crossing Vehicles Stations	Platform to bottom step height (350mm)	Higher platforms to achieve step free access would effectively require a closed (trunk-feeder) system and potentially closed stations. Proposal offers significant assistance to many with mobility problems.
Ticketing	On board Off board Paper Magnetic Smartcard	Vehicle Stations	Tentatively, off board smartcard within the BRT with on board payment system for tributary services. Further consideration at Feasibility Stage required.	Ease of payment, manageable technology risk and association with high technology.
Number of lanes	Single Twin	None	Single lane system with by pass lanes at some	High demand is forecast and benefits in operating express services identified.

Concept Issue	Option	Linkage	Recommendation	Justification/Information
			stations to facilitate express services	
Vehicle type	12m single 18m articulated 24m biarticulated Diesel LPG/CNG Hybrid High floor (2 step) High floor (1 step) Low floor	Configuration Accessibility	12m standard vehicle with 850mm floor.	Flexibility, availability, cost and in keeping with the scale of the City. It is recommended that physical design be flexible to accommodate the potential for 18m articulated vehicles in the future.
Stations	Open Closed	Configuration Vehicles	Closed stations within the BRT system, Open stations to serve tributaries	To facilitate efficient boarding/alighting to reduce vehicle dwell times and enhance run times.

Source: DFR for the Study and Concept Plan for a Demonstration Bus Rapid Transit Corridor, 2010)

7.0 Environmental and Social Management Guidelinesand Plans

331. The EIA described and provided in this document is completed with the inclusion of a set of Environmental Management and Monitoring Guidelines, a Social Management Plan and a Resettlement Action Plan. These Guidelines and Plans serve as guidance to the National PMO, PIU, Contractors and is part of the TOR for the DED Consultant.

7.1 Implementation Arrangements

332. In the Philippines the environmental regulations of GOP are derived from the Philippine Environmental Impact Statement (EIS) system which was established in 1977 by virtue of presidential decrees PD1152 and PD1586 and a series of subsidiary legislation, administrative orders and memoranda that regulate the operations of the system. The Department of Environment and Natural Resources (DENR) is the regulatory authority and is tasked to implement Administrative Order 30 Series of 2003 (DAO 03-30) which contains the Implementing Rules and Regulations of the of The Government of the Philippines (GOP). DAO 30 requires all projects categorized as environmentally critical (ECPs) or within environmentally critical areas (ECAs) to go through an assessment process referred to as the EIS System that requires Environmental Impact Assessment (EIA). DENR reviews the environmental assessment and issues clearance certification before construction can commence.

333. A Technical Working Group chaired by CCG with DOTC and other concerned government agencies as memebrs has been established for the Project to provide policy and technical guidance and interagency coordination.

334. For purposes of this project, the GOP has created a National BRT Project Management Office to (i) ensure coordination among all implementing agencies during construction; and (ii) design and negotiate the business model of the BRTand monitor the future BRT operations in the country. Throughout the project implementation, the National BRT-PMO is supported by local BRT Project Implementing Unit (PIU) which oversees the works and performance of the BRT Operator and the BRT Contractors.

335. The Technical Support Consultants (TSC) is recruited to support the BRT-PIU management during project implementation. The TSC provides engineering, procurement, construction management support and is engaged to undertake detailed design, draft bidding documents and supervise the construction.

336. The National BRT-PMO through its BRT-PIU is required to obtain approval and the Environmental Clearance certificate (ECC) from the Department of Environment and Natural Resources (DENR) following environmental assessment and public consultation. Under the Philippine EIS System, the project requires EIA and compliance to the EIS System is necessary so as not to delay implementation of the project. DENR-EMB Region 7 is the authority to issue the necessaryECC for the project.

337. **Table 7.1-1**defines institutional responsibilities for EMP implementation while the Organizational Chart for the Cebu BRT is presented in **Figure 7.1-1**.

Table 7.1-1
Responsibilities for EMP Implementation

Agency	Responsibilities
DOTC / National BRT Project Management Office (National BRT-PMO)	• Executing agency with overall responsibility for all BRT project implementation. • Ensure that sufficient funds are made available to properly implement the EMP • Ensure that all BRT projects, regardless of financing source, complies with the provisions of the EMP and *WB environmental policies and particularly WB POLICY OP 4.01* • Ensure that BRT projects comply with Government environmental policies and regulations. • For project duration, ensure that dedicated Technical Support Consultants including environment and Environmental and Social Safeguard Unit (ESSU) to oversee EMP implementation are engaged. • Ensure that environmental protection and mitigation measures in the EMP are incorporated in the detailed designs • Ensure that necessary resources are allocated to obtain environmental clearances certification under EIS from DENR prior to award of civil works contracts • Ensure that the establishment and implementation of an environmental grievance redress mechanism, as described in the EIA, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Project's environmental performance • Ensure that bidding and contract documents include the EMP. • Ensure submission of semi-annual monitoring reports on EMP implementation to WB and DENR.
Cebu BRT Project Implementation Unit (PIU).	• Ensures that bidding and contract documents include the EMP • Submits monthly and semi-annual monitoring reports on EMP implementation to National BRT-PMO • Includes in the Project EMP and specify requirement for preparation and implementation of method statement/site specific EMPs (SEMPs) by the contractors as described in the EIA/EMP • Ensures that EMP provisions are strictly implemented during various project phases (design/pre-construction, construction and operation) to mitigate environmental impacts to acceptable levels. • Ensures that Project implementation complies with WB's environmental policy OP 4.01 and the principles and requirements therein • For project duration, commits and retains a dedicated staff within BRT-PIU as environment and safety officer (ESO) to oversee EMP implementation • Checks that environmental protection and mitigation measures in the EMP are incorporated in the detailed designs • Checks that necessary environmental clearances and approval(s) from DENR prior to award of civil works contracts • Participates in an environmental grievance redress mechanism, as described in the EIA, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Project's environmental performance • Undertakes monitoring of the implementation of the EMP (mitigation and monitoring measures) with assistance from TSC. • Reports to WB on all aspects of environmental management and monitoring at six month intervals, based on the results of EMP monitoring • Ensures proper and timely implementation of TSC tasks specified in the EMP, conducts environmental training as specified in the EIA/EMP,

Agency	Responsibilities
	conducts contractors workers' orientation on EMP provisions, undertakes regular monitoring of the contractor's environmental performance, conducts field measurements for dust and noise as required in the EMP, and prepares environmental baseline report and environmental semi-annual environmental monitoring reports , as specified in the EMP, for the National BRT-PMO National submission to WB • With support from TSC, prepares semi-annual environmental monitoring reports for submission to WB. • Based on the results of EMP monitoring, identifies environmental corrective actions and prepare a corrective action plan, as necessary, for submission to WB
TSC (Technical Support Consultant (TSC)	• Incorporates into the project design the environmental protection and mitigation measures identified in the EMP for the design stage; • AssistsBRT-PIUto ensure that all environmental requirements and mitigation measures from the EIA and EMP are incorporated in the bidding and contracts documents • Prior to construction, reviews the updated SEMPs/method statements prepared in consultation with contractors • Works within BRT-PIU to execute any additional environmental assessment prior to project construction as required in the EMP (e.g., preparation of new or supplementary environmental assessment in case of change in alignment that will result to adverse environmental impacts that are not within the scope of the EIA prepared during loan processing, etc.) • Undertakes environmental management capacity building activities for National BRT-PMO and CBRT-PIU as described in the EIA and EMP
Contractor	• Recruits qualified social and environmental safeguard specialist to ensure compliance with environmental statutory and contractual obligations and proper implementation of the EMP • Implementsall necessary EMPs • Provides sufficient funding and human resources for proper and timely implementation of required mitigation measures in the EMP and segregates these sums in the bidding documents • Implements additional environmental mitigation measures for unexpected impacts, as necessary
BRT Operator	• Responsible for operation and maintenance of Project corridor • Implements EMP monitoring during operation
Department of Environment and National Resources	• Provides regulatory compliance works for the BRT project; • Reviews and approves environmental assessment reports required by the Government. • Issues environmental clearance certification for the Project based on their mandate and regulations • Undertakes monitoring of the project's environmental performance based on their mandate
Cebu City Environment and Natural Resources Office (CCENRO)	• Provides regulatory compliance works for the BRT project; • Undertakes monitoring of the project's environmental performance based on their mandate

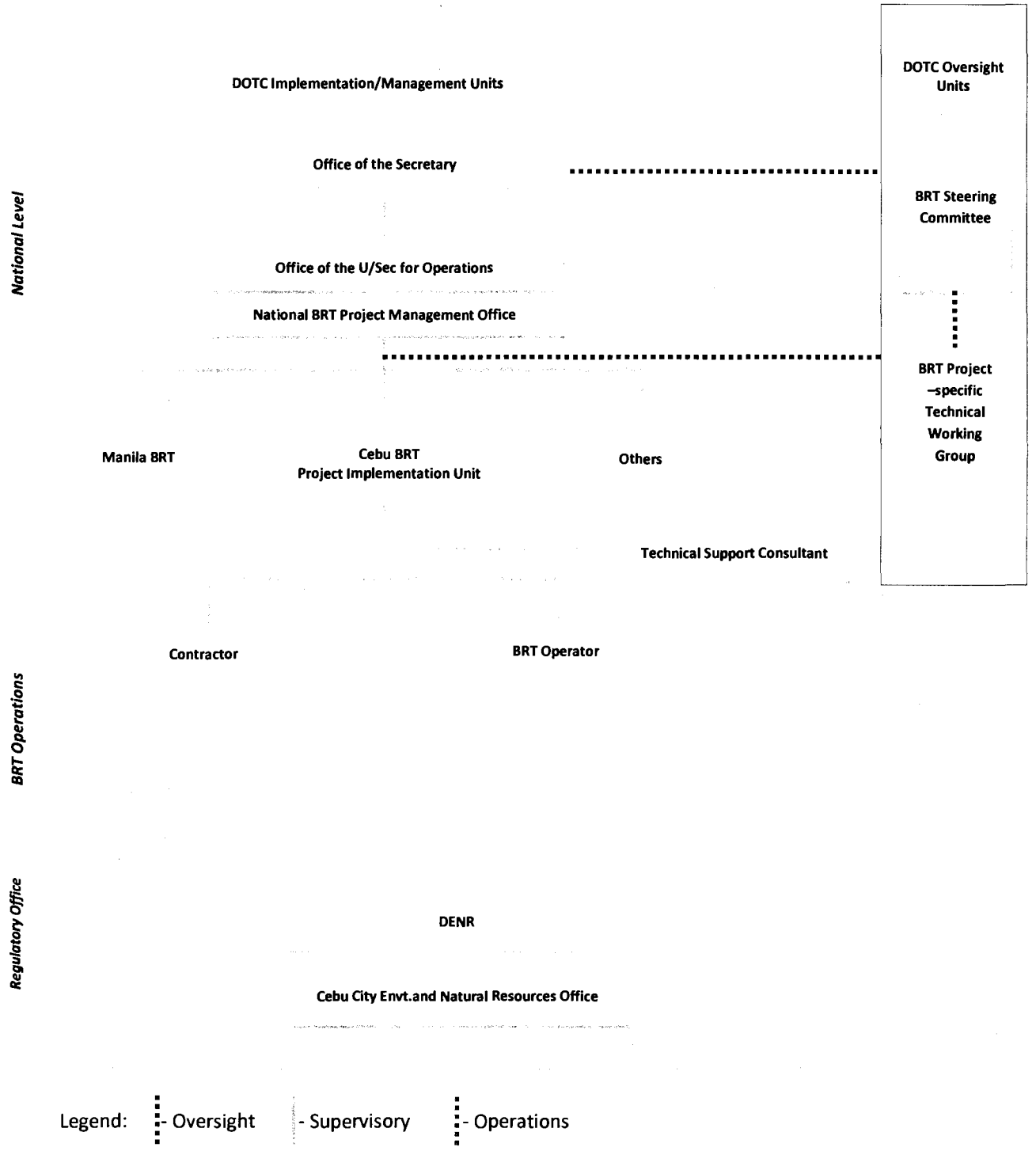


Figure 7.1-1
Cebu BRT EMP Implementation Structure

338. To facilitate EMP implementation during construction, the BRT contractors are required to fully cooperate with National BRT-PMO, BRT-PIU, TSC and the local population in the mitigation of impacts. Clearances for Contractor payments may include certification from the BRT-PIU as to the effective implementation of the SEMPs and all other mitigation measures specified in the EMP. The completion of implementation of mitigation measures is therefore linked to payment milestones.

7.2 Environmental Mitigation

339. The anticipated environmental impacts and mitigation measures discussed in the previous section are presented in **Table 7.2-1**. The table also shows responsibilities and timeframe/schedule for implementation of mitigation measures and monitoring.

340. **Table 7.2-1**alsoshows that most mitigation activities during pre-construction are implemented by the BRT-PIU assisted by the TSC. During construction and operation, mitigation measures are primarily implemented by the contractors and the BRT operator.

341. To ensure implementation of mitigation measures during construction, the Enviuronmental Guidelines are included in the tender and contract documents for civil works. Contractors' conformity with environmental contract procedures and specifications are regularly monitored by BRT-PIU with assistance from TSC and results are reported semi-annually to WB, DENR and CCENRO.

7.3 Social Management Plan

342. The project is creating social impacts to the following stakeholders: 1) Commuters, 2) Settlements along the corridor, 3) Displaced public transport operators. A Social Impact Management Measures and Activities have been presented and disclosed to the key stakeholders to address the social impacts / risks that may result from the project (**Refer to Table 7.3-1**).

343. The management measures to address these impacts to PUV operators and jeepney drivers can be summarized into five (5) options, as follows: Option 1) Remain on their route, despite the impact of the BRT, and hope that a sufficient number of other Operators will withdraw to make the route viable for those who remain; Option 2: Remain on their route, which has been restructured and will remain strong; Option 3: Operate on newly opened routes; Option 4: Cancel their PUJ franchise and apply for open franchises of other transport services such as trucks-for-hire or school service; Option 5: Transform their investment to participate in BRT operations. For drivers who will not be accommodated in the options above, they will be provided opportunites to work for the BRT system or be retrained for other productive skills.

344. There are no significant environmental impacts that may be generated by the management measures listed herein other than which are addressed in the Environmental Management Plan (EMP). The impacts that may result from the proposed livelihood options are expected to be minimal due to the small scale and nature of the existing livelihoods and businesses that could be affected by the project.

7.4 Resettlement Policy Framework

345. A Resettlement Policy Framework (RPF) which accompanies this EIA, was prepared to guide the revision, approval, disclosure and implementation of a final Resettlement Action Plan (RAP) for the Cebu BRT project.If physical displacement is unavoidable, the EMP has identified and examined proposed resettlement sites and the submission of a detailed social development plan will be adopted to address the economic needs of the displaced people.

346. Taken from the RPF, an Eligibility and Entitlement matrix for the project is presented in Table 7.4-1. Eligibility refers to the qualification of persons to receive entitlements from the project. Eligibility is a function of the (i) type of tenure or rights that displaced persons have on the land and structure and (ii) the cut-off date set by the project. On the other hand, entitlements refer to the package of compensation for losses of physical assets, income, resettlement, and livelihood restoration measures to, at least restore standards of living to pre-project levels. There are four (4) types of entitlements: (a) compensation for affected physical assets; (b) transitory allowances; (c) transfer assistance and relocation sites; (d) compensation and livelihood restoration measures for income loss and temporary or permanent loss of sources of livelihood.

347. An initial RAP was prepared based on the preliminary design submitted by the FS consultants. The approval and disclosure were made with the understanding that the specifics of the RAP may change when the project boundaries and locations are defined with finality during detailed engineering design.The RAP made an assessment of the real estate properties, assets, and economic activities of potential Project Affected Persons (PAPs). A desk review and a cursory survey of the various structures along the BRT corridor was conducted, identifying commercial/ industrial buildings, residences, schools, churches and government offices.

348. The scope of the RAP covers a) Owners and occupants of structures; b) Owners but non-occupants of structures; c) Non-owners but occupants of structures (either as renters, care-takers or informal settlers); and, d) Encroachers. Its objectives among others are to identify and quantity the quality and basis of resources needed in the resettlement of displaced persons including the cost of asset and income restoration and where impacts are unavoidable, appropriate measures to mitigate such impacts must be considered and implemented in parallel.

349. The RAP identified no cluster of shanties along the BRT route. The CCG through the Division for the Welfare of Urban Poor (DWUP) has a proposed resettlement site area which is a government housing project in Barangay Sinsin of about 2 hectares in land area.

7.5 Environmental Monitoring

7.5.1 Compliance Monitoring

350. **Table 7.2-1**also shows the program for monitoring the compliance on various provisions of the EMP during pre-construction, construction and operation phases. BRT-PIU would implement a number of measures during detailed design phase (e.g., incorporation of environmental design measures into the detailed design, preparation of draft method statements/SEMPs, etc.). During construction, monitoring works are implemented by the contractors and their environmental performance, in terms of implementation of such works, is monitored by BRT-PIU. The timing or frequency of monitoring is also specified in **Table 7.2-1**. During operation, EMP implementationis the responsibility of the BRT Operator.

7.5.1.1 Design Stage

351. National BRT-PMO and BRT-PIU ensure that EMP measures are incorporated in the detailed design. The bidding documents for the Contractor and BRT Operator include the EMP provisions. The effective incorporation of the EMP in the civil works contracts arealso ensured by National BRT-PMO and BRT-PIU with assistance from TSC and this, along with implementation of EMP provisions, is audited by WB as part of the loan conditions.

7.5.1.2 Pre-construction Stage

352. Implementation of construction of the Project needs to comply with environmental requirements and clearance that has been obtained from DENR for the whole Project at a divisional level for any statutory environmental assessment or an indication that no further assessment is required. National BRT-PMO and BRT-PIU need to confirm that Contractor(s) and their suppliers have complied with all statutory requirements for permits from DENR and provincial authorities. National BRT-PMO and BRT-PIU also check that Contractor(s) have all the necessary valid licenses and permits for use of powered mechanical equipment if necessary and the use of local water supplies (and to construct or operate plant such as for cement batching or asphalt/bitumen (if required) in line with all environmental regulations and environmental clearance certification conditions from division al authorities.

Table 7.2-1
Environmental Mitigation and Environmental Performance Monitoring Plan for Cebu BRT Project

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
DESIGN & PRE-CONSTRUCTION										
1. Design update and project disclosure	Incorporate design measures in the project design to minimize environmental impacts. Compliance with statutory environmental assessment process. Establishment of Grievance Redress Mechanism (GRM)	1. Secure the services of the Design and Supervision Consultant to update designs to address design requirements. 2. Update EIA and EMP based on detailed design and submit to WB for review and approval. 3. Ensure EMPs are included in bidding and contract documents 4. Notify Project to DENR and identify and obtain environmental permits / certificates under statutory environmental assessment process. 5. Implement plan for Grievance Redress Mechanism as described in the EIA and inform local authorities 6. Based on the Project Environmental Guidelines, prepare detailed EMP with DED.		1 to 3: Start of detailed design. 4: Before start of civil works 5 & 6 (i to ix): During detailed design phase	All BRT route.	Cost included in BRT-PIU.	Environmental approval for the Project obtained from DENR Response from DENR on permits. Require in TSC contract. Check at DD. Complete check of items 1 to 6.	Completion detailed design/prior to start of site works. Once.	National BRT-PMO /BRT PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by Safeguard Specialists as part of Project Management
2. Project boundaries/ location	EMP can control impacts and	1. Design BRT and road upgrading works within ROW, to avoid schools,	TSC	Detailed design	Entire BRT route	Included in TSC cost.	Require in TSC contract. check at DD	Once, during detailed design.	National BRT-PMO /BRT-	Cost met by Safeguard

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
change	compliance required for environmental laws.	mosques, cemeteries and other sensitive receptors (SR). 2. Make the detail design of alignment to minimize loss of trees and other vegetation. 4. Detailed designs to provide for enhancement (e.g., landscaping, tree replanting) where practicable. 5. Make plans for tree replacement in coordination with local DENR-Forest Management Bureau. 6. Update the EMP should there be additional environmental impacts identified during detailed design and for which appropriate mitigation measures have not been included in the EMP. Submit updated EMP to WB for review before start of civil works. 7. Prepare a new or supplementary environmental assessment report in compliance with the WB's WB Environmental Policy 4.01 if there are any additional					Complete check of items 1 to 7 on detailed design.		PIU/Safeguard Specialists/DENR/CCENRO/WB	Specialists as part of Project Management

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		components or modifications in the Project such as change in specific location/alignment, among others, that will result to adverse environmental impacts and are not within the scope of the environmental assessment report prepared during loan processing. Submit the report to WB for review before start of related civil works.								
3. Environmental capacity development	Develop environmental management capacity of and BRT-PIU to ensure proper EMP implementation and promote environmental awareness among workers.	1. BRT-PIU to commit and retain dedicated staff safeguard specialist for project duration to oversee EMP implementation 2. TSC to train BRT-PIU to build their capacity on EMP implementation, monitoring and reporting using workshops and on-the-job training techniques and case studies. 3. Conduct workers' orientation on EMP provisions. Such orientation is periodically conducted by the TSC as every new contractor is engaged.	1: BRT-PIU/ESO 2&3: TSC	Initiate during detailed design phase and continue throughout project construction	Throughout CEBU	Cost included in safeguard specialists and TSC cost	Require in TSC contract. Check at DD. Complete training and check before and during construction.	Prior to start of site works and throughout construction phase.	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by Safeguard Specialists as part of Project Management
4a.Traffic Management	Minimize traffic disruption and	1. Contact all relevant local authorities and local district	TSC	Detailed design phase	Throughout all CEBU	Cost included in	Require in TSC contract.	Once, detailed	National BRT-PMO	Cost met by

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
Guidelines	congestion.	groups and conduct traffic impact assessments to plan traffic management and conduct traffic assessment if necessary. 2 To minimize disturbance of vehicular traffic and pedestrians during construction, access arrangements for vehicles accessing the Project area are formulated such that this will avoid community disturbance and severance and will at least retain a passing lane along all roads used during construction. The design includes consideration of the following i) Lane availability and minimizing interference with traffic flows past the works site. ii) Establishment of acceptable working hours and constraints. iii) Agreement on time scale and establishment of traffic flow/delay requirements. iv) Programming issues including the time of year and available resources. v) Discussion of the TSC/		(before bidding)		design fees.	Check at DD Complete check of items 1 to 2	design phase	/BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Safeguard Specialists as part of Project Management

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		BRT-PIU inspection/monitoring role. vi)Establishment of complaints management system for duration of the works vii) Agreement on publicity/public consultation requirements (advance signing etc.).								
4b. Guidelines on reprovisioning disrupted utilities	Minimize interruption to power, water supply and telecommunications systems	1. Identify all power, water supply, telecommunications systems likely to be interrupted by the works. 2. Contact all relevant local authorities for utilities and local district groups to design reprovisioning of power, gas and water supply and telecommunications. 3. Minimize interruption to power, gas and water supply and telecoms.	BRT-PIU	Detailed design phase (before bidding)	Throughout all CEBU	Cost included in design fees.	Require in TSC contract. Check at DD Complete check of items 1 to 3	Once, detailed design phase	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by Safeguard Specialists as part of Project Management
4c. Guidelines on Waste and Spoil Disposal	Minimize waste; avoid fly-tipping and pollution.	1. Re-use of waste materials & spoil disposal locations included in bid and contract documents. 2. The guidelines cover handling, storage, treatment, transport and disposal of solid and liquid wastes, hazardous materials, hazardous	TSC	Detailed design phase (before bidding)	Throughout all CEBU	Cost included in design fees.	Require in TSC contract. Check at DD Complete check of items 1 to 5	Once, detailed design phase	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by Safeguard Specialists as part of Project Management

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		wastes and excavation spoils. 3. The guidelines include consideration of all matters related to solid and liquid waste disposal including the following: i) Expected types of waste and quantities of waste arising. ii)Waste reduction, reuse and recycling methods to be employed iii) Agreed reuse and recycling options and locations for disposal / endorsement from DENR and local groups. iv) Methods for treatment and disposal of all solid and liquid wastes. v) Methods of transportation to minimize interference with normal traffic. vi) Establishment of regular disposal schedule and constraints for hazardous waste. vii) Program for disposal of general waste / chain of custody for hazardous waste. viii) Discussion of the BRT-								

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		PIU inspection/monitoring role. ix)Establishment of complaints management system for duration of the works x) Agreement on publicity/public consultation requirements (advance signing etc.). 4. The Waste Management and Spoil Disposal guidelines include section on Hazardous Materials and Waste section. This details the mitigation measures, organizational arrangements, resources, facilities, etc. to avoid environmental as well as health and safety impacts due to use and disposal of hazardous materials/substances. 5. The Spoil Disposal section of the Waste Management and Spoil Disposal guideline include consideration of the following: i) Locations and quantities of spoil arising from the construction works. ii) Agreed locations for								

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		disposal / endorsement from DENR and local groups. iii) Methods of transportation to minimize interference with normal traffic. iv) Establishment of acceptable working hours and constraints. v) Agreement on time scale and program for disposal and chain of custody. vi) Programming issues including the time of year and available resources. vii) Discussion of the BRT-PIU/TSC inspection/monitoring role. viii)Establishment of complaints management system for duration of the works ix) Agreement on publicity/public consultation requirements (advance signing etc.).								
4d. Guidelines on construction materials management	Avoid stockpiling of rock based materials and runoff.	1. Designs to balance cut and fill where possible. 2. The guidelines detail the arrangements to be made to facilitate the timely production and supply of construction materials to	TSC	Detailed design phase (before bidding)	Throughout all CEBU	Cost included in design fees.	Require in TSC contract. Check at DD Complete check of items 1 to 3	Once, detailed design phase	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCEN	Cost met by Safeguard Specialists as part of Project Manageme

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		avoid impacts due to unnecessary stockpiling outside the Project site. As a minimum, the plan shall consider the following: (i) Required materials, potential sources and estimated quantities available, (ii) Impacts to identified sources and availability, (iii) Excavated slope material for reuse and recycling methods to be employed, (iv) Endorsement from DENR and local groups for use of sources. (v) Methods of transportation to minimize interference with normal traffic. (vi) Constraints of regular delivery schedule to reduce stockpiling on site. (vii) Program for reuse of slope excavated material for reuse (viii) Program for delivery of quarry and borrow materials. (ix) Discussion of the BRT-PIU/TSC inspection/monitoring role. (x) Agreement on							RO/WB	nt

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		publicity/public consultation requirements. 3. Prepare a draft mass haul chart for the aggregate and asphalt materials needed for the construction works.								
4e Guidelines on Drainage and Hydrological Impact Management	To minimize hydrological impacts flooding and runoff of river banks.	1. Designs for bridges and culverts sufficient to control flooding with appropriate drainage structures to cater for worst case flow and rainfall from 100 year return storm and to dissipate energy of flow to reduce runoff. 2. Design embankment and drainage to address current flooding problems Ensure that rehabilitated road can not cause flooding of adjacent areas. 3. Designs for drainage to avoid disposal of outflow on steep slopes >30% and non-vegetated areas. Protect slopes below. 4. To ensure that construction works can not cause ponding/flooding within the Project site, construction camps, borrow/quarry areas, other areas used for project-	TSC	Detailed design phase (before bidding)	Throughout all CEBU	Cost included in design fees.	Require in TSC contract. Check at DD Complete check of items 1 to 4	Once, detailed design phase	National BRT-PMO /Safeguard Specialists/DENR/CCENRO	Cost met by Safeguard Specialists as part of Project Management

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		related activities and adjacent areas.								
4f Runoff Control and Flooding Guidelines	To minimize hydrological impacts, flooding damage to the works and runoff of river banks.	1. Incorporate runoff control and works stabilization measures in the engineering design such as side ditches and berms, rock lining and slope walls, where appropriate. 2. Cut areas of works designed not to undercut or destabilize adjacent trees. 3. Temporary drainage works are to be designed based on the historical flood data and flood forecasting. 4. Ensure design includes prevention of flooding in adjacent areas during or construction of bridges. 5. Incorporate in the design side drainage structures to divert the stream water at construction sites. 6. Design incorporates sufficient sizes of drains to take design flows. 7. The guidlines detail the arrangements/ provisions to ensure that construction works can not cause excessive runoff and	TSC	Detailed design phase (before bidding)	Throughout all CEBU	Cost included in design fees.	Require in TSC contract. Check at DD Complete check of implementation of items 1 to 7	Once, detailed design phase	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by Safeguard Specialists as part of Project Management

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		siltation of waterways adjacent to the Project site, have sufficient provisions to ensure stabilization of cut areas of the works and other runoff-prone areas, minimize hydrological impacts, flooding and runoff of river banks and adjacent areas and to protect the works under construction. The guidelines consider the following: i) Climate and rainfall for the area and checking weather forecasts. ii) Terrain and typical locations susceptible to runoff and runoff. iii) Protection of the works and potential impacts to the environment. iv) Runoff control methods to be employed, locations and installation timing. v) Limits to stockpiling on sites near waterways. vi) Discussion of the TSC/ BRT-PIU inspection/monitoring role. vii) Agreement on publicity/public consultation requirements.								

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
4g. Tree cutting guidelines	Minimize tree cutting	1. Contact Commissioner for Forests office and all relevant local authorities, and local district groups to design tree cutting and replanting. 2. To avoid indiscriminate tree-cutting. The plan clearly defines areas where tree removal is necessary based on Project requirements and have provisions for replanting to compensate for lost trees. The guidelines prohibits introduction of invasive species and specifies that new alien plant species (i.e., species not currently established in the City) are used unless carried out within the existing regulatory framework for such introduction.	TSC	Detailed design phase (before bidding)	Throughout all CEBU	Cost included in design fees.	Require in TSC contract. Check at DD Complete check of items 1 to 2	Once, detailed design phase	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing
4h. Noise and dust management guidelines	Minimize noise and dust	1. Reconfirm all noise and dust sensitive receivers likely to be affected by construction works. 2. Contact local district groups to design mitigation in advance. 3. To minimize impacts to sensitive receptors (residential areas, schools,	TSC	Detailed design phase (before bidding)	Throughout all CEBU	Cost included in design fees.	Require in TSC contract. Check at DD Complete check of contractor's implementation of items 1 to 3	Once, detailed design phase	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		temples, hospitals, etc.) due to construction works, sourcing and transport of construction materials, and other project-related activities..								
4i. Workers and public safety guidelines	Avoid accidents due to construction works	To identify interfaces between the works and the public, formulate measures to ensure safety of workers and the public, and prevent accidents due to the construction works.	TSC	Detailed design phase (before bidding)	Throughout all CEBU	Cost included in design fees.	Require in TSC contract. Complete check at DD	Once, detailed design phase	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing
5. Environmentally responsible procurement guidelines	EMP provisions are properly implemented by selected contractor.	1. Guidelines are included in bidding and contract documents to ensure that mitigation measures are budgeted and to prepare the contractor for environmental responsibilities. 2. Specify in bid document that Contractor engages capable and trained staff or site agent(s) to take responsibility for the environmental management and safety issues at the working level and to monitor the effectiveness and review mitigation measures as the project proceeds.	1 & 2: TSC for BRT-PIU 3: Preparation of SEMPs – Contractor, Approval of SEMPs-TSC 4: Contractor	1 & 2: Bid preparation 3 & 4: Before start of civil works	Throughout all CEBU	Included in bid cost	1 & 2: Inclusion in bid docs 3 & 4: Check compliance	Bid preparation stage. Before start of site works	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		3. Contractors submit updated specific environmental management plans or SEMPs for approval by PIU (i.e., management plans such as Runoff Control Guidelines, Noise and Dust Control Guidelines, etc.). 4. Contractors recruit qualified staff to oversee implementation of environmental and safety measures specified in the EMP.								
6. Coordinating Utilities & Tele-communication reprovisioning guidelines	Utilities & telecoms remain in service during construction Only minor / unavoidable interruptions to utilities & telecoms.	1. Set up Coordinating Committee early in the detailed design stage. 2. Identify all potential hindrances to construction in the field 3. Identification of foreseeable constraints and identify lead time 4. Establish preparedness of the utilities to facilitate reprovisioning. 5. Facilitate Utilities and Telecoms Reprovisioning guidelines 6. Include the guidelines (as part of the EMP) in the bidding documents 7. Coordinating committee	1 to 10: BRT-PIU 11 & 12: TSC 11: Contractor	1 to 10: During detailed design and bid preparation 11& 12 Before start of civil works and periodically during construction.	Throughout all CEBU.	Included in SPO and TSC costs	1 to 10: Inclusion of Guidelines in EMP in bid docs 11 & 12 Security of utilities and telecoms connections	Bid preparation stage. Before start of and throughout site works	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		Chairmanship of DOTC/SPO with / BRT-PIU as secretary 8. Monthly meetings for first six months of design. 9. Membership Implementing agency, all utilities, police and local authorities as necessary. As the Project 10. Additional coordinating committee meetings in construction phase if problems occur. 11. Contractors inducted construction gears up through awareness workshops conducted periodically by the PIU 12. PIU shares experience in the implementation of the works in case unexpected difficulties occur.								
7. Ambient air, water and sediment quality and noise monitoring guidelines	Establish baseline air water and sediment quality and noise levels to help in assessing project impacts during implementation	1. Collect baseline data on air quality at three locations along the alignment in the calendar month before the construction commences. 2. Collect baseline data on noise at six locations along the alignment in the calendar month before the construction commences. 3. Collect baseline water	1 to 3: TSC 4. TSC notifies DENR	To be completed no later than the calendar month before the construction commences.	1. Four (4) throughout all CEBU. 2. Four (4) throughout all CEBU. 3&4. Two (2) locations 50m up and downstream of the rivers	Included in TSC costs	1. Total suspended particulates (TSP) 2. Noise levels Leq15mins dB(A) 3. pH, temperature, turbidity,	To be completed no later than the calendar month before the construction commences.	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		quality at the sections where the rivers of Bulacao, Guadalupe and Subangdaku cross the BRT Alignment before the construction commences. 4. Collect baseline data on sediment quality at the sections where the rivers of Bulacao, Guadalupe and Subangdaku Rivers cross the BRT Alignment during the early stages of detailed design to establish toxicity of sediments to facilitate discussions with DENR on identification of suitable site for disposal. To be completed no later than the calendar month before the construction commences.			and BRTAlignment intersections.		dissolved oxygen (DO), oil and grease, and total suspended solids (TSS) 4. As 3. plus heavy metals Cd, Cu, Hg, Pb			
CONSTRUCTION STAGE										
1. Activate management plans and obtain permits / licenses.	Avoid impacts from unplanned activities.	1. Update and activate management plans/SEMPs for waste and spoil disposal, materials management, drainage, runoff control, tree-cutting and replanting, traffic and utilities and reprovisioning, noise and dust control and workers and public safety. The SEMPs can not be in	1: Contractor to prepare updated SEMPs, TSC to assist and approve 2: Contractor	1. One month before start of site works 2. Before start of site works.	Project site	Cost included in contractors fees	1. Complete check and approve before construction. 2. Complete check of all necessary environmental approvals/permits.	Before start of site works.	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		conflict with any provisions of the EMP. 2. Contractor(s) and their suppliers comply with all statutory requirements for permits from DENR with regard to use of mechanical equipment, establishment and operation of construction plants such as concrete batching plant, rock crusher, spoils disposal, etc.								
2. Orientation for Contractor, Workers on environmental and social management guidelines.	Contractor & workers trained to implement mitigation measures and better implementation of EMP.	1. Contractors clearly separate resources applied to mitigation measures. Tenders identify named staff to supervise management's plans. 2. TSC conducts training/ orientation involving construction workers and BRT-PIU with regard to implementation of mitigation measures in the updated management guidelines/SEMPs, Project EMP (i.e., those specified in the EIA) and any additional measures identified during detailed design phase. 3. Implement dengue controls and HIV-AIDS education and prevention	1: Contractor 2: TSC 3: Contractor	1: Before start of site works 2: Within one month of start of site works 3. Upon deployment of workers to project site	Project site	Cost included in contracts for TSC and Contractor	Complete check of implementation of items 1 to 3	1: Before start of site works 2: Within one month of start of construction 3: Monthly during construction.	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		program in line with social plans.								
3. Loss of Trees	Minimize impacts to flora and fauna	1. Monitoring and marking of vegetation that will not be removed agreed with forest authority prior to commencement of construction. 3. Forest authority to approve replacement of cut trees to be undertaken based on the tree cutting and replanting guidelines. 4. Clearing of trees minimized. 5. Prohibit cutting of trees for firewood and for use in Project. 6. During replanting works, new alien plant species (i.e., species not currently established in the City) are not used unless carried out with the existing regulatory framework for such introduction. Invasive species shall not be introduced into new environments. 7. As much as possible, bridge works are scheduled in dry season to minimize adverse impacts to river water quality and other	1: Contractor to prepare updated TRP, TSC to approve 2: Contractor, District Forestry Office (DFO), TSC 3: DFO/local forestry office 4 to 11: Contractor	1: One month before start of site works 2 to 3: Before tree-cutting is implemented 4 to 12: Throughout construction phase	CEBU route.	Cost included in contracts	Check implementation of items 1-12 and TRP provisions	1 to 3: Prior to and during construction (monthly) 4 to 12: Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		aquatic resources. 8. The contractor prohibits the use of wood as a fuel for the execution of any part of the Works, including but not limited to the heating of bitumen and bitumen mixtures, and to the extent practicable shall ensure that fuels other than wood are used for cooking, and water heating in all his camps and living accommodations 10. Contractor bans buying or using wood from the illegal sources. 11. Contractor takes all precautions necessary to ensure that damage to vegetation is avoided due to fires resulting from execution of the works. The Contractor immediately suppresses the fire, if it occurs, and undertakes replanting to replace damaged vegetation.								
4. Drainage and Hydrological Impacts	To minimize hydrological impacts flooding and runoff of river banks.	1. Review detailed designs for cross-drainage and side-drainage structures, assess and agree with BRT-PIU if redesign is required or if new structures	1: Contractor 2: Contractor to update DMP, TSC to assist and approve.	1 & 2: One month before start of site works 3 to 8: Throughout	Throughout project site, particularly at bridges, causeways, and all areas	Cost included in design	Check implementation of items 1-8 and DMP provisions	1 & 2: Before start of site works 3 to 7: Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/D	Cost met by SPO/ESO project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		are constructed or existing ones are repaired. 2. Updated guidelines to be approved in writing by TSC one month prior to starting works. Contractor to implement provisions of DMP. 3. Implement agreed designs for bridges and culverts sufficient to control flooding as designed and to dissipate energy of flow to reduce runoff. 4 Protect lead off streams that may become silted by construction runoff, workshops or equipment washing-yards. 5. Minimize alterations in the project corridor's surface drainage patterns as much as possible: 6. Drains to be constructed so that the outfalls of the surface run-off from the carriageway are diverted away from the SRs. 7 Ensure that storm drains and highway drainage systems are periodically cleared to maintain storm water flow during construction.	3 to 7: Contractor	construction phase	considered prone to flooding.			Implementation of DMP provisions: Monthly	ENR/CCENRO/WB	

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
5. Utilities	Prevent interruption of services such as electricity and water during relocation of the utilities line /connections. Repair damaged access roads.	1. Contractor to implement guideline provisions. 2. Reconfirm power, water supply and telecommunications systems likely to be interrupted by the works. 3. Contact all relevant local authorities for utilities and local village groups to plan reprovisioning of power, water supply and telecommunications systems. 4. Utilities shall be relocated and reconnected well ahead of commencement of construction works and contractor shall coordinate with utility company for relocation and reconnection well before works commence. 5. Affected communities shall be properly informed in advance. 6. Reconnection of utilities shall be completed at the shortest practicable time before construction commences. 7. Utilities damaged during construction shall be	1: Contractor, BRT-PIU and TSC to assist and approve 2 to 8: Contractor	1: One month before start of site works 2 to 6: Before start of construction 7 & 8: During construction	Throughout project site	Cost included in contracts	Check implementation of items 1-8 and UIRP provisions	1 to 6: Before construction 7 & 8: Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by and SPO/ESO project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		reported to the TSC and utility authority and repairs arranged immediately. 8. Access roads damaged during transport of construction materials and other project-related activities shall be reinstated upon completion of construction works at each section								
6. Materials exploitation and management of quarry and borrow areas	Minimize impacts from materials extraction, transportation and storage.	1. Updated guyidelines to be approved in writing by TSC one month prior to starting works. Contractor to agree & implement guidelines provisions. 2. Balance cut and fill requirements to minimization impacts from extraction of aggregates. 3. Prioritize use of existing quarry sites with suitable materials and update the list of quarries and borrow pits monthly and report to BRT-PIU and minimize impacts on other local resources. 4. Prócure materials only from DENR authorized quarries and borrow sites. 5. If the contractor shall operate the quarry site,	1: Contractor to update the guidelines, TSC to approve 2 to 17: Contractor	1: One month before start of site works, the guidelines to be updated regularly (monthly or as required by TSC) 2 to 13: Throughout construction 14 to 17: Upon completion of materials extraction	Project site, quarry and borrow sites	Cost included in contract	Check implementation of items 1-17 and guidelines provisions	1: Before construction 2 & 17: Monthly Implementation of guidelines provisions: Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		required environmental permits shall be secured prior to operation of quarry/borrow areas. 6. Use quarry with highest ratio between extractive capacity (both in terms of quality) and loss of natural state; 7. Use quarry sites lying close to the alignment, with a high level of accessibility; 8. Do not use quarries in areas of natural woodland or near rivers which provide food and shelters for birds and other animals. 9. Borrow/quarry sites shall not be located in productive land and forested areas. 10. During quarry/borrow site operation, provide adequate drainage to avoid accumulation of stagnant water. 11. It is preferable to avoid or reduce the sections of quarry sites located on river bed. If it is not possible to locate quarries out of river beds, quarry sites lying on small rivers and streams shall be avoided. Alluvial terraces or alluvial								

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		deposits which lie on the river beds but not covered by water in normal hydrological conditions, are preferred; 12. Ensure borrow pits are left in a tidy state with stable side slopes and proper drainage in order to avoid creation of water bodies favorable for mosquito breeding 13. Upon completion of extraction activities, quarry and borrow pits shall be dewatered and fences shall be installed, as appropriate, to minimize health and safety risks. 14. To avoid drowning when pits become water-filled, measures such as fencing, providing flotation devices such as a life buoy tied to a rope, etc. shall be implemented.								
7. Spoil Disposal	Control spoil and construction waste disposal, oily and hazardous wastes.	1.The updated guidelines shall cover all aspects of spoil removal, storage, disposal and monitoring, Updated guidelines to be approved in writing by TSC one month prior to starting works. Contractor to	1: Contractor to update the Guidelines, TSC to assist and approve 2 to 11: Contractor	1: One month before start of site works 2 to 12: Throughout construction phase	Project site and spoils disposal sites	Cost included in contracts	Check implementation of items 1-11 and Guidelines provisions Spoils disposal will	1: Before construction 2 & 11: Monthly Implementation of Guidelines	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by and SPO/ESO project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		implement the guideline provisions. 2. Areas for disposal to be agreed with land owner and DENR checked and recorded by the TSC/BRT-PIU and monitored 3. Spoil disposal areas to be rehabilitated monitored, catalogued, and marked. 4. Spoil will not be disposed of in rivers and streams or other natural drainage path. 5. Spoil will not be disposed of on fragile slopes, flood ways, wetland, farmland, forest, religious or other culturally sensitive areas or areas where a livelihood is derived. 6. Surplus spoil will be used where practicable for local repair works to fill eroded gullies and depression areas and degraded land in consultation with local community. 7. Spoils shall only be disposed to areas approved by local authority. 8. Spoil will be disposed of to the disused quarries and abandoned borrow pits where practicable.					be monitored by TSC/ BRT-PIU/ and recorded using a written chain of custody (trip-ticket) system to the designated disposal sites.	provisions: Monthly		

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		9. Disposed spoil will be spread in 15cm layers and compacted to optimum moisture content, covered with topsoil, landscaped and provided with drainage and vegetation to prevent runoff in line with best practice. 10. Spoil disposal shall not cause sedimentation and obstruction of flow of watercourses, damage to agricultural land and densely vegetated areas. 11. Under no circumstances will spoils be dumped into watercourses (rivers, streams, drainage, etc.) 12. The spoils disposal site shall be located at least 50 m from surface water courses and shall be protected from runoff by avoiding formation of steep slopes and grassing.								
8. General Construction Waste Disposal	Reduce, reuse and recycle waste and contamination due to poor waste disposal practices.	1. The guidelines to cover all aspects of waste storage, disposal and accidental spills to be approved in writing by BRT-PIU one month prior to starting works. Contractor	1: Contractor to update the Guidelines, TSC to assist and approve 2 to 10: Contractor	1: One month before start of site works 2 to 10: Throughout construction	Project site and waste disposal areas	Cost included in contracts	Check implementation of items 1-10 and Guidelines provisions	1: Before construction 2 & 10: Monthly Implementation of	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCEN	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		to implement the guideline provisions. 2. Areas for disposal to be agreed with land owner and DENR checked; and recorded and monitored by the BRT-PIU. 3. Waste disposal areas approved by local authorities shall be rehabilitated, monitored, catalogued, and marked. 4. Segregation of wastes shall be observed. Cleared foliage, shrubs and grasses can be given to local farmers for fodder and fuel. Organic (biodegradables) shall be collected and disposed of onsite by composting (no burning on site). 4. Recyclables shall be recovered and sold to recyclers. 5. Residual and hazardous wastes shall be disposed of in disposal sites approved by local authorities. 6. Construction/workers' camps shall be provided with garbage bins. 7. Burning of construction and domestic wastes shall		phase				Guidelines provisions: Monthly	RO/WB	

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		be prohibited. 8. Disposal of solid wastes into canals, rivers, other watercourses, agricultural field and public areas shall be prohibited. 9. There will be no site-specific landfills established by the contractors. All solid waste will be collected and removed from the work camps and disposed in local waste disposal sites. 10. Solid waste generated during construction and at campsites to be treated and safely disposed only in demarcated off-site waste disposal sites identified and agreed with TSC/ BRT-PIU, local community and local authorities.								
9. Use of hazardous substances and hazardous waste disposal	Minimize contamination due to use and storage of hazardous substances	1. Updated guidelines to be approved in writing by TSC one month prior to starting works. Contractor to implement Guidelines provisions. 2. Ensure that safe storage of fuel; other hazardous substances and bulk materials are agreed by BRT-PIU and have necessary approval/permit	1: Contractor to update the guidelines, TSC to approve 2 to 16: Contractor	1: One month before start of site works 2 to 17: Throughout construction phase	Throughout Project site, storage areas, equipment and vehicle maintenance and refueling areas	Cost included in contracts	Check implementation of items 1-16 and Guidelines provisions	1: Before construction 2 & 16: Monthly Implementation of Guidelines provisions: Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		from DENR and local authorities. 3. Hydrocarbon, toxic material and explosives will be stored in adequately protected sites consistent with national and local regulations to prevent soil and water contamination. 4. Equipment/vehicle maintenance and refueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas shall be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency. 5. Fuel and other hazardous substances shall be stored in areas provided with roof, impervious flooring and bund/containment wall to protect these from the elements and to readily contain spilled fuel/lubricant. 6. Segregate hazardous wastes (oily wastes, used batteries, fuel drums) and								

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		ensure that storage, transport and disposal shall not cause pollution and shall be undertaken consistent with national and local regulations. 7. Ensure all storage containers are in good condition with proper labeling. 8. Regularly check containers for leakage and undertake necessary repair or replacement. 9. Store hazardous materials above flood level. 10. Discharge of oil contaminated water shall be prohibited. 11. Used oil and other toxic and hazardous materials shall be disposed of in an authorized facility off-site. 12. Adequate precautions will be taken to prevent oil/lubricant/ hydrocarbon contamination of channel beds. 13. Ensure availability of spill cleanup materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous								

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		substances where such materials are being stored. 14. Spillage, if any, will be immediately cleared with utmost caution to leave no traces. 15. Spillage waste will be disposed at disposal sites approved by local authorities and approved by TSC. 16. All areas intended for storage of hazardous materials will be quarantined and provided with adequate facilities to combat emergency situations complying with all the applicable statutory stipulation. 17. The Contractor shall identify named personnel in the management plan/SEMP in-charge of these sites and ensure they are properly trained to control access to these areas and entry will be allowed only under authorization.								
10. Asphalt plant rock crushers, bitumen	Avoid air pollution, nuisances, trafic obstacles	1. Locate asphalt plant, rock crushers and bitumen supply off road and (wherever practicable) at	Contractor	1: During selection of locations for asphalt	Throughout all CEBU.	Cost included in contracts	Check implementation of items 1-9	1: Before establishment of facilities 2 & 9:	National BRT-PMO /BRT-PIU/Safegua	Cost met by SPO/ESO project

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
usage and soil contaminati on	and contamination	least 500m from nearest sensitive receivers (residential areas, schools, hospital, etc.) and rivers and install and maintain dust suppression equipment. 2. Bitumen should not be used as fuel. Fuel wood not for bitumen heating. Bitumen drums stored in dedicated area not scattered along CEBU road. 3. Bitumen will not be allowed to enter either running or dry streambeds and nor will be disposed of in ditches or small waste disposal sites prepared by the contractor. 4. Bitumen storage and mixing areas shall be protected against spills and all contaminated soil must be properly handled according to applicable national and local laws and regulation. As a minimum, these areas must be contained, such that any spills can be immediately contained and cleaned up. Any petroleum products		plant, rock crusher, bitumen storage 2 to 9: Throughout construction phase				Monthly	rd Specialists/D ENR/CCEN RO/WB	staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		used in the preparation of the bitumen mixture must also be carefully managed to avoid spills and contamination of the local water table. 5. Fuel wood shall not be used for heating bitumen and bitumen shall be not used as fuel. 6. Bitumen drums shall be stored in a dedicated area, not scattered along the works 7. All accidental spills of bitumen or chemicals should be cleaned up immediately with the top 2cm of any contaminated soil underneath and disposed of as chemical waste to a site approved by the local authority. 8. Prevent soil contamination requiring contractors to instruct and train their workforce on storage and handling of materials and chemicals that can potentially cause soil contamination. 9. Recycle debris generated by dismantling of existing pavement subject								

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		to the suitability of the material.								
11. Noise and dust nuisances	To minimize air impacts effectively and avoid complaints due to the airborne dust.	1. The guidelines include requirements for controlling noise and dusty materials at source. Updated guidelines to be approved in writing by BRT-PIU one month prior to starting works. Contractor to implement guideline provisions. 2. Restrict works to daylight hours within 500m of residential settlements and hospitals. 3. Powered mechanical equipment and vehicle emissions to meet national TCVN standards. All construction equipment and vehicles shall have valid certifications indicating compliance to vehicle emission standards. 4. Construction equipment and vehicles will be maintained to a good standard and shall be provided with muffler silencers. Machinery causing excessive pollution will be banned from	1: Contractor to update NDCP, TSC to approve 2 to 16: Contractor	1: One month before start of site works 2 to 16: Throughout construction phase	Throughout all CEBU	Cost included in contracts	Check implementation of items 1-16 and NDCP provisions	1: Before construction 2 & 16: Monthly and spot checks Implementation of NDCP provisions: Monthly and spot checks	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESO project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		construction sites. 5. Monitor and investigate complaints; propose alternative mitigation measures. 6. Keep stockpiles moist 7. Tightly cover trucks transporting construction materials (sand, soil, cement, gravel, etc.) to avoid or minimize spills and dust emission. 8. On rainless day undertake watering, at least twice per day, on dusty and exposed areas at construction yards, materials stockpile, construction sites, access roads, quarry areas, borrow sites and other project areas where residential sites and other sensitive receptors such as schools, hospital, etc. are located nearby. If works are within 15m of any sensitive receivers, the contractor shall install dust barrier between the works at the road edge and the sensitive receivers (e.g. 2.5 m high temporary walls, etc.) 9. Mixing and crushing								

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		plants operations will be equipped with dust suppression devices such as water sprays. 10. Clean up road surfaces after work. 11. Temporary noise barriers shall be used, as necessary, in sites where sensitive receptors are present, such as residential areas, schools, hospitals, temples, etc. 12. To protect buildings and structures from vibration, non-vibrating roller shall be used in construction sites near buildings and structures. 13. Structures which are damaged due to vibration caused by the Project shall be repaired . 14. Machinery shall be turned off when not in use. 15. Pile driving during to be schedule for day time if construction site is near sensitive receptors or approved by DENR, local authority . 16. Impose speed limits on construction vehicles to minimize dust emission								

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		along areas where sensitive receptors are located (houses, schools, hospitals, etc.).								
13. Runoff control / run-off	Protect established works.	1. To implement excavation stabilization measures specified in the detailed designs and maintained during construction to protect the works. Updated guidelines to be approved in writing by PIU one month prior to starting works. Contractor to implement provisions of the guidelines. 2. Establish permanent surfaces immediately after completion of works in each stretch / sector. 3. Check weather forecasts and minimize work in wet weather. 4. Include and implement appropriate measures for excavation protection, i.e. shoring up as required in the detailed construction drawings. 5. Prevent runoff and protect the excavations with temporary or permanent drainage as soon as practicable after cutting.	1: Contractor to update ECP, TSC to assist and approve 2 to 12: Contractor	1: One month before start of site works 2 to 12: Throughout construction phase	Throughout project site and all vulnerable slopes agreed with TSC.	Cost included in contracts	Check implementation of items 1-12 and ECP provisions	1: Before construction 2 & 12: Monthly Implementation of ECP provisions: Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESO project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		6. Payments will be linked to the completion of the works as indicated by the installation of runoff control measures to protect the works to the satisfaction of BRT-PIU.								
14.River protection and bridge construction	Protect rivers and maintain river flow	In sections along and near the intersections of BRT alignment and rivers of Bulacao, Guadalupe and Subangdaku: 1. Rocks and stones will be disposed not to block rivers and streams. 2. In bridge repair and demolition, the bridge structure will not be dropped into the river but alternative means will be used to avoid "dropping the bridge" into rivers/streams. This will be done by "sawing" appropriate sections of the bridge and using cranes to lift these sections away or alternatively by construction of a platform onto which the bridge could be lowered. 3. Cofferdams, silt fences, sediment barriers or other devices will be used as appropriate based on the	Contractor	At all times	All rivers and streams with repair and reconstruction works.	Cost included in contracts	Check implementation of items 1-4	Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		design to prevent migration of silt during excavation and boring operations within streams. If cofferdams are used, these will be dewatered and cleaned to prevent siltation by pumping from cofferdams to a settling basin or a containment unit. 4. Other runoff control measures above and covering open surfaces with grasses and creepers to reduce runoff will be implemented as early as possible in construction.								
15. Water quality	Prevent water quality impacts due to negligence and ensure unavoidable impacts managed effectively.	1. Store lubricants, fuels in dedicated enclosures >50 m from water bodies. 2. Solid waste from construction activities and workers camps will not be thrown in rivers and other water courses (drainage, etc.) 3. Construction storage/stockpiles shall be provided with bunds to prevent silted run-off. 4. Stockpiled materials will be covered to reduce silted run-off. 5. No stockpiling or borrow	Contractor	Throughout construction phase	Throughout project site	Cost included in contracts	Check implementation of items 1-10	Monthly	TSC, SPO/ESO	Cost met by SPO/ESO project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		sites <100m of water body. 6. Work in rivers will be scheduled during dry season and work duration shall be as short as possible. 7. Construction storage/stockpiles shall be provided with bunds to prevent silted run-off. 8. Stockpile areas and storage areas for hazardous substances shall be located away from water bodies. 9. Washing of machinery and vehicles in surface waters shall be prohibited.								
16. Water resources	Mitigate the impact of using local community water resources.	1. Assess availability of water and evaluate impact on use of local water resources to ensure that water utilization for Project shall not deplete local village supplies. 2. Bring in project water by tanker as necessary. 3. Worker camps will be located as agreed with local community authority to prevent the unplanned consumption of community-owned water resources. 4. Maintain close liaison	Contractor	Throughout construction phase	Throughout project site, construction camps	Cost included in contracts	Check implementation of items 1-11	Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESO project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		with local communities to ensure that any potential conflicts related to common resource utilization for project purposes are resolved quickly. 5. Establish and implement guidelines to minimize the wastage of water during construction and at campsites. 6. Avoid or minimize use of river bed for construction materials. 7. Confine winning river materials to 20% of river width in any location and keep away from river banks. 8. Reinstate river banks if necessary, and 10. In case of accidental obstruction or damage, drainage ditches and ponds shall be cleaned or repaired immediately.								
17. Operation of workers camps and workshops / yards.	Worker facilities not to cause nuisance.	1. Worker camp location and facilities located and agreed with local communities and facilities approved by BRT-PIU and managed to minimize impacts. 2. Construction camps will	Contractor	1 & 2: During selection of locations for workers camps. 3 to 16: Throughout construction	Project site, construction camps	Cost included in contracts.	Check implementation of items 1-16	1 & 2: Once for each location, prior to establishment of facilities 3 to 16: Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		be established in areas with adequate natural drainage. 3. Hire and train as many local workers as possible. 4. Provide adequate housing for all workers at the construction camps and establish clean canteen/eating and cooking areas. 5. Portable lavatories (or at least pit latrines in remote areas) shall be installed and open defecation shall be prohibited and prevented by cleaning lavatories daily and by keeping lavatory facilities clean at all times. 6. Provide separate hygienic sanitation facilities/toilets and bathing areas with sufficient water supply for male and female workers. 7. Wastewater effluents from contractors' workshops and equipment washing-yards will be passed through gravel/sand beds and all oil/grease contaminants will be removed discharging it into natural streams. Oil and		phase						

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		grease residues shall be stored in drums awaiting disposal in line with the agreed Waste Management Plan and consistent with national and local regulations. 8. Predictable wastewater effluent discharges from construction works shall have the necessary permits from DENR and local authorities before the works commence. 9. Borrow pits and natural depressions with pre-laid impervious liners will be used to dispose of scarified/scraped asphalt, and then covered with soil. This will check potential groundwater contamination. 10. Options for completely or partially recycling scraped scarified materials will also be taken into account. 11. Camp site will be cleaned up to the satisfaction of and local community after use. 12. Solid and liquid waste will be managed in line with Waste Management Plan.								

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		13. All waste materials shall be removed and disposed to disposal sites approved by local authorities 14. Land used for campsites shall be restored to the original condition as far as practicable and the area if required tin the TCRP shall be planted with appropriate trees / shrubs as soon as practicable after it is vacated and cleaned.								
18. Sanitation and Diseases	Control of infectious diseases.	1. Standing water will not be allowed to accumulate in the temporary drainage facilities or along the roadside to prevent proliferation of mosquitoes. 2. Temporary and permanent drainage facilities will be designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water ponds. 3. Dengue control ((e.g., provision of insecticide treated mosquito nets to workers, installation of proper drainage to avoid formation of stagnant water, etc.) and HIV-AIDS	Contractor	Throughout construction.	Throughout project site, workers camps	Cost included in contracts.	Check implementation of items 1-4	Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESO project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		education will be implemented in line with social plans for the project. 4. HIV/AIDS awareness and prevention program shall be implemented in line with social plans under the Project								
19. Safety Precautions for the Workers	Ensure worker safety.	1. Updated guidelines to be approved in writing by BRT-PIU one month prior to starting works. Contractor to implement guidelines provisions. 2. Establish safety measures as required by law and by good engineering practice and provide first aid facilities that are readily accessible by workers. 3. Scheduling of regular (e.g., weekly tool box talks) to orient the workers on health and safety issues related to their activities as well as on proper use of PPE. 4. Fencing on all excavation, borrow pits and sides of temporary bridges 5. Workers shall be provided with appropriate personal protective	1: Contractor to update WPSP, TSC to assist and approve. 2 to 10: Contractor	1: One month before start of site works 2 to 10: Throughout construction phase	All construction sites	Cost included in contracts	Check implementation of items 1-10 and WPSP provisions Check compliance to Philippines Labor Act (2006).	1: Before construction 2 & 10: Monthly Implementation of WPSP provisions: Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESO project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		equipment (PPE) such as safety shoes, hard hats, safety glasses, ear plugs, gloves, etc. at no cost to the employee. 6. Where worker exposure to traffic cannot be completely eliminated, protective barriers shall be provided to shield workers from traffic vehicles. Another measure is to install channeling devices (e.g., traffic cones and barrels) to delineate the work zone. 7. Workers shall be provided with reliable supply of potable water. 8. Construction camps shall be provided with adequate drainage to avoid accumulation of stagnant water. 9. Construction camps shall be provided with toilets/sanitation facilities in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. These facilities shall be well maintained to allow								

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		effective operation. 10. Ensure reversing signals are installed on all construction vehicles.								
20. Public safety	Prevent accident with public in local community	1. Include in WPSP for barriers (e.g., temporary fence), shall be installed at construction areas to deter pedestrian access to the roadway except at designated crossing points. 2. The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and areas where heavy equipment is in operation and such sites have a watchman to keep public out. 3. Speed restrictions shall be imposed on Project vehicles and equipment when traveling within 50m of sensitive receptors (e.g. residential, schools, temples, etc.). 4. Upon completion of construction works, borrow areas will be backfilled (if suitable materials are available, e.g., excavation spoils) or fenced.	Contractor	At all times throughout construction phase	Locations identified and agreed by TSC	Cost included in contracts	Check implementation of items 1-4	Monthly	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing
21. Traffic	Minimize	1. Prior to start of site	1: Contractor	1: One	Entire BRT	Cost	Check	1: Before	National	Cost met

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
Conditions	disturbance of traffic and traffic congestion	works, update and implement Traffic Management Guidelines during detailed design phase. Updated guidelines to be approved in writing by TSC one month prior to starting works. Contractor to implement TTMP provisions. 2. Communicate to the public through local officials regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restrictions. 3. In coordination with local traffic authorities, implement appropriate traffic diversion schemes to avoid inconvenience due to project operations to road users, ensure smooth traffic flow and avoid or minimize accidents, traffic hold ups and congestion 4. In coordination with local traffic officials, schedule transport of materials to avoid congestion, set up clear traffic signal boards and traffic advisory signs at	to update TTMP, PIU to assist and approve 2 to 8: Contractor	month before start of site works 2 to 8: Throughout construction phase	route	included in contracts	implementation of items 1-8 and RRMP provisions	construction 2 & 8: Monthly Implementation of TTMP provisions: Monthly	BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		the roads going in and out the road and bridge construction sites to minimize traffic build-up. 5. Provide safe vehicle and pedestrian access around construction areas. 6. Install bold diversion signs that would be clearly visible even at night and provide flag persons to warn of dangerous conditions (24 hours, as necessary) 7. Provide sufficient lighting at night within and in the vicinity of construction sites. 8. Designate traffic officers in construction sites.								
22. Archaeological and cultural artifacts.	Preservation of chance finds of cultural and archaeological relics. identified during construction	1. Site agents instructed to keep a watching brief for relics 2. Should any potential items be located, the site TSC will immediately be contacted and work will be temporarily stopped in that area. 3. If the site supervisor determines that the item is of potential significance, an officer from the National Museum (NM) will be invited to inspect the site	Contractor	Throughout construction. Check and report on same day.	All areas.	Cost included in contracts.	Check implementation of items 1-4	Before construction and monthly check.	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to implement MM	Timing to implement MM	Locations implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		and work will be stopped. 4. Until NM has responded to this invitation work will not re-commence in this location until agreement has been reached between NM and DOR as to any required mitigation measures, which may include excavation.								
23 Enhancements	Provide environmental enhancement of the project	Contractor to reconfirm and implement enhancements (e.g., landscaping, tree replanting) identified at the detailed design stage.	Contractor	Throughout construction.	All areas.	Cost included in contracts.	Confirmed implementation of required enhancements	Before construction and monthly check.	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing
24 Disruption to access and business activity	Provide continued access to shops, residences, mosques, etc., during construction period.	Contractor to provide planks and d continued access during construction period. Night works to be considered in areas with high density commercial activity.	Contractor	Throughout construction.	All areas.	Cost included in contracts.	Confirmed implementation of required enhancements	Before construction and monthly check.	National BRT-PMO /BRT-PIU/Safeguard Specialists/DENR/CCENRO/WB	Cost met by SPO/ESSU project staffing
OPERATIONAL STAGE										
1. Road Safety	Minimize road accidents.	1. Undertake road safety awareness campaigns for local residents and other road users of BRT route. 2. Install and maintain road warning signs and	BRT Operator, local (district) traffic authority	During operation.	Throughout Entire BRT route. .	Included in operation and maintenance cost	Throughout operations and maintenance	Semi-annual	National BRT-PMO /BRT-PIU/BRT Operator/Safeguard	Cost met by for SPO/ESSU staffing

Environmental Concern	Objective	Impact mitigation					Performance and Impact monitoring			
		Proposed Mitigation Measures (MM)	Responsible to Implement MM	Timing to Implement MM	Locations Implement MM	Mitigation Cost	Parameter to monitor	Frequency & Verification	Responsible to Monitor	Monitoring Cost
		markings. 3. Monitor road accidents and implement necessary preventive measures (awareness campaigns, provision of appropriate road furniture to enhance road safety and control traffic).							Specialists/DENR/CCENRO/WB	
Compliance										
Compliance	AQ & N									
2. Tree survival	Ensure survival of planted trees.	Monitor survival of replanted trees, also transplanted / compensatory planting trees) and replant, as necessary.	BRT Operator and District Forestry Office (DFO)	During operation.	Throughout Entire BRT route. .	Included in operation and maintenance cost	First three years of operation	Semi-annual for 1st 3 years of operation	National BRT-PMO /BRT-PIU/BRT Operator/Safeguard Specialists/DENR/CCENRO/WB	Cost met by for SPO/ESSU staffing and CCOF staffing
3. Vendors	Ensure vendors impacted by project are given commercial space in stations or other locations	Ensure commercial licenses are fairly given and vendors previously selling goods at stations are included in station commercial spaces with preference for women.	BRT Operator	During operation	All stations	Included in operation and maintenance cost	First three years of operation	Semi-annual for 1st 3 years of operation	National BRT-PMO /BRT-PIU/BRT Operator/Safeguard Specialists/DENR/CCENRO/WB	Vendors

Table 7.3-1
Social Impact Management Measures and Activities

SOCIAL RISK/IMPACTS	TARGET POPULATION	MANAGEMENT MEASURES	IMPLEMENTING AGENCY/ ORGANIZATION	SOURCE OF FUND
PRE-CONSTRUCTION PHASE				
Accessibility and proximity	Elderly PWDs Women Children Other commuters	Meaningful and active participation in the planning and design phase	BRT Management	OSCA, DOTC, CCG, CITOM
CONSTRUCTION PHASE				
Accessibility and proximity	Elderly PWDs Women Children	Posting of traffic aides to assist in street crossings and riding in public transport Safety signage written in bold letters and made very visible to avoid accidents and preferably with sounds	BRT Management	OSCA, DOTC, CCG, CITOM
	Other commuters	Implement a traffic management plan to avoid traffic confusion Billboards and public announcement should be put up to provide information to public		
OPERATION PHASE				
Accessibility and proximity	Elderly	Provide feeder transport to bus stations and terminals Provide at-grade pedestrian crossings at strategic locations (i.e. schools, markets, churches, etc.) Put up adequate and large traffic signs with flashing lights Posting of traffic aides to assist in street crossings Road curbs should be smooth and yet not cause slippage nor become slippery when wet, preferably	BRT Management, FESCAP (Federation of Senior Citizens Association of the Philippines)	OSCA, DOTC, CCG, CITOM, BRT Management

SOCIAL RISK/IMPACTS	TARGET POPULATION	MANAGEMENT MEASURES	IMPLEMENTING AGENCY/ ORGANIZATION	SOURCE OF FUND
		with hand rails at points of crossing "Courtesy Lanes" at bus stations and terminal Ramps on buses for easy and safe boarding/off-boarding Provide special "passenger cards" to be distributed through OSCA incorporating 20% discount Designated seats for the elderly in buses within the immediate proximity of bus door for easy ingress and egress		
	PWDs	Provide feeder transport to bus stations and terminals Provide at-grade pedestrian crossings at strategic locations (i.e. schools, markets, churches, etc.) Put up adequate and large traffic signs with flashing lights and sounds/alarms Posting of traffic aides to assist in street crossings Road curbs should be smooth and yet not cause slippage nor become slippery when wet, preferably with hand rails at points of crossing "Courtesy Lanes" at bus stations and terminal Ramps on buses for easy and safe boarding/off-boarding Provide special "passenger cards" incorporating 20% discount	BRT Management	OSCA, DOTC, CCG, CITOM, BRT Management

SOCIAL RISK/IMPACTS	TARGET POPULATION	MANAGEMENT MEASURES	IMPLEMENTING AGENCY/ ORGANIZATION	SOURCE OF FUND
		Hand and guard rails within easy reach of PWD Designated seats for PWDs in buses within the immediate proximity of bus door for easy ingress and egress Ensure enough space in the bus to accommodate assistive devices of PWDs Passenger instructions written in Braille could be installed to allow the blind or sight-impaired persons to find his way without needing special assistance		
	Women	Provide feeder transport to bus stations and terminals Provide at-grade pedestrian crossings at strategic locations (i.e. schools, markets, churches, etc.) Put up adequate and large traffic signs with flashing lights Posting of traffic aides to assist pregnant women and mothers with infants/small children in street crossings, or going into/coming from the bus station "Courtesy Lanes" for pregnant women/mothers with infants/small children at bus stations and terminal Ramps on buses for easy and safe boarding/off-boarding and not cause strain on pregnant women Designated seats/space for pregnant women, lactating mothers or mothers with infants/small	BRT Management	OSCA, DOTC, CCG, CITOM, BRT Management

SOCIAL RISK/IMPACTS	TARGET POPULATION	MANAGEMENT MEASURES	IMPLEMENTING AGENCY/ ORGANIZATION	SOURCE OF FUND
		children, and unescorted ladies Special "for women only" buses during peak hours Bus stations ideally to be within the proximity of markets, schools and churches		
	Children	Provide feeder transport to bus stations and terminals Provide at-grade pedestrian crossings at strategic locations Put up adequate and large traffic signs with flashing lights Posting of traffic aides to assist in street crossings or going into/coming from the bus stations as well as oversee if there may be suspicious characters in and around the vicinity of the bus stations Signage reminding commuters not to crowd-out children while boarding, off-boarding and inside the bus must be installed Hand and guard rails must be within easy reach of children. Children must not be allowed to seat or stand near bus doorways: signage must be installed to remind everyone about this	BRT Management	OSCA, DOTC, CCG, CITOM, BRT Management
	Other commuters	Provide feeder transport to bus stations and terminals Provide at-grade pedestrian crossings at strategic locations for access to short-distance trip for the affected barangays	BRT Management	OSCA, DOTC, CCG, CITOM, BRT Management

SOCIAL RISK/IMPACTS	TARGET POPULATION	MANAGEMENT MEASURES	IMPLEMENTING AGENCY/ ORGANIZATION	SOURCE OF FUND
Affordability	Elderly	Ensure affordable but competitive fare rate	BRT Management	BRT Management
	PWDs			
	Children	Provide mandated discounts		
	Women	Ensure affordable but competitive fare rate		
	Other commuters			
Safety and Security	Elderly	Install adequate security measures within the bus station and its immediate environ to serve as both deterrent as well as facilitating mechanism in the arrest of potential petty criminals Install intelligent traffic signalling devices to help in regulating the flow of people and vehicles within the bus station/terminal Post traffic aides to enhance the circulation as people and motorists can see authority figures Place security officers to ensure pre-emptive visibility Ensure adequate ventilation to help ease the discomfort of over-crowded space Install special waiting lounge/space for the elderly in bus stations and terminals	BRT Management	
	PWDs	Install adequate security measures within the bus station and its immediate environ to serve as both deterrent as well as facilitating mechanism in the arrest of potential petty criminals Install intelligent traffic signalling devices to help in regulating the flow of people and vehicles within the bus station/terminal	BRT Management	

SOCIAL RISK/IMPACTS	TARGET POPULATION	MANAGEMENT MEASURES	IMPLEMENTING AGENCY/ ORGANIZATION	SOURCE OF FUND
		Post traffic aides to enhance the circulation as people and motorists can see authority figures Place security officers to ensure pre-emptive visibility Ensure adequate ventilation to help ease the discomfort of over-crowded space Install special waiting lounge/space for PWDs in bus stations and terminals		
	Women	Install adequate security measures within the bus station and its immediate environ to serve as both deterrent as well as facilitating mechanism in the arrest of potential petty criminals Install intelligent traffic signalling devices to help in regulating the flow of people and vehicles within the bus station/terminal Post traffic aides to enhance the circulation as people and motorists can see authority figures Place security officers to ensure pre-emptive visibility Ensure adequate ventilation to help ease the discomfort of over-crowded space Install special waiting lounge/space for pregnant women/ mothers with infants or small children in bus stations and terminals	BRT Management	
	Children	Install adequate security measures within the bus station and its immediate environ to serve as both deterrent as well as facilitating mechanism in the	BRT Management	

SOCIAL RISK/IMPACTS	TARGET POPULATION	MANAGEMENT MEASURES	IMPLEMENTING AGENCY/ ORGANIZATION	SOURCE OF FUND
		arrest of potential petty criminals Install intelligent traffic signalling devices to help in regulating the flow of people and vehicles within the bus station/terminal Post traffic aides to enhance the circulation as people and motorists can see authority figures Place security officers to ensure pre-emptive visibility Ensure adequate ventilation to help ease the discomfort of over-crowded space Install special waiting lounge/space for children in bus stations and terminals to avoid being crowded-out/in by adults		
	Other commuters	Install adequate security measures within the bus station and its immediate environ to serve as both deterrent as well as facilitating mechanism in the arrest of potential petty criminals Install intelligent traffic signalling devices to help in regulating the flow of people and vehicles within the bus station/terminal Post traffic aides to enhance the circulation as people and motorists can see authority figures Place security officers to ensure pre-emptive visibility Ensure adequate ventilation to help ease the discomfort of over-crowded space	BRT Management	

SOCIAL RISK/IMPACTS	TARGET POPULATION	MANAGEMENT MEASURES	IMPLEMENTING AGENCY/ ORGANIZATION	SOURCE OF FUND
Livelihood	PUJ operators	**Option 1:**Remain on their route, despite the impact of the BRT, and hope that a sufficient number of other Operators will withdraw to make the route viable for those who remain **Option 2:**Remain on their route, which has been restructured and will remain strong **Option 3:**Operate on newly opened routes **Option 4:**Cancel their PUJ franchise and apply for open franchises of other transport services such as trucks-for-hire or school service **Option 5:**Transform their investment to participate in BRT operations	BRT Management, DOTC, LTFRB, LTO, CCG, CITOM, City DMDP (Department of Manpower Development and Placement)	DOTC, LTFRB, LTO, CITOM
	PUJ drivers	Continue on as driver but depends on the operators' chosen option (1,2, 3 and 4) Drivers who would not be accommodated in the above options will be provided with the following opportunities: • Work for the BRT System • Retrain for other productive skills Those with skills can be recruited into a labor pool that can offer services to wealthier residents Enrol qualified children under the government's Conditional Cash Transfer Program Spouse could become a member of a microfinance	BRT Management, CCG, TESDA, NGO, Church-based Organization, DSWD, PhilHealth, MFI,	DOTC, CCG, BRT Management, TESDA, DSWD, PhilHealth, MFI,

SOCIAL RISK/IMPACTS	TARGET POPULATION	MANAGEMENT MEASURES	IMPLEMENTING AGENCY/ ORGANIZATION	SOURCE OF FUND
		organization and start a micro-enterprise with the microfinance organization providing credit, savings and micro-insurance services Sponsorship by the CCG into the Philhealth Insurance Corporation's (PHIC) Indigent Program Those renting or living in informal settlements may be awarded a house and lot in the city's relocation site with reasonable amortization terms. Relocation sites are shown in Figure 5.5-1.		
Misinformation/ lack of project awareness	Other commuters/commuting public	Information and Education Campaign 1) Tri-Media; 2) Public Forum; 3) Flyer distribution in public bulletin boards	CCG/PIA/BRT Management	CCG/BRT Management

Table 7.4-1
Resettlement Policy Framework:Eligibility and Entitlement Matrix

TYPE OF LOSS	MAGNITUDE AND CHARACTERISTIC	ELIGIBLE PERSONS	ENTITLEMENT
A. LAND Residential, Commercial, Industrial	Severe	Owner	Equivalent urban land; or, Full cash compensation at replacement cost without deduction for capital gains, documentary stamp, transfer taxes, and other directly related transaction costs. If severely affected, the project will purchase the orphaned or residual lands at replacement cost if the owner opts to do so.
	Partial		Full cash compensation at replacement cost for the affected portion without deduction for capital gains, documentary stamp, transfer taxes, survey costs, cost of new subdivision plan, and other transaction costs.
B. STRUCTURE Residential, Commercial, Industrial	Severe	Owner-Occupant	Replacement cost for structures covers: (i) the demolition costs of the old structure and (i) the costs constructing a new one, including the cost of securing permits and other transaction costs. Full cash compensation at replacement cost for the affected structure without deduction for (i) salvaged/salvageable materials; and (ii) depreciation. Replacement cost includes not only the cost of materials but also the cost of (i) architectural services; (ii) hauling cost of materials; (iii) labor cost; (iv) cost of reinstalling utilities; (v) contractor's profits; and (vi) cost of processing or

TYPE OF LOSS	MAGNITUDE AND CHARACTERISTIC	ELIGIBLE PERSONS	ENTITLEMENT
			securing the necessary government permits. Cost of transferring to the new structure at the prevailing rates in the area. For income losses, See Section F below.
B. STRUCTURE Residential and Mixed Residential, Commercial, and Industrial	Informal Settlements	Owner-Occupants	First priority to receive a house and lot with security of tenure in a government relocation site. Free transportation to the relocation site Compensation for demolition expenses equivalent to seven (7) days wages of a demolition team consisting of three (3) persons at the official minimum wage in the area. This amount will be given even if the owner-occupant and its relatives do the dismantling themselves. This does not apply if government does the demolition. Food allowance during the transfer and the transition period in the resettlement site equivalent to seven (7) days worth of wages of the household head or the family breadwinner at the official minimum wage in the area. Retention of ownership of salvaged materials. If resettlement site is ready, the project will provide temporary housing or provide transitory housing allowance as provided in the UDHA of minimum daily wage in the area multiplied by 60 days. For loss of enterprise-based income, see Section D. below.

TYPE OF LOSS	MAGNITUDE AND CHARACTERISTIC	ELIGIBLE PERSONS	ENTITLEMENT
			The project will pay for a full year's enrolment in Philhealth, Pag-ibig, and SSS as individually paying member for the head of the household.
		Renters	Second priority to receive house and lot with security of tenure in government relocation. If not awarded, explore moving in with original household. If moving in is impossible, cost of transferring to new rental housing. Food allowance during the period of transferring to the new rental housing or to the resettlement site for a maximum of seven (7) days of wages computed at the official minimum wage in the area For loss of enterprise-based income, see Section D. below. The project will pay for a full year's enrolment in Philhealth, Pag-ibig, and SSS as individually paying member for the renter.

TYPE OF LOSS	MAGNITUDE AND CHARACTERISTIC	ELIGIBLE PERSONS	ENTITLEMENT
		Sharers	Third priority to receive house and lot with security of tenure in a government relocation site. If not awarded, explore moving in with original household. If moving in is impossible, cost of transferring to new rental housing. Food allowance during the transfer for a maximum of seven (7) days computed at the official minimum wage in the area. For loss of enterprise income, see Section D. below The project will pay for a full year's enrolment in Philhealth, Pag-ibig, and SSS as individually paying member for the sharer.
		Absentee Structure Owners	Considered professional squatters under R.A. 7279. No compensation for structures. Demolition to be done by the government at no cost to the absentee structure owner. The absentee structure owner may retain salvaged materials.
	Informal (Purely Commercial)	Encroachers on public ROW	No compensation for structures; For loss of enterprise based income, see Section D. below. The encroacher may retain salvaged materials.

TYPE OF LOSS	MAGNITUDE AND CHARACTERISTIC	ELIGIBLE PERSONS	ENTITLEMENT
B. STRUCTURE Public and Community Facilities	Severe	Government	Cash compensation at full replacement cost for the land and structure or re-construction of the structure to be funded by the project on other government-owned land. Cost of transfer of the moveable equipment, furniture, appliances to the new site. For facilities delivering basic services such as day care centers, health centers, and schools. Project will shoulder the cost of acquisition of a replacement site, or if a site is available, construction of a new structure. This should be completed prior to dismantling the affected structure. The project will also shoulder the cost of transferring to this new facility.
	Partial		Cash compensation at full replacement cost for the affected portion of land and structure. Cost of repairs or re-construction of the affected structure. Cost of transferring or reorganization within the state including the cost of temporary facilities to house users while repair is ongoing. If occupant requires a separate structure or dwelling, while repair is ongoing, a rental allowance equivalent to two (2) months deposit and one (1) month advance rent at the prevailing rental rates in the area will be given.

TYPE OF LOSS	MAGNITUDE AND CHARACTERISTIC	ELIGIBLE PERSONS	ENTITLEMENT
B.STRUCTURE Utilities	Severe and Partial	Private Utility Company	If facilities are located in public ROW, utility company shoulders the cost of relocation to a new site or reconstruction on the new site. If facilities are located on private land, the project shoulders the cost of demolition, transfer, and reconstruction.
C. TREES AND OTHER FIXED IMPROVEMENTS	On Public Land or ROW	Government	Tree cutting permit secured from the DENR will determine replacement, usually ten trees to one
	On Private Land	Private Land Owner	Appraiser determines the cost of the tree. Tree is appraised according to its timber value using basal tree diameter; If fruit bearing, the average harvest of tree for a tree of that kind multiplied by the typical fruit-bearing period or remainder of the fruit bearing years. Water facilities (artesian wells), garages, and other improvements of the land whose removal cannot be accomplished without destroying it are compensated at full replacement cost, including the costs of demolition, the permits and other transaction costs.
D. INCOME	Temporary	Enterprise Owners	Loss of income due to closure, repair, or the transfer of the enterprise to a new site. The compensation is two (2) months of net income computed on the basis of the current year or the last fiscal year.

TYPE OF LOSS	MAGNITUDE AND CHARACTERISTIC	ELIGIBLE PERSONS	ENTITLEMENT
Enterprise Based		Tenured Street Vendors	Loss of income due to closure, repair, or transfer of the enterprise to a site within the existing business area. The compensation is three (3) days of net income. The project will pay for a full year's enrolment in Philhealth, Pag-ibig, and SSS as individually paying members. The enrolment will be according to the salary bracket of the worker.
		Encroachers with fixed informal structures on the ROW (purely commercial)	Loss of income for closure due to reorganization or transfer. The compensation is 7 days of net income regardless of the type of structure encroaching on the ROW.
	Permanent	Enterprise Owners	Compensation equivalent to four (4) months of net income.
		Tenured Street	For permanent closure, compensation equivalent to four (4) months of net income on the basis of the current year's earnings or the last fiscal year. The project will pay for a full year's enrollment in Philhealth, Pag-ibig, and SSS as individually paying members. The enrollment will be according to the salary bracket of the worker. The tenured street vendors can avail of the business development or human resource development and job

TYPE OF LOSS	MAGNITUDE AND CHARACTERISTIC	ELIGIBLE PERSONS	ENTITLEMENT
			placement programs that the project will offer.
		Vendors	For permanent closure, compensation equivalent to one (1) month of net income.
		Encroachers with fixed, informal structures on ROW (purely commercial)	The encroachers can avail of the business development or human resource development and job placement programs that the project will offer.

7.5.1.3 Construction Stage

353. The updated environmental guidelines prepared by contractors, with assistance from the TSC and approval by BRT-PIU, is initiated to take account of any subsequent changes and fine tuning of the mitigation measures. The BRT-PIU shall undertake regular monitoring of the contractor's implementation of mitigation measures specified in the EMP.

7.5.1.4 Operational Stage

354. BRT Operator shall implement the EMP mitigation and monitoring requirements during operation such as monitoring of runoff control measures, survival of planted trees, etc. Accidents along BRT road shall also be monitored as basis for implementation of mitigation measures to improve road safety.

7.5.1.5 Environmental Effects Monitoring

355. As shown in **Table 7.2-1**, BRT-PIU through its Contractors shall undertake baseline environmental monitoring for air quality, noise and surface water quality. One-time sampling shall be conducted prior to start of site works at the specified locations. During construction, the Contractor shall undertake quarterly monitoring of surface water quality and semi-annual monitoring of air quality and noise in the same locations sampled during pre-construction. Additional sampling occasions shall be carried out and additional parameters shall be analyzed (as necessary) to validate complaints and/or investigate pollution events caused by the project.

7.5.2 Reporting

356. National BRT-PMO and BRT-PIU shall submit the following environmental monitoring report to WB:

357. *Baseline Monitoring Report*: The results of baseline data collection carried out by TSC on air quality and noise (as specified in the EMP) shall be submitted to WB prior to commencement of civil works.

358. The environmental monitoring reports shall cover the status of EMP implementation in terms of required mitigation measures for different project phases, results of environmental effects monitoring (air quality, noise and surface water quality), necessary remedial actions to effectively address negative environmental impacts due to project implementation, status of environmental capacity building activities as well as documentation of complaints received and corresponding action/resolution. The environmental monitoring reports will be submitted to WB semi-annually during the construction period and annually for two years after completion of construction.

7.6 Environmental Costs

359. As part of good engineering practices in the Project, there have been several measures as spoil management, safety, signage, dust prevention, noise mitigation, etc. the costs for which will be included in the design costs of the Project. The EIA costs include monitoring costs during construction and capacity building costs on environmental management of which are absorbed into TSC or contractors works packages. The costs for training proposed include the costs incurred towards the site visits, travel to the training program by the participants, printing of training materials and other logistic arrangements. The costs involved towards preparation of training material and imparting of training are covered in the TSC fees. The budget for the environmental management costs for the Project is presented in **Table 7.6-1** below. The government counterpart funding will require

covering the costs for environmental permitting and tree planting and are included as a separate line item under the total project costs.

7.7 Conclusions

360. As always mentioned, the BRT project is for Cebu City's economic development. The EIA revealed that the Project could have adverse environmental impacts but are by large manageable.

361. The EMP will reduce adverse environmental impacts to acceptable levels. It includes specifications for environmental protection measures for each potential environmentally adverse impact and include detailed monitoring plan. It also spells out responsibilities for each relevant organization in the implementation of the EMP. The EMP ensures implementation of the environmental mitigation measures and monitoring during pre-construction, construction and operation. Therefore, the Project will be implemented in an environmentally sound manner and will effectively contribute to the sustainable urban development of Cebu City.

Table 7.6-1
Summary of Estimated Costs for EMP Implementation (4 years)*

Item	Estimated Total Cost (USD)
A. Environmental specialists in TSC:	408,000.00
1) International (1 person for 12 man months USD25,000/month intermittent over 3 years)*	300,000.00
2) National (1 person for 36 months @ USD3,000/month)*	108,000.00
B. Environmental management capacity building program/training to be undertaken by TSC (@USD 10,000/quarter)	160,000.00
C. Environmental impact monitoring (@ USD 5,000/quarter)	80,000.00
D. Environmental Permitting (Lump Sum)	125,000.000
Total	**773,000.00**

**includes design and construction phase; 1$ = PhP 40*

8.0 CONSULTATION, INFORMATION DISCLOSURE, & GRIEVANCE REDRESS MECHANISM

8.1 Public Consultations

362. The BRT Project had carried out various activities related to information disclosure, public consultation (PC), and public participation. These initiatives were undertaken during the entire 8-month period and were temporarily ended towards the completion of the FS and EIA and SIA works. Information disclosure and public participation were achieved by employing various modes of public communications.

363. During months 1 to 2, the PC was designed to raise project awareness of Cebu City BRT and gain initial feedback to inform the system design coupled with consultations with jeepney franchisees, operators, drivers, conductors and mechanics. This first stage consultation involved approximately 1500 people in total. This stage was essential in guiding BRT design and comprised of:

- 14 meetings open to the general public (30 invitees per meeting) administered through local barangays along the proposed route (through these consultations local BRT ambassadors were also appointed to channel information through as the scheme developed).

- Workshops with representatives of special interest groups including the business community, students, young people, the elderly, the urban poor, people with disabilities and local civil society groups.

- The establishment of two design reference groups. The first was established to examine infrastructure design and involved the local universities, eminent architects and civil engineers. The second was a group of persons with disabilities that examined scheme development with respect to the needs of the disabled community with reference to both national and international design standards.

364. During months 5 to 6, another round of PC were undertaken to facilitate the development of the Cebu City BRT brand identity. These PCs involved 550 people in total and broken down into:

- 6 focus groups at local barangay level with selected representatives of residents living along the proposed BRT route; and
- A quantitative 'hall test' survey of a representative sample of citizens to enable the in-depth validation and choice of designs created through the focus groups.

365. A final stage of consultation (months 7 to 8) was then held in order to gather feedback with respect to the BRT outline design system principles developed during the FS and the potential social and environmental impacts of the project. This final stage consultation involved in excess of 1000 people which involved and broken down into:

- 14 further meetings with the general public at barangays along the proposed route.
- Further workshops and meetings with stakeholders, representatives of the earlier identified special interest groups and design reference groups; and
- A public meeting on the likely social and environmental impacts of Cebu City BRT.

366. Presented in **Table 8.1-1** is the summary of the main consultation activities undertaken within the 8-monthFS period including the end of project public exhibitions involving thousands of citizens as spectators and visitors of the exhibits. The numbers in

brackets in the cells in **Table 8.1-1** outline the approximate number of participants involved in each activity.

367. Additional forms of media communication schemes were likewise used such as press releases, informal press briefings and more formal press conferences including:

- February 2012 to launch the study website, Facebook and Twitter pages.
- March 2012 following completion of the first stage consultation activities.
- May 2012 to publicize the interim consultation activities.
- June and July 2012 to publicize the outputs from the FS.

368. A series of additional communication and associated promotional tools were also developed to accompany the planned media engagement at appropriate stages of the project. These included:

- A study website (in English and Cebuano language), hosted by ITP.
- Social media communications managed by the Communications Manager.
- Posters / flyers (in English and Cebuano language).
- Promotional materials e.g. fans, t-shirts, badges and bags.

369. Finally, during the social and environmental impact study phase, DOTC and CCG conducted the first Public Consultation (PC) and information disclosure on 16 July 2012 with concerned individuals, barangay officials, non-government organizations (NGOs), and local government unit (LGU) planning officials. The second PC was conducted on 31 August 2012 with concerned project stakeholders. Details of the project components were presented to the stakeholders and their views on the respective proposals were requested. Stakeholders expressed support to the proposed project. Minutes of these two (2) PCs are presented in **Annex 2**.

8.2 Future Disclosure and Consultations

370. The process of public consultation and participation can be continued during the detailed design phase where additional information shall be disclosed. During detailed design, National BRT-PMO and BRT-PIU will again conduct public consultations and information disclosure. Affected property and structures owners are expected to attend to these proposed consultations since detailed mode and scheme of property and structure acquisition and compensation will also be presented and discussed. National BRT-PMO and BRT-PIU shall keep records of environmental and social complaints received during consultations, field visits, informal discussions, and/or formal letters, together with the subsequent follow-up and resolutions of issues.

8.3 Grievance Redress Mechanism

371. Implementation of the proposed Cebu BRT project will be fully compliant to WB's safeguards requirement on grievance redress mechanism. National BRT-PMO and BRT-PIU shall disclose the proposed mechanism in public consultations during detailed design and in meetings during the construction phase.

372. Complaints about environmental performance of projects during the construction phase can best be handled by an ad-hoc Joint DOTC and CCG Environmental Complaints Committee (JDCECC) for expeditious resolutions of the complaints, while complaints during the operation phase can be brought to the attention of DENR-EMB. DOTC and CCG shall address promptly, at no costs to the complainant and without retribution, any complaints and concerns. JDCECC shall be co-chaired by DOTC and CCG and shall have members from

the contractor, barangay government, concerned NGOs, and women's organizations. Creation of the JDCECC and its operation shall be included in appropriate sections of the project's civil works contract.

373. Complaints about environmental performance of projects can also be brought to the attention of the regional offices of DENR-EMB. The process of handling such complaints is described in the *Revised Procedural Manual (2007)* for the IRR of PD 1586.

Table 8.1-1
Summary of Main Consultations Activities Conducted for Cebu BRT Project

2012						
January	**February**	**March**	**April**	**May**	**June**	**July**
06 **Jan** Bulacao& Luz Barangay Meeting (59)		**13 March** Road Revolution (6)	**10** Branding FGDs Brgys. Luz and Capitol Site (16)	2 Branding research hall test Ayala Center Cebu (100+)	**18** Return consultation with representatives of the disabled sector (City Federation of Persons with Disabilities, Organization of Rehabilitation Agencies, Regional Council for the Welfare of Disabled Persons) (12)	**02** 2nd phase Barangay consultations, Bulacao and Poblacion Pardo (70); Guesting of Mr. Colin Brader on Straight from the Sky (local cable TV show)
09 **Jan** Poblacion Pardo & Basak Pardo (45)		**14 March** Cebu City Federation of Persons with Disabilities (80)	11 Branding FGDs Brgys. Bulacao and Sambag 2 (15)	3 Branding research hall test Cebu City Hall (250+)		03 2nd phase Barangay consultations, Sta. Cruz and Capitol Site (40)
					19 Return consultation w with Movement for a Livable Cebu (12)	
10 **Jan** Basak San Nicolas &Mambaling (49)		**16 March** Movement for a Livable Cebu(30)	12 Branding FGDs Brgys. Pahina Central and Duljo-Fatima (20)	4 Branding research hall test SM City Cebu (150+)	23 Press Briefing (32)	04 2nd phase Barangay consultations, Basak Pardo and Calamba (80)
11 **Jan** Duljo&		**19 March** Cebu	16 Cebu City Hall		30 2nd phase	06 2nd phase

2012						
January	**February**	**March**	**April**	**May**	**June**	**July**
Calamba (65)		City Hall employees (Batch 1)(25)	employees (Batch 4) (22) + SPES(104)		Barangay consultations, Basak San Nicolas and Duljo-Fatima (65)	Barangay consultations, Mambaling and Pahina Central (47)
				17 Cebu City Hall employees (Batch 9 - CCMC) (108)		
12 **Jan** Pahina Central &Sambag 1 (51)		**20 March** Cebu City Hall employees (Batch 2)(22)	17 Cebu City Hall employees (Batch 5) (25)	18 Cebu City Hall employees (Batch 10 - CCMC) (112)		06 2nd phase Barangay consultations, Sambag 1 and Sambag 2 (41)
19 **Jan** Sambag 2 & Sta. Cruz (50)		**26 March** Cebu City Sangguniang Kabataan Federation (50)	18 Cebu City Hall employees (batch 6-CHy Health/OCCR & DEPW) (64)			07 2nd phase Barangay consultations, Kamputhaw and Luz (48)
20 **Jan** Capitol Site & Kamputhaw (53)	**28 Feb** Motorist's Corner/ Mr. Nimrod Quifiones		19 Cebu City Hall employees (Batch 7 -OBO, DPS) (70)			16 Citywide Public Consultation on Social and Environmental impacts. Presentation to Cebu Chamber of Commerce and Industry Board of Directors, Social Hall, Cebu City Hall (80)
			20 Cebu City Hall employees (batch 8 - CFTOM CCMC) (228)			17 Presentations to Metro Cebu Development Coordinating Board, Cebu South

2012						
January	**February**	**March**	**April**	**May**	**June**	**July**
						Mini-bus Operators Association and Movement for a Livable Cebu (62)
						21 TRANSCEBU Mall exhibition, Ayala Center Cebu (1,000+)
						24 TRANSCEBU Mall exhibition, SM City Cebu (1,000+)
						26 TRANSCEBU exhibition. Cebu City Hall (1,000+)

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Educational Background	• **Ph.D. Urban Planning and Regional Planning (1995)** *University of Tsukuba, Japan* • **Master in Environmental Sciences (1991)** *University of Tsukuba, Japan* • **Certificate in Development Economics (1987)** *University of the Philippines – Diliman, Philippines* • **Bachelor of Arts in Economics (1982)** *University of the Philippines – Diliman, Philippines*
Affiliation/s	• **Board of Directors** (Dec. 2007-Present); **Vice President** (July 2001-July 2003); **Member** (June 1995-Present), Transportation Science Society of the Philippines • **Associate Member**, Philippine Institute of Environmental Planners • **Member** (June 2011-Present), National Competitive Council/Export Development Council – Infrastructure Working Group • **Member** (August 2005-Present), International Organization of Lowland Technology • **Associate Member** (April 2005-Present), National Research Council of the Philippines

Name	Andrelita J. Sto. Domingo
Official Designation	Environmental Engineer
Educational Background	• **Doctor in Environmental Science (units, 2002)** *Miriam College Graduate School, Philippines* • **M.S. Environmental Studies (2000)** *Miriam College Graduate School, Philippines* • **Master in Business Administration (1995)** *Central Colleges of the Philippines, Philippines* • **Post Graduate Diploma in Sector Technology and Management (1991)** *Netherlands International Institute for Management, Netherlands* • **Bachelor of Science in Chemical Engineering (1979)** *University of Sto. Tomas, Philippines* ✓ Registered Chemical Engineer (1980)
Affiliation/s	• **Member**, Philippine Institute of Chemical Engineers (PIChE) • **Member**, Pollution Control Association of the Philippines, Inc. • **Member**, Air and Waste Management Association (AWMA) • **Member**, Philippine Association of Research Managers

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WOODFIELDS CONSULTANTS, INC.

ATTENDANCE SHEET

(External)

Form No		
SP-QMS-04F7		
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Office/ Project: CEBU BUS RAPID TRANSIT PROJECT	**Date** 16 JULY 2012
Venue: SOCIAL HALL, CEBU CITY HALL	**Time** Start: End:
Subject: PUBLIC CONSULTATION	**Reference No.:**

NAME	POSITION/COMPANY	E-MAIL ADD.	CONTACT NO/S.	SIGNATURE
EVANGELINE SANDOVAL	SANITARY ENGINEER DOH7		4157633	[signature]
Bing Perez	WCI			[signature]
Roland Cabiluna	Brgy STA. CRUZ		2543872	[signature]
[illegible]	[illegible]			[signature]
CARLITA B. MILLON	Mambaling Elem. Sch.			[signature]
CRISTINIANA R. PASCO	MAMBALING ES		7198136	[signature]
HENRY REYNES	Mambaling Elem.		09078327260	[signature]
[illegible]	WB			[signature]
Terry C. Galvez	DOE			[signature]
[illegible] Reyes	Cebu Planners		09328349168	[signature]
[illegible]	USPF			[signature]
Elvin Joseph [illegible]	Restaurant Manager		0933[illegible]	[signature]
Raquel Cayas	Sec – ROTARY CLUB		09234031871	[signature]
Zaldy Peñaranda	Head – Legis Adm.		2533373	[signature]
Elma G. Villaluna	CNM		4183389	[signature]
ALMA N. CATUBIG	DPWH SRP CO		4116772	[signature]
Cleofe P. Alalé	– do –		4116772	[signature]
Maribel E. Villegas	BED Sambag I		0923[illegible]	[signature]
NOEL GOMEZ	CAPITOL COMMANDO		09173903148	[signature]
JESSIE RAMON S.O.	CONSULTANT CCC		09153821885	[signature]
ALAN S. BACALSO	Private Capital		0917-322-695	[signature]
CAYETANO [illegible]	Jr. Consultation		09103348972	[signature]
[illegible]	2 consultation		2724548	[signature]
TIMOTEO MENIDO	SAMPHILRE		2383782	[signature]
Jonathan Orillo	CCCI		232-1421	[signature]

WOODFIELDS CONSULTANTS, INC.	Form No	SP-QMS-04F7	
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Office/ Project: CEBU BUS RAPID TRANSIT	**Date**
Venue: SOCIAL HALL	**Time** Start: End:
Subject: PUBLIC CONSULTATION	**Reference No.:**

NAME	POSITION/COMPANY	E-MAIL ADD.	CONTACT NO/S.	SIGNATURE
FLORAMIE A. VEGA	ROBINSONS LAND CORP	[illegible]	255143	[signature]
RICHARD J. SARMIENTO	〃	richard.sarmiento@[illegible].com	505-8455	[signature]
RICHARD CABUCOS	METRO A PRES.		09175110980	[signature]
Maria Pino Buanghug	Chairman / CCHVA	[illegible]@yahoo		[signature]
Christine Marie Sanchez	CCMC	fortine09@yahoo.com kimci.sanchez@gmail.com	09178854664	[signature]
LUNOD, FULTON	CCMC	fultonlunod@yahoo.com	09227765149	[signature]
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Ramonida, Belen	Prince Warehouse		0943 [illegible]	[signature]
Dale [illegible]	[illegible]		[illegible]	[signature]
[illegible]	ITC ENV.			[signature]
Armi Green	Private Sector		09176207750	[signature]
DEREK THUSLAR	XT architecture	derek@[illegible]architecture.net	4564227[illegible]	DBT
Rafael Yap	CITOM	relyap@yahoo[illegible]		
COLIN BRADER	ITP	brader@[illegible].net	0918[illegible]341	[signature]
Arlene Donaire	WB / Proj Coordinator	apdonaire@yahoo.com		[signature]
Magdalena Amores	KMK		4899300	[signature]
Jingjing Mariño-Farrarons	Events YR	eventsyr@gmail.com	3549313	[signature]
MA. CONCEPCION T. ENCABO	AC, BRT-PMO	mcencabo@gmail.com	4189241	[signature]
DANILO B. OMAYAN	PRESIDENT - [illegible] -			
LUV VAURON	Brgy. Sec. / LGU	[illegible]	2628441	[signature]
JAMIE PARCO	Brgy Staff / Duljo			[signature]
JOJO PADILLA	Brgy Staff / Duljo			[signature]
Alipio N. Bacalso Jr.	CPDO			[signature]
[illegible]	RLO	[illegible]	[illegible]	[signature]
[illegible]	Pahina [illegible]		[illegible]-1685	[signature]

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WOODFIELDS CONSULTANTS, INC.
ATTENDANCE SHEET
(External)

Form No		
SP-QMS-04F7		
Rev No	Effectivity Date (mm/dd/yy)	Page/s
1	03/05/12	1 of 1

Office/ Project: CEBU BRT PROJECT	**Date** 16 JULY 2012
Venue: SOCIAL HALL, CEBU CITY HALL	**Time** Start: End:
Subject: PUBLIC CONSULTATION	**Reference No.:**

NAME	POSITION/COMPANY	E-MAIL ADD.	CONTACT NO/S.	SIGNATURE
1) EMMANUEL Y. O.	BRGY. KAMPUTHAW CHIEF TANOD		231-4311	[signature]
2 Ma. [illegible]	Brgy [illegible]		505-5011	[signature]
3 [illegible]	[illegible]		415-3458	[signature]
4. Rustico T. Aguhar	[illegible]			
5 William Cornado	[illegible]			[signature]
PAUL VILLAREAL	DOTC-RMC-7			[signature]
[illegible]	[illegible]		[illegible]	[signature]
8. Benjamin Bagayna	KATIWMCO		2610970	[signature]
9 MARIA CABADSAN	NEDA 7		414-7500	[signature]

WOODFIELDS CONSULTANTS, INC.
MINUTES OF THE MEETING

Form No		
SP-QMS-09F1		
Rev No	Effectivity Date (mm/dd/yy)	Page/s
2	09/13/10	1 of 1

Reference : 12-0347-MOM-12-002

Date: 16 JULY 2012

Venue: SOCIAL HALL, CEBU CITY HALL

Time: 9:20AM

Attendees:

Name	Office/ Position	Initials
See attached Attendance Sheet		

Not Present:

Name	Office/ Position	Initials
1.		
2.		
3.		
4.		
5.		

Facilitator: PAMELA C. CHAN

Agenda:

1. Brief Project Presentation about the Cebu BRT
2. Potential Environmental Impacts and Mitigating Measures
3. Potential Social Impacts and Mitigating Measures
4. Workshop per Group
5. Plenary Session – presentation of group outputs
6. Open Forum

Highlights of the Meeting

- The meeting formally started at 9:20AM with an Opening Prayer and the singing of the National Anthem.
- The Welcome Remarks was made by Atty. Rafael Christopher Yap, Director of the Cebu City Traffic Operations Management (CITOM), in behalf of Mayor Michael Rama.
- The Program started with a brief Project Presentation by Mr. Colin Brader of ITP.
- The presentation on the EIA Process, potential environmental impacts of the Cebu BRT Project and the corresponding proposed mitigating measures was made by Dr. Delfin San Pedro, EIA Team Leader.
- The potential social impacts and mitigating measures was presented by Mr. Miguel Guioguio, SIA Team Leader.
- To better manage the crowd, the participants were asked to group into four to amend or append to the listed impacts and mitigating measures.
- Each group's output was presented to all the participants through the assigned group leader. The following were the issues and concerns identified by the group:

Key Issues	Action Items	Responsibility	Target Date
Group 4 **Group Leader: Ma. Susan V. Lastimosa**			
1) During road expansion/widening, what will happen to the establishments/houses which will be affected? Will there be a relocation site?	To be addressed in the Resettlement Action Plan	Resettlement Specialist	
2) A taxi lane must be provided. Long queues at the terminal. *(Richard Cabucos, President of Metro Cebu Taxi Operators Association)*	To be considered in the Detailed Design		
3) There must be designated persons/medics to assist PWD passengers at strategic points. *(Danny Omayan, President of CCFPWD)*			
4) Safety measures must be provided for the			

passage of the children. *(Henry Reynes, Mambaling Elementary School)*			
5) Where are the locations of the terminals? These should be integrated to the foot bridges and must have provision for PWDs. *(Mr. Jesus Ramon Rafols, Cebu Capitol Commercial Complex)*			
Group 3 **Group Leader: Ms. Elma Villahermosa**			
1) There should be enough traffic enforcers and traffic signs during the construction phase to minimize vehicular traffic.	To be addressed by the Traffic Management Plan and Environmental Management Plan.		
2) Material stockpile must be properly cordoned and provided with signages for safety purposes.			
3) Coordinate with Cebu City Risk Reduction Council to minimize localized ponding and flooding during construction.			
4) Construction must be properly timed. Consider working at night time along the school areas and daytime along residential areas to minimize nuisance. What about areas near hospitals?	To be considered in the Environmental Management Plan.		
5) DENR should be consulted with regard to the presence of centennial areas which might be affected.			
6) Is there any provision for bike lanes? What is the plan?	To be considered in the Detailed Design		
7) How much will be the fare in BRT? How is it compared with jeepney fare?	Dr. Green said that according to the FS Study that is being finalized, the BRT fare is the same as the current jeepney fare.		
8) Make sure that displaced persons are provided with a sustainable means of livelihood.	This will be discussed in the Social Management Plan.		
Group 2 **Group Leader: Christine Marie Sanchez**			
1) There must be a traffic plan to address the traffic			

congestion especially in areas that will be affected during the construction phase.			
2) Public information (in all sectors) regarding the project and its schedule of construction must be done ahead of time in order to minimize discomfort and other negative impacts.			
3) If possible, there should be no construction near hospitals and schools, for health reasons.			
4) What will happen to the jeepney drivers who may be displaced? They should be prioritized in the plan.			
5) There must be a prevention plan for possible clogging and flooding.			
6) Safety signage must be installed especially during peak hours to avoid untoward incidents.			
7) How is the project going to be sustainable? Are we looking at 5-10 yeas? 25 years? Who will ensure the maintenance of the project?			

Other Matters:

- No presentation was made by **Group 1** and they said that they would rather participate in the Open Forum.

Schedule of next meeting: Schedule of 2nd Public Consultation to be announced

Prepared by: PAMELA C. CHAN
Designation: Project Management Officer

wci	WOODFIELDS CONSULTANTS, INC. **ATTENDANCE SHEET** ***(External)***	Form No SP-QMS-04F7 Rev No 1 / Effectivity Date (mm/dd/yy) 03/05/12 / Page/s 1 of 1

Office/ Project: CEBU BRT	**Date** 31 AUG 2012
Venue: CCMC AUDITORIUM, CEBU CITY	**Time** **Start:** **End:**
Subject: 2ND PUBLIC CONSULTATION	**Reference No.:**

NAME	POSITION/COMPANY	E-MAIL ADD.	CONTACT NO/S.	SIGNATURE
Carlita P. Millon	MAMBALING ELEM Teacher DepEd		238-63-61	[signature]
CRIS R. PALEN	MAMBALING E/S		4178136	[signature]
HENRY NEYHET	Mambaling Elem		4178136	[signature]
TEO AVENIDO	SUPERVISOR (SUPERVISE)		2665740	[signature]
Ing. Ley Bacala	Banglio Sentral		2560973	[signature]
Rene Barrazo	-do-		254472	[signature]
Suzette B. Pacaña	Bldg. Supervisor (CIT-U)		417-5737	[signature]
RICHARD COMMUNA	CBPEA		[illegible]	[signature]
SELEMON PAE	PD			[signature]
[illegible]	WCI		0917[illegible]	[signature]
[illegible]	WCI		[illegible]	[signature]
Jamie Parr Rep. of Councilor [illegible]	Administrative Begy. Alijo Fatima		4188092	[signature]
Juliet M. Quinon	DPWH-Engr. IV		4116720	[signature]
Cleofe P. Abalo	ECO II - DPWH RO7		4116721	[signature]
[illegible]	WC	[illegible]		[signature]
PAMELA C CHAN	[illegible]	[illegible]	4?6 ?760	[signature]
Salade Usuie	Al-Khairiah Mosque			[signature]
[illegible]	VTC		[illegible]	[signature]
Arlene Donaire	World Bank			[signature]
Simon Pete Cregno	World Bank		0917747?133	[signature]
MA. CONCEPCION T. ENCABO	BRT-PMO			[signature]
Terry C. Galvantel	PM II / DOTC			[signature]
[illegible], Chiakit	DOH-CHD-CV		4140402	[signature]
FERMIN BLAS MARIVAS	Pt. PARDO		272-3419	[signature]
Maya Villaluz	World Bank		09175414?38	[signature]

wci	**WOODFIELDS CONSULTANTS, INC.** **ATTENDANCE SHEET** ***(External)***	*Form No* **SP-QMS-04F7**	
		Rev No 1	*Effectivity Date (mm/dd/yy)* 03/05/12 · *Page/s* 1 of 1

Office/ Project: CEBU BRT	**Date**
Venue: CCMC AUDITORIUM , CEBU CITY	**Time** **Start:** **End:**
Subject: 2ND PUBLIC CONSULTATION	**Reference No.:**

NAME	POSITION/COMPANY	E-MAIL ADD.	CONTACT NO/S.	SIGNATURE
MARIO MELANO	MTN DEPED	NONE	0916-746867	
BING PEREZ	WCI	bmperezjr@ey-c		
ESPARCIA , JEPHERSON	CCHMC	jepi esparcia 2@gmail.com		
Benjamin Pagaypa	KATIPUNAN LBV		09159654913	
FLORANTE A. VEGA	GROUP PROPERTY MANAGER CEBU	florante.vega@ovinsure...com	09226224135	

WOODFIELDS CONSULTANTS, INC.
MINUTES OF THE MEETING

Form No		
SP-QMS-09F1		
Rev No	Effectivity Date (mm/dd/yy)	Page/s
2	09/13/10	1 of 1

Reference : 12-0347-MOM-12-003

Date: 31 AUGUST 2012

Venue: CEBU CITY MEDICAL CENTER AUDITORIUM

Time: 10:00AM

Attendees:

Name	Office/ Position	Initials
See attached Attendance Sheet		

Not Present:

Name	Office/ Position	Initials
1.		
2.		
3.		
4.		
5.		

Facilitator: PAMELA C. CHAN

Agenda:
1. Brief Project Presentation about the Cebu BRT
2. Presentation of Potential Environmental Impacts and Mitigating Measures
3. Open Forum

Highlights of the Meeting

- The meeting formally started at 10:00AM with an Opening Prayer and the singing of the National Anthem.
- The Welcome Remarks was made by Atty. Rafael Christopher Yap, Director of the Cebu City Traffic Operations Management (CITOM), in behalf of Mayor Michael Rama.
- The Program started with a brief project presentation by Dr Delfin San Pedro, EIA Team Leader, which includes the final alignment, identification of potential environmental impacts and mitigation measures were also presented.
- It was clarified that details of the alignment and the design are further explained in the FS prepared by ITP and in the Cebu BRT website.
- A simulation of the actual BRT was presented from the video found in the website of Cebu BRT.
- An open forum was conducted to clarify some issues and suggest further inputs for the Draft EIA Report.
- Most of the participants wanted the Cebu BRT to be implemented by the private sector than the government or through PPP.
- Dr. Hussein Lidasan explained the risks involved in different institutional arrangements (private, government or PPP).

Key Issues	Response	Responsibility	Target Date
1) Need for more information			
Can you show us the traffic flow during the construction phase? What are the proposed solutions to alleviate traffic during construction? - *Mario Melano, DepEd*	Traffic congestion is expected during the construction phase. Information regarding traffic re-routing and management can be found in the Traffic Management Plan. The project implementation will be by phases so as to minimize traffic congestion. Traffic signs and traffic advisories shall be made available to the public prior to construction. - *Dr. Delfin San Pedro*		
	CITOM will talk to the contractors to ensure minimal traffic congestion during the construction period. Construction will be done in phases. – *Atty. Raffy Yap*		

Can you help us visualize the movement of traffic during the BRT construction? Especially for Bulacao which is a very narrow route. –*Mario Melano*	We do not have a moving presentation at this time. To further explain, a dry-run of the Traffic Management Plan will be conducted for 3-4 months prior to implementation to undergo further refinement. A traffic survey was conducted to determine the volume of vehicles in the major thoroughfares which was used as one of the parameters in traffic re-routing schemes. One of the measures is to properly inform the public about the construction schedule in advance. This should also be discussed to the barangay captains and councilors during the barangay consultations – *Dr. Delfin San Pedro*		
2) Duplication of buses will increase traffic.			
There will be duplication if southbound buses still enter Bulacao. Is there a measure that buses from the South will only be up until Bulacao so that all the passengers will be taking the BRT and traffic volume will be lesser? Will there be widening of roads and provision for sidewalks? – *Carlita Millon, Mambaling Elementary School*	That concern has already been raised to the City Council because it will really be difficult if the southbound buses are also in the terminal. However, the only complication is that the South Bus Terminal has a different owner. Dialogues with them were already started because they (southbound buses) will surely be affected with this project. An ordinance will be passed stating that either: a) they go directly to the South Bus Terminal without picking up passengers on their way or b) transfer the location of the South Bus Terminal, which is a challenge considering the political consideration in Cebu –*Atty. Raffy Yap*		
	Other transportation routes whether bus or jeepneys which will be displaced as a result of the BRT can still serve as feeder routes which will carry passengers to the BRT. Regarding		

	widening and provision for sidewalks, widening will be done in some areas and provision for pedestrians such as sidewalks is part of the design –*Dr. Delfin San Pedro*		
Actually during the time of Mayor Osmena, there was an alternative bus terminal that was introduced by to the Mayor for the mini-bus. But the Mayor said that the mini-bus and the big buses can stay in the same area near the entrance of SRP. But sad to say, with the change of administration, the issue has been brought back to Mayor Rama. But the Mayor said that it was very hard. – *Richard Coromina, CBPOA*	All these things are being considered, it's just a matter of decision – *Dr. Delfin San Pedro* The Cebu City Government would like this Project to push through despite the political issues on the way. – *Atty. Raffy Yap*		
The BRT is patterned with the BRT in Brazil right? – *Richard Coromina, CBPOA*	Actually, it is patterned after all the good experiences from BRT all over the world. We will adapt measures responsive to the local situation. –*Dr. San Pedro*		
What will happen to the four existing flyovers? Are they going to be affected by the projects? –*Richard Coromina, CBPOA*	No flyovers will be displaced. The BRT will utilize the existing flyover structures or avoid them.		
From our understanding of the presentation, it will hit the flyovers especially the one in Mambaling. The taxpayers spent for the construction of these flyovers. – *Mario Melano, DepEd*	I don't think there will be conflict between the BRT and the existing flyovers. The important thing to determine is how they will complement each other. The BRT targets those who are using the public transport. The flyovers will cater mainly to private vehicles. This is also considered in the Detailed Engineering Design. Another thing, we need to look at where jeepneys could possibly connect to the BRT route -*Dr. Tho Lidasan, Land Use Planner*		
3) What will happen to the special lane of the BRT at intersections? Will this be cut? The implementation of the BRT should not affect the local business and the locality in general.	It can merge with other traffic in some portions of the alignment. –*Dr. Tho Lidasan*		

Richard Coromina, CBPOA			
	Right of way will be acquired to accommodate the dedicated lane for BRT in the middle, and two lanes in the left and right sides of the BRT including a sidewalk. Pedestrian crossings and traffic lights will be the same because the project will be on ground.–*Dr. Delfin San Pedro*		
4) Do you have a simulation of the actual BRT? We would like to see the	There will be a separate venue for that which will be in the presentation of the design. Let us focus the discussion on the environmental impacts of the project. –*Engr. Maricon Encabo, OIC-BRT*		
	A separate venue will be arranged for those who would like to view the design and the actual BRT simulation so that Dr. San Pedro can continue with the discussion. –*Ms. Arlene Donaire, WB*		
5) If the terminals are in the middle, how do the pedestrians access the terminals?	On-ground pedestrian lanes are provided. The Intelligent Traffic Management System will play a big role for this. Another innovation in the project is to use roof with solar panels to capture energy and use this to power the road/traffic lights. Thus, it will not compete with the local consumption.		
6) Are the buses driven by drivers? Will the displaced jeepney drivers be prioritized for this?	Yes that is considered in the FS and the EIA and the SIA.		
7) Is the BRT implemented by the local government or national government?	Although not yet final and under study, normally the civil works will be the government's responsibility but the supplier of the buses and the operators will be the private sector. Generally, that will be the institutional arrangement. This will be a Public-Private Partnership (PPP) project – *Dir. Terry Galvante, DOTC*		

	The Public-Private Partnership concept that will be used will be the one effective for the project. *–Dr. Tho Lidasan*		
8) During road widening, will the Mambaling skywalk be affected? The taxpayers spent for that. *–Carlita Millon, Mambaling Elem School*	Those will be considered in the design. The Detailed Engineering Design will address that – *Dr. Delfin San Pedro*		
9) Is the SRP included in Phase 1?	Yes *–Atty Raffy Yap*		
10) Where is the station in Fuente Osmena? What will be the impact of this to the accessibility of pedestrians? *–Floramie Vega, Robinson's Land*	There will be widening in some parts of the elliptical road. Impact on accessibility and traffic was considered in the design and the Traffic Management Plan *–Dr. San Pedro*		
11) How much is the unit cost of the bus and the capacity?	The unit cost is 190,000. The full seating capacity is 100. –Engr. Maricon Encabo		
12) What fuel will be used for the bus?	Super Clean diesel will be used.		
13) Were the drainages considered in the construction of the BRT? - *Richard Coromina, CBPOA*	Re-provisioning of utilities will be conducted prior to construction so as not to affect drainage, water supply and other utilities. A Utilities Re-Provisioning Plan (URP) shall be prepared and coordinated with utility providers. *–Dr. San Pedro*		

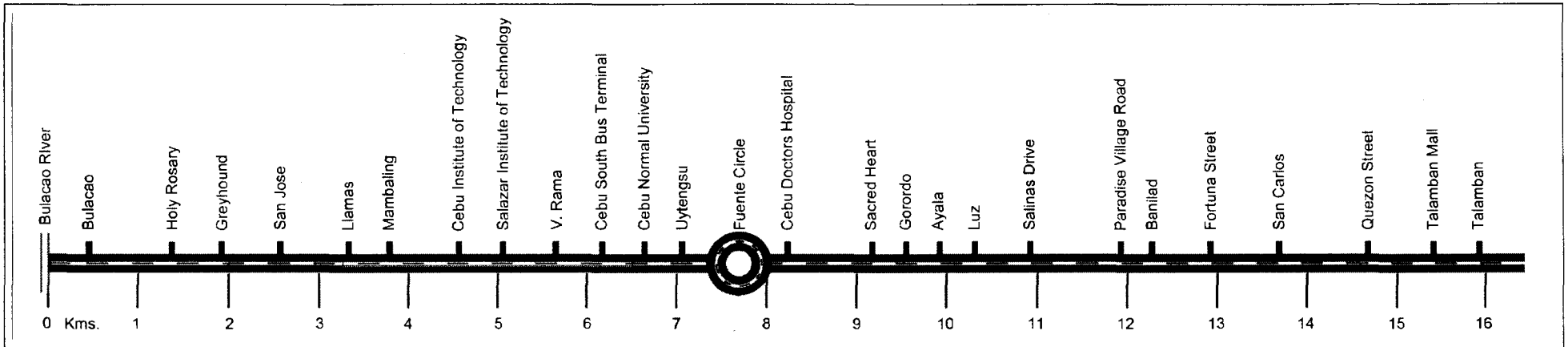
Other Matters:

- None

Schedule of next meeting: To be announced

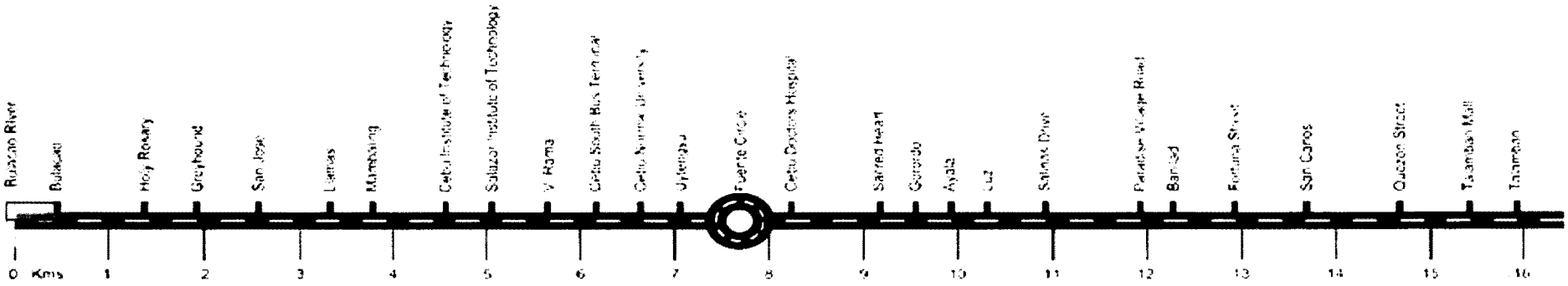
Prepared by: PAMELA C. CHAN
Designation: Project Management Officer

Table 17
Segmented Profile of BRT (Central Island)



Location	0 meters to 6500 meters																				
	0-250 meters	251-500 meters	501-750 meters	751-1000 meters	1001-1250 meters	1251-1500 meters	1501-1750 meters	1751-2000 meters	3251-3500 meters	3501-3750 meters	3751-4000 meters	4001-4250 meters	4251-4500 meters	4501-4750 meters	4751-5000 meters	5001-5250 meters	5251-5500 meters	5501-5750 meters	5751-6000 meters	6001-6250 meters	6251-6500 meters	Summary of Data
1. Vegetation and Landscape	- Vegetation found (66 Indian Trees)	- Vegetation found (50 Indian Trees)	- Vegetation found (57 Indian Trees)	- Vegetation found (50 Indian Trees)	- Vegetation found (10 Indian Trees)	- Vegetation found (57 Indian Trees)	- Vegetation found (54 Indian Trees)	- Vegetation found (28 Indian Trees)	- Vegetation found (3 Indian Trees)	- Vegetation found (50 Indian Trees)	- Vegetation found (1 Indian Trees)	- No vegetation found	- No vegetation found	- Vegetation found (9 Indian Trees)	- Vegetation found (50 Indian Trees)	- Vegetation found (33 Indian Trees)	- Vegetation found (50 Indian Trees)	- Vegetation found (30 Indian Trees)	- Vegetation found (14 Indian Trees)	- Vegetation found (15 Indian Trees)	- Vegetation found (50 Indian Trees)	**Vegetation:** **- 638 indian Trees**
	Landscapes: - Magic Flower -Bougainvillea	Landscapes: -Bougainvillea	Landscapes: -Bougainvillea	Landscapes: -Bougainvillea	Landscapes: -Bougainvillea	Landscapes: -Bougainvillea	Landscapes: -Bougainvillea	Landscapes: -Bougainvillea	Landscapes: - Duranta	Landscapes: - Duranta	Landscapes: - Duranta	No Landscapes	No Landscapes	Landscapes: - Duranta	Landscapes: - Duranta	Landscapes: - Duranta	Landscapes: - Duranta	Landscapes: - Duranta	Landscapes: - Duranta	Landscapes: - Duranta	Landscapes: -Bougainvillea - Santan	**Landscapes:** **-Bougainvillea** **- Duranta** **- Santan**
2. Utilities	- 19 flags - 12 lamp posts - 1 electrical post (concrete) - 1 traffic light	- 8 lamp posts - 3 traffic lights	- 5 lamp posts	- 8 lamp posts	- 1 lamp post	- 8 lamp posts - 1 traffic light	- 5 lamp posts - 1 traffic light	- 3 lamp posts - 1 traffic light	- 1 traffic light	- 1 electrical post (concrete) - 2 traffic lights	- 1 electrical post (concrete)	- 10 electrical posts (concrete)	- 10 electrical posts (concrete)	- 11 lamp posts - 4 traffic lights - 1 electrical transformer	- 5 lamp posts - 3 traffic lights	- 5 lamp posts - 1 traffic light	- 9 lamp posts - 2 traffic lights	- 10 lamp posts	- 6 lamp posts - 2 traffic lights	- 9 lamp posts	- 1 lamp post - 3 electrical posts (concrete) - 1 traffic light - 1 drainage line	**- 19 flags** **- 106 lamp posts** **- 26 electrical posts (concrete)** **- 23 traffic lights** **- 1 electrical transformer** **- 1 drainage line**

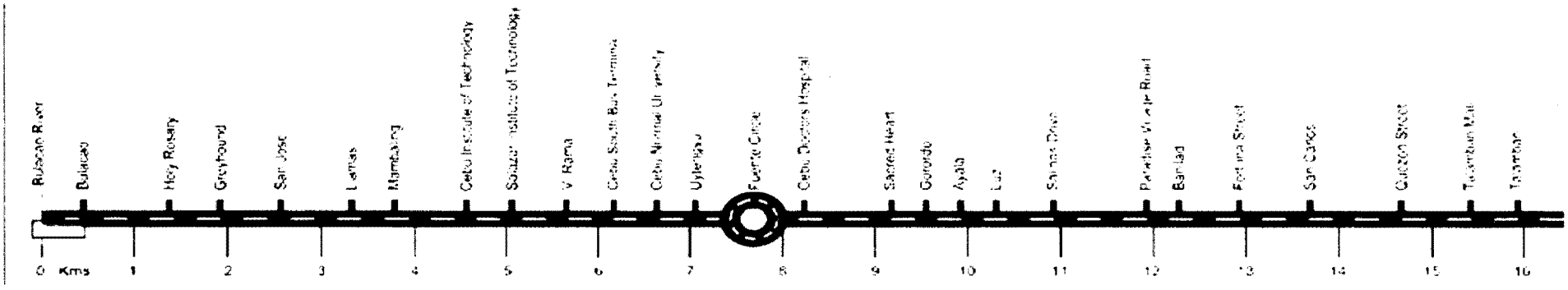
Table 1a
Segmented Profile of BRT (Bulacao River to Bulacao Station - Left Side)



0 meters to 450 meters

Location	0-50 meters	50-100 meters	100-150 meters	150-200 meters	200-250 meters	250-300 meters	300-350 meters	350-400 meters	400-450 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections
2. Structure of cultural sensitivity and ecological importance	- Bulacao River	- None	- None	- Villa Bulsita Subdivision	- None	- None	- None	- None	- None	- Bulacao River - Villa Buisita Subdivision
3. Vegetation and Landscape	- Vegetation found (11 Gmelina trees)	- Vegetation found (5 mahogany trees)	- Vegetation found (2 Pine trees)	- Vegetation found (2 Pine trees)	- No vegetation found	- Vegetation found (1 Pine tree)	- No vegetation found	- Vegetation found (5 Pine trees)	- Vegetation found (3 mahogany)	Vegetation: - 11 gmelina - 10 pine tree - 8 mahogany
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (3 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 4 electrical transformers - Electrical Post (2 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- 29 electrical post (19 concrete, 10 log) - 9 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

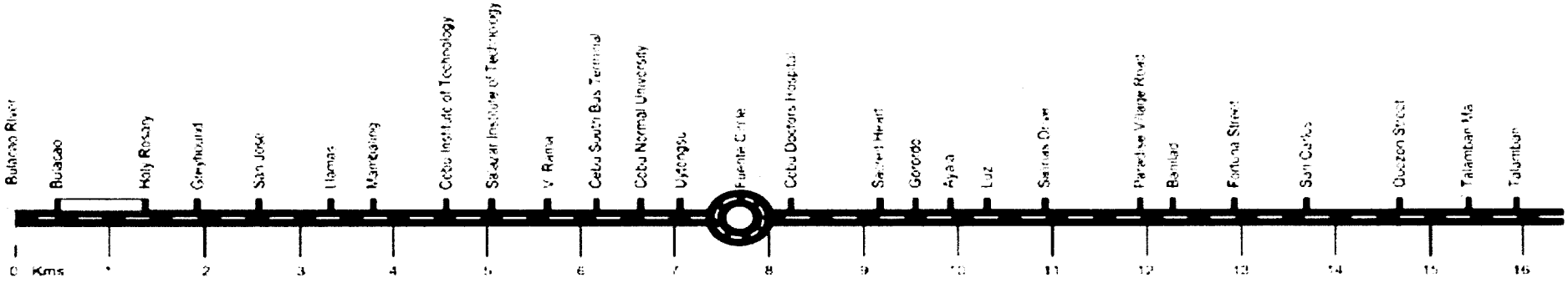
Table 1b
Segmented Profile of BRT (Bulacao Station to Holy Rosary Station - Right Side)



0 meters to 450 meters

Location	0-50 meters	50-100 meters	100-150 meters	150-200 meters	200-250 meters	250-300 meters	300-350 meters	350-400 meters	400-450 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- Charlie Ville Street I - With Kerbs	- Charlie Ville Street II - With Kerbs	- No major intersections - With Kerbs	- San Antonio de Padua St. - With Kerbs	- Fatima St. - With Kerbs	- St. Jude Acres Federation Communities St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	major intersections: - Charlie Ville Street I - Charlie Ville Street II - San Antonio de Padua St. - Fatima St - St. Jude Acres Federation Communities St.
2. Structure of cultural sensitivity and ecological importance	- Bulacao River	- None	- St. Paul College Foundation, Inc.	- None	- None	- SNR. San Antonio de Padua Chapel	- None	- Bulacao Envangelical Free Church	- None	- Bulacao River - St. Paul College Foundation, Inc. - SNR. San Antonio de Padua Chapel - Bulacao Envangelical Free Church
3. Vegetation and Landscape	- Vegetation found (1 Tamarind tree)	- Vegetation found (1 Jack fruit & 1 Black plume)	- No vegetation found	- No vegetation found	- Vegetation found (1 mahogany, 1 cucumber)	- Vegetation found (1 Gmelina)	- No vegetation found	- Vegetation found (3 Gmelina, 3 Pines trees, 1 star apple)	- Vegetation found (1 Gmelina)	Vegetation: - 5 gmelina - 3 pine tree - 1 mahogany - 1 Tamarind - 1 Jackfruit - 1 Black plum - 1 cucumber - 1 star apple
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 4 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (1 Concrete, 1 Log)	- 39 electrical post (14 concrete,25 log) - 6 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

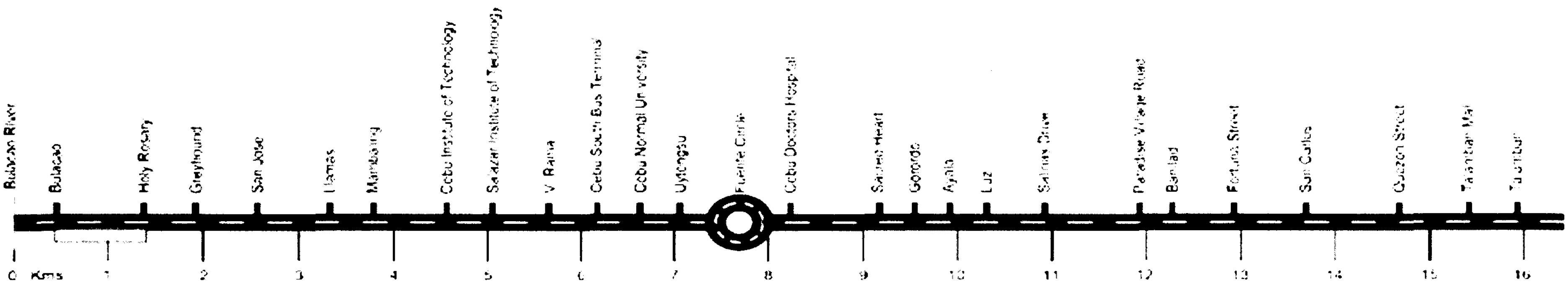
Table 2a
Segmented Profile of BRT (Bulacao Station to Holy Rosary Station - Left Side)



450 meters to 1400 meters

Location	450-500 meters	500-550 meters	550-600 meters	600-650 meters	650-700 meters	700-750 meters	750-800 meters	800-850 meters	850-900 meters	900-950 meters	950-1000 meters	1000-1050 meters	1050-1100 meters	1100-1150 meters	1150-1200 meters	1200-1250 meters	1250-1300 meters	1300-1350 meters	1350-1400 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Aznar Road - With Kerbs	- No major intersections - With Kerbs	-Sabellands St. - With Kerbs	Major intersections - Aznar road - Sabellands St.
2. Structure of cultural sensitivity and ecological importance	- Villa Mangga Elementary School	- None	- None	- None	- None	- None	- None	- None	- Newton Estate Subdivision - Closed/ Newbery Interactive School	- None	- Villa Lourdes Chapel	- None	- None	- Sitio Rosimba - Pardo Church	- Pardo Church	- Holy Rosary	- Holy Rosary of Pardo	- Baptist Church	- None	- Villa Mangga Elem School - Newton Estate Subd. - Newbery interactive School - Sitio Rosimba - Pardo Church - Holy Rosary of Pardo - Baptist Church
3. Vegetation and Landscape	- No vegetation found	- No vegetation found	- Vegetation found (4 mahogany)	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (1 mango tree) - 5M magic flower	- Vegetation found (2 mahogany)	- Vegetation found (2 guava)	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (12 pine trees)	- Vegetation found (11 pine trees)	- No vegetation found	- No vegetation found	- No vegetation found	Vegetation: - 23 pine tree - 6 mahogany - 1 mango - 2 guava
4. Utilities	- Telephone cables - Drainage lines - Electrical Post (6 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 2 Electrical transformers - Electrical Post (3 Concrete, 2 Log)	- Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (1 Concrete, 2 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 0 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 0 Log)	- Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- 55 electrical post (33 concrete, 22 log) - 14 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - with vacant lots	- Mixed Land Uses (Residential , Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

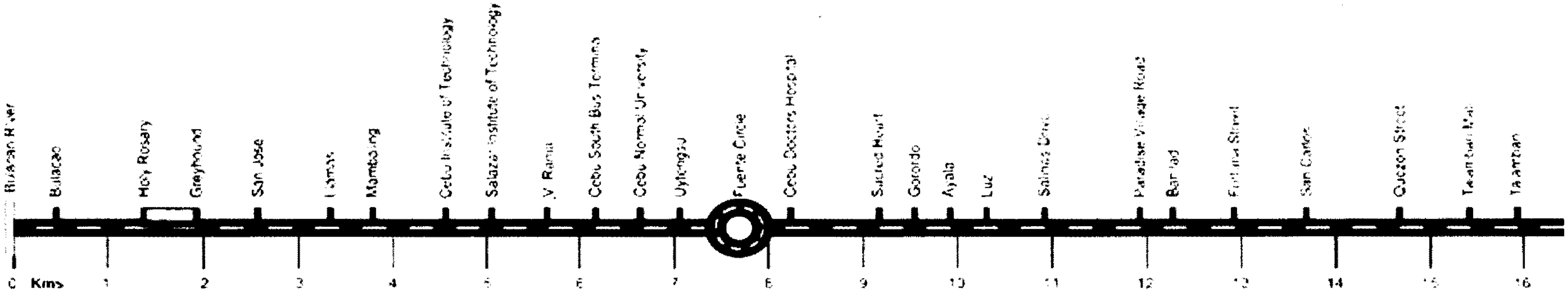
Table 2b
Segmented Profile of BRT (Bulacao Station to Holy Rosary Station - Right Side)



450 meters to 1400 meters

Location	450-500 meters	500-550 meters	550-600 meters	600-650 meters	650-700 meters	700-750 meters	750-800 meters	800-850 meters	850-900 meters	900-950 meters	950-1000 meters	1000-1050 meters	1050-1100 meters	1100-1150 meters	1150-1200 meters	1200-1250 meters	1250-1300 meters	1300-1350 meters	1350-1400 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- San Vicente St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- San Roque St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Sunrise Street - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- (Cogon) Jaga Street - With Kerbs	- A. Gabuya St. I - With Kerbs	- No major intersections - With Kerbs	- Gabuya St. II - With Kerbs	- Tabura Street - With Kerbs	- No major intersections - With Kerbs	major intersections: - San Vicente St. - San Roque St. - Sunrise St. - Cogon (Jaga St.) - A. Gabuya St. I - Gabuya St. II - Tabura St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- The Church of God Christian Service	- None	- None	- None	- None	- None	- None	- Pardo Elementary School	- None	- None	- None	- None	- The Church of God Christian Service - Pardo Elementary School
3. Vegetation and Landscape	- No vegetation found	- Vegetation found (1 Gmelina)	- Vegetation found (1 Gmelina, 1 Neem tree)	- Vegetation found (1 narra, 1 calachuchi, 1 pomelo)	- Vegetation found (2 narra0	- Vegetation found (5 narra tree)	- Vegetation found (3 Gmelina, 1 narra, 1 canistel tree)	- Vegetation found (4 narra, 1 coconut)	- Vegetation found (3 Gmelina, 3 narra)	- Vegetation found (3 Gmelina, 2 narra)	- Vegetation found (2 narra)	- Vegetation found (4 narra)	- Vegetation found (4 narra)	- Vegetation found (2 Gmelina, 3 mahogany)	- Vegetation found (2 pine trees, 5 mahogany, 2 black plum, 3 neem tree)	- No vegetation found	- Vegetation found (6 narra, 1 tambis)	- Vegetation found (2 narra)	- Vegetation found (4 narra)	Vegetation: - 13 gmelina - 2 pine trees - 8 mahogany - 2 Black plum - 4 neem tree - 45 narra - 1 calachuchi - 1 pomelo - 1 canistel tree - 1 tambis - 1 coconut
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 5 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 4 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (5 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (4 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines -3 electrical transformers - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines -1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- 78 electrical post (41 concrete, 37 log) - 8 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) -No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

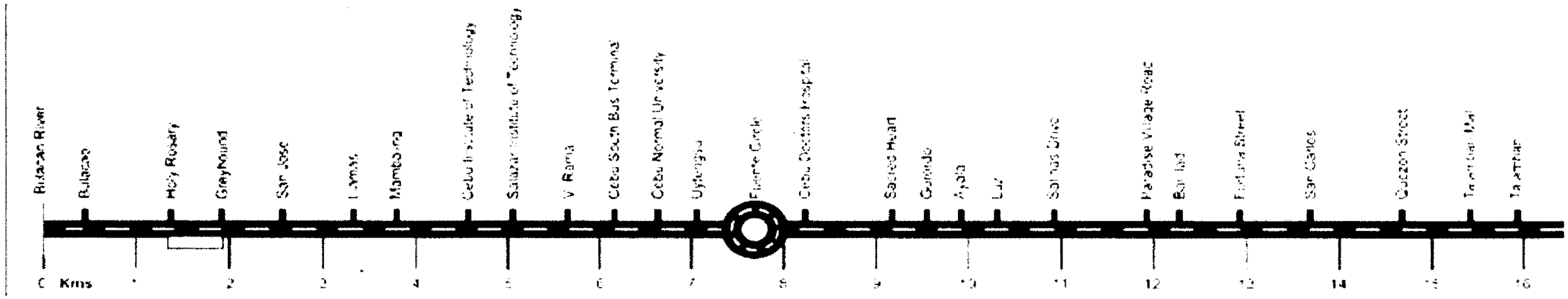
Table 3a
Segmented Profile of BRT (Holy Rosary Station Greyhound- Left Side)



1400 meters to 1950 meters

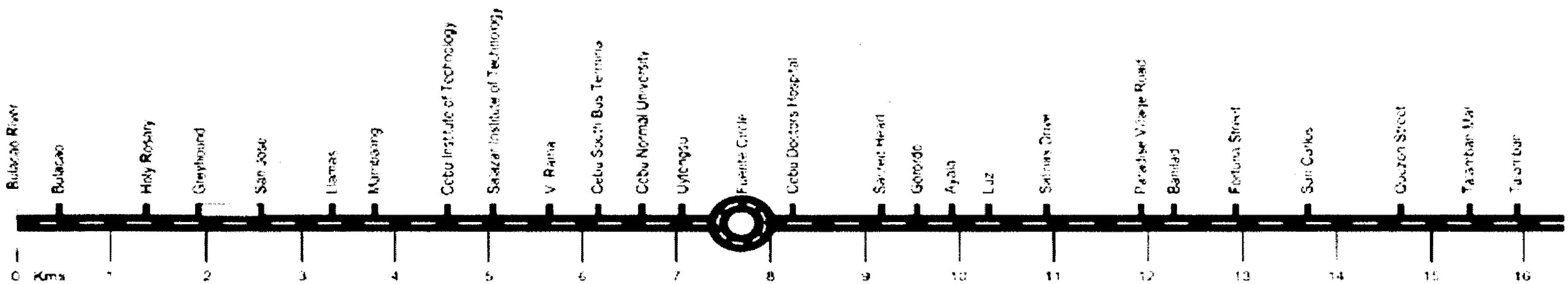
Location	1400-1450 meters	1450-1500 meters	1500-1550 meters	1550-1600 meters	1600-1650 meters	1650-1700 meters	1700-1750 meters	1750-1800 meters	1800-1850 meters	1850-1900 meters	1900-1950 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Kinasang-an Babao - With Kerbs	- Back Cres. Com. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	Major Intersections: - Kinasang-an Babao - Back Cres. Com.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- Tan-Chua Dental Clinic	- None	- None	- None	- None	Structure of cultural sensitivity and ecological importance: - Tan-Chua Dental Clinic
3. Vegetation and Landscape	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (1 mango tree)	- Vegetation found (3 pine trees)	- Vegetation found (2 mahogany)	- Vegetation found (1 Gmelina)	- Vegetation found (5 pine trees)	- Vegetation found (6 mahogany)	- Vegetation found (5 narra)	Vegetation: - 1 gmelina - 13 pine trees - 8 mahogany - 1 mango
4. Utilities	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Telephone cables - Drainage lines - 3 electrical transformer - Electrical Post (1 Concrete, 2 Log)	- Telephone cables - Drainage lines - 2 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - 3 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 0 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 0 Log)	Utilities: - 28 electrical post (17 concrete, 11 log) - 17 electrical transformers
5. Present Land Use	- Mixed Land Use - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

Table 3b
Segmented Profile of BRT (Holy Rosary Station Greyhound- Right Side)



Location	1400-1450 meters	1450-1500 meters	1500-1550 meters	1550-1600 meters	1600-1650 meters	1650-1700 meters	1700-1750 meters	1750-1800 meters	1800-1850 meters	1850-1900 meters	1900-1950 meters	Summary of Data
	1400 meters to 1950 meters											
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Inayawan Street - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	Major Intersections: - Inayawan Street
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- Rainbow village	- Greyhound Subdivision	- None	- None	- Sto. Nino Community School	- Upper Kauswagan Street	Structure of cultural sensitivity and ecological importance: - Rainbow village - Greyhound Subdivision - Sto. Nino Community School - Sto. Nino Community School - Upper Kauswagan Street
3. Vegetation and Landscape	- Vegetation found (4 narra)	- Vegetation found (4 narra)	- Vegetation found (1 tamarind)	- Vegetation found (1 mahogany, 5 narra)	- Vegetation found (1 mahogany, 1 black plum, 1 neem tree, 6 narra)	- Vegetation found (2 mahogany, 1 black plum, 1 narra, 1 tambis)	- Vegetation found (1 narra)	- Vegetation found (6 narra)	- Vegetation found (5 narra)	- Vegetation found (4 narra)	- Vegetation found (3, jackfruit, 2 star apple, 5 narra)	Vegetation: - 4 mahogany - 1 tamarind - 3 jackfruit - 2 black plum - 2 star apple - 1 neem tree - 42 narra - 1 tambis
4. Utilities	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	Utilities: - 36 electrical post (20 concrete, 16 log) - 14 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

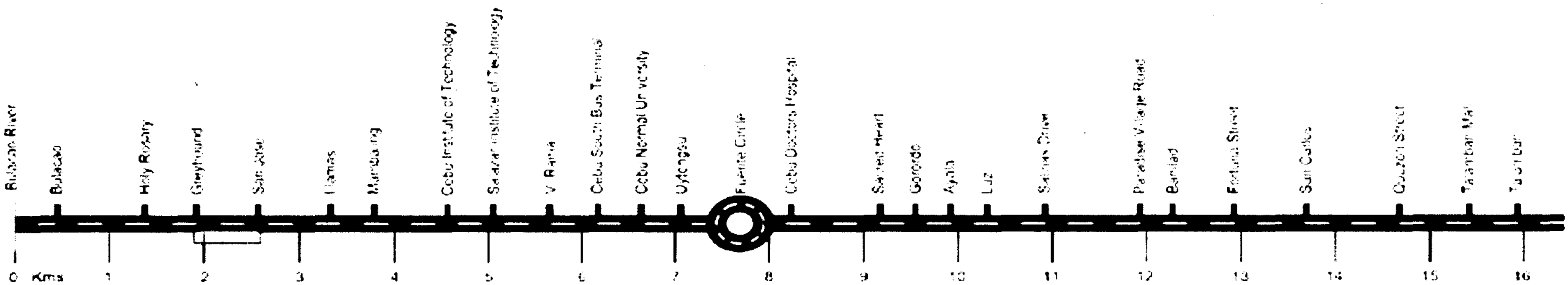
Table 4a
Segmented Profile of BRT (Greyhound Station to San Jose - Left Side)



1950 meters to 2600 meters

Location	1950-2000 meters	2000-2050 meters	2050-2100 meters	2100-2150 meters	2150-2200 meters	2200-2250 meters	2250-2300 meters	2300-2350 meters	2350-2400 meters	2400-2450 meters	2450-2500 meters	2500-2550 meters	2550-2600 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- E. Corro St. to Brgy. Quiot - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	major intersections: - E. Corro St. to Brgy. Quiot
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- Dental Clinic	- San Jose Recolletos	- Bamboo Village	- None	- None	- None	- Dental Clinic - San Jose Recolletos - Dental Clinic
3. Vegetation and Landscape	- Vegetation found (8 pine tree)	- Vegetation found (5 pine tree)	- Vegetation found (3 mango tree)	- Vegetation found (6 mahogany)	- Vegetation found (5 guava)	- Vegetation found (3 pine tree)	- Vegetation found (4 pine tree)	- Vegetation found (4 pine tree)	- Vegetation found (1 guava)	- Vegetation found (1 mango)	- No vegetation found	- Vegetation found (1 star apple, 1 coconut)	- Vegetation found (2 coconut)	Vegetation: - 24 pine trees - 6 mahogany - 4 mango - 6 guava - 1 star apple - 2 coconut
4. Utilities	- Water lines - Telephone cables - Drainage lines	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (3 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 11 electrical transformer - Electrical Post (1 Concrete, 3 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines -1 electrical transformer - Electrical Post (0 Concrete, 1 Log)	- 43 electrical post (11 concrete, 22 log) - 20 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

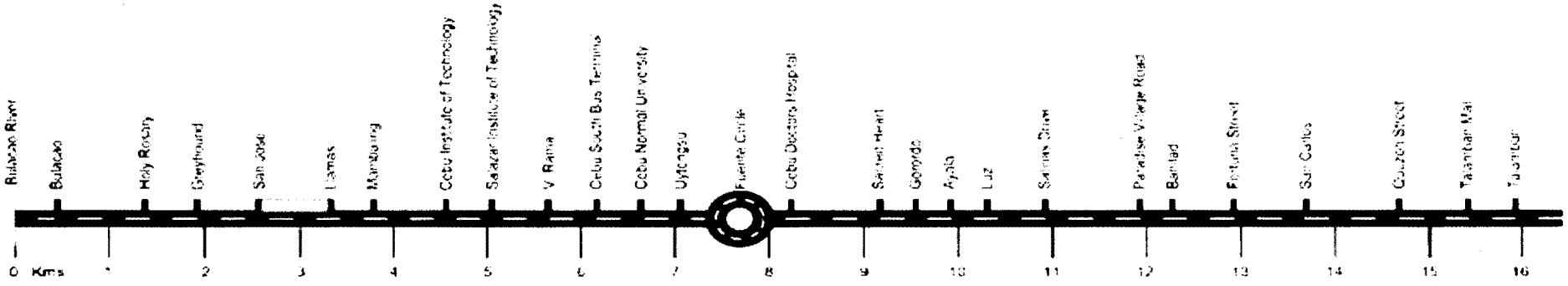
Table 4b
Segmented Profile of BRT (Greyhound Station to San Jose - Right Side)



1950 meters to 2600 meters

Location	1950-2000 meters	2000-2050 meters	2050-2100 meters	2100-2150 meters	2150-2200 meters	2200-2250 meters	2250-2300 meters	2300-2350 meters	2350-2400 meters	2400-2450 meters	2450-2500 meters	2500-2550 meters	2550-2600 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Ubos Pundok St. - With Kerbs	- Botherhood St. - With Kerbs	major intersections: - Ubos Pundok St. - Botherhood St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- Cebu Trinity Christian School	- None	- Cabreros Compound	- None	- None	- None	- None	- Basak Creek	- None	- None	- Basak Creek	- Cebu Trinity Christian School - Cabreros Compound - Basak Creek
3. Vegetation and Landscape	- Vegetation found (1 pine tree, 1 mango, 7 narra)	- Vegetation found (9 narra)	- Vegetation found (8 narra)	- Vegetation found (1 pine tree, 1 mango, 7 narra)	- Vegetation found (3 narra)	- Vegetation found (1 narra)	- Vegetation found (1 mahogany, 3 narra)	- Vegetation found (4 narra)	- Vegetation found (1 narra)	- Vegetation found (8 narra)	- Vegetation found (4 narra)	- Vegetation found (3 narra)	- Vegetation found (7 narra)	Vegetation: - 2 pine trees - 1 mahogany - 2 mango - 65 narra
4. Utilities	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete,2 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 3 Log) -	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - 3 electrical transformers Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log) -	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- 48 electrical post (26 concrete, 22 log) - 13 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

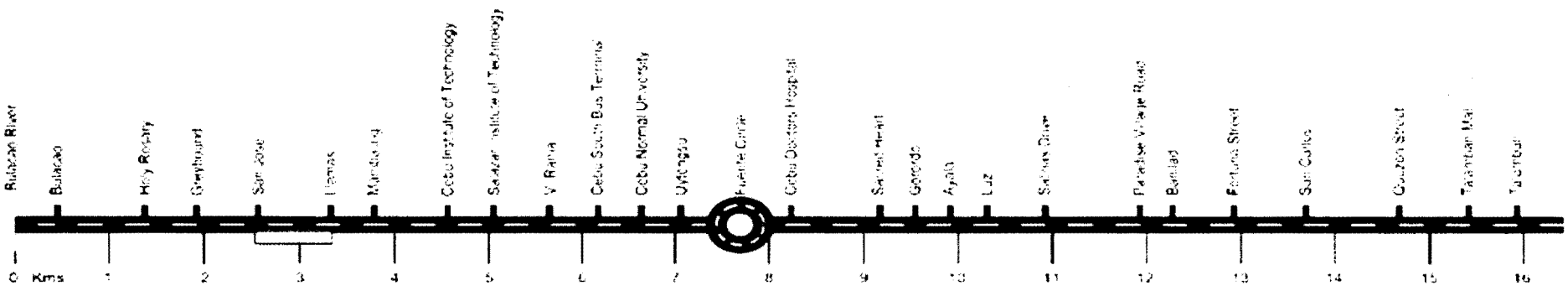
Table 5a
Segmented Profile of BRT (San Jose Station to Llamas - Left Side)



2600 meters to 3250 meters

Location	2600-2650 meters	2650-2700 meters	2700-2750 meters	2750-2800 meters	2800-2850 meters	2850-2900 meters	2900-2950 meters	2950-3000 meters	3000-3050 meters	3050-3100 meters	3100-3150 meters	3150-3200 meters	3200-3250 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- J. N. Jumalon St. - With Kerbs	- No major intersections - With Kerbs	- Macopa St. - With Kerbs	- No major intersections - With Kerbs	- Ramp Comp. Lemon St. - With Kerbs	- No major intersections - With Kerbs	- HP Baclay St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	major intersections: - J. N. Jumalon St. - Macopa St. - Ramp Comp. Lemon St. - HP Baclay St.
2. Structure of cultural sensitivity and ecological importance	- Catholic Church of Holy Cross Parish	- None	- None	- Vicente Rama Elem School	- Basak Pardo Elem School	- None	- None	- United Pentecostal Church	- None	- None	- Cebu Evangelism Center	- Friendship Village	- None	- Catholic Church of Holy Cross Parish - Vicente Rama Elem School - Basak Pardo Elem School - United Pentecostal Church - Cebu Evangelism Center - Friendship Village
3. Vegetation and Landscape	- Vegetation found (4 gmelina, 4 mahogany)	- Vegetation found (4 mango, 4 guava)	- Vegetation found (3 talisay)	- Vegetation found (7 mango)	- Vegetation found (2 star apple, 2 talisay)	- Vegetation found (1 mango)	- Vegetation found (4 star apple)	- Vegetation found (3 mahogany)	- Vegetation found (4 star apple, 4 coconut)	- Vegetation found (7 pine trees)	- Vegetation found (2 mango)	- Vegetation found (6 pine trees, 6 star apple)	- Vegetation found (4 pine trees)	Vegetation: - 4 gmelina - 17 pine trees - 7 mahogany - 14 mango - 4 guava - 16 star apple - 4 coconut - 5 talisay
4. Utilities	- Water lines - Telephone cables - Drainage lines - 1 traffic light (under repair) - Electrical Post (2 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 3Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (3 Concrete, 4 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (1 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 4 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- 54 electrical post (23 concrete, 31 log) - 14 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - With vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - With vacant lots

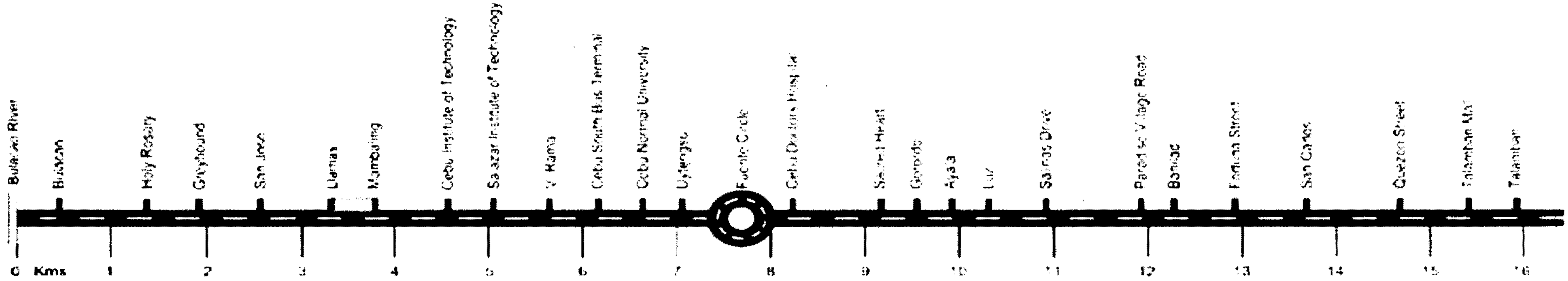
Table 5b
Segmented Profile of BRT (San Jose Station to Llamas- Right Side)



2600 meters to 3250 meters

Location	2600-2650 meters	2650-2700 meters	2700-2750 meters	2750-2800 meters	2800-2850 meters	2850-2900 meters	2900-2950 meters	2950-3000 meters	3000-3050 meters	3050-3100 meters	3100-3150 meters	3150-3200 meters	3200-3250 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Bontores Street - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Cabreros Streets - No Kerbs	- No major intersections - With Kerbs	- No major intersections - No Kerbs	- No major intersections - No Kerbs	- No major intersections - No Kerbs	major intersections: - Bontores Street - Cabreros Streets - With Kerbs
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- Messenger of hope community center	- None	- Beyones Pantinople Optical Clinic	- None	- None	- None	- None	- None	- None	- None	- Messenger of hope community center - Beyones Pantinople Optical Clinic
3. Vegetation and Landscape	- Vegetation found (8 narra)	- Vegetation found (4 narra)	- Vegetation found (6 narra)	- Vegetation found (4 narra)	- Vegetation found (7 narra)	- Vegetation found (1 tamarind, 8 narra)	- Vegetation found (4 narra)	- Vegetation found (5 narra)	- Vegetation found (2 narra)	- Vegetation found (3 narra)	- Vegetation found (3 narra)	- Vegetation found (2 narra)	- Vegetation found (8 narra)	Vegetation: - 1 tamarind - 64 narra
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete,1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Telephone cables - Drainage lines - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- 45 electrical post (25 concrete, 20 log) - 6 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

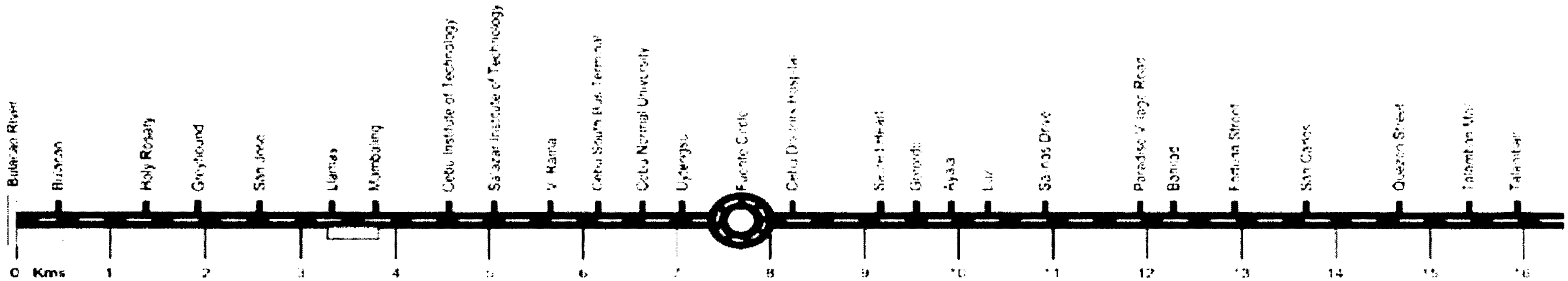
Table 6a
Segmented Profile of BRT (Llamas Station to Mambaling - Left Side)



3250 meters to 3850 meters

Location	3250-3300 meters	3300-3350 meters	3350-3400 meters	3400-3450 meters	3450-3500 meters	3500-3550 meters	3550-3600 meters	3600-3650 meters	3650-3700 meters	3700-3750 meters	3750-3800 meters	3800-3850 meters	Summary of Data
1. Road Features	- F. Llamas Mambaling - With Kerbs	- No major intersections - With Kerbs	- Encalyptus St. - With Kerbs	- Dapdap St. - With Kerbs	- Caimito St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Bayabas St. - With Kerbs	- Avocado St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	major intersections: - F. Llamas Mambaling - Encalyptus St. - Dapdap St. - Caimito St. - Bayabas St. - Avocado St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- Dental Clinic	- None	- None	- None	- None	- None	- Mambaling Elem School	- None	- Dental Clinic - Mambaling Elem School
3. Vegetation and Landscape	- Vegetation found (2 mango)	- Vegetation found (2 pine tree)	- Vegetation found (3 pine tree, 3 mango)	- Vegetation found (2 narra)	- Vegetation found (7 pine tree)	- Vegetation found (6 jackfruit)	- Vegetation found (4 mango, 4 guava)	- Vegetation found (6 pine tree)	- Vegetation found (5 mahogany, 5 narra)	- Vegetation found (6 guava, 6 coconut)	- No vegetation found	- Vegetation found (7 mahogany)	Vegetation: - 18 pine trees - 12 mahogany - 9 mango - 10 guava - 6 jackfruit - 7 narra - 6 coconut
4. Utilities	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 4 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (3 Concrete, 3 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 3 Log)	- Telephone cables - Drainage lines - Electrical Post (1 Concrete, 0Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - 4 electrical transformers - Electrical Post (4 Concrete, 4 Log)	- 50 electrical post (24 concrete, 26 log) - 17 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

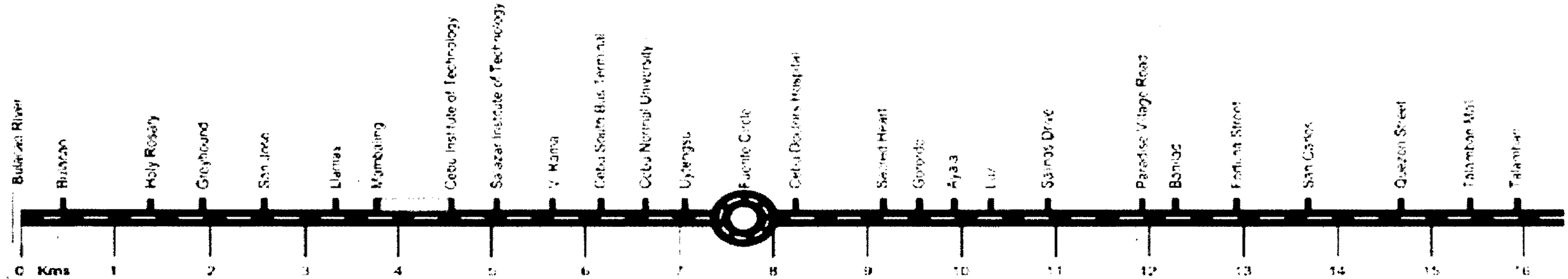
Table 6b
Segmented Profile of BRT (Llamas Station to Mambaling - Right Side)



3250 meters to 3850 meters

Location	3250-3300 meters	3300-3350 meters	3350-3400 meters	3400-3450 meters	3450-3500 meters	3500-3550 meters	3550-3600 meters	3600-3650 meters	3650-3700 meters	3700-3750 meters	3750-3800 meters	3800-3850 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Tabada St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - No Kerbs	- No major intersections - No Kerbs	major intersections: - Tabada St. - With Kerbs
2. Structure of cultural sensitivity and ecological importance	- Alkhairiah Mosque	- None	- None	- None	- None	- None	- None	- None	- None	- None	- None	- None	- Alkhairiah Mosque
3. Vegetation and Landscape	- Vegetation found (6 narra)	- Vegetation found (8 narra)	- Vegetation found (1 mango, 1 jackfruit, 5 narra)	- Vegetation found (1 star apple, 6 narra)	- Vegetation found (1 narra)	- Vegetation found (4 narra)	- Vegetation found (9 narra)	- Vegetation found (4 narra)	- Vegetation found (2 narra)	- No vegetation found	- No vegetation found	- 45 meter length Duranta Plant	Vegetation: - 1 mango - 1 jackfruit - 1 star apple - 45 narra
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 4 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (4 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Drainage lines - Electrical Post (4 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (4 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- 65 electrical post (35 concrete, 30 log) - 1 electrical transformer
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - With vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - With vacant lots

Table 7a
Segmented Profile of BRT (Mambaling Station to Cebu Institute of technology- Left Side)

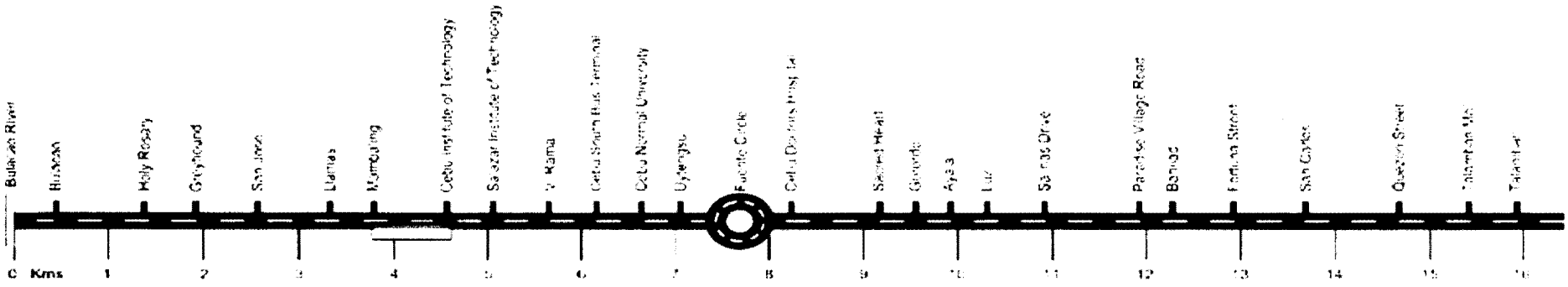


3850 meters to 4600 meters

Location	3850-3900 meters	3900-3950 meters	3950-4000 meters	4000-4050 meters	4050-4100 meters	4100-4150 meters	4150-4200 meters	4200-4250 meters
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Ma.Gochian St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- None
3. Vegetation and Landscape	- Vegetation found (3 gmelina)	- Vegetation found (5 guava, 5 star apple)	- Vegetation found (1 mango)	- Vegetation found (5 mahogany)	- Vegetation found (5 gmelina, 5 star apple)	- Vegetation found (5 guava, 5 star apple)	- Vegetation found (5 mahogany)	- No vegetation found
4. Utilities	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (0 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (0 Concrete, 3 Log)	- Telephone cables - Drainage lines - Electrical Post (0 Concrete, 4 Log)	- Telephone cables - Drainage lines - Electrical Post (0 Concrete, 4 Log)	- Electrical Post (1 Concrete, 2 Log)	- Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

Location	4250-4300 meters	4300-4350 meters	4350-4400 meters	4400-4450 meters	4450-4500 meters	4500-4550 meters	4550-4600 meters	Summary of Data
1. Road Features	- Jedan Babao St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	major intersections: - Ma.Gochian St. - Jedan Babao St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- Kinalumsan Creek	- None	- None	- None	- Kinalumsan Creek
3. Vegetation and Landscape	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (2 star apple)	Vegetation: - 8 gmelina - 10 mahogany - 1 mango - 10 guava - 17 star apple
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 4 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (1 Concrete, 4 Log)	- Water lines - Telephone cables - Drainage lines - 5 electrical transformers - Electrical Post (2 Concrete, 4 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (0 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- 60 electrical post (17 concrete, 43 log) - 13 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

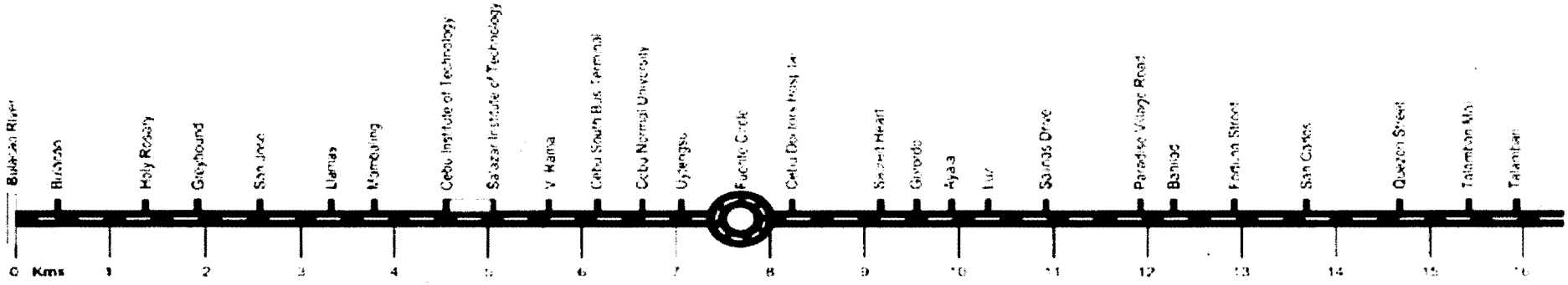
Table 7b
Segmented Profile of BRT (Mambaling Station to Cebu Institute of technology - Right Side)



3850 meters to 4600 meters

Location	3850-3900 meters	3900-3950 meters	3950-4000 meters	4000-4050 meters	4050-4100 meters	4100-4150 meters	4150-4200 meters	4200-4250 meters	4250-4300 meters	4300-4350 meters	4350-4400 meters	4400-4450 meters	4450-4500 meters	4500-4550 meters	4550-4600 meters	Summary of Data
1. Road Features	- No major intersections - No Kerbs	- SRP Street - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	major intersections: - SRP Street
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- None	- Sr. Sto. Niño Chapel	- None	- None	- Kinalumsan River	- None	- None	- None	- Sr. Sto. Niño Chapel - Kinalumsan River
3. Vegetation and Landscape	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (3 narra)	- Vegetation found (9 narra)	- Vegetation found (1 narra)	- Vegetation found (2 narra)	- Vegetation found (1, gmelina, 1 narra)	- No vegetation found	- Vegetation found (1 gmelina)	- Vegetation found (5 narra)	- Vegetation found (1 narra)	- Vegetation found (2 narra)	- Vegetation found (3 narra)	- Vegetation found (2 tamarind, 1 black plum, 2 narra)	Vegetation: - 2 gmelina - 2 tamarind - 1 black plum - 29 narra
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (5 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (1 Concrete, 2 Log)	- Water lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- 54 electrical post (29 concrete, 25 log) - 10 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - With vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

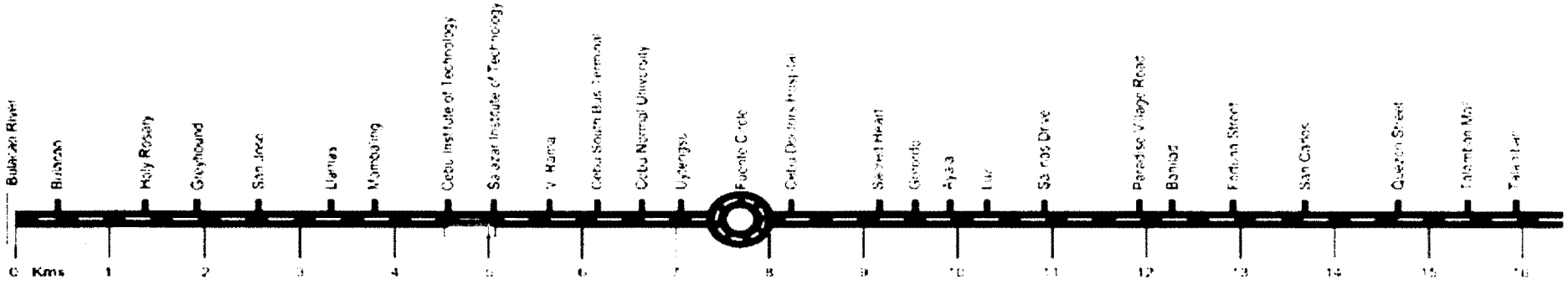
Table 8a
Segmented Profile of BRT (Cebu Institute of Technology to Salazar Institute of Technology- Left Side)



4800 meters to 5100 meters

Location	4600-4650 meters	4650-4700 meters	4700-4750 meters	4750-4800 meters	4800-4850 meters	4850-4900 meters	4900-4950 meters	4950-5000 meters	5000-5050 meters	5050-5100 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- Cebu Institute of Technology	- None	- None	- None	- None	- Salazar Institute of Technology	- Cebu Institute of Technology - Salazar Institute of Technology
3. Vegetation and Landscape	- Vegetation found (2 guava)	- Vegetation found (4 guava)	- Vegetation found (6 mahogany)	- Vegetation found (2 guava)	- Vegetation found (2 guava)	- No vegetation found	- Vegetation found (2 gmelina)	- Vegetation found (3 mahogany)	- No vegetation found	- No vegetation found	Vegetation: - 2 gmelina - 9 mahogany - 10 guava
4. Utilities	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (4 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 4 electrical transformers - Electrical Post (5 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 2 Traffic lights - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 4 electrical transformers - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- 39 electrical post (24 concrete, 15 log) - 21 electrical transformer - 2 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

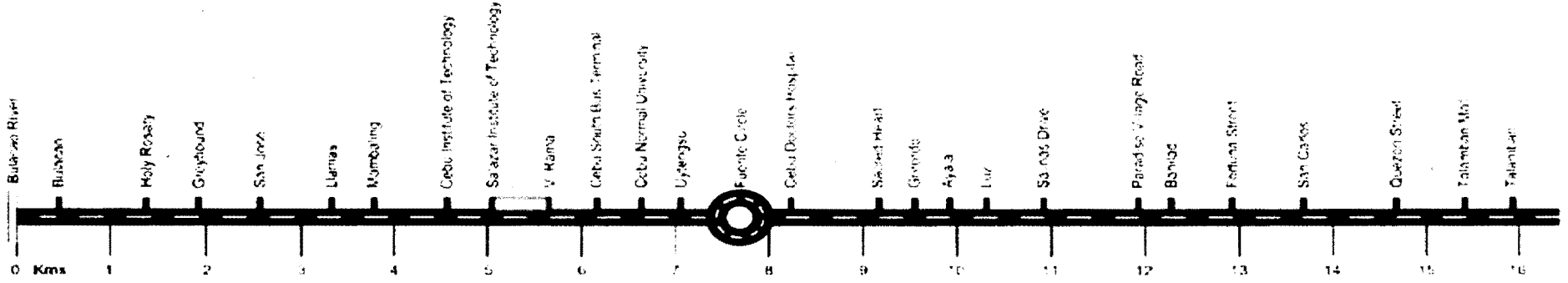
Table 8b
Segmented Profile of BRT (Cebu Institute of Technology to Salazar Institute of Technology - Right Side)



4600 meters to 5100 meters

Location	4600-4650 meters	4650-4700 meters	4700-4750 meters	4750-4800 meters	4800-4850 meters	4850-4900 meters	4900-4950 meters	4950-5000 meters	5000-5050 meters	5050-5100 meters	Summary of Data
1. Road Features	- Fatima St. - With Kerbs	- No major intersections - With Kerbs	- B. Aranas St. - With Kerbs	- B. Aranas St. Ext. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Tres Deabric St. - No Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	major intersections: - Fatima St. - B. Aranas St - B. Aranas St. Ext. - Tres Deabric St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- None	- None	- None	- Structure of cultural sensitivity and ecological importance
3. Vegetation and Landscape	- Vegetation found (1 mahogany, 1 narra)	- Vegetation found (2 narra, 1 talisay)	- Vegetation found (1 mango, 2 narra, 1 balete)	- Vegetation found (5 mahogany, 1 jackfruit, 2 narra)	- Vegetation found (1 narra)	- Vegetation found (1 narra)	- Vegetation found (1 mahogany, 1 narra)	- Vegetation found (1 tamarind)	- Vegetation found (1 narra)	- Vegetation found (1 gmelina, 1 narra)	Vegetation: - 1 gmelina - 7 mahogany - 1 mango - 1 tamarind - 1 jackfruit - 12 narra - 1 talisay - 1 balete
4. Utilities	- Water lines - Telephone cables - Drainage lines - 1 traffic light - Electrical Post (3 Concrete, 2 Log)	- Water lines - 3 electrical transformers - 1 traffic light - Electrical Post (1 Concrete, 3 Log)	- Water lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (3 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Telephone cables - Drainage lines - 1 traffic light	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - 1 traffic light - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- 39 electrical post (19 concrete, 20 log) - 11 electrical transformer - 4 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

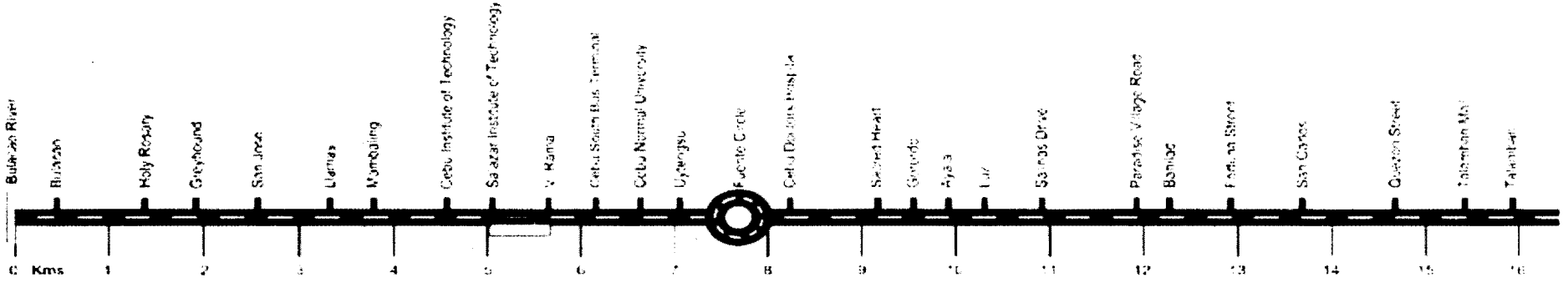
Table 9a
Segmented Profile of BRT (Salazar Institute of Technology to V. Rama - Left Side)



5100 meters to 5650 meters

Location	5100-5150 meters	5150-5200 meters	5200-5250 meters	5250-5300 meters	5300-5350 meters	5350-5400 meters	5400-5450 meters	5450-5500 Meters	5500-5550 meters	5550-5600 meters	5600-5650 Meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Labangon St. - With Kerbs	- To Labangon - With Kerbs	- No major intersections - With Kerbs	- No major intersections - No Kerbs	- V. Rama St. - No Kerbs	- No major intersections - No Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Labangon St. - to Labongon - V.Rama St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- Dr. Uy Clinic - Jesus Saves	- Christian Fellowship	- None	- Guadalupe River	- None	- None	- None	- None	- None	- Dr. Uy Clinic - Jesus Saves - Christian Fellowship - Guadalupe River
3. Vegetation and Landscape	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (3 gmelina, 3 pine trees, 3 mahogany, 3 mango, 3 guava, 3 tamarind, 3 jackfruit, 3 black plum, 3 cucumber, 3 star apple, 3 neem tree, 3 narra, 3 calachuchi, 3 pomelo, 3 canistel, 3 coconut, 3 talisay, 3 balete, 3 cotton tree)	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (2 guava)	Vegetation: (3 gmelina, 3 pine trees, 3 mahogany, 3 mango, 5 guava, 3 tamarind, 3 jackfruit, 3 black plum, 3 cucumber, 3 star apple, 3 neem tree, 3 narra, 3 calachuchi, 3 pomelo, 3 canistel, 3 coconut, 3 talisay, 3 balete, 3 cotton tree)
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 traffic light - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - 3 traffic lights - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - 5 traffic lights - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 traffic light - Electrical Post (2 Concrete, 2 Log)	- 35 electrical post (20 concrete, 15 log) - 3 electrical transformers - 10 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - with vacant lots	- Mixed Land Uses (Residential and Commercial) - with vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

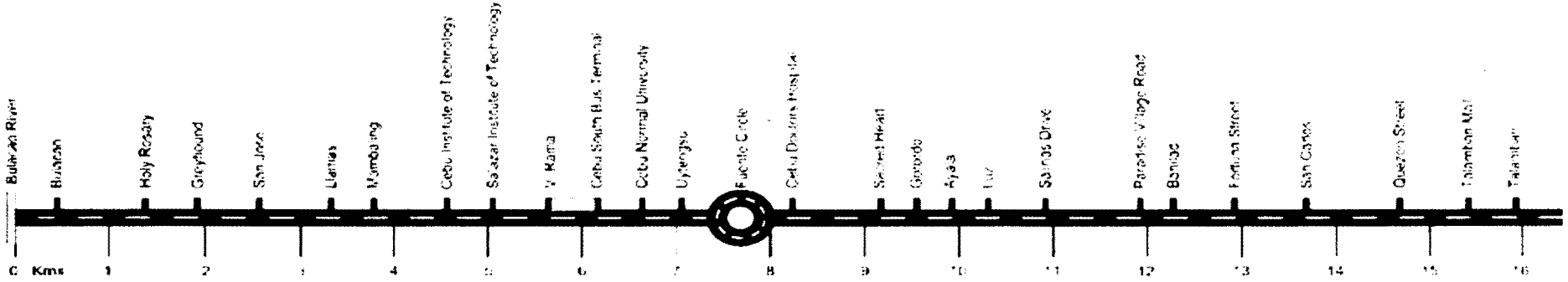
Table 9b
Segmented Profile of BRT (Salazar Institute of Technology to V. Rama - Right Side)



5100 meters to 5650 meters

Location	5100-5150 meters	5150-5200 meters	5200-5250 meters	5250-5300 meters	5300-5350 meters	5350-5400 meters	5400-5450 meters	5450-5500 Meters	5500-5550 meters	5550-5600 meters	5600-5650 Meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Rama St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - No Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Pahina Central Street - With Kerbs	- Rama St. - Pahina Central Street
2. Structure of cultural sensitivity and ecological importance	- None	- Nbne	- Mother of Perpetual Help chapel	- None	- None	- Guadalupe River	- None	- None	- None	- Cebu City Medical	- None	- Mother of Perpetual Help chapel - Guadalupe River - Cebu City Medical
3. Vegetation and Landscape	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (1 gmelina, 1 narra, 1 cotton tree)	- Vegetation found (1 black plum)	- No vegetation found	- Vegetation found (1 narra)	- No vegetation found	- Vegetation found (2 narra)	- Vegetation found (4 ipil-ipil)	- Vegetation found (4 gmelina)	Vegetation: - 5 gmelina - 1 black plum - 4 narra - 1 cotton tree - 4 ipil-ipil
4. Utilities	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - 1 traffic light - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 Traffic lights - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- 44 electrical post (21 concrete, 23 log) - 10 electrical transformers - 2 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

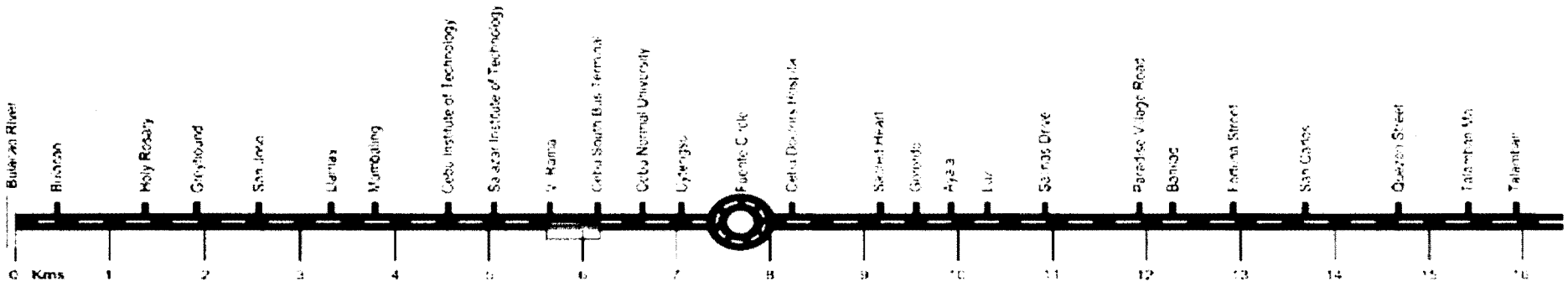
Table 10a
Segmented Profile of BRT (V. Rama Station to Cebu South Bus Terminal- Left Side)



5650 meters to 6200 meters

Location	5650-5700 meters	5700-5750 meters	5750-5800 meters	5800-5850 meters	5850-5900 meters	5900-5950 meters	5950-6000 Meters	6000-6050 Meters	6050-6100 meters	6100-6150 Meters	6150-6200 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- Rallos St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - No Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Urgelio St. - With Kerbs	- Rallos St. - Urgelio St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- Sta. Cruz Chapel	- Dr. Della Oriel	- None	- None	- Rizwood College	- Cyber Medical Clinic	- None	- None	- Sta. Cruz Chapel - Dr. Della Oriel - Rizwood College - Cyber Medical Clinic
3. Vegetation and Landscape	- No vegetation found	- Vegetation found (1 guava)	- No vegetation found	- Vegetation found (1 mahogany)	- Vegetation found (1 guava)	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (1 gmelina, 1 pine trees, 1 mahogany, 1 mango, 1 guava, 1 tamarind, 1 jackfruit, 1 black plum, 1 cucumber, 1 star apple, 1 neem tree, 1 narra, 1 calachuchi, 1 pomelo, 1 canistel, 1 coconut, 1 talisay, 1 balete, 1 cotton tree)	Vegetation: (1 gmelina, 1 pine trees, 2 mahogany, 1 mango, 3 guava, 1 tamarind, 1 jackfruit, 1 black plum, 1 cucumber, 1 star apple, 1 neem tree, 1 narra, 1 calachuchi, 1 pomelo, 1 canistel, 1 coconut, 1 talisay, 1 balete, 1 cotton tree)
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 4 electrical transformers - Electrical Post (3 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 2 traffic lights - Electrical Post (1 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (3 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 6 electrical transformers - Electrical Post (2 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - 1 traffic light - Electrical Post (5 Concrete, 2 Log)	- 46 electrical post (26 concrete, 20 log) - 21 electrical transformer - 3 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

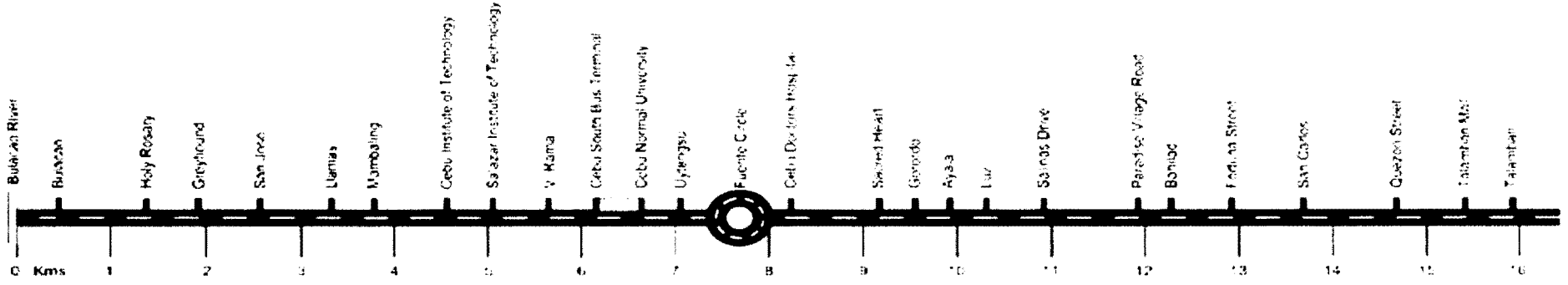
Table 10b
Segmented Profile of BRT (V. Rama Station to Cebu South Bus Terminal- Right Side)



5650 meters to 6200 meters

Location	5650-5700 meters	5700-5750 meters	5750-5800 meters	5800-5850 meters	5850-5900 meters	5900-5950 meters	5950-6000 Meters	6000-6050 Meters	6050-6100 meters	6100-6150 Meters	6150-6200 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Leon Kilat St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Leon Kilat St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- None	- None	- ACT School	- None	- ACT School
3. Vegetation and Landscape	- Vegetation found (6 mahogany, 6 narra)	- No vegetation found	- Vegetation found (3 gmelina)	- Vegetation found (3 neem tree)	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (5 narra)	- Vegetation found (1 narra)	- No vegetation found	- No vegetation found	Vegetation: - 3 gmelina - 6 mahogany - 3 neem tree - 12 narra
4. Utilities	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - 1 traffic light - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 traffic light - Electrical Post (3 Concrete, 3 Log)	- Water lines - Telephone cables - 7 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - 1 electrical transformer - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - 2 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Electrical Post (1 Concrete, 2 Log)	- Telephone cables - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage Lines - 2 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage Lines - 1 traffic light - Electrical Post (4 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage Lines - 2 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage Lines - Electrical Post (2 Concrete, 2 Log)	- 42 electrical post (23 concrete, 19 log) - 15 electrical transformers - 3 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

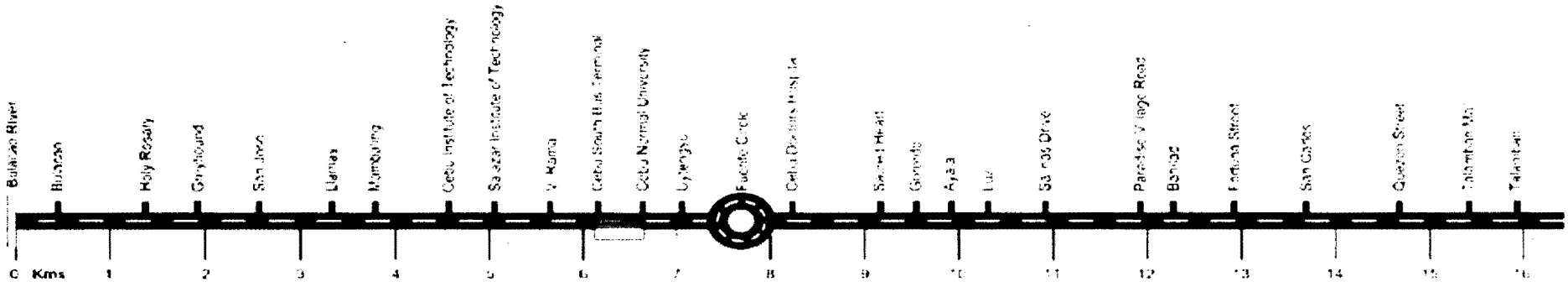
Table 11a
Segmented Profile of BRT (Cebu South Bus Terminal to Cebu Normal University - Left Side)



6200 meters to 6650 meters

Location	6200-6250 meters	6250-6300 meters	6300-6350 meters	6350-6400 meters	6400-6450 meters	6450-6500 Meters	6500-6550 Meters	6550-6600 meters	6600-6650 Meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- P. Del Rosario Cor. Osmena Blvd. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- R.R. Landon St. - With Kerbs	- No major intersections - No Kerbs	- No major intersections - With Kerbs	- P. Del Rosario Cor. Osmena Blvd. - R.R. Landon St.
2. Structure of cultural sensitivity and ecological importance	- None	- City Central	- City Central	- None	- None	- None	- None	- None	- None	- City Central
3. Vegetation and Landscape	- No vegetation found	- Vegetation found (7 narra)	- Vegetation found (6 narra)	- Vegetation found (13 narra)	- Vegetation found (6 narra)	- Vegetation found (20 narra)	- Vegetation found (6 narra)	- Vegetation found (6 narra)	- Vegetation found (14 narra)	**Vegetation:** - 78 narra
4. Utilities	- Water lines - Telephone cables - Drainage lines - 1 traffic light - Electrical Post (1 Concrete, 3 Log)	- Telephone cables - Drainage lines - 2 electrical transformers - 2 traffic lights - Electrical Post (3 Concrete, 2 Log)	- Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (3 Concrete, 3 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 3 Log)	- Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - 1 traffic light - Electrical Post (2 Concrete, 3 Log)	- Telephone cables - Drainage lines - 1 traffic light - Electrical Post (2 Concrete, 3 Log)	- Telephone cables - Drainage lines - 1 traffic light - Electrical Post (2 Concrete, 2 Log)	- 40 electrical post (18 concrete, 22 log) - 8 electrical transformers - 6 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

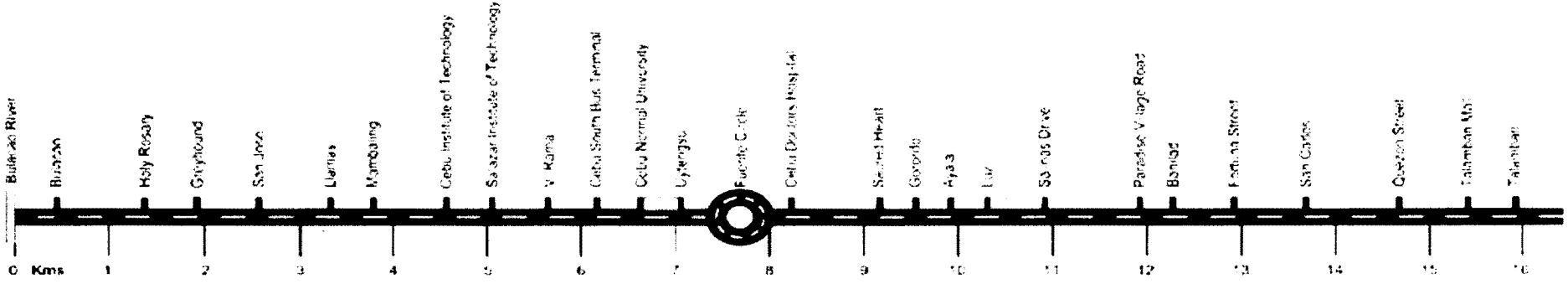
Table 11b
Segmented Profile of BRT (Cebu South Bus Terminal to Cebu Normal University - Right Side)



6200 meters to 6650 meters

Location	6200-6250 meters	6250-6300 meters	6300-6350 meters	6350-6400 meters	6400-6450 meters	6450-6500 Meters	6500-6550 Meters	6550-6600 meters	6600-6650 Meters	Summary of Data
1. Road Features	- Osmeña Blvd. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- R.R. Landon St. - With Kerbs	- No major intersections - No Kerbs	- No major intersections - With Kerbs	- Osmena Blvd. - R.R. Landon St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- Cebu Normal University	- Cebu Normal University	- None	- None	- None	Cebu Normal University
3. Vegetation and Landscape	- No vegetation found	- Vegetation found (9 narra)	- Vegetation found (9 narra)	- Vegetation found (1 mahogany, 2 narra)	- Vegetation found (10 narra) - Landscape (30m Saging)	- Vegetation found (1 gmelina, 1 ,mahogany, 12 narra)	- Vegetation found (6 narra)	- Vegetation found (8 narra) - Landscape (40m Duranta)	- Vegetation found (6 black plum, 10 narra)	Vegetation: - 1 gmelina - 2 mahogany - 6 black plum - 66 narra Landscape: - 30m Saging - 40m Duranta
4. Utilities	- Water lines - Telephone cables - Drainage lines - 1 traffic light - Electrical Post (1 Concrete, 3 Log)	- Water lines - Drainage lines - 1 electrical transformer - 2 traffic lights	- Water lines - Drainage lines - 2 traffic lights	- Water lines - Drainage lines - Electrical Post (0 Concrete, 1 Log)	- Telephone cables - Drainage lines - 3 traffic lights - Electrical Post (1 Concrete, 2 Log)	- Drainage lines - 2 traffic lights - Electrical Post (0 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Water lines - Drainage lines - 1 electrical transformer - 2 traffic lights - Electrical Post (0 Concrete, 1 Log)	- Drainage lines - Electrical Post (1 Concrete, 0- Log)	- 14 electrical post (5 concrete, 9 log) - 3 electrical transformers - 12 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

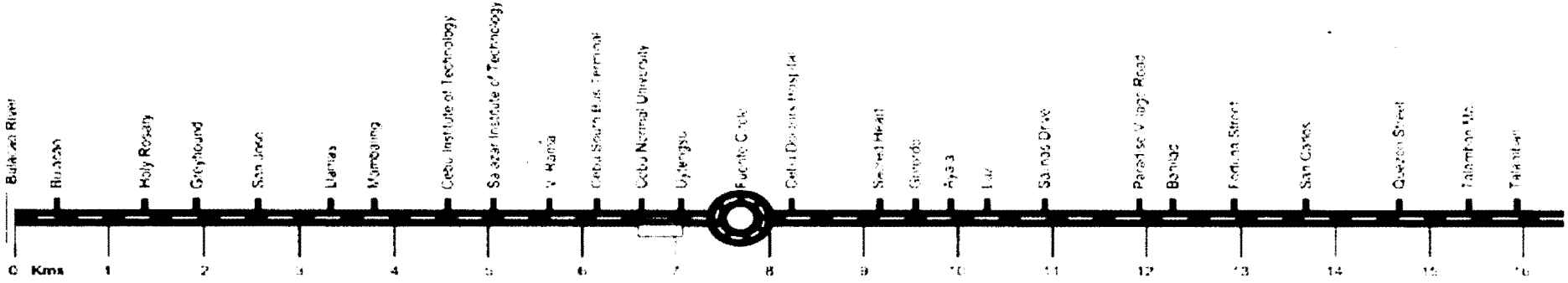
Table 12a
Segmented Profile of BRT (Cebu Normal University to Uytengsu Station- Left Side)



6650 meters to 7100 meters

Location	6650-6700 meters	6700-6750 meters	6750-6800 meters	6800-6850 meters	6850-6900 Meters	6900-6950 Meters	6950-7000 meters	7000-7050 Meters	7050-7100 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Uytengsu St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Urgelio St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Uytengsu St. - Urgelio St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- None	- None	- No Structure of cultural sensitivity and ecological importance
3. Vegetation and Landscape	- Vegetation found (5 narra)	- Vegetation found (11 narra)	- Vegetation found (2 narra) - Landscape (3m grass)	- Vegetation found (4 narra) - Landscape (3m grass)	- Vegetation found (9 narra) - Landscape (10m duranta)	- Vegetation found (6 narra) - Landscape (3m grass)	- Vegetation found (4 narra) - Landscape (3m grass)	- Vegetation found (6 narra)	- Vegetation found (13 narra)	Vegetation: - 60 narra Landscape: - 3m grass - 10m duranta
4. Utilities	- Telephone cables - Drainage lines - 4 traffic lights - Electrical Post (2 Concrete, 3 Log)	- Telephone cables - Drainage lines - 3 traffic lights - Electrical Post (3 Concrete, 2 Log)	- Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (1 Concrete, 3 Log)	- Telephone cables - Drainage lines - Electrical Post (5 Concrete, 2 Log)	- Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (3 Concrete, 1 Log)	- Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (3 Concrete, 1 Log)	- Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (3 Concrete, 2 Log)	- Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Telephone cables - Drainage lines - 4 electrical transformers - Electrical Post (1 Concrete, 4 Log)	- 44 electrical post (24 concrete, 20 log) - 15 electrical transformers - 7 traffic lights
5. Present Land Use	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots

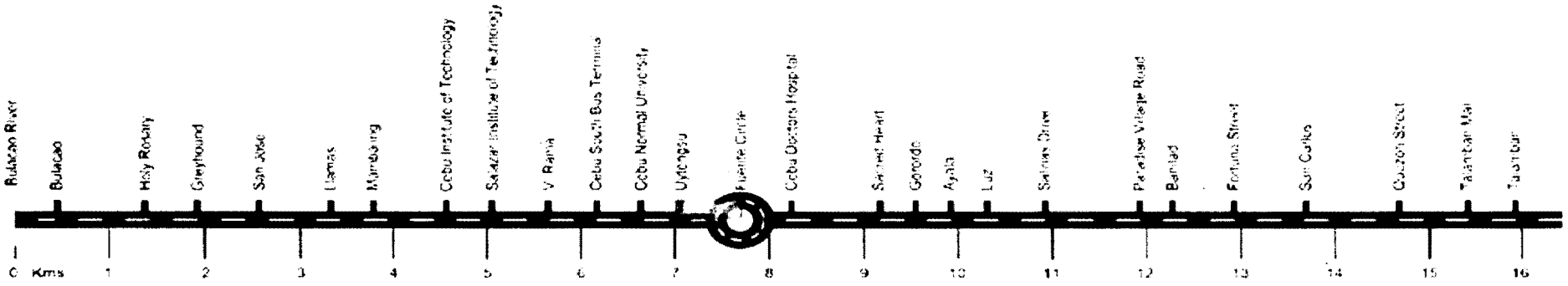
Table 12b
Segmented Profile of BRT (Cebu Normal University to Uytengsu Station - Right Side)



6650 meters to 7100 meters

Location	6650-6700 meters	6700-6750 meters	6750-6800 meters	6800-6850 meters	6850-6900 Meters	6900-6950 Meters	6950-7000 meters	7000-7050 Meters	7050-7100 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- Bradford United	- Visayan Community Medical Center	- Visayan Community Medical Center	- None	- Bradford United - Visayan Community Medical Center
3. Vegetation and Landscape	- Vegetation found (4 narra, 5 coconut)	- Vegetation found (6 narra)	- Vegetation found (4 narra) - Landscape (10m San Francisco)	- Vegetation found (8 narra) - Landscape (10m San Francisco)	- Vegetation found (7 narra)	- Vegetation found (5 narra)	- Vegetation found (2 black plum, 2 narra, 3 coconut, 2 talisay) - Landscape (15m bombil)	- Vegetation found (2 narra, 2 balete)	- Vegetation found (9 narra)	Vegetation: - 2 black plum - 47 narra - 8 coconut - 2 talisay - 2 balete Landscape: - 10m san francisco - 15m bombil
4. Utilities	- Drainage lines - 1 traffic lights - Electrical Post (1 Concrete, 0 Log)	- Drainage lines - 3 traffic lights - Electrical Post (0 Concrete, 3 Log)	- Telephone cables - Drainage lines - 2 traffic lights - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - 4 traffic lights - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Drainage lines - Electrical Post (3 Concrete, 7 Log)	- Water lines - Telephone cables - Drainage lines - 2 traffic lights - Electrical Post (0 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- 29 electrical post (11 concrete, 18 log) - 12 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots

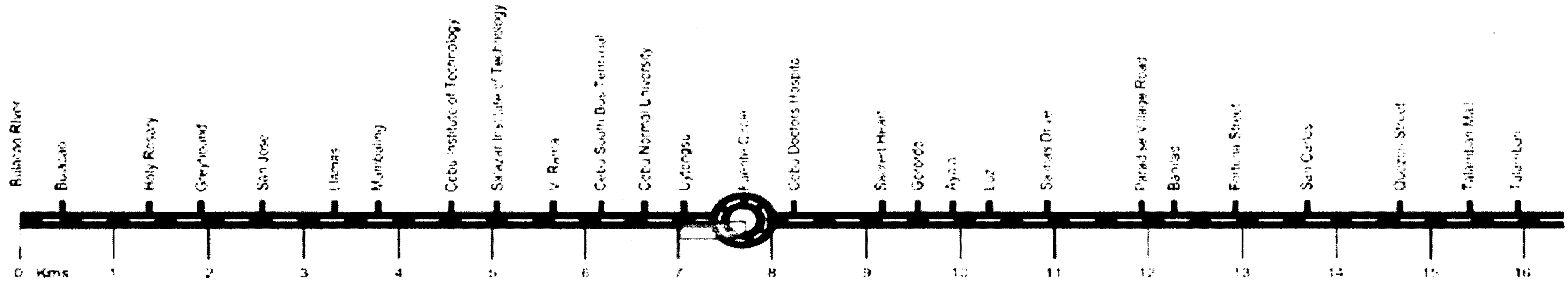
Table 13a
Segmented Profile of BRT (Uytengsu Station to Fuente Circle - Left Side)



7100 meters to 7750 meters

Location	7100-7150 meters	7150-7200 meters	7200-7250 meters	7250-7300 meters	7300-7350 meters	7350-7400 meters	7400-7450 meters	7450-7500 meters	7500-7550 meters	7550-7600 meters	7600-7650 meters	7650-7700 meters	7700-7750 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- B. Rodriguez St. - With Kerbs	- No major intersections - With Kerbs	- G. Garcia St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Llorente St. - With Kerbs	major intersections: - B. Rodriguez St. - G. Garcia St.
2. Structure of cultural sensitivity and ecological importance	- None	- DOH Building	- DOH Building	- Department of Health	- SHI Nursing Home	- None	- None	- None	- None	- None	- None	- None	- None	- DOH Building - SHI Nursing Home
3. Vegetation and Landscape	- Vegetation found (12 narra)	- Vegetation found (9 narra)	- Vegetation found (5 narra)	- Vegetation found (11 narra)	- Vegetation found (2 narra)	- Vegetation found (4 narra)	- Vegetation found (6 narra)	- Vegetation found (1 narra)	- No vegetation found	- No vegetation found Landscape (Acacia 1)	- No vegetation found	- No vegetation found Landscape (5m bougivilla)	- Vegetation found (6 narra) Landscape (5m grass)	Vegetation: - 56 narra
4. Utilities	- Telephone cables - Drainage lines - 6 electrical transformers - Electrical Post (5 Concrete, 1 Log)	- Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (3 Concrete, 2 Log)	- Telephone cables - Drainage lines - 4 electrical transformers - Electrical Post (3 Concrete, 1 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - 6 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Telephone cables - Drainage lines - Electrical Post (4 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (1 Concrete, 0 Log)	- Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 6 electrical transformers - Electrical Post (5 Concrete, 1 Log)	- 48 electrical post (32 concrete, 16 log) - 22 electrical transformers
5. Present Land Use	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial and Institutional) - With vacant lots

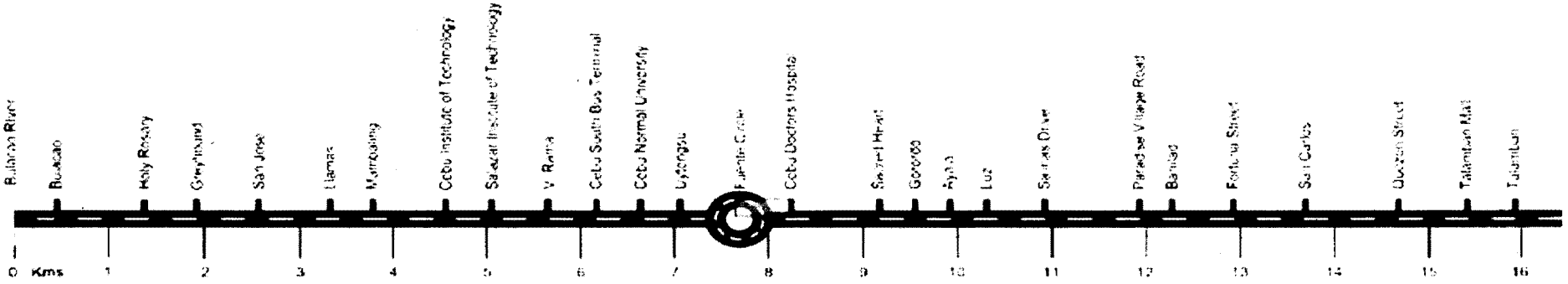
Table 13b
Segmented Profile of BRT (Uytengsu Station to Fuente Circle - Right Side)



7100 meters to 7750 meters

Location	7100-7150 meters	7150-7200 meters	7200-7250 meters	7250-7300 meters	7300-7350 meters	7350-7400 meters	7400-7450 meters	7450-7500 meters	7500-7550 meters	7550-7600 meters	7600-7650 meters	7650-7700 meters	7700-7750 meters	Summary of Data
1. Road Features	- Arlinto Pond Street - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Gen. Mayilom St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Llorente St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- MP Yap St. - With Kerbs	major intersections: - Arlinto Pond Street - Gen. Mayilom St. - Llorente St. - MP Yap St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- None	- None	- None	- Caritas Health Shield	- None	- None	- Caritas Health Shield
3. Vegetation and Landscape	- Vegetation found (4 narra) - Landscape (5m anahaw)	- Vegetation found (2 narra, 2 talisay)	- No vegetation found	- Vegetation found (1 narra) - Landscape (5m duranta)	- Vegetation found (3 narra)	- Vegetation found (9 narra) - Landscape (5m duranta)	- No vegetation found	- No vegetation found	- No vegetation found - Landscape (5m duranta)	- Vegetation found (10 narra)	- Vegetation found (10 narra) - Landscape (30m duranta)	- Vegetation found (1 narra) - Landscape (30m duranta)	- No vegetation found	Vegetation: - 41 narra - 2 talisay Landscape: - 5m anahaw - 5m duranta - 30m duranta
4. Utilities	- Water lines - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Water lines - Drainage lines - 2 traffic lights - Electrical Post (1 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Drainage lines	- Drainage lines - Electrical Post (2 Concrete, 0 Log)	- Telephone cables - Electrical Post (2 Concrete, 2 Log)	- Drainage lines - 4 traffic lights - Electrical Post (2 Concrete, 2 Log)	- Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Drainage lines - 1 electrical transformer - 2 traffic lights - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - 1 electrical transformer - 2 traffic lights - Electrical Post (5 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (5 Concrete, 0 Log)	- 45 electrical post (29 concrete, 16 log) - 3 electrical transformers - 10 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - With vacant lots

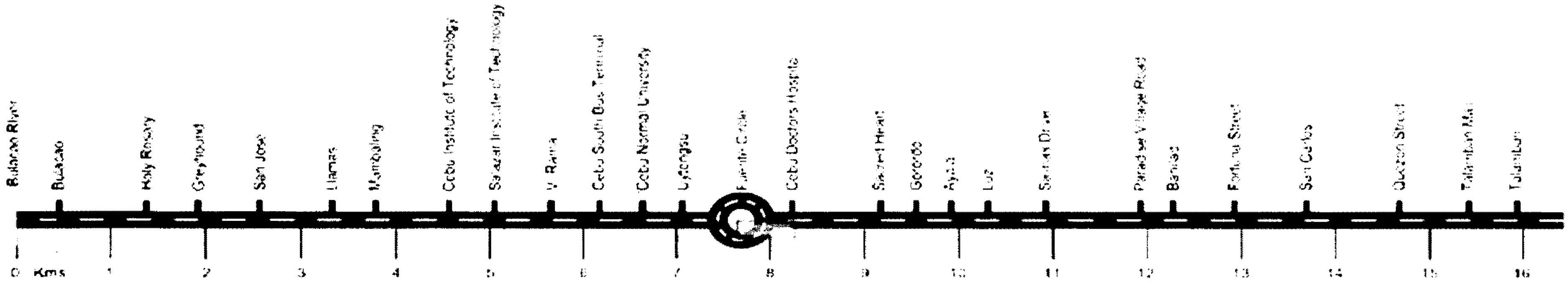
Table 14a
Segmented Profile of BRT (Fuente Circle Station to Cebu Doctors Hospital- Left Side)



7750 meters to 8300 meters

Location	7750-7800 meters	7800-7850 meters	7850-7900 meters	7900-7950 meters	7950-8000 meters	8000-8050 meters	8050-8100 meters	8100-8150 meters	8150-8200 meters	8200-8250 meters	8250-8300 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Jasmin St. - With Kerbs	- Jasmin St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Jose Avila - With Kerbs	- Jasmin St. - With Kerbs	- Escorio St. Cor. Osmena - With Kerbs	major intersections: - Jasmin St. - Jose Avila - Escorio St. Cor. Osmena
2. Structure of cultural sensitivity and ecological importance	- None	- Rizal Memorial Cebu City Museum	- None	- None	- None	- None	- None	- None	- None	- None	- None	- Rizal Memorial Cebu City Museum
3. Vegetation and Landscape	- Vegetation found (9 narra) - Landscape (5m duranta)	- Vegetation found (11 narra) - Landscape (5m duranta)	- Vegetation found (10 narra) - Landscape (5m duranta)	- Vegetation found (8 narra) - Landscape (5m duranta)	- Vegetation found (7 narra) - Landscape (5m duranta)	- Vegetation found (4 narra) - Landscape (5m duranta)	- Vegetation found (7 narra) - Landscape (5m duranta)	- Vegetation found (9 narra) - Landscape (5m duranta)	- Vegetation found (6 narra)	- No vegetation found	- No vegetation found	Vegetation: - 71 narra Landscape: - 5m duranta
4. Utilities	- Telephone cables - Drainage lines - 4 electrical transformers - 2 traffic lights - Electrical Post (4 Concrete, 1 Log)	- Telephone cables - Drainage lines - 6 electrical transformers - Electrical Post (3 Concrete, 2 Log)	- Telephone cables - Drainage lines - 6 electrical transformers - Electrical Post (4 Concrete, 6 Log)	- Telephone cables - Drainage lines - 3 electrical transformers - 1 traffic lights - Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - 1 traffic lights - Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (3 Concrete, 3 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 3 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 3 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (4 Concrete, 3 Log)	- Telephone cables - Drainage lines - 5 electrical transformers - Electrical Post (3 Concrete, 3 Log)	- Telephone cables - Drainage lines - 5 electrical transformers - 4 traffic lights - Electrical Post (2 Concrete, 1 Log)	- 58 electrical post (31 concrete, 27 log) - 32 electrical transformers - 8 traffic lights
5. Present Land Use	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots	- Mixed Land Uses (Commercial) - No vacant lots

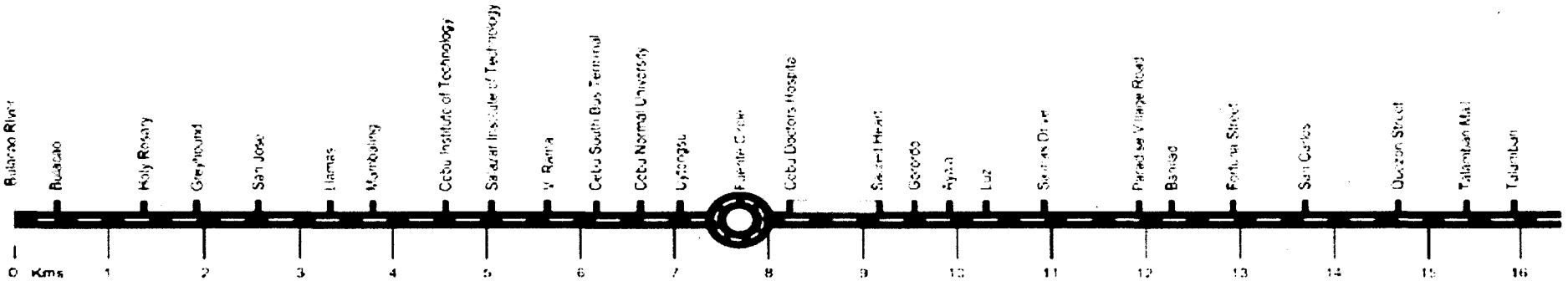
Table 14b
Segmented Profile of BRT (Fuente Circle Station to Cebu Doctors Hospital - Right Side)



7750 meters to 8300 meters

Location	7750-7800 meters	7800-7850 meters	7850-7900 meters	7900-7950 meters	7950-8000 meters	8000-8050 meters	8050-8100 meters	8100-8150 meters	8150-8200 meters	8200-8250 meters	8250-8300 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Aura St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	major intersections: - Aura St.
2. Structure of cultural sensitivity and ecological importance	- None	- Cebu Gospel Church	- Cebu Doctors	- Cebu Doctors	- None	- None	- None	- None	- None	- None	- None	- Cebu Gospel Church - Cebu Doctors
3. Vegetation and Landscape	- Vegetation found (4 narra) - Landscape (30m duranta)	- Vegetation found (1 star apple, 7 narra) - Landscape (40m duranta)	- Vegetation found (5 narra) - Landscape (10m duranta)	- Vegetation found (1 black plum, 10 narra) - Landscape (40m duranta)	- Vegetation found (6 narra) - Landscape (25m duranta)	- Vegetation found (6 narra) - Landscape (20m duranta)	- Vegetation found (12 narra) - Landscape (15m duranta)	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (1 narra)	Vegetation: - 1 black plum - 1 star apple - 51 narra Landscape: - Duranta
4. Utilities	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - 3 traffic lights - Electrical Post (3 Concrete, 1 Log)	- Water lines - Drainage lines - Electrical Post (0 Concrete, 2 Log)	- Water lines - Drainage lines - 2 traffic lights	- Water lines - Drainage lines - 2 traffic lights - Electrical Post (1 Concrete, 1 Log)	- Drainage lines - 1 traffic lights - Electrical Post (1 Concrete, 1 Log)	- Drainage lines - 2 traffic lights - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - 2 traffic lights - Electrical Post (5 Concrete, 1 Log)	- None	- None	- None	- Drainage lines	- 21 electrical post (12 concrete, 9 log) - 2 electrical transformers - 12 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

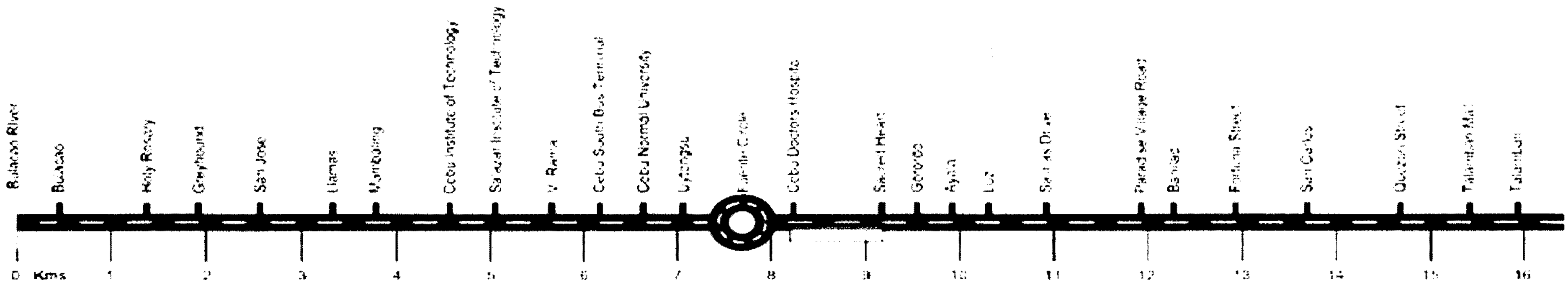
Table 15a
Segmented Profile of BRT (Cebu Doctors Hospital Station to Sacred Heart - Left Side)



8300 meters to 9200 meters

Location	8300-8350 meters	8350-8400 meters	8400-8450 meters	8450-8500 meters	8500-8550 meters	8550-8600 meters	8600-8650 meters	8650-8700 meters	8700-8750 meters	8750-8800 meters	8800-8850 meters	8850-8900 meters	8900-8950 meters	8950-9000 meters	9000-9050 Meters	9050-9100 meters	9100-9150 meters	9150-9200 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Clavano St. - With Kerbs	- Villalon Drive - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Escario St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Juana Osmeña - With Kerbs	- Purok 4 - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Rosal St. - With Kerbs	major intersections: - Clavano St. - Villalon Drive - Escario St. - Juana Osmeña - Purok 4 - Rosal St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- None	- None	- None	- None	- Atillo Medical Clinic	- None	- None	- None	- None	- None	- None	- Atillo Medical Clinic
3. Vegetation and Landscape	- No vegetation found	- No vegetation found	- No vegetation found	- Vegetation found (1 mango)	- No vegetation found	- No vegetation found	- Vegetation found (1 guava)	- Vegetation found (2 star apple)	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found - Landscape (40m duranta)	- No vegetation found	- No vegetation found - Landscape (10m duranta)	- Vegetation found (1 mango)	- No vegetation found - Landscape (10m duranta)	Vegetation: - 2 mango - 1 guava - 2 star apple Landscape: - Duranta
4. Utilities	- Telephone cables - Drainage lines - 2 traffic lights	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - 1 traffic light - Electrical Post (4 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 5 Log)	- Telephone cables - Drainage lines	- None	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (6 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 9 electrical transformers - Electrical Post (0 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (7 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - 1 traffic light - Electrical Post (6 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (4 Concrete, 0 Log)	- 68 electrical post (42 concrete, 26 log) - 20 electrical transformers - 4 traffic lights
5. Present Land Use	- Institutional - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Institutional - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Commercial - No vacant lots	- Mixed Land Uses - With vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - With vacant lots

Table 15b
Segmented Profile of BRT (Cebu Doctors Hospital Station to Sacred Heart - Right Side)



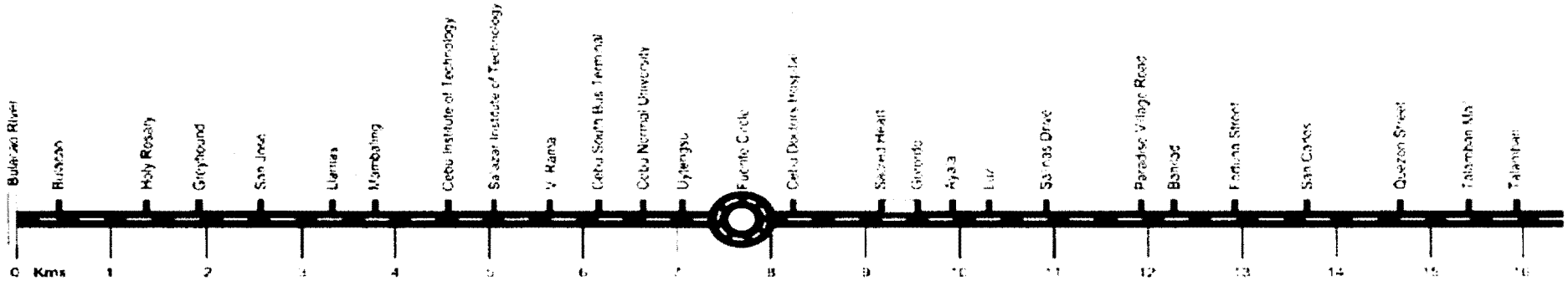
8300 meters to 9200 meters

Location	8300-8350 meters	8350-8400 meters	8400-8450 meters	8450-8500 meters	8500-8550 meters	8550-8600 meters
1. Road Features	- Ramos Ext. St. - No Kerbs	- Gov. M.Roa St. - No Kerbs	- No major intersections - No Kerbs	- No major intersections - No Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None
3. Vegetation and Landscape	- No vegetation found	- Vegetation found (1 gmelina, 1 mahogany, 3 narra)	- No vegetation found	- No vegetation found	- Vegetation found (1 star apple)	- No vegetation found - Landscape (35m carabao grass)
4. Utilities	- Water lines - Drainage lines - Electrical Post (4 Concrete, 2 Log)	- Water lines - Drainage lines - Electrical Post (0 Concrete, 1 Log)	- Water lines - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- None	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

Location	8600-8650 meters	8650-8700 meters	8700-8750 meters	8750-8800 meters	8800-8850 meters	8850-8900 meters
1. Road Features	- No major intersections - With Kerbs	- No major intersections - No Kerbs	- Juana Osmena St. - No Kerbs	- Lower Camputhaw St. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs
2. Structure of cultural sensitivity and ecological importance	- Seventh Day Adventist	- None	- None	- None	- None	- None
3. Vegetation and Landscape	- Vegetation found (2 narra)	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found
4. Utilities	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Drainage lines - 1 electrical transformer - Electrical Post (6 Concrete, 5 Log)	- Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (4 Concrete, 0 Log)	- Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Drainage lines - Electrical Post (4 Concrete, 0 Log)	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 1 Log)
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

Location	8900-8950 meters	8950-9000 meters	9000-9050 Meters	9050-9100 meters	9100-9150 meters	9150-9200 meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	major intersections: - Ramos Ext. St. - Gov. M.Roa St. - Juana Osmena St. - Lower Camputhaw St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- Camputhaw River	- Seventh Day Adventist - Camputhaw River
3. Vegetation and Landscape	- Vegetation found (4 mahogany)	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	Vegetation: - 1 gmelina - 5 mahogany - 1 star apple - 5 narra Landscape: - 35m carabao grass
4. Utilities	- Telephone cables - Drainage lines	- Telephone cables - Drainage lines - Electrical Post (3 Concrete, 2 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (0 Concrete, 3 Log)	- Water lines - Drainage lines - Electrical Post (3 Concrete, 0 Log)	- Water lines - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Drainage lines - Electrical Post (2 Concrete, 1 Log)	- 61 electrical post (39 concrete, 22 log) - 2 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots

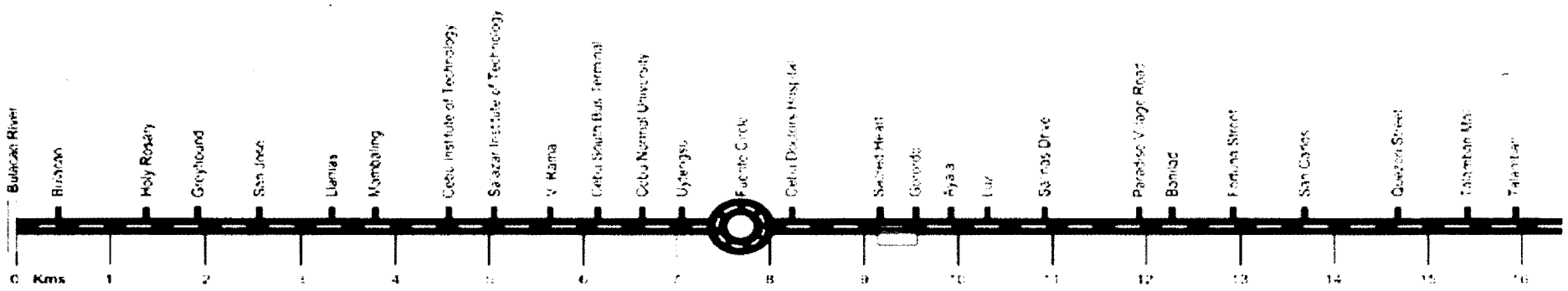
Table 16a
Segmented Profile of BRT (Sacred Heart Station to Gorordo Station - Left Side)



9200 meters to 9550 meters

Location	9200-9250 meters	9250-9300 meters	9300-9350 meters	9350-9400 meters	9400-9450 meters	9450-9500 Meters	9500-9550 Meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Tojong St. - With Kerbs	- Acacia St. - With Kerbs	- No major intersections - With Kerbs	- Gorordo St. - With Kerbs	- Tojong St. - Acacia St. - Gorordo St.
2. Structure of cultural sensitivity and ecological importance	- None	- Escorio Br.	- None	- None	- None	- None	- None	- Escorio Br.
3. Vegetation and Landscape	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found
4. Utilities	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (4 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (4 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 2 electrical transformers - Electrical Post (1 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (4 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - 3 electrical transformers - Electrical Post (5 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 4 Log)	- 31 electrical post (23 concrete, 8 log) - 9 electrical transformers
5. Present Land Use	- Commercial - No vacant lots	- Mixed Land Uses - No vacant lots	- Mixed Land Uses - No vacant lots	- Residential - No vacant lots	- Mixed Land Uses - No vacant lots	- Mixed Land Uses - No vacant lots	- Residential - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

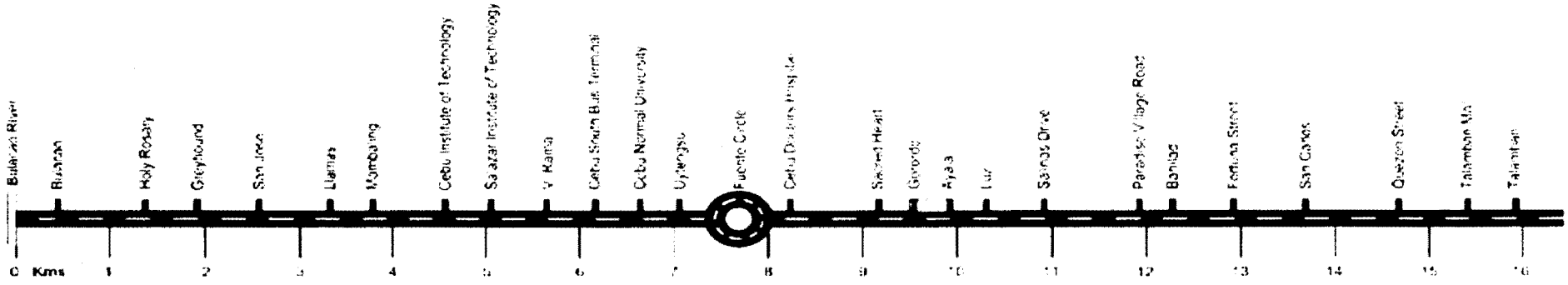
Table 16b
Segmented Profile of BRT (Sacred Heart Station to Gorordo Station - Right Side)



9200 meters to 9550 meters

Location	9200-9250 meters	9250-9300 meters	9300-9350 meters	9350-9400 meters	9400-9450 meters	9450-9500 Meters	9500-9550 Meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- Gorordo Ave. - With Kerbs	- No major intersections - With Kerbs	- No major intersections - No Kerbs	- Gorordo Ave.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- None
3. Vegetation and Landscape	- Vegetation found (1 mahogany, 1 black plum, 1 star apple)	- Vegetation found (6 mahogany)	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	- No vegetation found	Vegetation found: - 7 mahogany - 1 black plum - 1 star apple
4. Utilities	- Drainage lines - Electrical Post (2 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Drainage lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Drainage lines - 3 electrical transformers	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (4 Concrete, 3 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (2 Concrete, 2 Log)	- 20 electrical post (11 concrete, 9 log) - 3 electrical transformers
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - No vacant lots	- Mixed Land Uses (Residential, Commercial and Institutional) - With vacant lots

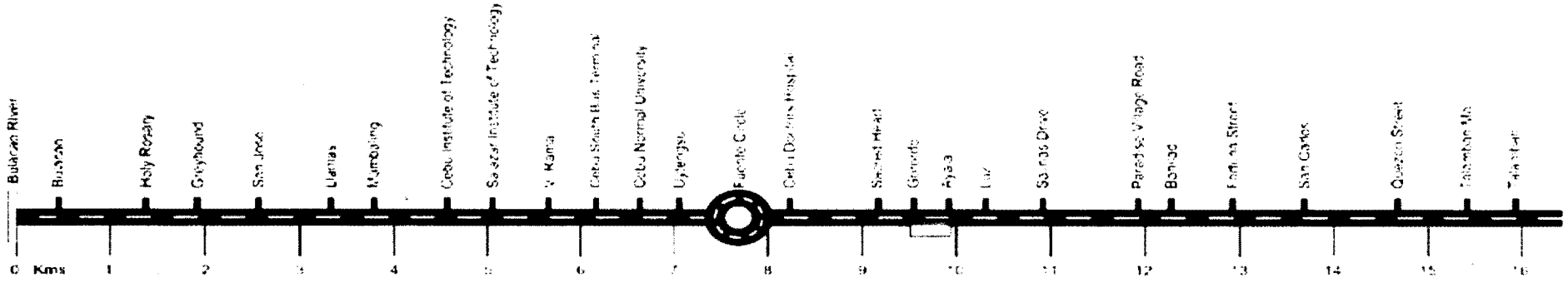
Table 17a
Segmented Profile of BRT (Gorordo Station to Ayala- Left Side)



9550 meters to 9800 meters

Location	9550-9800 Meters	9600-9650 Meters	9650-9700 meters	9700-9750 meters	9750-9800 Meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- Kamagong St. - With Kerbs	- Apitong St. - With Kerbs	- No major intersections - With Kerbs	- Molave St. - No Kerbs	- Kamagong St. - Apitong St. - Molave St.
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None
3. Vegetation and Landscape	- No vegetation found	- No vegetation found	- Vegetation found (2 talisay)	- No vegetation found	- No vegetation found	Vegetation found: - 2 talisay
4. Utilities	- Telephone cables - Drainage lines - Electrical Post (2 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - 1 electrical transformer - Electrical Post (3 Concrete, 1 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (2 Concrete, 0 Log)	- Water lines - Telephone cables - Drainage lines - Electrical Post (3 Concrete, 0 Log)	- 13 electrical post (13 concrete, 0 log) - 1 electrical transformer
5. Present Land Use	- Commercial - No vacant lots	- Mixed Land Uses - No vacant lots	- Mixed Land Uses - No vacant lots	- Mixed Land Uses - No vacant lots	- Residential - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots

Table 17b
Segmented Profile of BRT (Gorordo Station to Ayala- Right Side)



9550 meters to 10000 meters

Location	9550-9600 Meters	9600-9650 Meters	9650-9700 meters	9700-9750 meters	9750-9800 Meters	9800-9850 meters	9850-9900 meters	9900-9950 meters	9950-10000 Meters	Summary of Data
1. Road Features	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs	- No major intersections - With Kerbs
2. Structure of cultural sensitivity and ecological importance	- None	- None	- None	- None	- None	- None	- None	- None	- None	- None
3. Vegetation and Landscape	- No vegetation found	- Vegetation found (1 mango, 1 star apple, 3 balete)	- No vegetation found	- No vegetation found	- Vegetation found (2 mahogany, 1 cotton tree)	- Vegetation found (1 pine tree, 2 coconut)	- Vegetation found (3 pine tree, 1 cotton tree, 1 ipil-ipil)	- No vegetation found	- No vegetation found	Vegetation found: - 4 pine tree - 2 mahogany - 1 mango - 1 star apple - 2 coconut - 3 balete - 2 cotton tree - 1 ipil-ipil
4. Utilities	- Electrical Post (0 Concrete, 1 Log)	- Water lines - Telephone cables - Electrical Post (1 Concrete, 1 Log)	- Water lines - Electrical Post (1 Concrete, 1 Log)	- Water lines - Electrical Post (1 Concrete, 0 Log)	- Water lines - Drainage lines - 5 traffic lights	- Water lines - Telephone cables - Drainage lines - 1 traffic light	- Water lines - Drainage lines - 1 traffic lights	- Water lines - Telephone cables - Drainage lines	- Water lines - Drainage lines	- 6 electrical post (3 concrete, 3 log) - 7 traffic lights
5. Present Land Use	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - No vacant lots	- Mixed Land Uses (Residential and Commercial) - With vacant lots

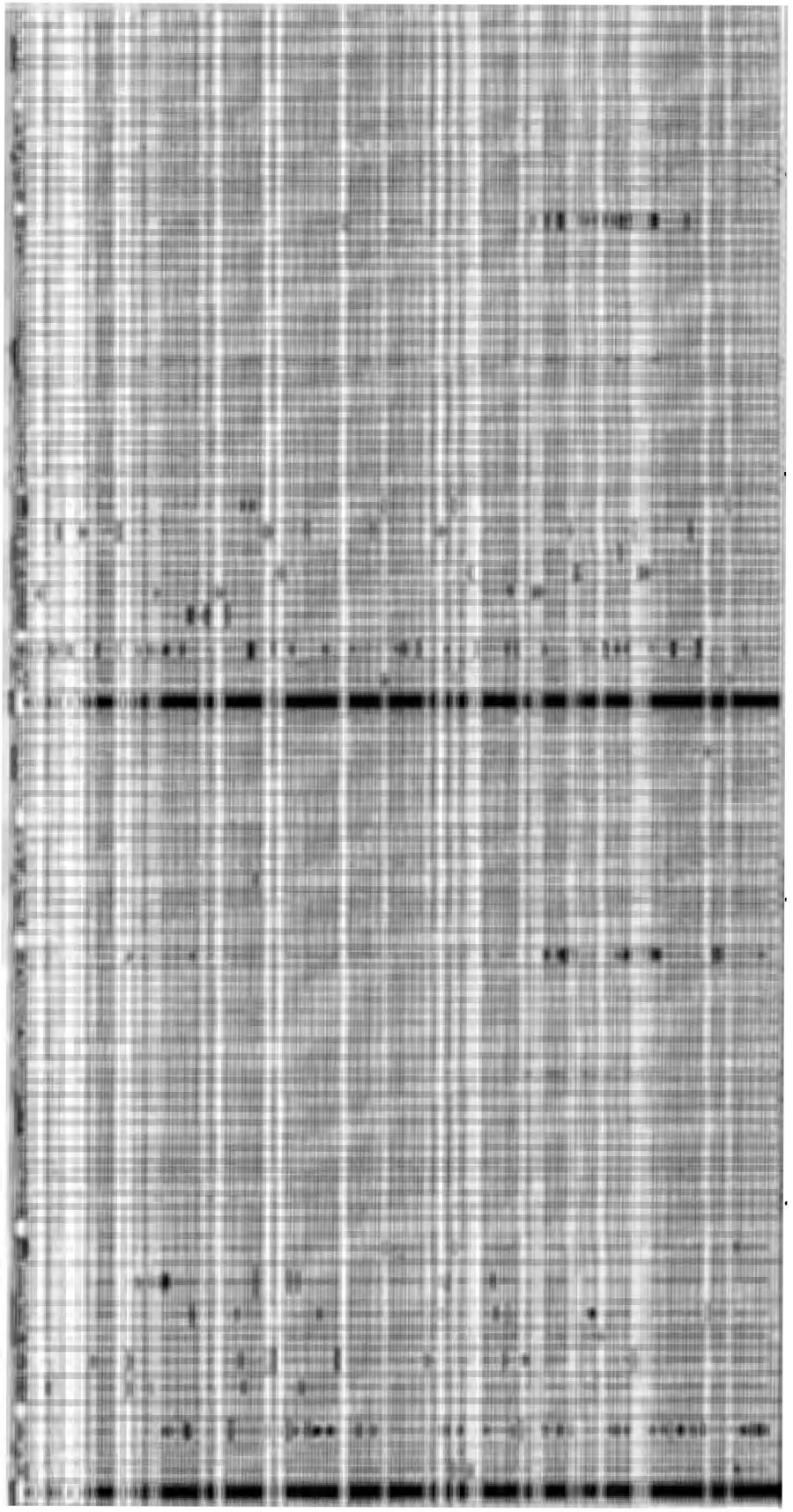


*Photo taken during start of Environmental Profiling.

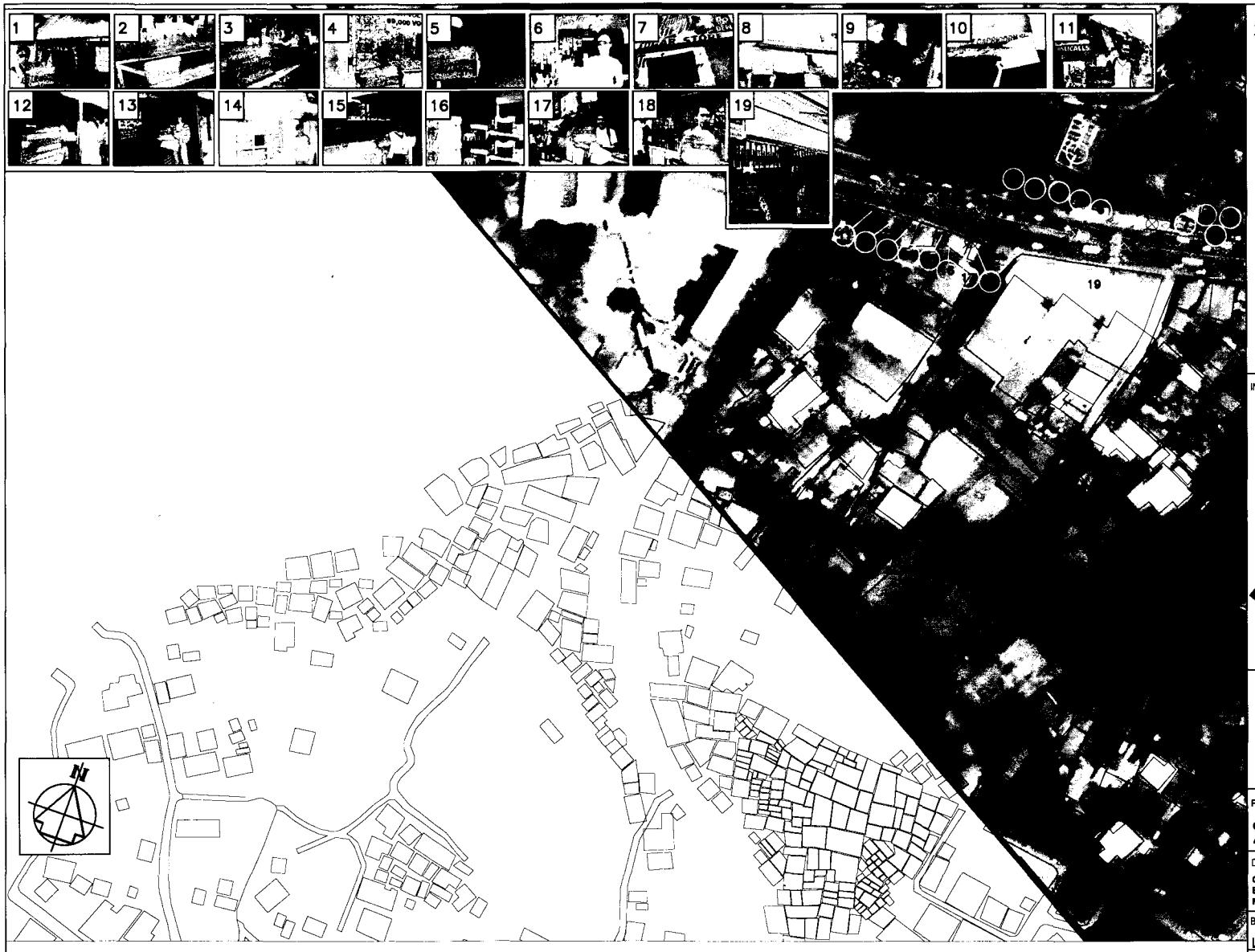
*Photo taken during start of Environmental Profiling.

* Photo during Envi Profiling at Poblacion Pardo.

*Top view of road going to ACT School.

*Top view of road going to Kinasang-an Pardo.

Photos taken during the Perception Survey

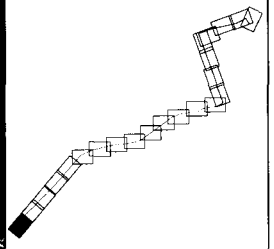


APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

- VECO 69KV POLE
- VECO PRIMARY POLE
- VECO SECONDARY POLE
- MCWD WATER UTILITY
- TRAFFIC SIGNAL POLE
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

SEGMENT C-6500 TO C-6600

INDEX MAP



WOODFIELDS CONSULTANTS INC

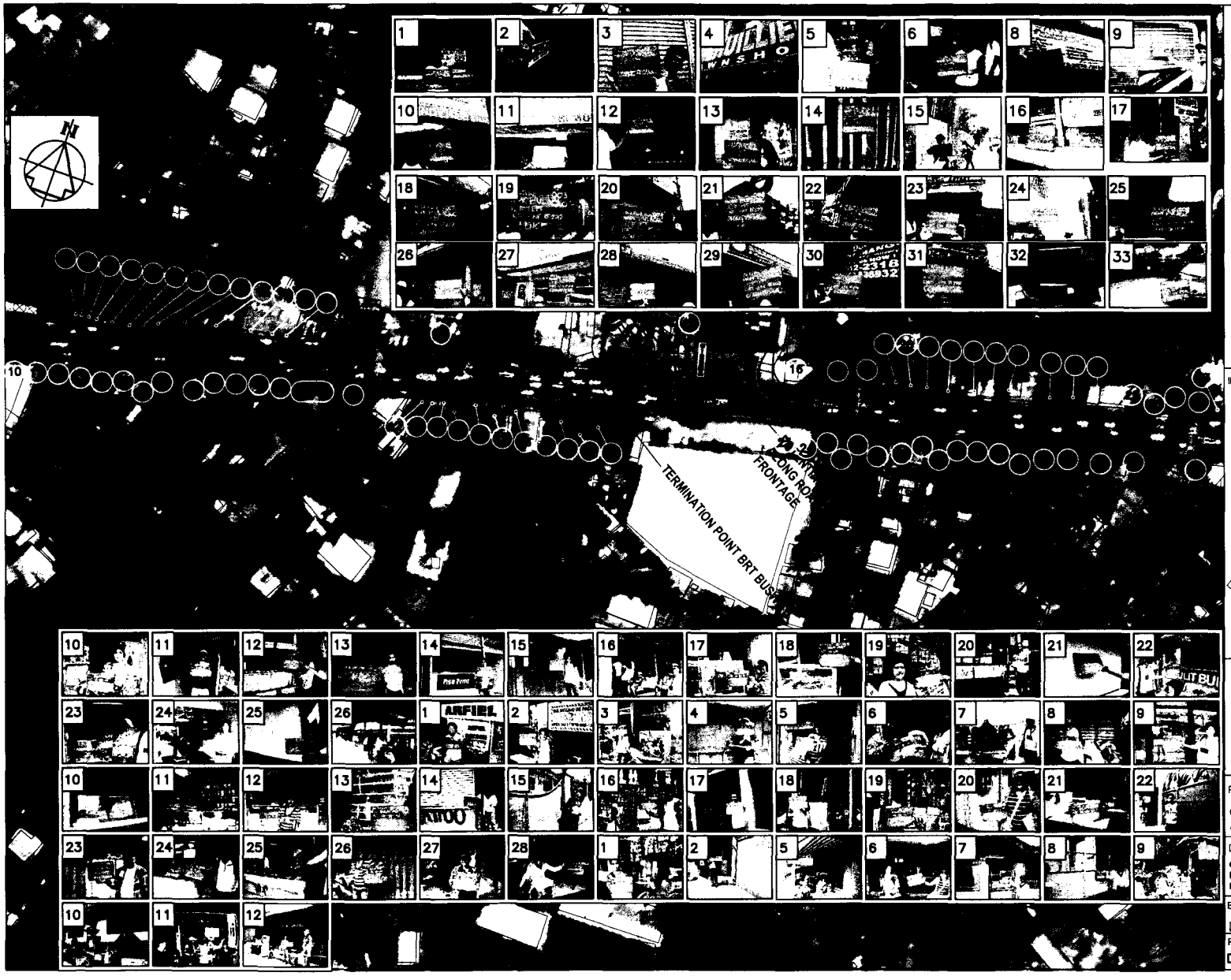
PROJECT

Cebu BRT Environmental Impact Assessment

DRAWING TITLE

OVERLAY OF PRELIMINARY ENGINEERING DESIGN DRAWING FROM ITP IN GOOGLE MAP

BASE SCALE	DATE
	Sept. 10, 2012
REFERENCE DRAWING:	REV
DWG/1240/CAD/A/001	0

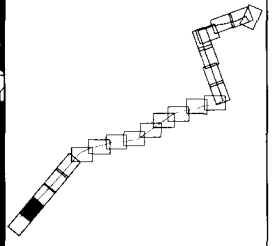


APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

- VECO 69KV POLE
- VECO PRIMARY POLE
- VECO SECONDARY POLE
- MCWD WATER UTILITY
- TRAFFIC SIGNAL POLE
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

SEGMENT C-6000 TO C-6480

INDEX MAP



WOODFIELDS CONSULTANTS INC.

PROJECT

Cebu BRT Environmental Impact Assessment

DRAWING TITLE

OVERLAY OF PRELIMINARY ENGINEERING DESIGN DRAWING FROM ITP IN GOOGLE MAP

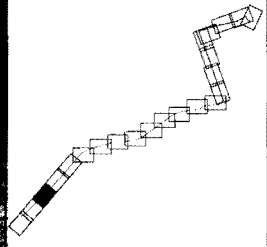
BASE SCALE	DATE
	Sept. 10, 2012
REFERENCE DRAWING:	REV
DWG/1240/CAD/A/002	0

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

- VECO 69KV POLE
- VECO PRIMARY POLE
- VECO SECONDARY POLE
- MCWD WATER UTILITY
- TRAFFIC SIGNAL POLE
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE (+)000 AT JONES' INTERSECTION

SEGMENT C-5500 TO C-5980

INDEX MAP



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PROJECT

Cebu BRT Environmental Impact Assessment

DRAWING TITLE

OVERLAY OF PRELIMINARY ENGINEERING DESIGN DRAWING FROM ITP IN GOOGLE MAP

BASE SCALE	DATE
	Sept. 10, 2012
REFERENCE DRAWING:	REV
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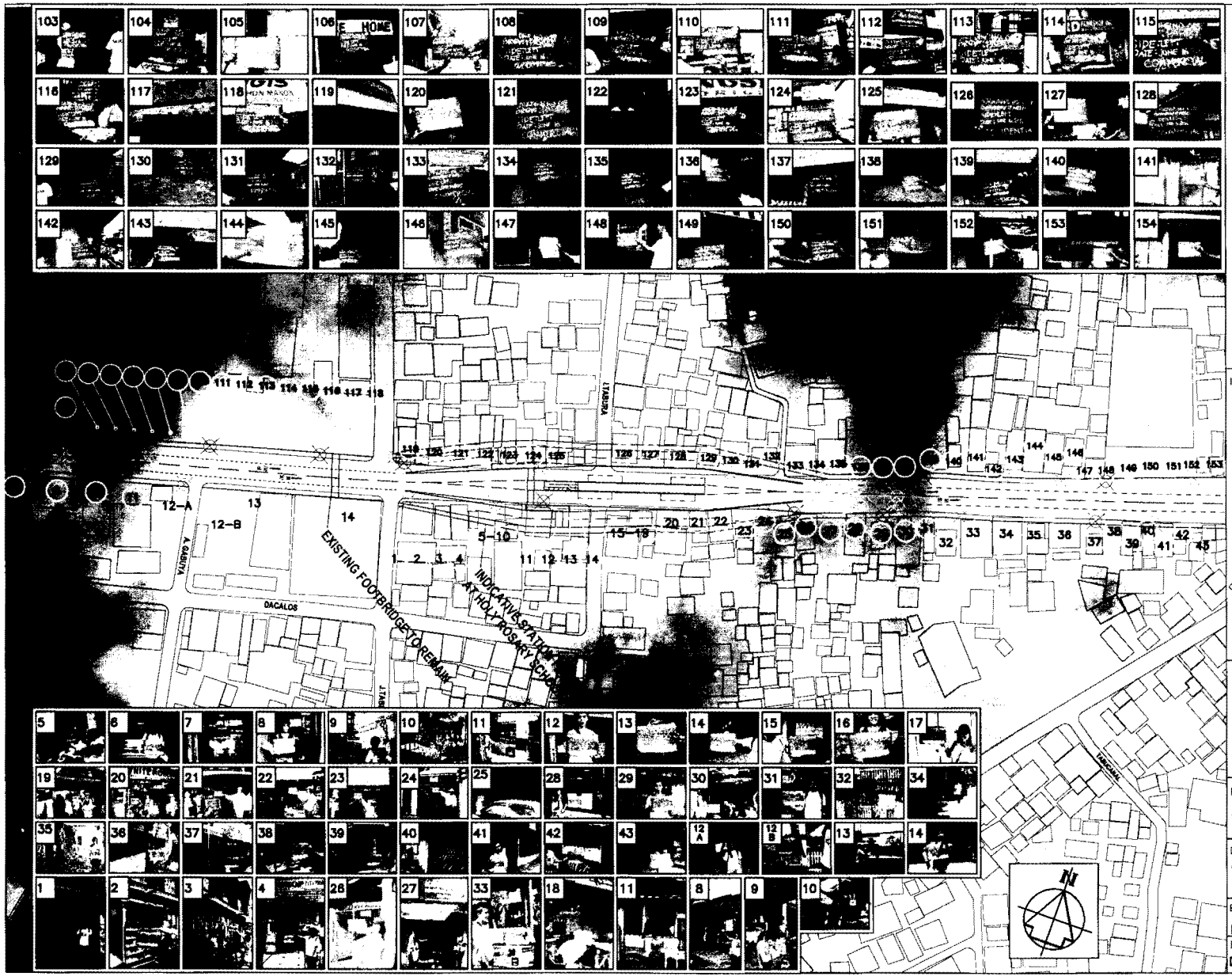
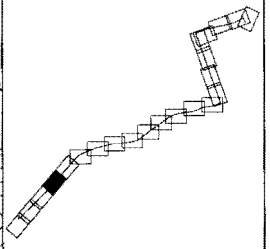


APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

- VECO 69KV POLE
- VECO PRIMARY POLE
- VECO SECONDARY POLE
- MCWD WATER UTILITY
- TRAFFIC SIGNAL POLE
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE =0+000 AT JONES' INTERSECTION

SEGMENT C-5000 TO C-5480

INDEX MAP



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Cebu BRT Environmental Impact Assessment

DRAWING TITLE

OVERLAY OF PRELIMINARY ENGINEERING DESIGN DRAWING FROM ITP IN GOOGLE MAP

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REFERENCE DRAWING:	REV
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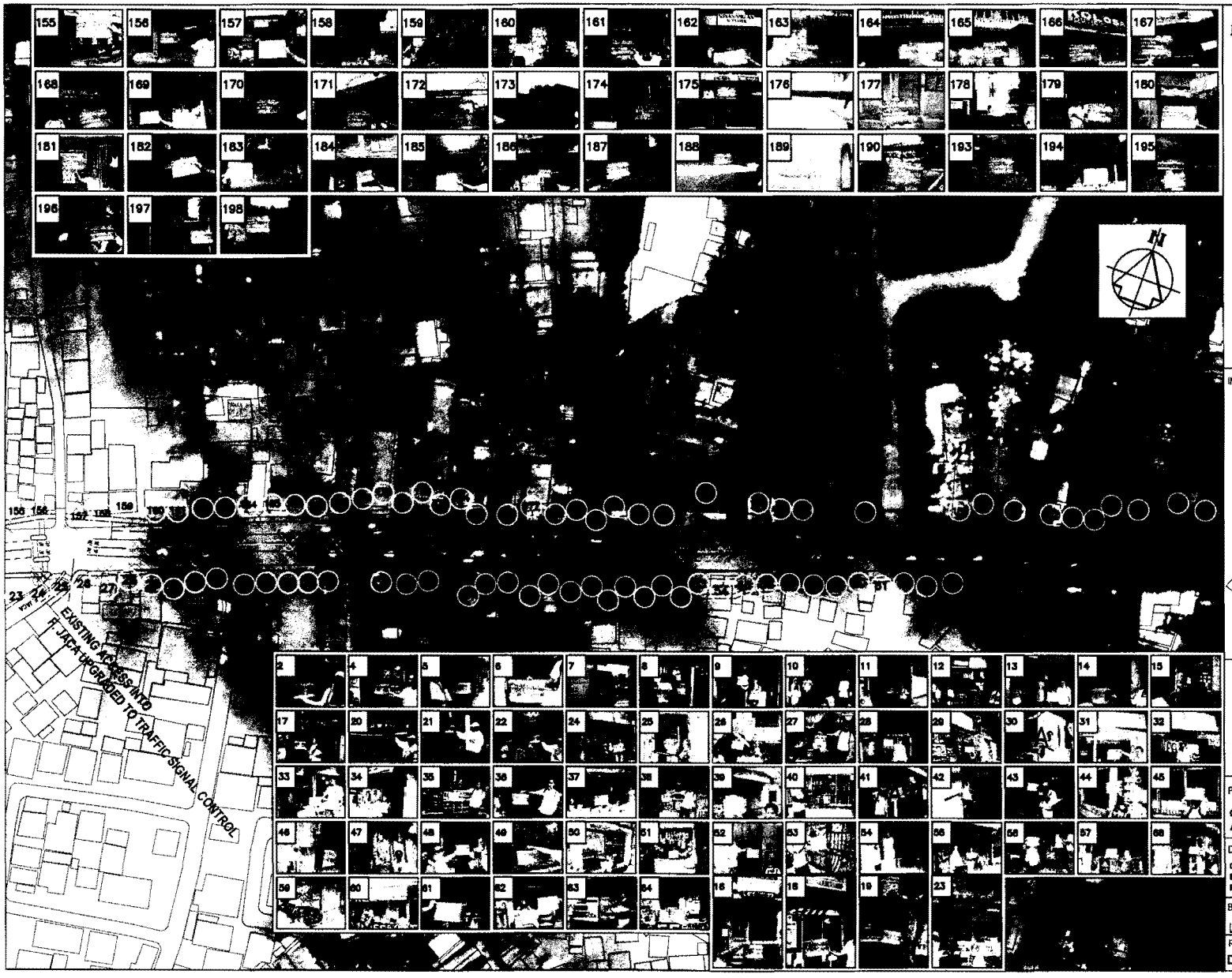

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

- VECO 69KV POLE
- VECO PRIMARY POLE
- VECO SECONDARY POLE
- MCWD WATER UTILITY
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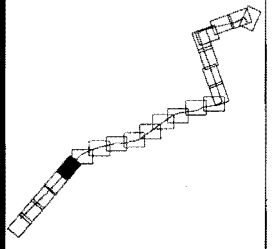
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE i=000 AT JONES' INTERSECTION

SEGMENT C-4500 TO C-4940

INDEX MAP



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Cebu BRT Environmental Impact Assessment

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OVERLAY OF PRELIMINARY ENGINEERING DESIGN DRAWING FROM ITP IN GOOGLE MAP

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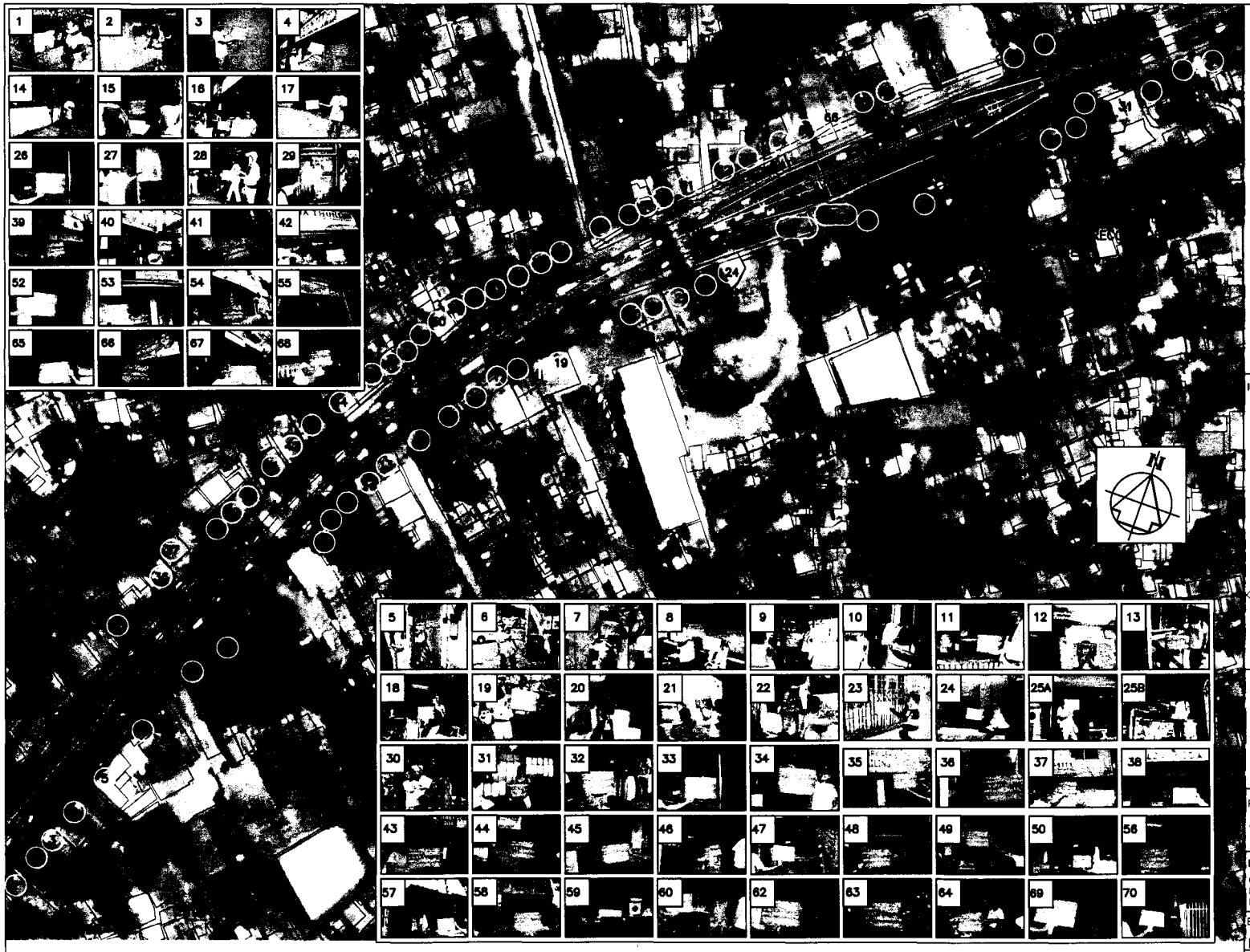
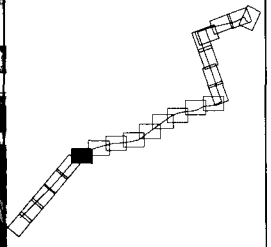


APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

- VECO 69KV POLE
- VECO PRIMARY POLE
- VECO SECONDARY POLE
- MCWD WATER UTILITY
- TRAFFIC SIGNAL POLE
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE 0+000 AT JONES' INTERSECTION

SEGMENT C-4000 TO C-4500

INDEX MAP



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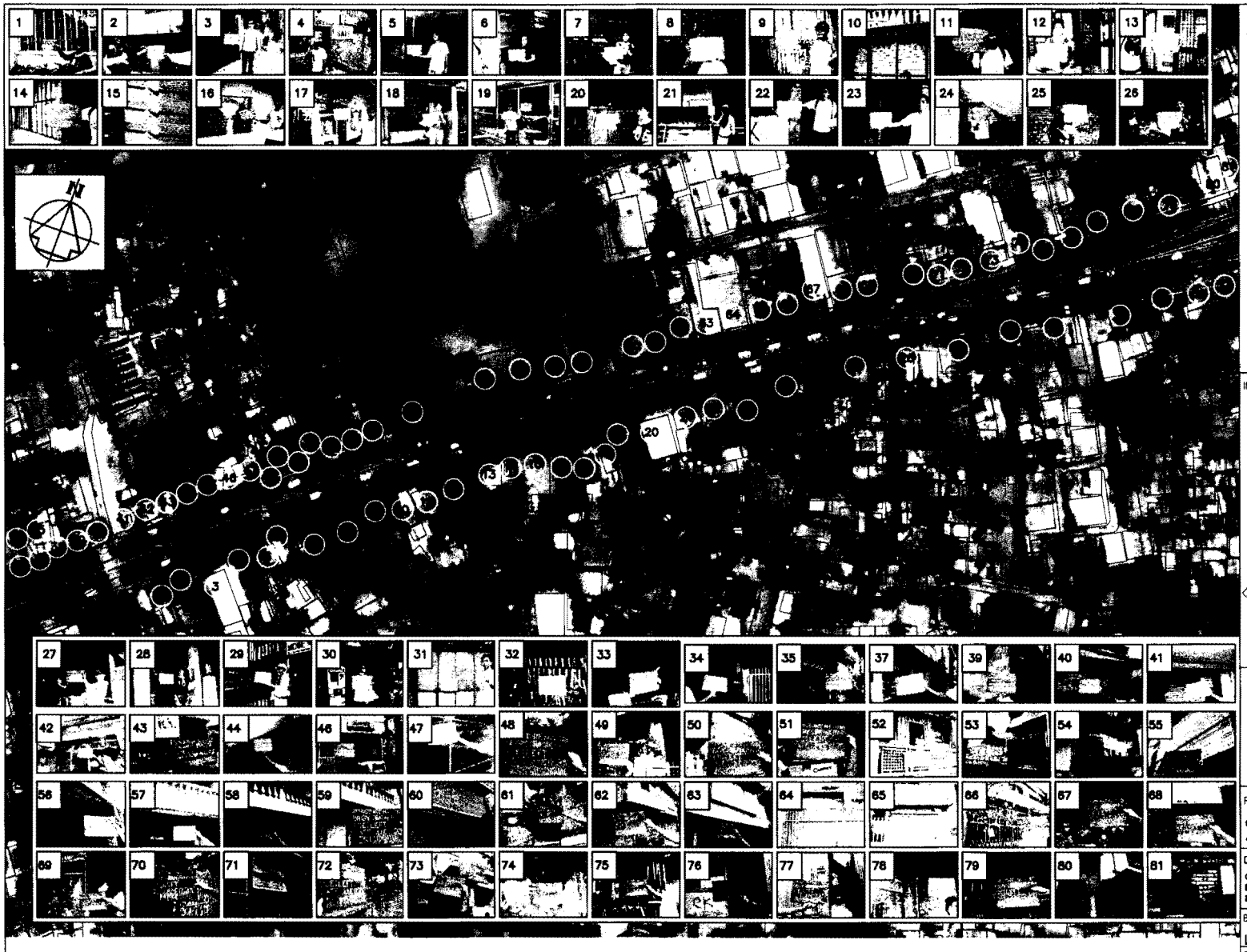

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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- VECO PRIMARY POLE
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- MCWD WATER UTILITY
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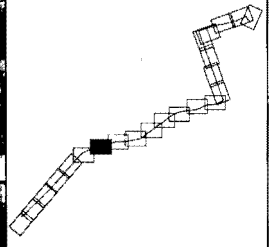
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE m+000 AT JONES' INTERSECTION

SEGMENT C-3500 TO C-3980

INDEX MAP



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APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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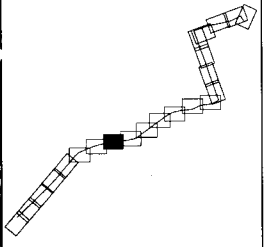
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

SEGMENT C-3000 TO C-3500

INDEX MAP



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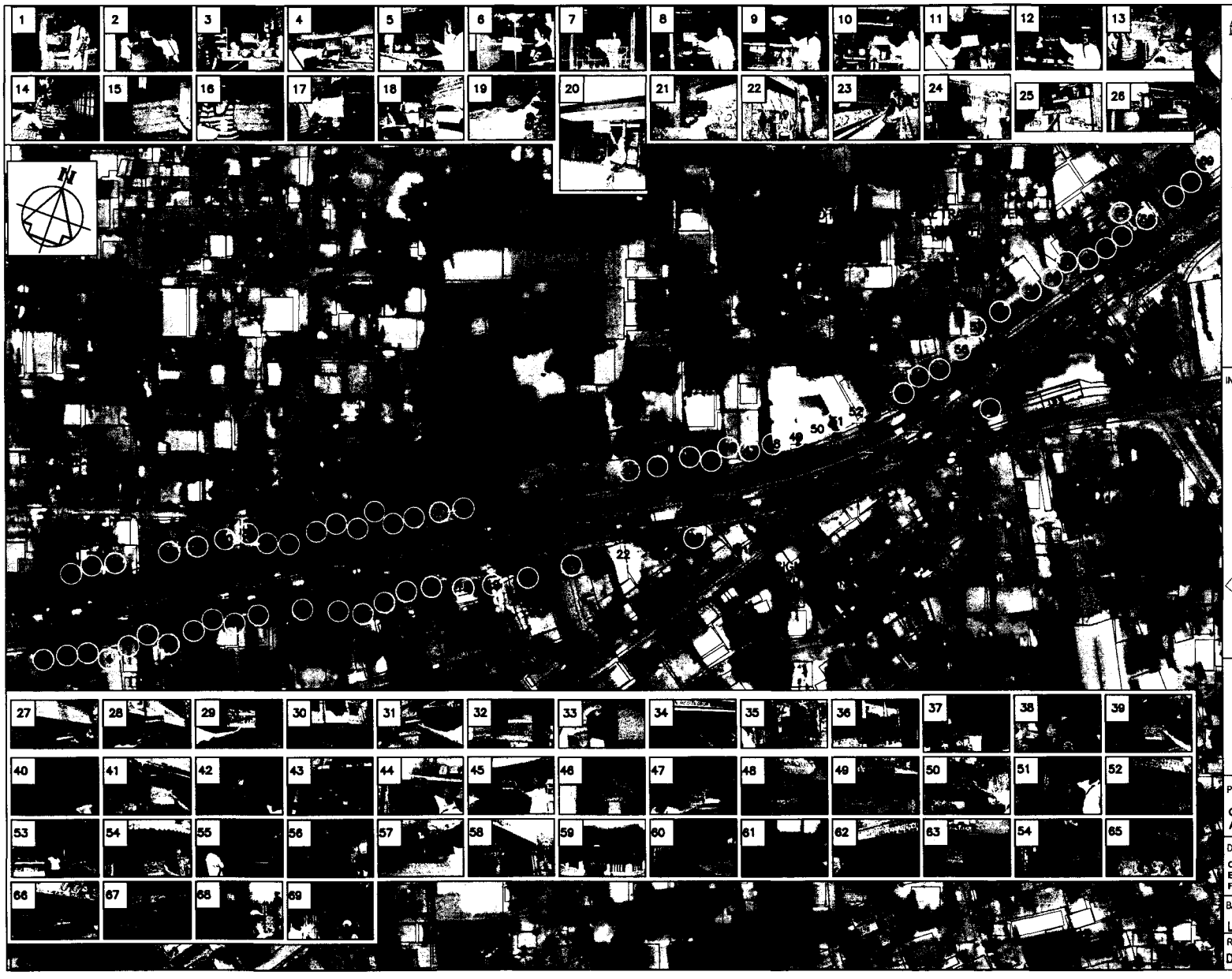

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

- VECO 69KV POLE
- VECO PRIMARY POLE
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- MCWD WATER UTILITY
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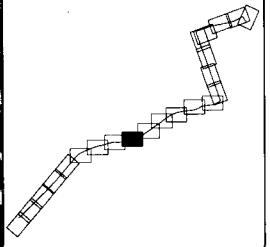
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE =000 AT JONES' INTERSECTION

SEGMENT C-2500 TO C-3000

INDEX MAP



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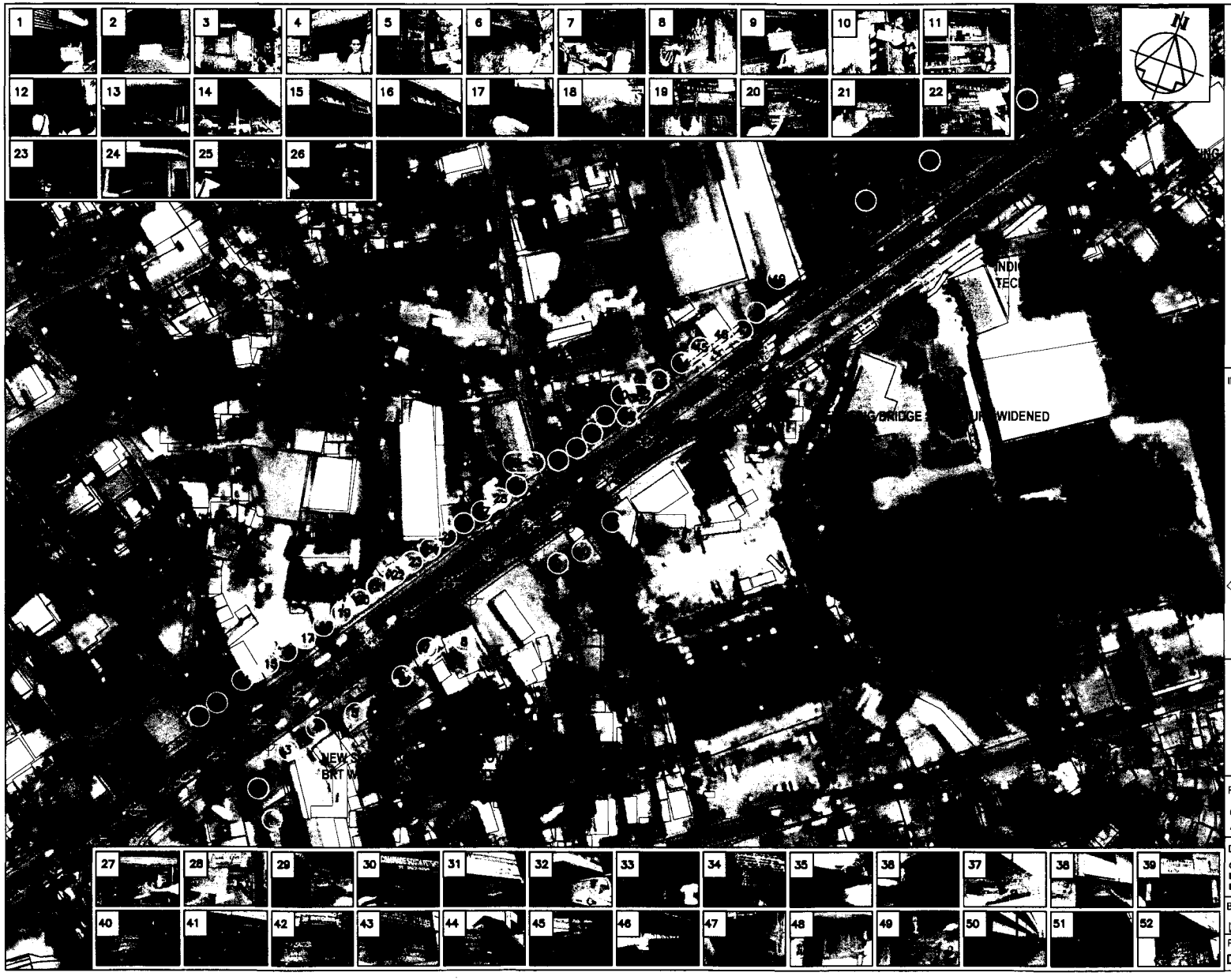

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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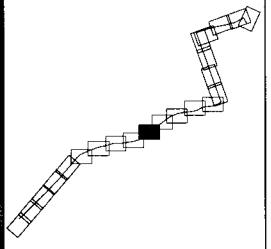
- TRAFFIC SIGNAL POLE
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

SEGMENT C-2000 TO C-2500

INDEX MAP



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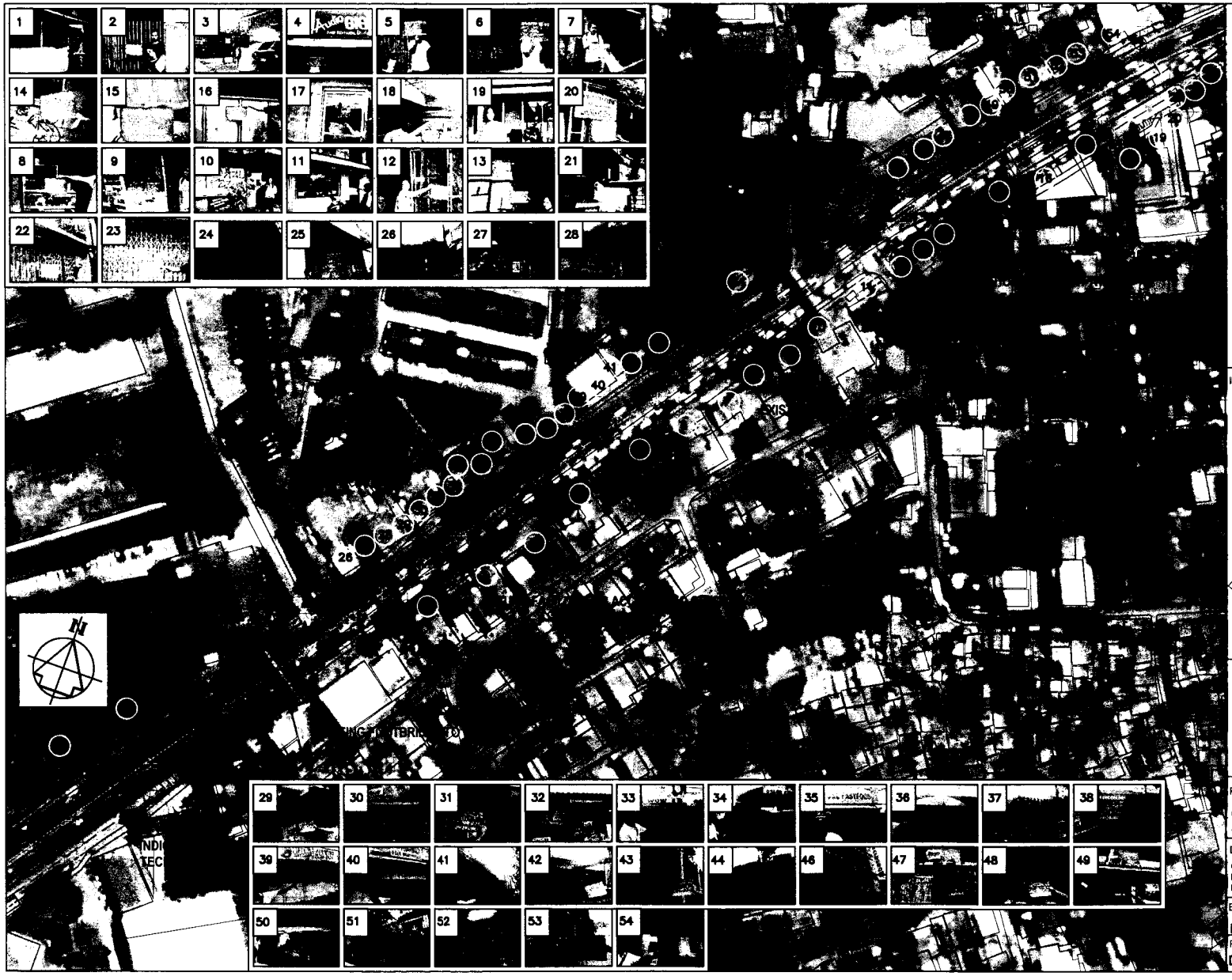

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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- VECO PRIMARY POLE
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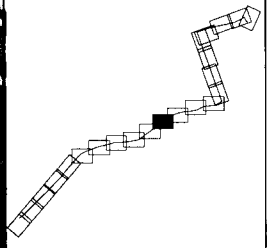
- TRAFFIC SIGNAL POLE
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

SEGMENT C-1500 TO C-2000

INDEX MAP



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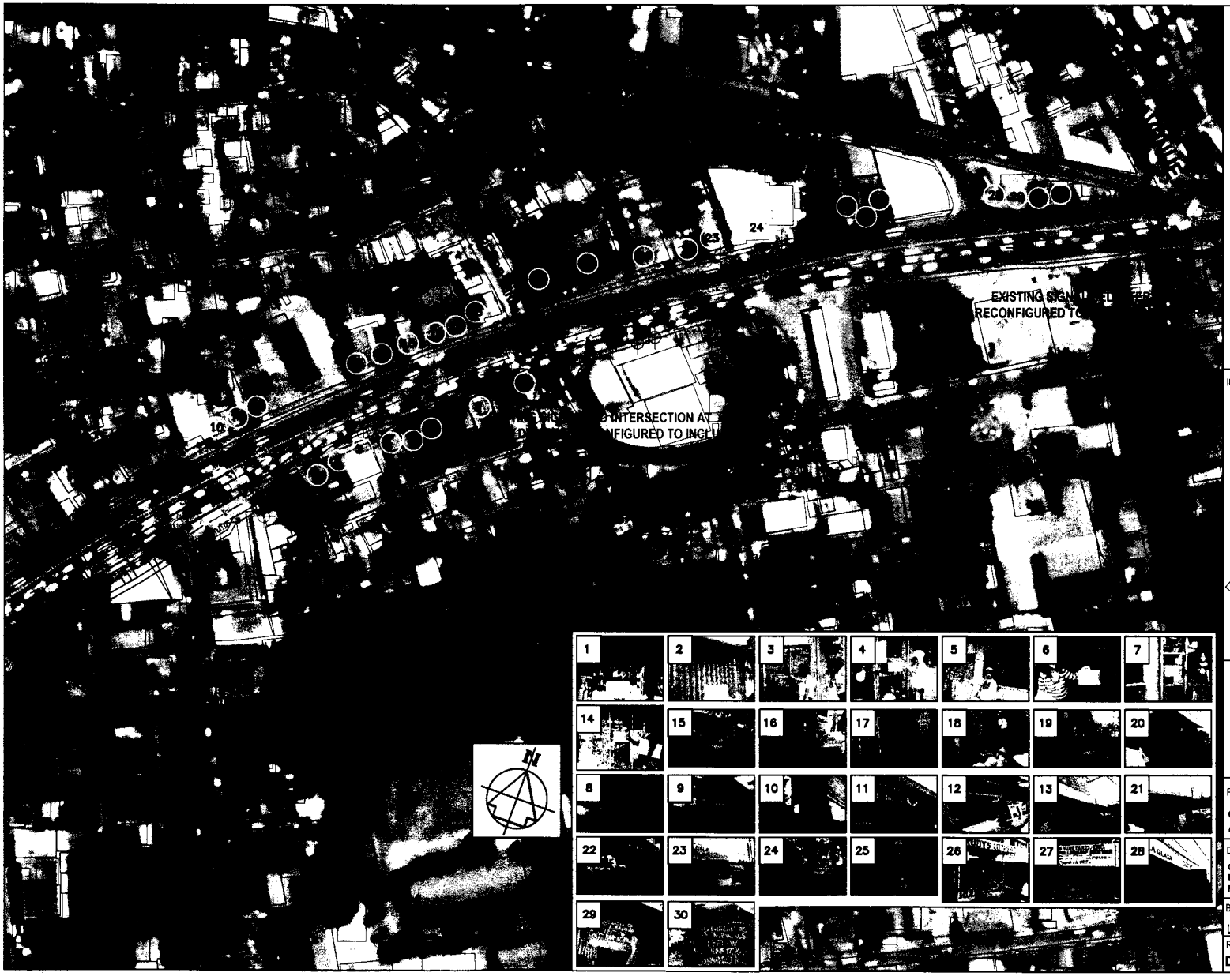

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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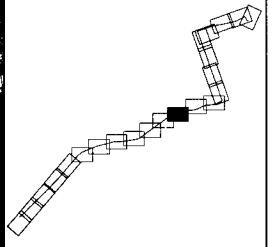
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

SEGMENT C-1000 TO C-1500

INDEX MAP



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Cebu BRT Environmental Impact Assessment

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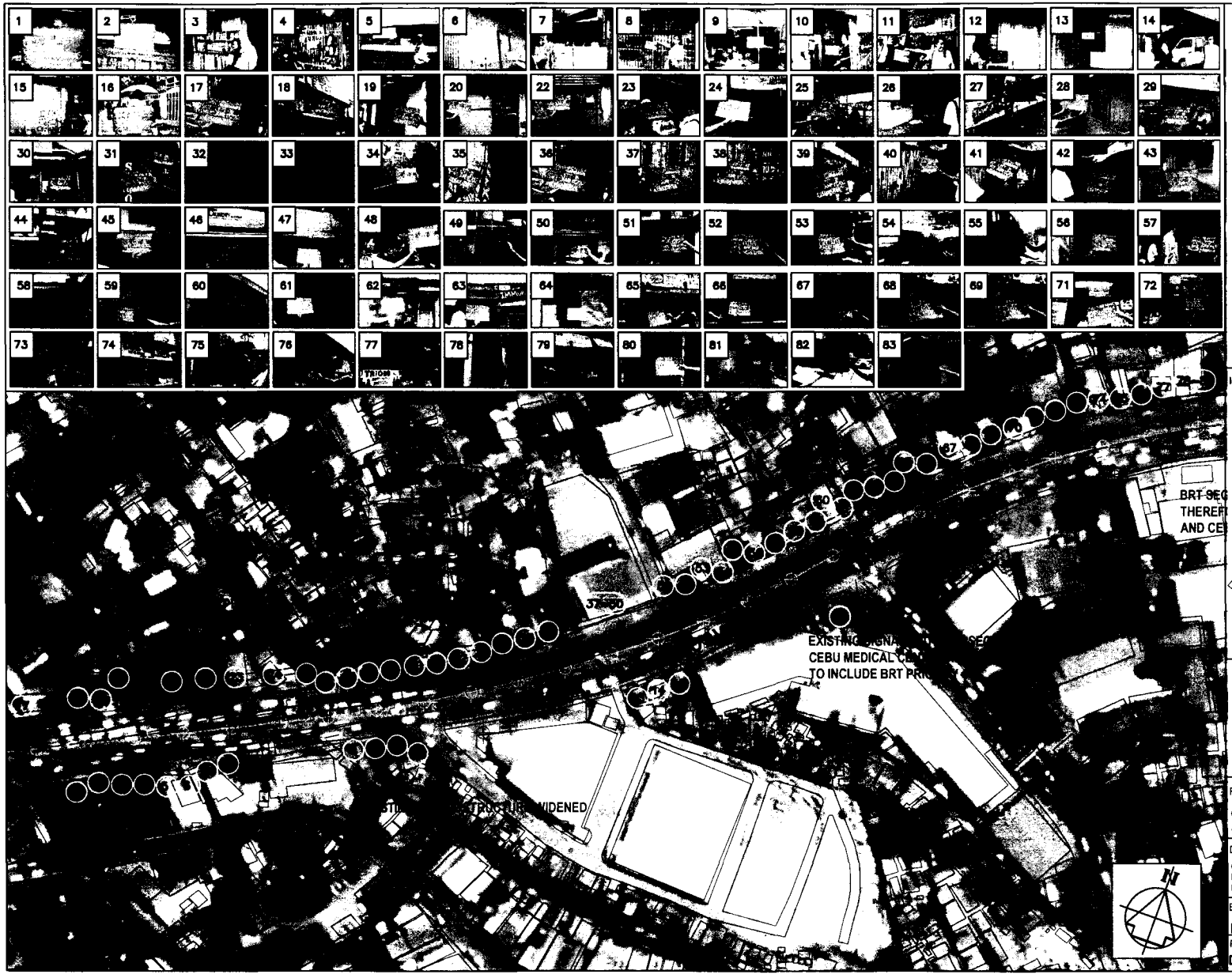

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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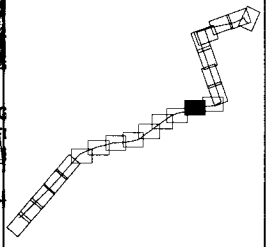
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE 0+000 AT JONES' INTERSECTION

SEGMENT C-0500 TO C-0960

INDEX MAP



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DRAWING TITLE

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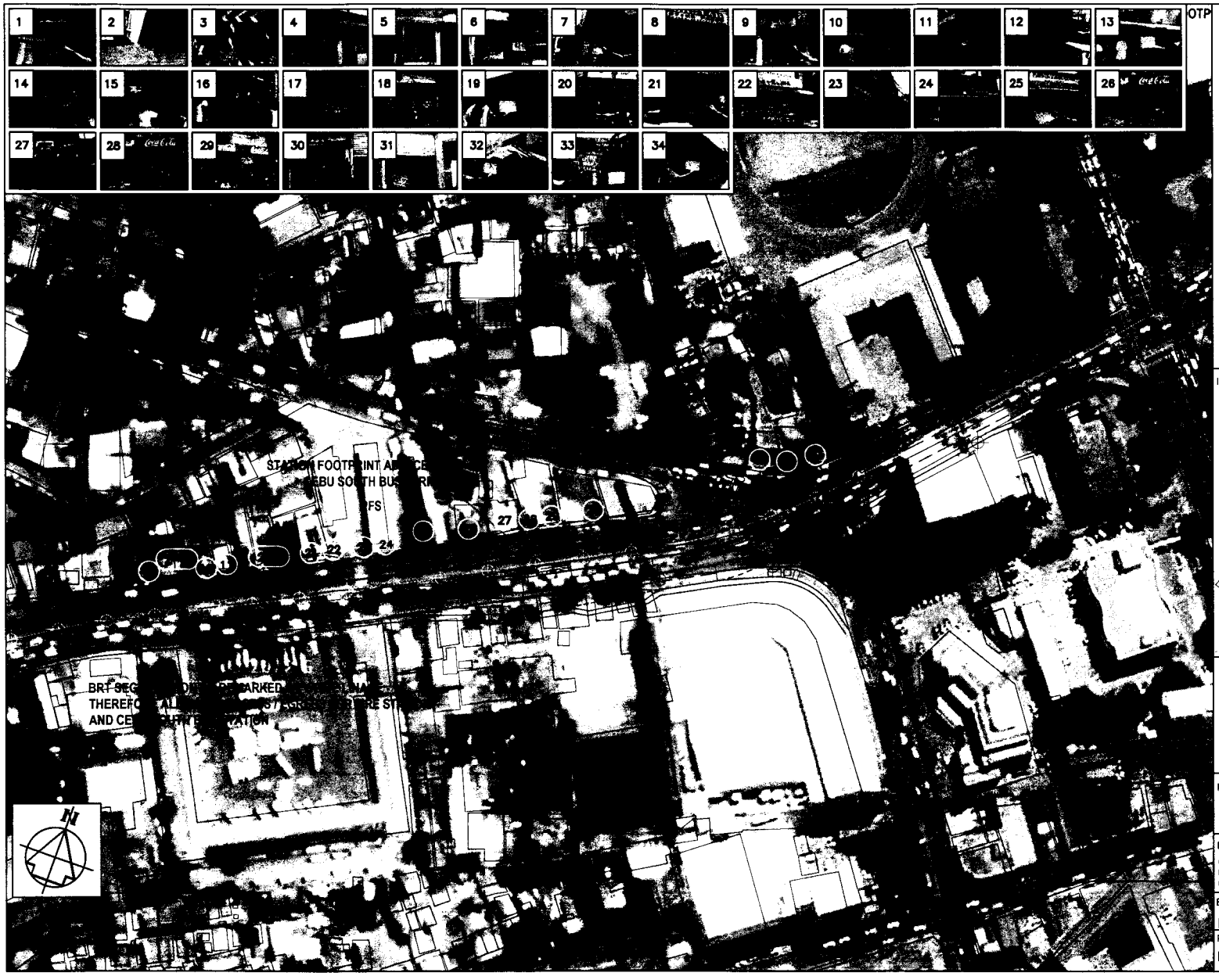

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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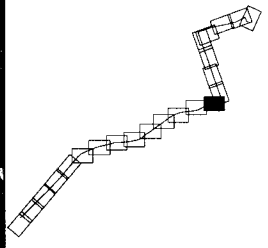
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n=000 AT JONES' INTERSECTION

SEGMENT C-0000 TO C-0500

INDEX MAP



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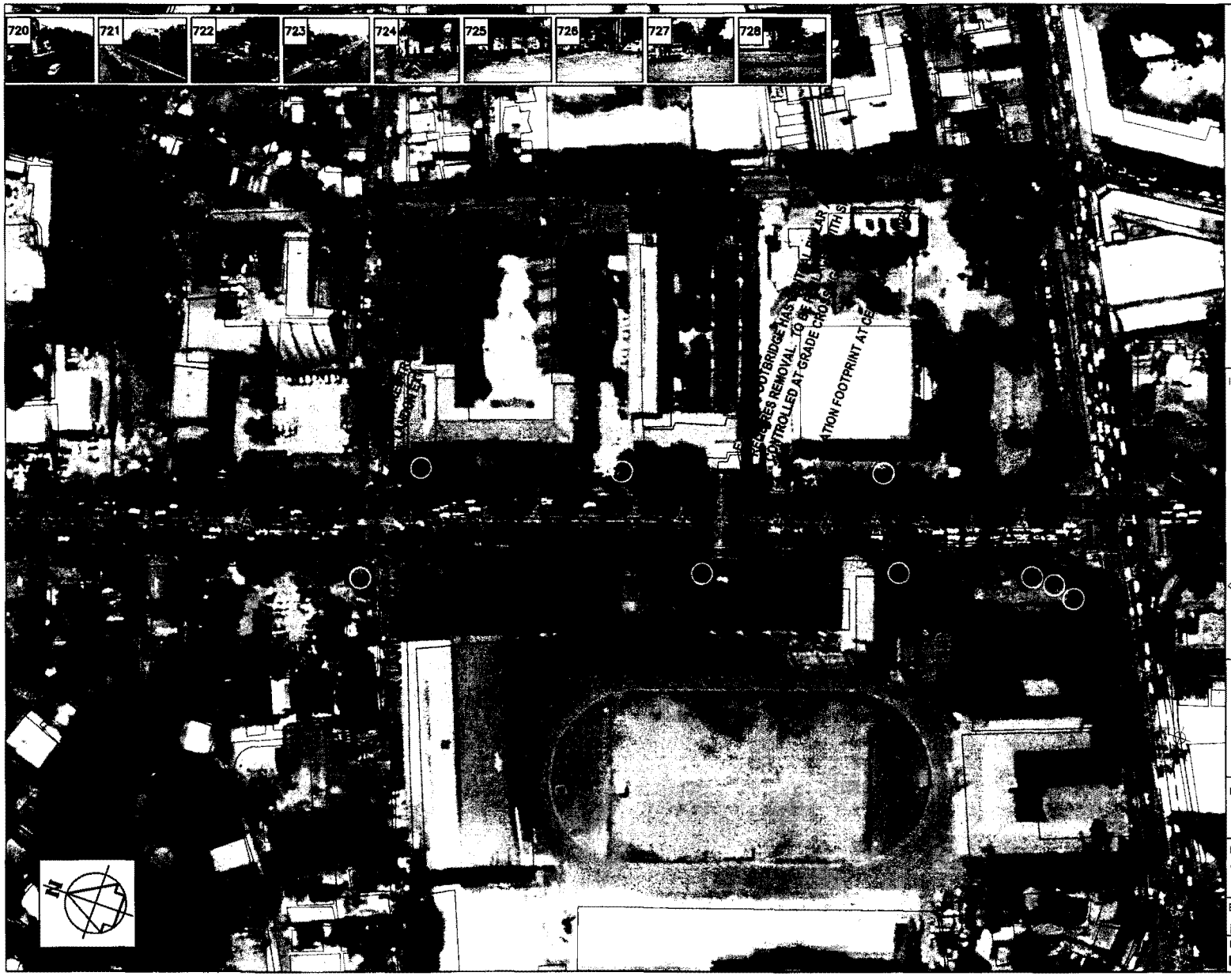

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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- VECO PRIMARY POLE
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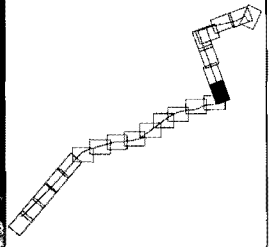
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

SEGMENT C-0000 TO C-0500

INDEX MAP



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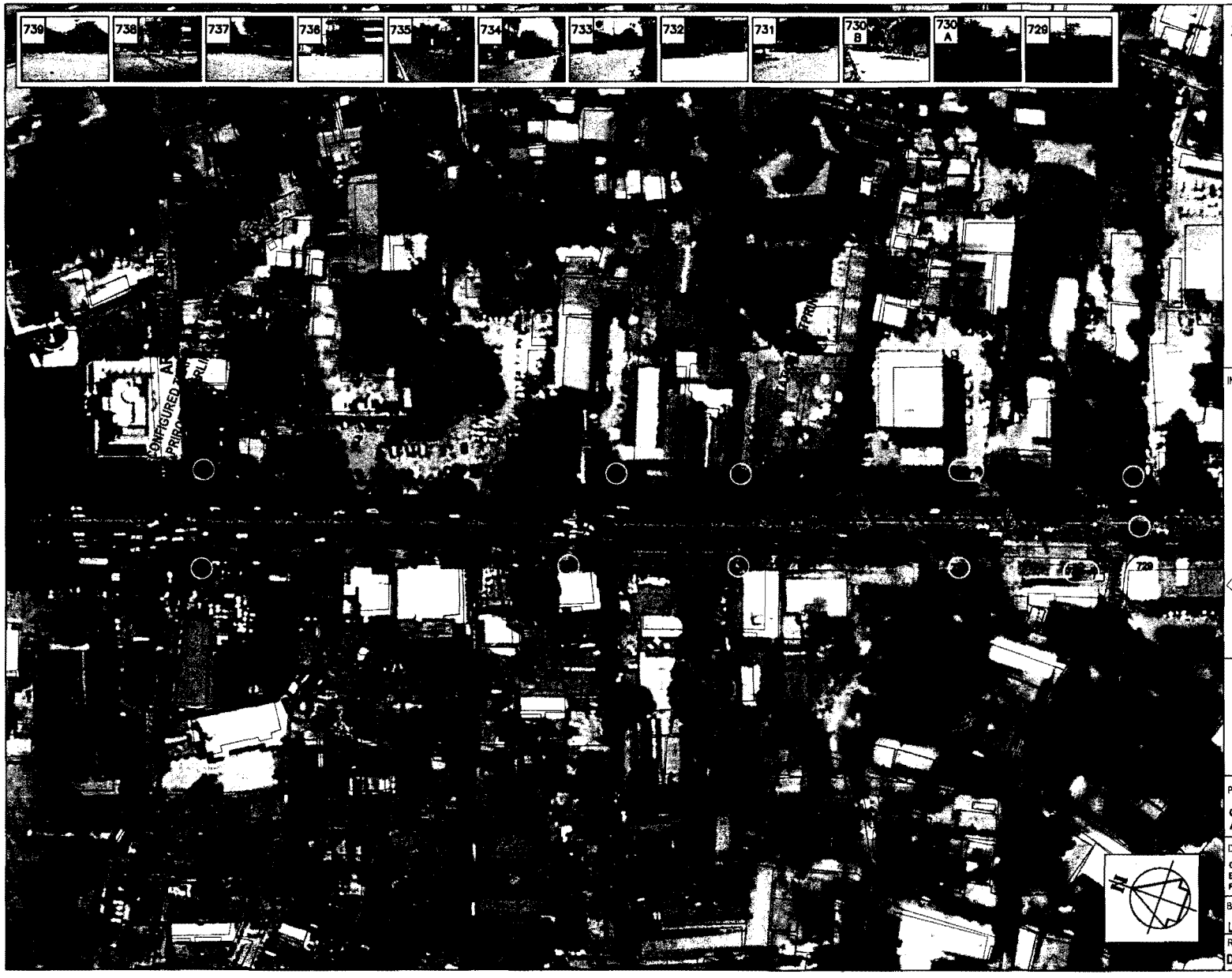

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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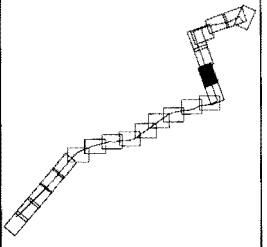
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE m+000 AT JONES' INTERSECTION

SEGMENT C-0500 TO C-960

INDEX MAP



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APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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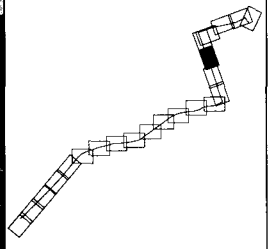
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

SEGMENT C-1000 TO C-1480

INDEX MAP



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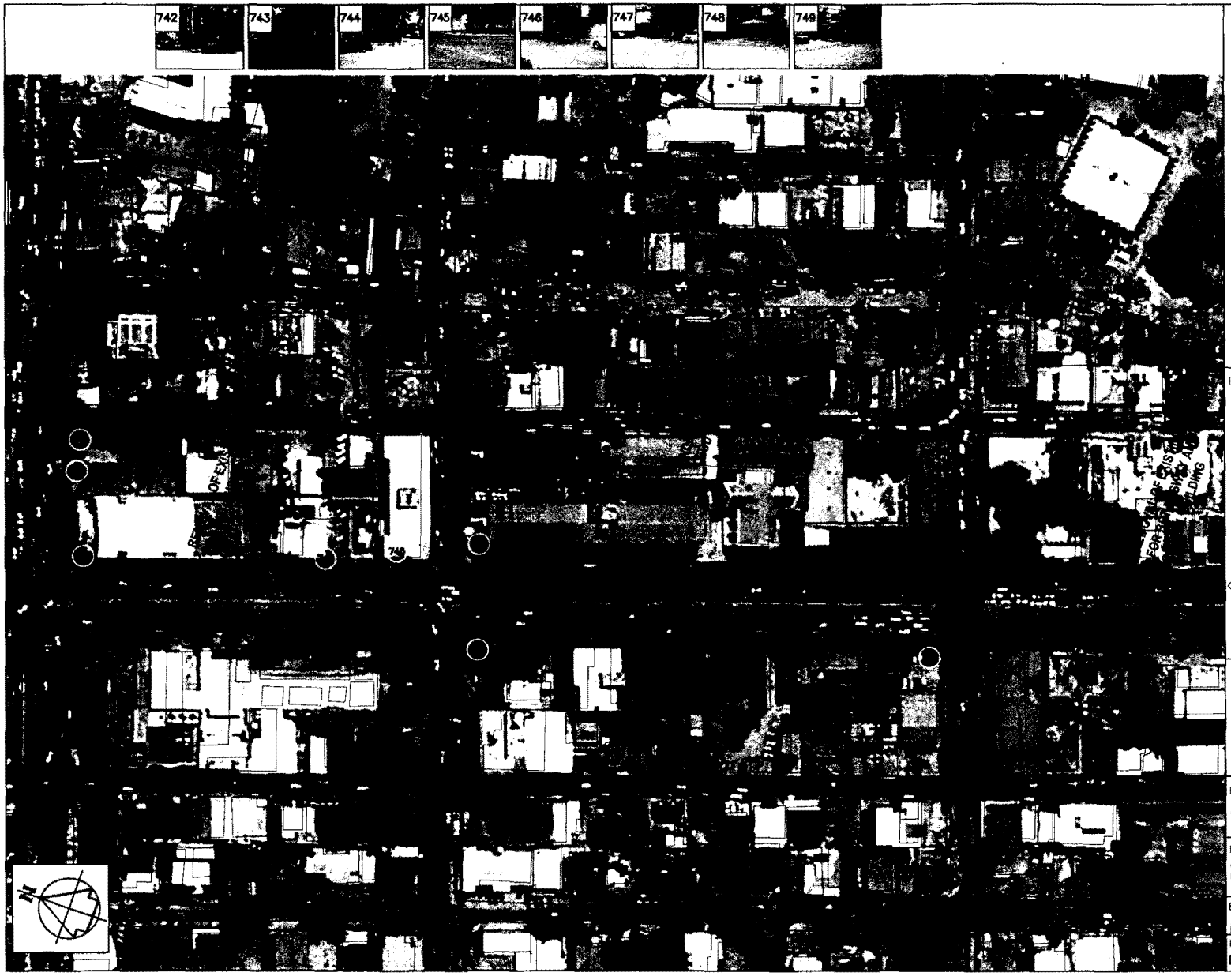

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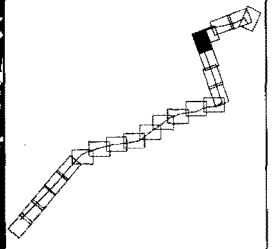
- TRAFFIC SIGNAL POLE
- UMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE P+000 AT JONES' INTERSECTION

SEGMENT C-1500 TO C-2000

INDEX MAP



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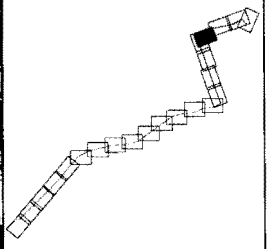
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE m=000 AT JONES' INTERSECTION

SEGMENT C-2000 TO C-2500

INDEX MAP



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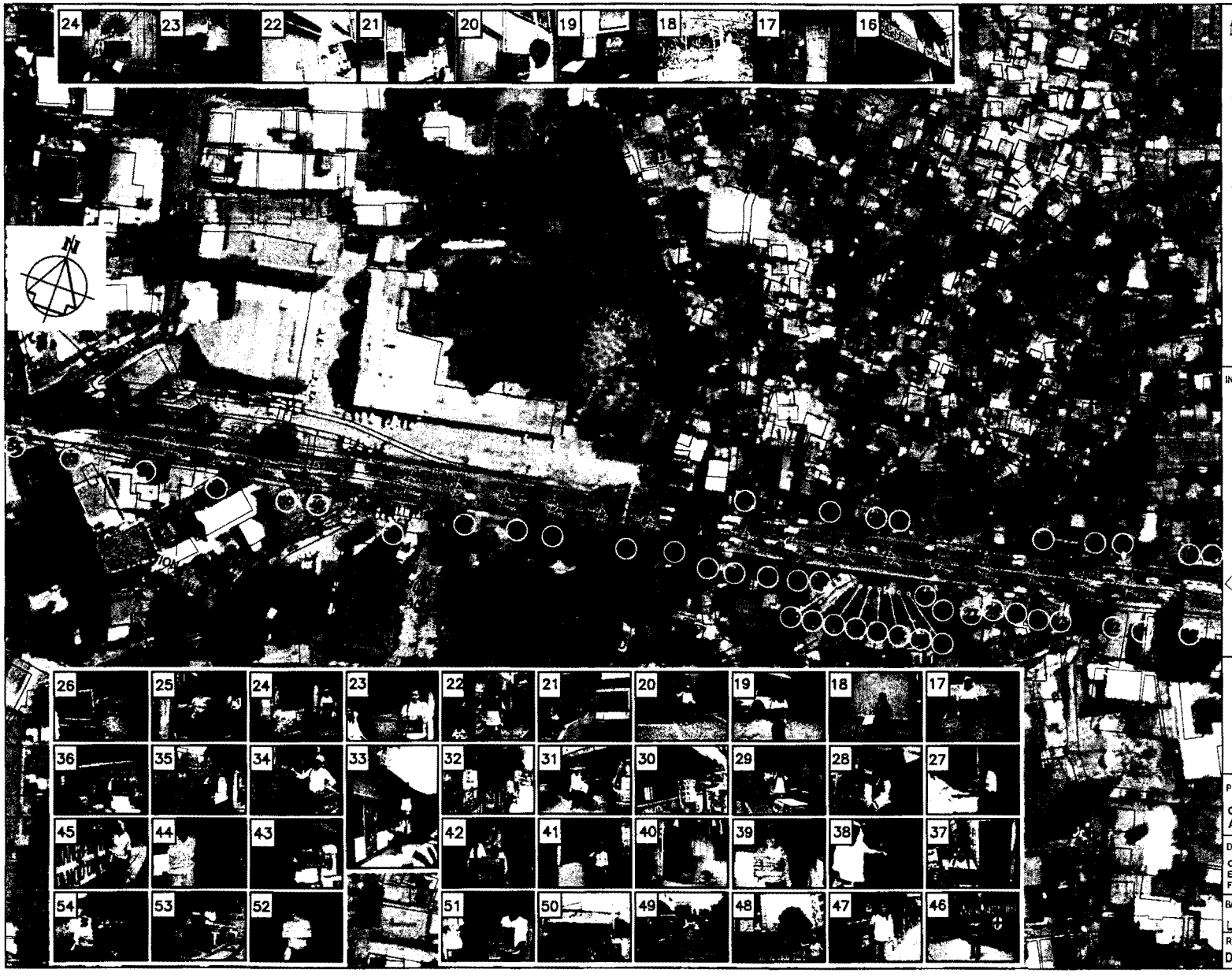

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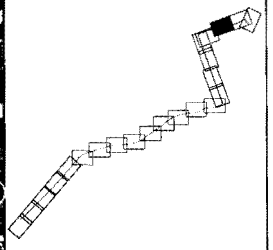
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE m+000 AT JONES' INTERSECTION

SEGMENT C-2520 TO C-3000

INDEX MAP



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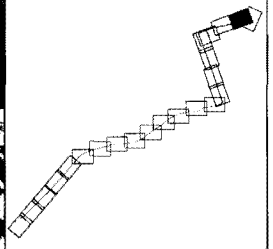
BASE SCALE	DATE
	Sept. 10, 2012
REFERENCE DRAWING:	REV
DWG/1240/CAD/A/020	0

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

- VECO 69KV POLE
- VECO PRIMARY POLE
- VECO SECONDARY POLE
- MCWD WATER UTILITY
- TRAFFIC SIGNAL POLE
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

SEGMENT C-3000 TO C-3500

INDEX MAP



WOODFIELDS CONSULTANTS INC.

PROJECT

Cebu BRT Environmental Impact Assessment

DRAWING TITLE

OVERLAY OF PRELIMINARY ENGINEERING DESIGN DRAWING FROM ITP IN GOOGLE MAP

BASE SCALE	DATE
	Sept. 10, 2012
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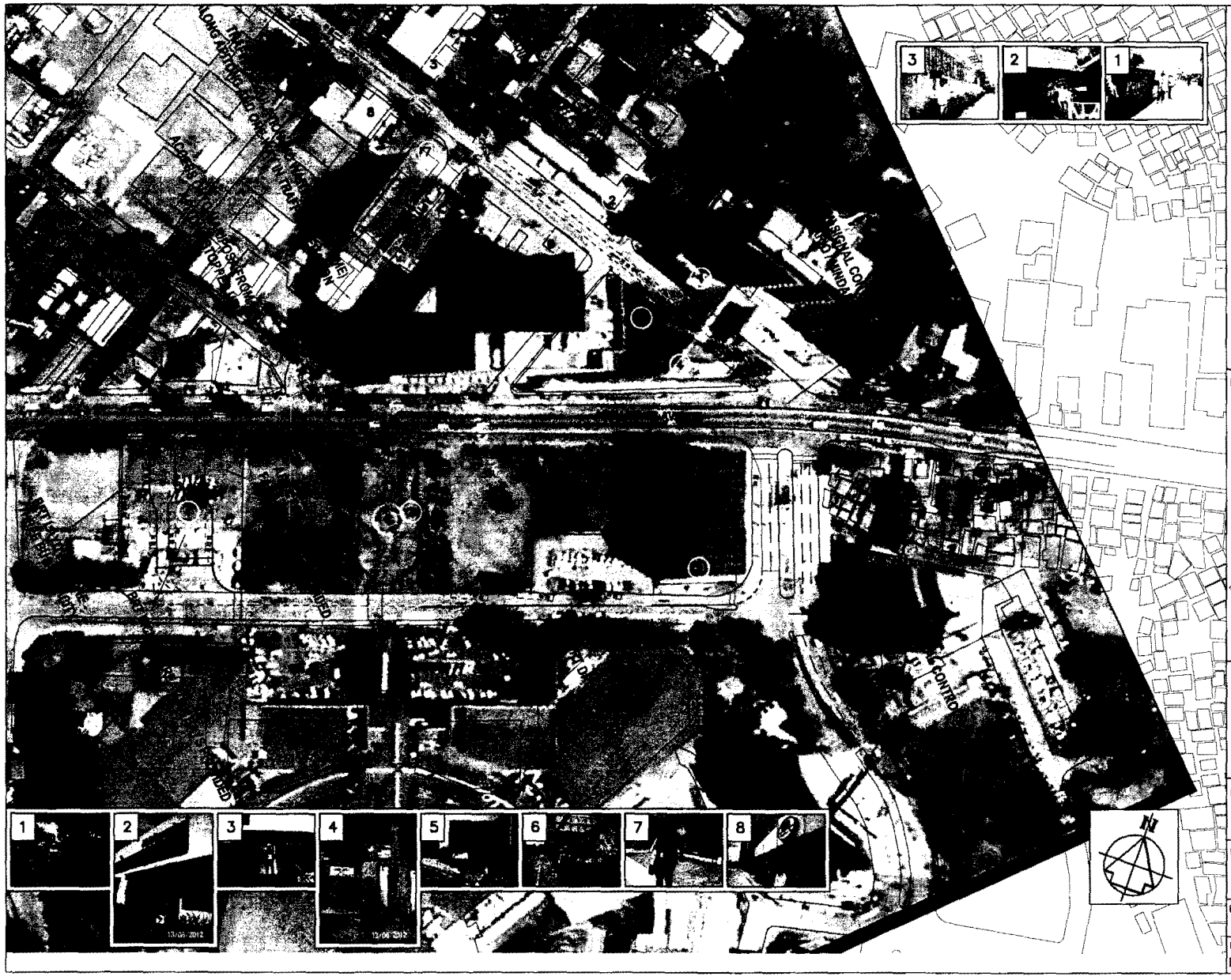
DWG/1240/CAD/A/021	0



APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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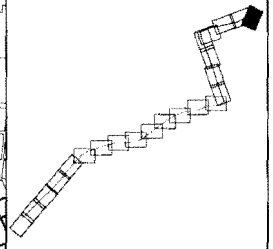
SEGMENT C-3500 TO C-3960

INDEX MAP



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Cebu BRT Environmental Impact Assessment

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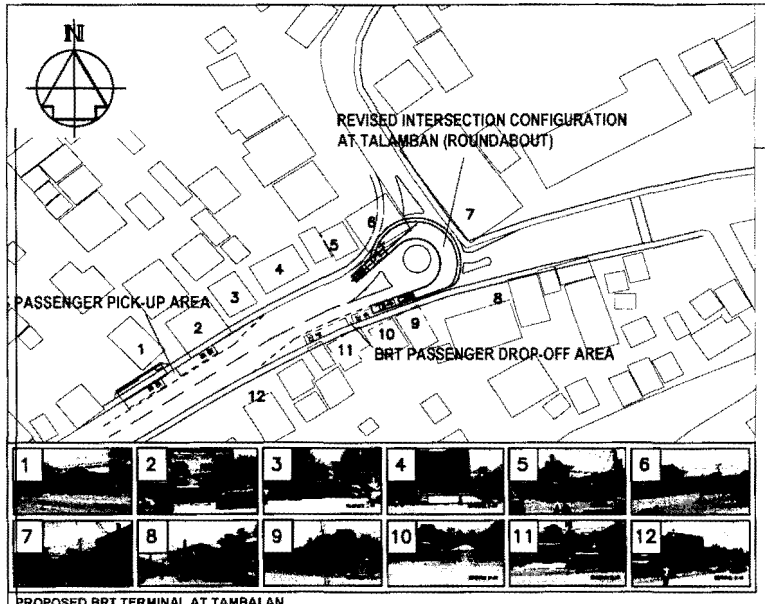
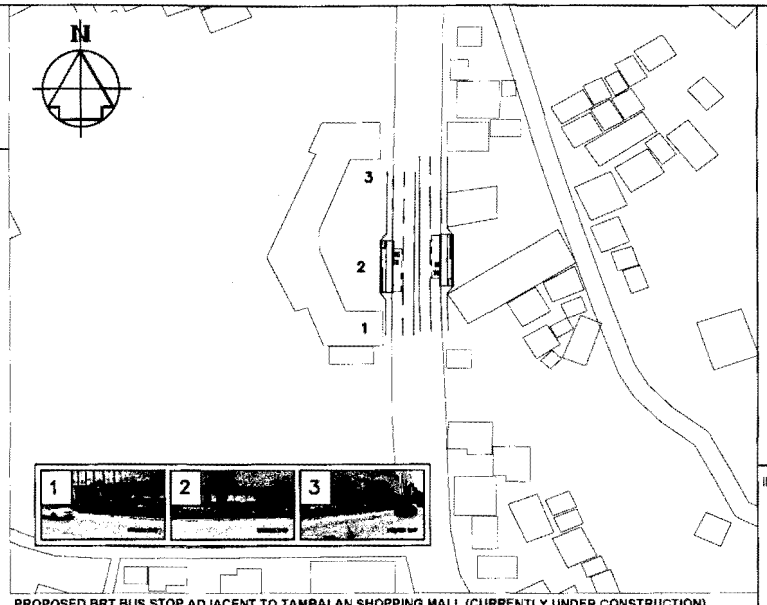


PROPOSED BRT TERMINAL AT TAMBALAN



PROPOSED BRT BUS STOP ADJACENT TO TAMBALAN SHOPPING MALL (CURRENTLY UNDER CONSTRUCTION)

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

- VECO 69KV POLE
- VECO PRIMARY POLE
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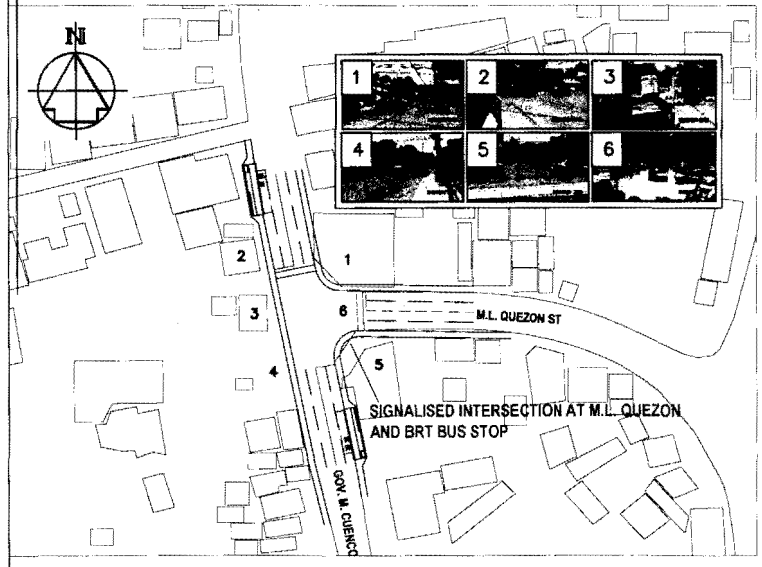
- TRAFFIC SIGNAL POLE
- LIMITS OF BRT BUSWAY DELINEATED (WHITE LINAGE) SEGREGATION
- CHAINAGE n+000 AT JONES' INTERSECTION

INDEX MAP



PROPOSED BRT BUS STOP AT PROPOSED SIGNALISED INTERSECTION AT M.L. QUEZON ST

PROPOSED BRT BUS STOP ADJACENT TO UNNIVERSITY OF SAN CARLOS, INCLUDING IMPROVED PEDESTRIAN CROSSINGFACILITY

WOODFIELDS CONSULTANTS INC

PROJECT

Cebu BRT Environmental Impact Assessment

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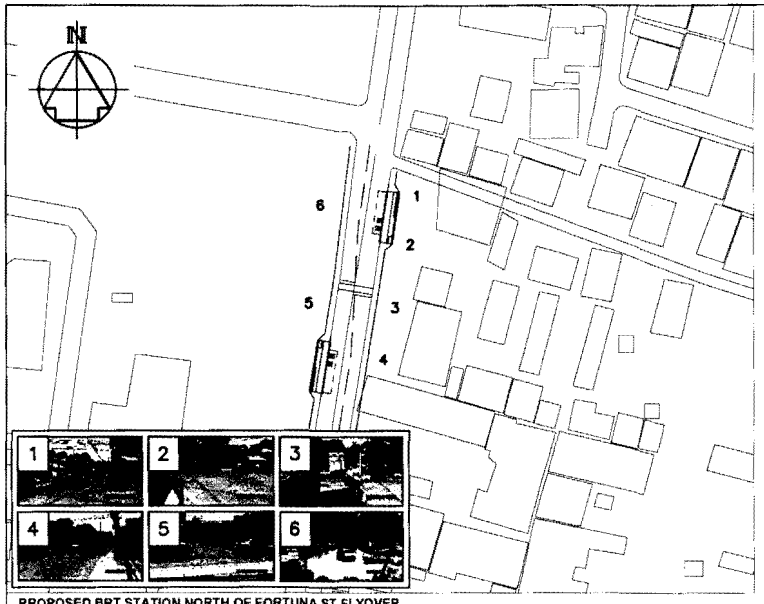
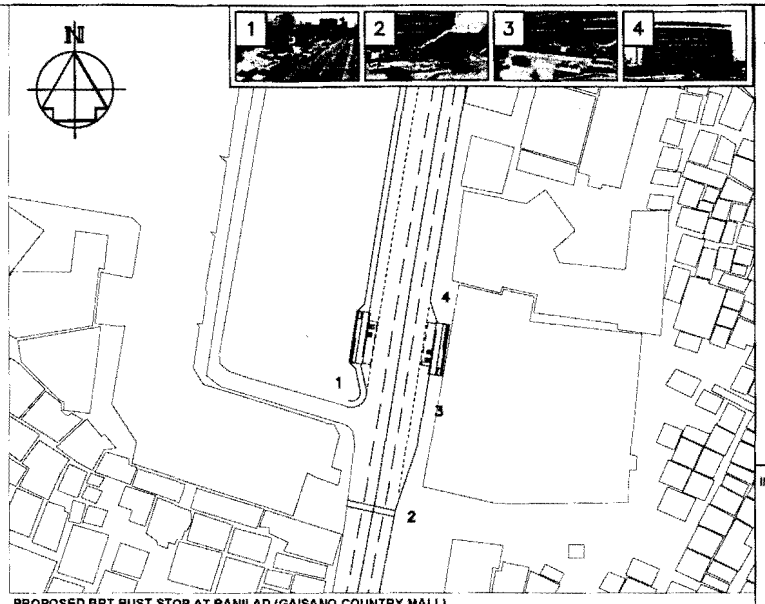
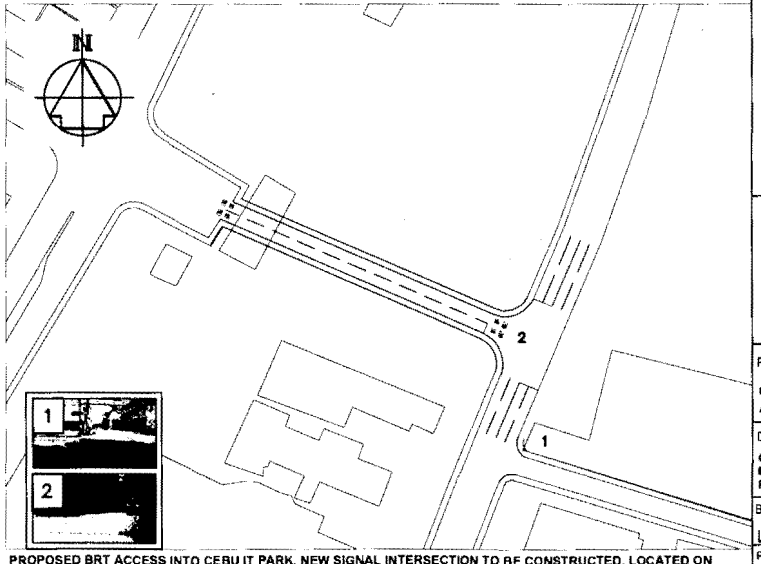


PROPOSED BRT STATION NORTH OF FORTUNA ST FLYOVER



PROPOSED BRT BUST STOP AT BANILAD (GAISANO COUNTRY MALL)

PROPOSED SIGNALISATION OF GOV. M. CUENCO AVE/OLD CARA RD, INCLUDING BRT BUS STOPS AND BUS PRIORITY ON APPROACH TO INTERSECTION



PROPOSED BRT ACCESS INTO CEBU IT PARK. NEW SIGNAL INTERSECTION TO BE CONSTRUCTED, LOCATED ON M. CUENCO AVE, APPROXIMATELY 10 METERS SOUTH OF ACCESS INTO CEBU COUNTRY CLUB

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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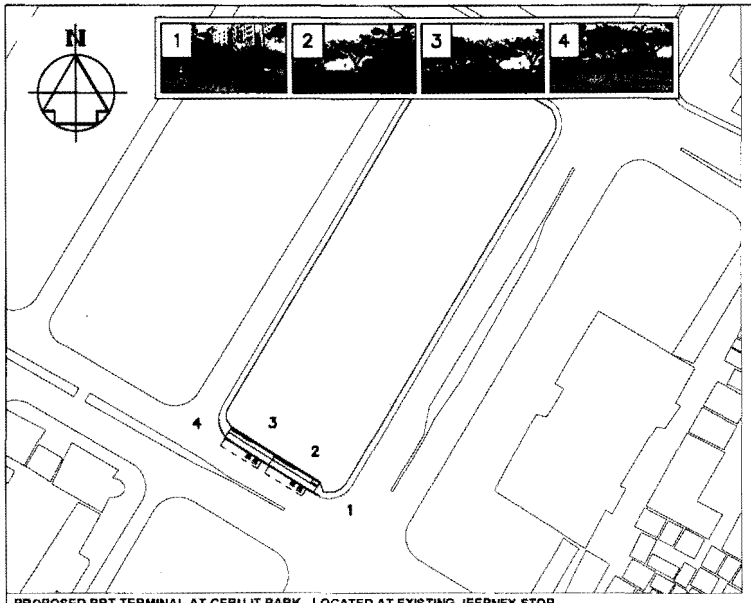
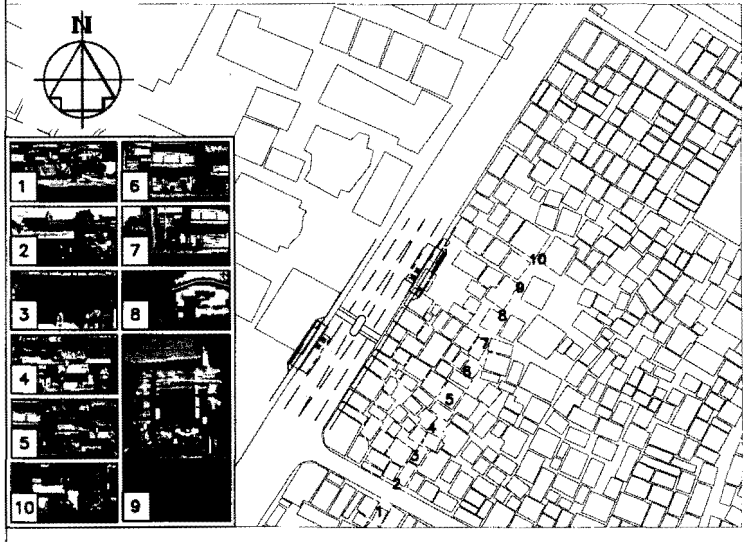
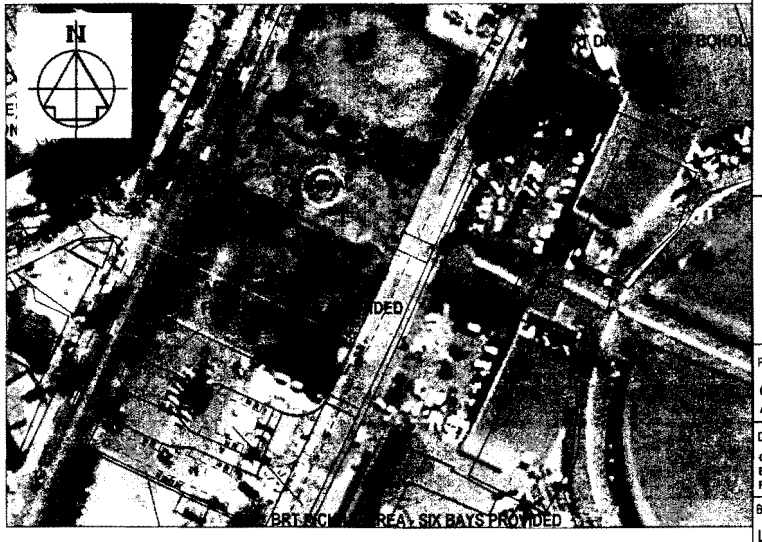


PROPOSED BRT TERMINAL AT CEBU IT PARK - LOCATED AT EXISTING JEEPNEY STOP

PROPOSED BRT BUST STOP ON GOV. M. CUENCO AVE - APPROX 30 METERS NORTH OF SALINA DRIVE AND INCLUDES NEW PEDESTRIAN CROSSING (SIGNAL) FACILITY



PROPOSED BRT BUST STOP ON ARCH. REYES AVE - APPROX 20 METERS NORTH OF P. CABANTAN AND INCLUDES NEW PEDESTRIAN CROSSING (SIGNAL) FACILITY



PROPOSED BRT TERMINAL AT AYALA (BOHOL REFER TO DWG/1240/CAD/022

APPROXIMATE POSITION OF UTILITY INFRASTRUCTURE

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Annex 6: Chance Find Procedures

I. Introduction and Coverage

This chance find proceduresareCebu BRT project-specific procedure that outlines the actions to be taken by the Contractor, the Cebu City Government (CCG), and the Department of Transportation and Communications (DOTC) if previously unknown cultural heritage is encountered.

These procedures were developed in accordance with the Philippine regulations and the World Bank's OP 4.11 on Physical Cultural resources of July 2006. These procedures are included as standard provisions in construction contracts of the Contractors to ensure the protection of cultural heritage.

Thesechance find proceduresidentify what measures should be taken in the event that physical cultural resources are encountered. It will be included in theConstruction Management Plan and in bidding documents, and will be diligently supervised by the PIU through its Environmental and Social Safeguard Specialists. These procedures are for strict implementation of the Contractor and apply to all types of physical cultural resources defined as "movable or immovable objects, sites, structures or groups of structures having archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance".

II. Ownership

All findings belong to the Government of the Philippines (GOP). TheNational Museum (NM) is the agency tasked in the preservation and protection of cultural properties by virtue of the implementation of R.A. 4846 (or the Cultural Properties Protection and Preservation Act, 1966) , P.D. 374(An Act Amending Some Sections of RA 4846, 1974) and R.A. 8492 (the National Museum Act of 1998) and other related cultural laws. The NM will determine the final destination of any artifact that is salvaged during the construction process.

III. Recognition

The Contractor will train all workers, especially those working on earth movements and excavations, on recognition of artifacts most likely to be found in the area. The NMor any other recognized Historical or Archaeological Institute in Cebu City canbe requested to provide this training.

If the Contractor discovers archeological sites, historical sites, remains andobjects, including graveyards and/or individual graves during excavation or construction, the Contractor shall:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damageor loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the National Museum takes over; and,
- After stopping work, the contractor must immediately report the discovery to the concerned government authorities.

IV. Supervision Engineer and Safeguard Officer

The contractor is not entitled to claim compensation for work suspension during this period. The Supervision Engineer is entitled to suspend work and to request from thecontractor some excavations at the contractor's expense if he thinks that a discovery was made and notreported.

V. Demarcation of the Discovery Site

With the approval of the Supervision Engineer and Safeguard Officer, the Contractor is then required to temporarily demarcate, and limit access to, the site.

VI. Non-Suspension of Work

The Supervision Engineer and Safeguard Officer are entitled to decide whether the Physical Cultural Resources (PCR) can be removed and for the work to continue, for example in cases where the find isa small object.

VII. Chance Find Report

The Contractor should then, at the request of the Supervision Engineer or the Safeguard Officer, and within a period of two working days, make a Chance Find Report (CFR), recording:

- Date and time of discovery;
- Location of the discovery;
- Description of the PCR;
- Estimated weight and dimensions of the PCR; and
- Temporary protection implemented.

TheCFR should be submitted to the Supervision Engineer, who will thensubmit it to CCG and notify the National Museum of the finding.

VIII. Arrival and Actions of the National Museum

Prior arrangements with the NM will berequested to send a representative that will arrive at the discovery site within 24 to 48 hours,and determine the action to be taken.This would require a preliminary evaluation of the findings to be performed by the archeologists of the NM. The significance and importance of the findings should be assessed according to the variouscriteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values. Subsequent actions may include, but not be limited to:

- Removal of PCR deemed to be of significance;
- Execution of further excavation within a specified distance of the discovery point; and,
- Extension or reduction of the area demarcated by the contractor.

These actions should be taken within 7 days.The contractor will not be entitled to claim compensation for work suspension during this period.

If the NM's representatives fail to arrive within the stipulated period, theSupervision Engineer will have the authority to extend the period by two days. If the NM's representatives fail to arrive after the

extension period, the Supervision Engineer will have the authority to instruct theContractor to remove the PCR or undertake other mitigating measures and resume work. Such additional works can be charged to the contract. However, the contractor may not be entitled to claim compensation for work suspension during this period.

IX. Further Suspension of Work

During this 7-day period, the NM will be entitled torequest the temporary suspension of the work at or in the vicinity of the discovery site for an additional period of up to, for example, 30 days. Thecontractor will not be entitled to claim compensation for work suspension during this period. However, the contractor will be entitled to establish an agreement with the NM for additional services or resources during this further period under a separate contract with the NM.

X. Restart of Works

Construction works could resume only after permission is grantedfrom CCG and/or DOTC or the NM concerning safeguard of the heritage.

TERMS OF REFERENCE FOR CONTRACTORS
Specifications for the Execution of the Environmental Management Plan (EMP)
Cebu BRT Project

GS.1 INTRODUCTION

The Specifications define the requirements for the quality of materials, workmanship and management for the satisfactory completion of the Works under the Contract.

These Specifications for the execution of the EMP shall be read in conjunction with the other Contract Documents. In case of ambiguities and/or discrepancies discovered which would require definite and/or specific clarifications and interpretations, the provision of applicable provisions of the General Contract and/or the Conditions of Contract for Works of Civil Engineering Construction are to be referred to by the Contracting Parties.

The Contractor shall carefully read and understand the exact meaning of the Specifications and/or Drawings.

In case of ambiguities or discrepancies or omissions, in the opinion of the Contractor, he shall inform the Project Proponent/Owner for actions to be taken. These information shall be submitted in writing at the time of submission of Detailed Programme in accordance with applicable Sub-Clause on Conditions of Contract for Works of Civil Engineering Construction. The Project Proponent/Owner shall evaluate related documents and decide accordingly and appropriately on the Works to be carried out, based on the Contract. If the Contractor finds out any discrepancy and carry out the Works without any consultation with and approval by the Project Proponent/Owner, such activity shall be solely the responsibility and risk of the Contractor.

GS.2 SCHEDULE AND REPORTS

2.1 COMMENCEMENT, EXECUTION AND COMPLETION OF WORKS

The Contractor shall commence the Works within ten (10) calendar days from the date of the receipt of the Project Proponent/Owner 's written Notice to Commence and shall complete the Works within the specified time duration.

2.2 CONSTRUCTION PROGRAMME

The Contractor shall submit a detailed construction programme or revision of the same to the Project Proponent/Owner for his approval.

The Contractor shall submit a construction program, with full details of all the works to be carried out during the contract, within fifteen (15) days after receiving the Letter of Acceptance. The construction program shall include a PERT/CPM (Critical Path Method) network and Bar Chart with S-curve, which comply with the provisions stated hereinafter.

Activities shown on the PERT/CPM network and Bar Chart (with S-curve) shall also include time allowances for the preparation and approval of drawings and samples, procurement and shipping of materials and equipment, installation of special and critical items, possible delays caused by flood and/or inclement weather, legal holidays, etc. All critical paths shall be marked on the PERT/CPM network.

The Contractor shall submit detailed scheduling, mobilization and utilization of equipment needed in the Project. This shall be incorporated in the Bar Chart Schedule.

The Contractor shall describe the conditions of work shifts to execute night works and/or Sunday and holiday works if any, which is applied to the respective work of the construction programme.

Whenever the Contractor proposes to change the Construction Programme, the Contractor shall immediately notify the Project Proponent/Owner in writing for the approval of the revision.

If the Contractor falls behind the approved construction programme, he shall, within fourteen (14) days from the date of such default, submit for approval a revision of the Construction Programme showing proposed measures to offset the setback.

When requested by the Project Proponent/Owner, the Contractor shall promptly furnish details of the Construction Programme for particular sections of the Permanent Works.

2.3 PROGRESS AND COMPLETION REPORT

The Contractor shall, before the fifth day of each month, submit to the Project Proponent/Owner, respectively, ten (10) copies of monthly progress report in a format acceptable to the Project Proponent/Owner detailing the progress of the work accomplished during the preceding month. The reports shall contain but are not limited to the following:

(1) A general description of the work performed during the reporting period and notable problems that have been encountered.
(2) The overall percentage of the Works completed as well as scheduled by the CPM network as of the end of a reporting period, with appropriate comments in writing to explain the differences and how to recover delay, if any.
(3) A list of local manpower by trade employed during the reporting period.
(4) An inventory of the amount of major construction materials consumed and delivered to the Site during the reporting period.
(5) An inventory of all equipment and plants, their present status, time when their repair is expected to be finished, if under repair.
(6) A general description of the weather and a list of rainfall and maximum and minimum temperatures and tide levels at the site for each day.
(7) A statement about labour relations and an explanation of actual or potential problems.
(8) A statement concerning the effectiveness of safety programme and a list of each accident involving hospitalization and/or death of any person. Also a list of any accidents in which equipment has been damaged to the extent it become inoperative, and any fire which has occurred.
(9) A statement concerning the effectiveness of security programmes and a list of major thefts.
(10) A list of the amount and date of each payment received as of the end of the reporting period and the amount of any monthly invoice submitted but not yet paid.
(11) A list of claim submitted during a reporting period including claim amounts and extension of time claimed.
(12) A statement concerning foreseeable problems areas.
(13) Record and status of correspondences exchanged between the Contractor and the Project Proponent/Owner.
(14) Photographs explained in Sub-Section GS.6.4.

The above progress reports shall be prepared/ submitted separately from the one specified in Sub-Section GS.6.5. At the end of the Work, the Contractor shall prepare and submit the Completion Report to the Project Proponent/Owner for approval.

2.4 PROGRESS PHOTOS AND VIDEO

(1) Progress Photo

The Contractor shall, throughout the Contract period, submit to the Project Proponent/Owner color photographs the size of not less than 125 x 203 mm, which clearly shows the Works in progress. Photographs shall be taken at the start, during and at the completion of each major component of the Works and at other times and places as directed by the Project Proponent/Owner. The Contractor shall first submit proof print of each photograph taken to the Project Proponent/Owner for selection. The selected photographs shall be attached to the monthly progress report specified in Sub-Section GS.6.3.

A brief description of the subject and the date they were taken will be added to each photograph. Additional prints shall be submitted if required by the Project Proponent/Owner or the Project Proponent/Owner.

The negatives of the photographs shall be the property of the Project Proponent/Owner and no print from these negatives shall be supplied to any person unless so authorized by the Project Proponent/Owner.

Upon completion of the Works, the Contractor shall submit all of the negatives arranged chronologically and marked for identification. The Contractor shall submit to the Project Proponent/Owner two (2) sets of color photographs adequately edited and filed showing the entire sequence of the Works until its completion.

2.5 WEEKLY WORK SCHEDULE AND DAILY WORK ACCOMPLISHMENT

Every Friday, the Contractor shall submit two (2) copies of a weekly schedule of main work items to be accomplished during the succeeding week. The schedule shall be in a form approved by the Project Proponent/Owner and is to contain appropriate comments with regards to major work items to be performed.

The Contractor shall likewise submit Daily Work Accomplishment to provide the Project Proponent/Owner the necessary data to closely and effectively monitor the progress of the Works.

2.6 JOINT PROGRESS MEETINGS

A regular meeting between the Project Proponent/Owner and the Contractor will be held once a week or fortnight at a time directed by the Project Proponent/Owner. The purpose of this meeting is to discuss the progress being made and the work proposed for the forthcoming activities. The Project Proponent/Owner may attend such meetings or hold separate meetings whenever necessary. Special meetings shall be called as the need for it arises.

2.7 PAYMENT

Payment for preparation and submission of the progress and completion reports including construction programme and progress photos will be made in the lump sum cost as stated therefore in the Bill of Quantities. The payment will be made monthly in proportion with the monthly progress of the whole Works completed at the current month. The payment shall constitute full compensation for all labour, materials, equipment, necessary copies and other incidental cost therewith.

GS.3 ENVIRONMENTAL CONSIDERATION AND ENVIRONMENTAL MANAGEMENT PLAN

3.1 WORKING SPACE, STORAGE AND STOCKPILING OF MATERIALS

Except for the construction Site described above, the Contractor shall be solely responsible for providing all other areas he may need for the construction of his temporary offices, warehouse, workshops, laboratory, storage areas, etc.

Materials shall not be stored on any roadway except where and as permitted by the Project Proponent/Owner. Stockpiling of construction materials shall be confined to such areas as may be approved by the Project Proponent/Owner. Additional space required, unless otherwise stipulated, shall be provided by the Contractor at his expense.

Where stockpiling is done outside of the right-of-way, the Contractor shall secure the permission of the property owner and the site shall be abandoned immediately when the portion of the Works for which it is required is completed, and the natural surfaces shall then be restored as nearly as possible to the original condition by the Contractor at his expense

The Contractor shall pay all costs, expenses, compensation or other disbursements, which may be incurred by him in negotiations with owner, occupier or public authority. The full costs, expenses, compensation or other disbursements shall be deemed to be included in the Contract Price. The Contractor shall be responsible for all damage, which he may do to land or property lying outside the working space as defined above.

3.2 UTILITIES AND TELECOMS REPROVISIONING PLAN (REMOVAL, RELOCATION AND INCLUSION OF PUBLIC UTILITIES AND SITE FACILITIES)

In general, the removal, relocation, and inclusion of public utilities and site facilities that are essential to the Works under the Contract are to be executed by their respective owners, the Contractor is therefore instructed to recognize the following stipulations:

(1) The Work Programme to be submitted, as required in the Conditions of Contract for Works of Civil Engineering Construction, shall be the basis, reference or the factor that will determine any negotiations or working arrangements to be entered into by the Project Proponent/Owner with the particular owners of water supply, sewerage, communication, electricity and gas supply utilities and Site facilities such as piers, etc. and it is therefore essential that the Contractor provides the details on the priorities and sequences of his construction activities and operations and any particulars that may be required by the Project Proponent/Owner on the said Programme.

(2) No work shall commence on any parts, portions or Sections on the Site of the Works that may affect or disturb the functions of the original conditions of public utilities and Site facilities unless a written permission has been secured first from the Project Proponent/Owner.

(3) No expense shall be borne by the Contractor in connection with the removal, relocation or inclusion of public utilities and Site facilities except for the purpose of payment of any claims from their owners as a result of any damages or injuries caused by Contractor or any of his Subcontractor(s) operations.

(4) However, if in the opinion of the Project Proponent/Owner, the Work will be unreasonably delayed, the Project Proponent/Owner after consultation with the Project Proponent/Owner and owner of the utilities, may instruct the Contractor to execute such removal, relocation or inclusion of public utilities. Payment to such work will be covered by the provisional sum provided for such work item in the Bill of Quantities.

3.3 PROTECTION AND RESTORATION OF PROPERTY

The Contractor shall be responsible for the preservation of all public and private property, monuments, telephone lines, other utilities, etc., along and adjacent to the Site insofar as they may be endangered by his operations; shall use every precaution necessary to prevent damage to pipes, conduits, and other underground structure; and shall protect carefully from disturbance or damage all land monuments and property marks until the Project Proponent/Owner has witnesses or otherwise reference their location and shall not remove them until directed. Any utility lines damaged by the Contractor shall be repaired at once at his expense. All trails and roads adjacent to or intersecting the Works shall be protected from damage.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Works, or in consequence of the non-execution thereof on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring same or he shall make good such damage or injury in some other acceptable manner.

3.4 DRAINAGE AND CARE OF WATER

3.4.1 WORKS TO BE KEPT CLEAR OF WATER

The Contractor shall keep the Works well drained until the Project Proponent/Owner certifies that the whole of the Works is substantially complete and shall ensure that so far as practicable, all works is carried out in the dry. Excavated areas shall be kept well drained and free from running water.

The Contractor shall construct, operate and maintain all temporary cofferdams, watercourses and other works of all kinds including pumping, and well-point dewatering that may be necessary to exclude water from the Works while construction (including construction or erection works by subcontractor) is in progress. Such temporary works shall not be removed without the approval of the Project Proponent/Owner.
Notwithstanding any approval by the Project Proponent/Owner of the arrangements made for the exclusion of water, the Contractor shall be responsible for the sufficiency thereof, and shall be liable for keeping the Works safe during all floods, and for making good at his own expense any damage to the Works that may be attributed to floods. Any loss of production, additional overheads, or additional costs of any kind that may result from the floods shall be at the Contractor's own risk.

3.4.2 DISCHARGE OF WATER INTO EXISTING CHANNEL

The Contractor shall make provision for the discharge or disposal from the Works and Temporary Works of all water and waste arising there from and the method of disposal shall be to the satisfaction of the Project Proponent/Owner and any authority or person having an interest in any land or channel over or in which water may be discharged.

3.4.3 PROTECTION OF EXISTING DRAINAGE

No existing drainage pipe encountered where the flow of run-off is affected by the execution of any part or section of the Works shall, in anyway, be decommissioned but fully safe guarded during the duration of said execution of the Works. The Contractor shall provide temporary outlets to such affected drainage pipes subject to the approval of the Project Proponent/Owner until the same have been reconnected to their permanent outlets in accordance with the Contract or as per instruction of the Project Proponent/Owner.

The furnishing of plant, labor and materials in pursuance to the provisions described in this Sub-Section shall not be paid for separately but all costs shall be deemed to have been included in the Bill of Quantities tendered for Section CW.1 "Cofferdam and Dewatering."

3.5 SPECIFIC ENVIRONMENTAL CONSIDERATION DURING CONSTRUCTION STAGE

It is quite unlikely that the construction of the project shall cause undue damage to the environment of the Project site and its adjacent areas. However, the Contractor should undertake measures to minimize any adverse effects and to execute monitoring works of the construction works during the construction as follows:.

3.5.1 Hydrology and Water Quality

(1) General

The Contractor's construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris and other objectionable pollutants and wastes into streams, flowing or dry water courses and underground water sources. Such pollutants and wastes include but, are not restricted to refuse, garbage, cement, concrete, sewage effluent, industrial waste, oil, waste water, human wastes and other petroleum products. The Contractor shall submit his plan showing the location and detailed design and plans of the water pollution prevention systems and facilities to the Project Proponent/Owner for approval.

(2) Particular Consideration

a) For the construction works on dry land, silt generated by the construction should be prevented from entering into the lake and rivers by construction of canals which will direct the storm water from the construction site to the nearest possible infiltration site (e.g., natural depressions or temporary retaining basins).

b) Oil pollution should be avoided by proper construction management (e.g., training of operators, laborers and workers). A comprehensive action plan should be made and submitted by the Contractor for approval of the Project Proponent/Owner to prevent accidental oil and related products spills in contaminating surface and ground water.

3.5.2 Terrestrial and Aquatic Ecology

(1) Preservation of Flora and Fauna

The Contractor shall refrain from destroying, removing or clearing trees, timber, shrub and other flora to any extent greater than that is approved by the Project Proponent/Owner as being necessary for the executing of this Contract and shall be approved by DENR. He shall take such measures as may be necessary to prevent his employees for hunting, disturbing, capturing or destroying stock and such fauna as may be protected by relevant statutes.

(2) Particular Consideration

Cutting of trees and other important vegetation during construction should be minimized. In areas where this is not possible, e.g., borrow pit areas, replanting should be done in nearby areas to maintain good aesthetic condition and the habitat of ecologically and commercially important animal species.

3.5.3 Soil Conservation

(1) Prevention of Erosion

All precautions shall be taken by the Contractor to prevent the erosion of soil from any lands used or occupied by the Contractor and of the bed or banks or any river or stream and the deposition of excavated or eroded material in any river or stream that may result from the execution of the Works.

(2) Time of Soil Conservation

All soil conservation measures shall be carried out in the earliest possible season, as determined by the Project Proponent/Owner, to ensure that the required protection is established by the time of completion of the Works.

(3) Other Soil Conservation Required for Temporary Works

If, in the opinion of the Project Proponent/Owner, the Contractor's operations in the areas forming the Permanent Works and other areas outside of the Permanent Works Area cause erosion hazards, the Contractor shall undertake soil conservation measures in these areas when directed and in accordance with the practices and procedures described in this Specification.

3.5.4 Noise and Dust Control

(1) Dust

a) Fugitive dusts during earth moving operations should be minimized by sprinkling water during dry and windy construction periods.
If it is so required at areas where it is heavily congested with houses, people, transportation, etc., that security net, sheet, etc. shall be provided for the security of the same from the dusts and danger.

b) Construction traffic generated dust should be minimized by watering the roadways.

(2) Noise

a) Noise should be minimized during pile driving by providing sound-absorbent materials on pile head caps and enclosure of construction equipment (e.g., compressors) which generate excessive noise.

b) Noise emissions from pump stations should be controlled within DENR allowable limits.

3.5.5 Socio-Economy

Traffic condition should be monitored during the construction stage and traffic congestion due to construction related vehicles should be minimized through introduction of appropriate measures, e.g., deployment of traffic control.

3.65 SECURITY AND HEALTH CONTROL

3.6.1 GENERAL

All security and health controls necessary for the execution of the Works such as but not limited to, medical facilities, sanitary arrangements, explosives and fuel, temporary fencing, safety precautions and fire prevention, shall be established and maintained by the Contractor at his own expense. The Contractor shall make himself responsible for all security and health controls and shall submit to the Project Proponent/Owner for his approval the organization and the regulations for these purposes.

3.6.2 SITE SECURITY

The Contractor's warehouse and storage area shall be secured against unauthorized entry in a manner appropriate to its contents. The Contractor shall also provide watchmen as required.

3.6.3 SANITARY ARRANGEMENT

The Contractor shall keep the Site in a clean and sanitary condition and shall provide and maintain sanitary facilities for the use of persons employed in the Works to the extent and in the manner and at such places as approved by the Project Proponent/Owner and by any local or other authorities concerned, and all persons connected with the Works shall be obliged to use these sanitary facilities.

The Contractor shall also post notices and take such other precautions as may be necessary to keep the Site clean and well maintained.

3.6.4 MEDICAL FACILITIES

The Contractor shall make his own arrangement for treatment of casualties on the Site in conformity with the requirements of any duly constituted medical and sanitary authority as provided hereof in Clause 35 of the General Conditions of Contract for Works of Civil Engineering Construction. The Contractor shall provide first aid units/stations, and shall be responsible for and bear all cost in connection with the first aid services including the use of ambulance of injured or sick employees transporting to the hospital. Such first aid services shall be provided to the Project Proponent/Owner and to their employees at the site at no cost to them.

3.6.5 DANGEROUS MATERIALS

The Contractor shall convey, store and make use of all, petroleum, acetylene carbide, acetylene carbide of calcium and other similar dangerous materials provided by them for use in or on the Works in strict accordance with the provision of all Laws, Orders and Regulations that are in force at the Site or that may be issued from time to time by the Government or the Project Proponent/Owner.

3.6.6 PRECAUTION FOR SAFETY

The Contractor shall take all necessary precautions against risks, loss of life or of injury to any person employed on the Works or to employees of the Project Proponent/Owner and the Project Proponent/Owner or to visitors or to persons having good and sufficient reasons to be about the Works, and shall properly safeguard the Works to the satisfaction of the Project Proponent/Owner.

Where and when it is deemed necessary, the Contractor shall furnish lighting facilities, signs and sentry, and other safety facilities and services.

The Contractor shall furthermore take all necessary precautions against damage to the property of the Project Proponent/Owner or of others located at or adjacent to the Site. The Contractor shall at all times comply with any accident prevention, regulations and any safety regulations of local or national authorities or that shall be prescribed by the Project Proponent/Owner.

The Contractor shall appoint a Safety Officer and hold periodical safety meetings with the Project Proponent/Owner and with his own supervisors and foremen. The Contractor shall report in writing within twenty-four (24) hours to the Project Proponent/Owner all accidents involving the death of and/or injury to any person, resulting from the Contractor's operation.

3.6.7 FIRE PREVENTION

The Contractor shall take every precaution to prevent fire occurring on or about the Site and shall provide fire fighting equipment suitable and adequate in the opinion of the Project Proponent/Owner, for ready use in all structures, buildings or the Works under construction, including his residential quarters, labor camps and ancillary buildings. The Contractor shall maintain such equipment and such additional fire fighting equipment as may be required, in good working condition until the Works are accepted by the Project Proponent/Owner.

The Contractor shall diligently fight any fire which occurs on the Site, wherever such fire may originate. In this regard, he shall employ all requisite equipment and manpower up to the limit of his equipment and manpower employed at the Site, including the equipment and manpower of his Subcontractors.

3.6.8 PAYMENT

The cost incurred by the Contractor in complying with the obligation under this Section shall not be paid separately and shall be deemed to be included in the various items tendered therefore in the priced Bill of Quantities.

GS.4 PROVISIONAL SUM AND COST FOR THE EMP

4.1 SCOPE OF WORK

The total amount of the following works is set out under the provisional sums.

(1) Relocation and diversion works for public and private utilities such as power supply, sewer, water supply, gas supply, telephone, drainage, etc., will be made in accordance with the requirements of the General Contract Section (____), except for items measured in other pay items.

(2) The sum indicated in the Bill of Quantities for the above item is a pre-estimate of the cost of work to be performed by the Contractor.

(3) These sums shall be the actual cost excluding overheads, administration costs and profit approved by the Project Proponent/Owner for the execution of the work in accordance with the Specification. All costs for overheads, administration costs and profit shall be included in the percentage addition nominated by the Contractor.

4.2 USE OF PROVISIONAL SUM

If the Project Proponent/Owner directs the Contractor to supply provisional sum items, the Contractor shall seek quotations by public tender or from certain suppliers or contractors nominated by the Project Proponent/Owner and shall submit those quotations to the Project Proponent/Owner who may, if he deems it necessary or desirable, revoke that direction in whole or in part at any item before acceptance of any quotation.

Following his consideration of any quotation submitted to him by the Contractor, the Project Proponent/Owner may direct the Contractor to, and the Contractor shall, obtain the items from the supplier or nominated subcontractors giving the quotation at the price and on the terms approved by the Project Proponent/Owner.

In the event that the Contractor has any difficulty with a supplier or nominated subcontractor or comprehend that the progress of the Works may be adversely affected by act of omission, or delay of the supplier or subcontractor, he shall immediately notify the Project Proponent/Owner.