Republic of the Philippines
Department of Transportation and Communications
&
Light Rail Transit Authority

PPP for the
Automatic Fare Collection System Project for LRT Lines 1& 2 and MRT 3
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Abbreviations

ADB  Asian Development Bank
AFCS  Automatic Fare Collection System
BPS  Basis points
CAPEX  Capital Expenditures
CHS  Central Clearing House System
CNC  Certificate of Non-Coverage
C&P  Consultation and Participation
CEDAW  Convention on the Elimination of All Forms of Discrimination Against Women
DSCR  Debt Service Cover Ratio
DSRA  Debt Service Reserve Account
DAO  Department Administrative Order
DOF  Department of Finance
DOLE  Department of Labor and Employment
DPWH  Department of Public Works and Highways
DOTC  Department of Transport and Communication
DMF  Design and Monitoring Framework
MMEIRS  Earthquake Impact Reduction Study of Metro Manila
EIRR  Economic Internal Rate of Return
ENPV  Economic Net Present Value
EMB  Environmental Management Bureau
EMP  Environmental Management Plan
EMoP  Environmental Monitoring Plan
EOPL  Environmental Quality Performance Level
FC  Financial Close
FIRR  Financial Internal Rate of Return
FSA  Full Systems Acceptance/Approval
GAD  Gender and Development
GOP  Government of the Philippines
IEC  Information Education and Communication
IRR  Internal Rate of Return
IFC  International Finance Corporation
ILO  International Labour Organization
JICA  Japan International Cooperation Agency
LRB  Last Ride Bonus
LRTA  Light Rail Transit Authority
LRT  Light Rail Transit Line
LRT1  Light Rail Transit Line no 1
LRT2  Light Rail Transit Line no 2
LLCR  Loan Life Cover Ratio
LGU  Local Government Unit
MRA  Maintenance Reserve Account
MRTC  Metro Rail Transit Corporation
MRT  Metro Rail Transit Line no 3
MCIT  Minimum Corporate Income Tax
NCR  National Capital Region
NCC  National Computer Center
NEDA  National Economic and Development Authority
NPCC  National Pollution Control Commission
NTC  National Telecommunications Commission
NPV  Net Present Value
ODA  Official Development Assistance
OPEX  Operational Expenditures
PAX  Passenger (number)
PAGASA  Philippine Atmospheric, Geophysical and Astronomical Services Administration
PPGD  Philippine Plan for Gender –Responsive Development
PoS  Point of Sale
PPPC  PPP Center
PDMF  Project Development and Monitoring Facility
PLCR  Project Life Cover Ratio
PTO  Public Transport Operator
PPP  Public-Private Partnership
RDCC  Regional Disaster Coordinating Council
RA  Republic Act
RFP  Request for Proposals
ROE  Return on Equity
SAM  Secure Application Module
SLA  Service Level Agreement
SMA  Service Maintenance Agreement
SJT  Single Journey Ticket
SCBA  Social Cost Benefit Analysis
SPV  Special Purpose Vehicle
SVT  Stored Value Card
SPRSS  Summary Poverty Reduction and Social Strategy
ToR  Terms of Reference
TVM  Ticket Vending Machine
TA  Transaction Advisory
VAT  Value Added Tax
# Table of Content

Disclaimer .................................................................................................................. 2

Abbreviations .............................................................................................................. 3

Table of Content ........................................................................................................ 5

PART I .......................................................................................................................... 7

1. Introduction ............................................................................................................. 7

2. Project Introduction .................................................................................................. 9
   2.1. Light Rail Transport in Manila ........................................................................ 9
   2.2. Current AFCS Scheme .................................................................................... 11
   2.3. Desired AFCS Scheme .................................................................................... 14

3. Implementation Model ............................................................................................. 20
   3.1. Business Model ............................................................................................... 20
   3.2. Value Chain ..................................................................................................... 21
   3.3. Business Rules ................................................................................................. 24
   3.4. Governance and Decision making .................................................................... 24

4. Project Scope ............................................................................................................ 26
   4.1. Desired AFCS Project ...................................................................................... 26
   4.2. High Level Functional Architecture ................................................................ 26
   4.3. System Components ....................................................................................... 28
   4.4. System Architecture Options ......................................................................... 30
   Legacy System Architecture .................................................................................. 30
   Centralized Virtualized System Architecture ...................................................... 30
   Systems as a Service ............................................................................................... 31
   4.5. Equipment ......................................................................................................... 31
   4.6. Transition Scheme and Implementation Schedule .......................................... 33
   4.7. Further Roll-Out ............................................................................................... 34
   4.8. Connecting Extensions to the AFCS ................................................................. 34
   4.9. Connecting Other Transport Modes to the AFCS ........................................... 35

5. Contracting Approach ............................................................................................. 36
   5.1. Legal Framework for Concession .................................................................... 36
   5.2. Contractual Structure ...................................................................................... 36
   5.3. Contract’s Commercial Characteristics ............................................................ 39

PART II ......................................................................................................................... 45

6. Procurement ............................................................................................................ 45
   6.1. Legal Basis of Procurement ............................................................................ 45
   6.2. Dual-stage Process .......................................................................................... 45
   6.3. Key Documentation ......................................................................................... 45

7. Outline of the Bidding Process ................................................................................. 46
March 11, 2013 ........................................................................................................... 46
Pre-Bid Conference(s) ............................................................................................... 46
DOTC/LRTA ................................................................................................................. 46
March 25, 2013 ............................................................................................................ 46
Deadline for Bidder’s Comments to the Instructions to Bidders, Draft Concession Agreement & Draft MPSS ........................................................................................................ 46
Bidders ......................................................................................................................... 46
May 16, 2013 ................................................................................................................ 46
Issuance of Final BOT Agreement and MPSS ............................................................... 46
DOTC/LRTA ................................................................................................................. 46
May 23, 2013 ................................................................................................................ 46
Bid Proposals Submission Date ..................................................................................... 46
Bidders ......................................................................................................................... 46
June 14, 2013 ................................................................................................................ 46
7.1. Pre-Qualification ................................................................................................. 47
7.2. Preparation of Bid Proposals ............................................................................. 47
7.3. Pre-Bid Conferences and Bid Bulletins ............................................................. 47
7.4. Submission of Bid Proposals ............................................................................ 47
7.5. Bid Evaluation .................................................................................................... 48
7.6. Awarding of Bidder and Issuance of Notice of Award ....................................... 48
7.7. Signing of Concession Agreement .................................................................... 48

PART III ..................................................................................................................... 50

8. The Philippines ....................................................................................................... 50
8.1. Macroeconomic Outlook .................................................................................. 50
8.2. Taxation .............................................................................................................. 50
8.3. DOTC ................................................................................................................ 52
8.4. LRTA ................................................................................................................ 54
PART I

1. Introduction

Metro Manila is currently served by three Urban Rail Transit Systems, namely the Light Rail Transit Line No. 1 (LRT 1) running along Taft-Rizal Avenues, the Light Rail Transit Line No. 2 (LRT 2) running along the Aurora-Recto Avenues, and the Mass Rail Transit Line No. 3 (MRT 3) running along the E. De Los Santos Avenue (EDSA).

LRT 1 and LRT 2 are operated by the Light Rail Transit Authority (LRTA) and have compatible fare collection system, while the DOTC operates MRT3 under lease agreement with a private corporation, MRTC (Metro Rail Transit Corporation). The fare collection system of MRT 3 is, however, not compatible with those of LRT 1 and LRT 2.

Table 1 describes the headlines of the current light rail/metro system.

<table>
<thead>
<tr>
<th>Stations</th>
<th>2011 PAX/yr (mln)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRT</td>
<td>43</td>
</tr>
<tr>
<td>LRT1</td>
<td>20</td>
</tr>
<tr>
<td>LRT2</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
</tr>
</tbody>
</table>

All three systems are utilizing magstripe fare collection technology capable of handling both single journey and stored value tickets. The Single Journey and Stored Value type tickets are sold at each rail station.

Stored Value and Single Journey tickets are available in LRT1, LRT2 and MRT3, and are being sold through tellers located inside station ticket offices or through automatic vending machines. The separate and independent systems allow the modification of fare structure or fare policy and fare charging can be set by each line using either a distance related, zonal or per station basis approach. Except for Stored Value Ticket users of LRT 1 and LRT 2, passengers transferring from one line to the other are required to purchase separate tickets resulting in multiple queuing times and boarding fees.

The current ticketing system is not of a quality that is in line with international standards and it keeps the public transport system from running at its full potential.

An efficiently procured contactless ‘Automatic Fare Collection System’ (AFCS) Project will bring important benefits to the more than 1 million daily passengers using the light rail lines, to the authorities operating those lines and if developed sensibly, also to the wider public.

- The AFCS will ensure seamless interconnection for travelers and will remove the current inconvenience of the need to buy separate tickets for separate lines. This will have a positive impact on the daily passenger flows using the metro rail network.

- The AFCS will allow the operating authorities to develop a service offering (including fare-charging arrangements, fare structures & fare policies) that better suit the needs of the passengers. Like the systems in Hong Kong, London, the Netherlands and other countries have shown, a well-designed AFCS improves customer satisfaction through various ways.
• The new AFCS will need to replace a current magnetic based ticketing system that is very much at the end of its usability. This requires the AFCS to be expedited swiftly and efficiently, and in close consultation with all relevant stakeholders.

• The AFCS will be developed and procured in line with current international best practice, it can service other transport modes (i.e., buses, taxi cabs, etc.), and may also serve as an electronic micropayment solution in convenience stores, or as identifier for loyalty schemes, facility access and location based services.

• A successful AFCS implementation may lead to a wider application outside of the public transport sector, inducing wider economic benefit. It may also serve to incentivize more people to get/use their bank accounts, which in turn will generate economic benefits.

• The AFCS scheme will be developed in line with the Keep It Simple (KIS) principle. It will distinguish between a simple and robust core and handle additional functionality or complexity through auxiliary systems. If one of such systems should fail, this should never interrupt public transport, the access of paying customers to public transport, or the fare collection itself.

To remedy the inconveniences associated with a non-interoperable ticketing system, the DOTC and LRTA are now pushing for the implementation of a common contactless AFCS Project that will be operable by Jan 1, 2015.

The AFCS project will comprise:

• Finishing, installation, construction, refurbishing, and maintenance of the automatic gates for the existing LRT 1/2 and MRT 3, insofar as deemed necessary by the Private Proponent for the implementation and operation of the new AFCS; financing, building, own and operate the central clearing house in order to clear all transactions, and settle the stored value transaction; financing, building and owning a card and token issuance capability, and creating a broad card-base through the issuance of contactless media, in line with the following points;
  ➢ Financing and installation of the required electronic infrastructure and hardware to accommodate the AFCS system, particularly the back office connecting infrastructure, station AFCS infrastructure and services;
  ➢ Design, installation, and construction of the new AFCS which will be a system accommodating contactless smartcard technology based on the ISO 14443 A/B standards for the stored value ridership, and ISO 14443 A/B contactless token (coin format) technology for the single journey ridership;
  ➢ The full responsibility for system integration and Full Systems Acceptance ("FSA") allowing the inclusion of other transport modes and extension/expansion of existing LRT 1/2 and MRT 3 in the AFCS system and/or develop into a generic contactless micropayment solution fulfilling other commercial functions; and
  ➢ Operation and maintenance of the AFCS for LRT 1/2 and MRT 3 and such other Public Transport Operators for a Concession Period of ten (10) years beginning at FSA; and
  ➢ Operation of the clearing and settlement capability for the AFCS of LRT 1/2 and MRT 3 and such other Public Transport Operators for a Concession Period of ten (10) years beginning at FSA; and
  ➢ Operation of the card and token issuance capability for the AFCS of LRT 1/2 and MRT 3 and such other Public Transport Operators for a Concession Period of ten (10) years and an exclusivity period – during which no other card issuers operate – of five (5) years, each beginning at FSA.
2. Project Introduction

2.1. Light Rail Transport in Manila

Overview
The Manila light rail transit systems consists of 3 metro lines. LRTA, a government owned corporation, owns and operates the LRT 1 and 2 lines. On the other hand, DOTC operates the MRT 3. MRT 3 was constructed under a Build-Lease-Transfer (BLT) Agreement between DOTC and Metro Rail Transit Corp. Limited (MRTCL). MRTC has since acceded to and assumed the rights and obligations of MRTCL in the BLT Agreement.

Entry to the light rail transit systems is through the use of a magnetic stripe tickets. Train stations along each of the lines are gated with entry, exit, reversible and flush gates with turnstiles. On a daily basis, 1.1 million rides are performed on the light rail transit systems.

Figure: Metro Manila Light Rail Network as per 2012

Current lines
The three currently operated urban rail transport systems in the Metro Manila area are:

- **MRT3.** The Metrostar, or commonly called MRT 3, with a route length of 16.9 km with thirteen (13) stations from North Avenue, Quezon City to Taft Avenue, Pasay City.

- **LRT2.** The Megatren of LRT 2, which started operation in 2004, has route length of 13.8 km and with eleven (11) stations from Santolalan, Pasig City to Avenida, Manila City.

- **LRT1.** The LRT 1 with twenty (20) stations and has a route length of 17 km from North Avenue,

The 2010-2011 LRTA and DOTC/Metrostar Express rail passenger statistics were analyzed and operating patterns compared with assumptions derived in the previous LRT 1 North Extension study and World Bank Ridership Study. Table 2 indicates the basic ridership patterns derived from the 2010-2011 rail operations data for LRT 2, LRT 2 and MRT 3. The 2010-2011 LRT 1, LRT 2 and MRT 3 monthly ridership figures are presented in the Table 3.
Table 2 - Basic Railway Ridership Parameters, 2010-2011

<table>
<thead>
<tr>
<th></th>
<th>LRT 1</th>
<th>LRT 2</th>
<th>MRT 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Hour Factor</td>
<td>0.081</td>
<td>0.091</td>
<td>0.089</td>
</tr>
<tr>
<td>Weekday-to-Annual Factor</td>
<td>318 days</td>
<td>321 days</td>
<td>318</td>
</tr>
<tr>
<td>Ave. Week Day Volume, 2010</td>
<td>496,470</td>
<td>197,369</td>
<td>484,615</td>
</tr>
<tr>
<td>Ave. Week Day Volume, 2011</td>
<td>492,635</td>
<td>198,834</td>
<td>499,390</td>
</tr>
<tr>
<td>Annual Growth Rate, %</td>
<td>0.50%</td>
<td>0.74%</td>
<td>3.69%</td>
</tr>
</tbody>
</table>

Source: LRTA and DOTC/Metrostar Express

Table 3: Light Rail Ridership 2010-2011

<table>
<thead>
<tr>
<th>Month</th>
<th>LRT 1 2010 Boarding</th>
<th>LRT 1 2011 Boarding</th>
<th>LRT 2 2010 Boarding</th>
<th>LRT 2 2011 Boarding</th>
<th>MRT 3 2010 Boarding</th>
<th>MRT 3 2011 Boarding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>13,540,739</td>
<td>13,590,847</td>
<td>5,530,622</td>
<td>5,548,201</td>
<td>12,736,012</td>
<td>13,181,515</td>
</tr>
<tr>
<td>Feb</td>
<td>12,748,748</td>
<td>12,303,035</td>
<td>5,193,329</td>
<td>5,038,046</td>
<td>12,280,400</td>
<td>12,221,943</td>
</tr>
<tr>
<td>Mar</td>
<td>13,542,034</td>
<td>13,019,653</td>
<td>5,545,579</td>
<td>5,364,991</td>
<td>13,355,286</td>
<td>13,685,301</td>
</tr>
<tr>
<td>Apr</td>
<td>10,791,378</td>
<td>10,368,811</td>
<td>4,053,921</td>
<td>3,868,385</td>
<td>11,172,469</td>
<td>11,292,438</td>
</tr>
<tr>
<td>May</td>
<td>12,161,951</td>
<td>12,216,987</td>
<td>4,577,954</td>
<td>4,583,854</td>
<td>12,463,385</td>
<td>13,257,147</td>
</tr>
<tr>
<td>Jun</td>
<td>12,629,490</td>
<td>12,612,408</td>
<td>5,133,566</td>
<td>5,030,198</td>
<td>12,277,792</td>
<td>12,914,575</td>
</tr>
<tr>
<td>Jul</td>
<td>13,761,055</td>
<td>13,777,396</td>
<td>5,876,060</td>
<td>5,744,011</td>
<td>12,961,659</td>
<td>13,816,536</td>
</tr>
<tr>
<td>Aug</td>
<td>13,499,725</td>
<td>13,696,582</td>
<td>5,747,650</td>
<td>5,821,245</td>
<td>13,184,225</td>
<td>13,799,084</td>
</tr>
<tr>
<td>Sep</td>
<td>13,333,560</td>
<td>13,332,923</td>
<td>5,746,636</td>
<td>5,787,473</td>
<td>13,236,251</td>
<td>13,404,963</td>
</tr>
<tr>
<td>Oct</td>
<td>12,914,445</td>
<td>13,559,520</td>
<td>5,229,845</td>
<td>5,506,501</td>
<td>13,185,631</td>
<td>13,600,356</td>
</tr>
<tr>
<td>Nov</td>
<td>13,141,350</td>
<td>13,590,847</td>
<td>5,306,291</td>
<td>5,695,645</td>
<td>13,123,320</td>
<td>13,491,222</td>
</tr>
<tr>
<td>Dec</td>
<td>13,809,570</td>
<td>14,588,888</td>
<td>5,414,144</td>
<td>5,837,097</td>
<td>13,174,013</td>
<td>14,140,969</td>
</tr>
<tr>
<td>Total</td>
<td>155,874,046</td>
<td>156,657,897</td>
<td>63,355,597</td>
<td>63,825,647</td>
<td>153,150,443</td>
<td>158,806,049</td>
</tr>
</tbody>
</table>

Source: LRTA and DOTC/Metrostar Express

Future Transport Development and Projections
In addition, substantial extension of the Light Rail Transport network is expected to take place between 2015 and 2020. Most eminently we highlight the expansion projects in the pipeline for projected implementation until 2020: LRT North Extension, PNR Northrail-Southrail Linkage, Phase 1 (Caloocan to Alabang), LRT Line 1 South Extension, LRT Line 2 East Extension, MRT7, PNR Northrail-Southrail Linkage Phase 2 (Alabang to Calamba), and Manila-Clark Airport Express Rail Link (reconfigured Northrail Project).

Based on the current network and its likely extensions, the projected ‘base case’ passenger volumes are demonstrated in the following graphs.
2.2. Current AFCS Scheme

Current AFCS Scheme

Entry to the transit system is through the use of magnetic stripe tickets. Train stations along each of the lines are gated with entry, exit, reversible and flush gates with turnstiles. On a daily basis, 1.1 million rides are performed on the transit system.

The magnetic tickets are of the credit card sized (ID-1), flexible type. They conform to the relevant ISO standards (ISO-1, ISO-2, ISO-7811-2/1985), and are recycled and reusable via resetting the magnetically encoded data via encoding machines. Due to wear of the magnetic strip, the lifespan of a magnetic ticket is up to 1000 equipment passes or up to 12 months (whichever comes earlier).

Two different types of tickets are distinguished: Stored Value Tickets (SVT) and Single Journey Tickets (SJT). The tickets are sold through tellers inside ticket offices or ticket vending machines.

- **SVT.** The SVT is sold for PhP 100 (or PhP 80 for concessionaires) and provides a stored value of PhP 100. Other values did exist but have been phased out due to lack of popularity. Upon entry, the ticket is validated. Upon exit, the travel price is deducted from the stored value. In case the remaining stored value prior to exit is below the price of travel, exit is granted and the ticket is retained in the gate for recycling. This is called the Last-Ride-Bonus (LRB). The SVT for MRT 3 is valid for up to 3 months after first use, whereas the SVT for LRT lines is valid for 6 months after first use.

- **SJT.** The magnetic SJT allows the passenger to travel for a single ride and a pre-specified maximum amount of stations. The SJT is valid on the day of purchase only, but the magnetic ticket itself is recycled. The limited validity is both due to historical reasons and to minimize the multiplier between daily SJT usage and amount of SJTs to support the usage and recycle process.

- **Other tickets.** Other tickets currently in use are:
  - **Employee Passes.** These tickets are issued to operator employees and grant free travel on the operator’s line(s).
- **Paid Exit Ticket.** A Single Journey ticket issued (sold) to passengers who have lost their tickets or who presented a defective ticket and the same is found to have invalid information during ticket analysis.

- **Free Exit Ticket** Issued to passengers who were barred at the gates due to defective (but not physically damaged) tickets, after they have been found to have valid information but which cannot be used to exit the system.

### System Architecture

Both LRTA and MRTC employ relatively standard system architectures. In this architecture, all AFC related devices on a station are connected to a system per station (Station Computer System or SCS). This system is meant to monitor station-employed AFC devices. It allows for instance to set direction on reversible gates. It furthermore relays data between AFC devices and the Central Computer System (CCS) per line. The Central Computer System is a management information system and holds the main parameters for system operation (such as secret keys).

The utilized AFC devices are the following:

- **Automatic Gates (AG):** entry, exit, reversible. Grants entry or exit when a valid ticket is inserted;
- **Analyzer/Dispenser (A/D), also referred to as Passenger Agent Machine (PAM):** device used by tellers and service personnel to select, encode and verify tickets;
- **Ticketing Vending Machines (TVM),** also named Ticket Issuing Machines (TIM): these are only employed on LRT 2 and MRT 3 to dispense SJTs;
- **Encoder Sorter (E/S):** They are used to initialize and sort tickets. This is the basis of the ticket recycle process.

### Network Infrastructure

AFCS equipment for **LRT1 and LRT2** consist of a Wintel-based application and database server running the AFCS application software (developed by Thales) under Windows 2003 Server and MS-SQL 2005 Standard Edition SP1. Ancillary equipment at the central (main) site include the Maintenance Console and Operator Consoles (virtual applications), Laser Printers for reports, 6 sets of Encoding and 4 sets of Sorting Machines at LRT1 and LRT2 respectively for ticket production and various network switches and routers for connecting the main server and other central site equipment with ticket handling equipment located at the various stations.

Remote links are established via closed-circuit optical fiber Ethernet connection. Remotely located AFC equipment (i.e. AG, TVM) are connected to the station's local area network (LAN) by which they can communicate directly with the Central Processing System server at the main site. Information exchanged between the Central Processing Server and the remote equipment consist setup parameter files to enable equipment operation (download) and report files (revenue, statistical and equipment status data files (upload).

Connection to the internet (for non-AFCS IT equipment) and fiber connections for AFCS station equipment are provided free-of-charge by Eastern Telecommunications as part of a Right of Way agreement to install Eastern’s fiber optic cable along the LRTA viaducts.

AFCS equipment for **MRT3** consists of mirrored Wintel-based application and database servers running the AFCS application software (developed by Omron) under a Windows 2000 Server. Ancillary equipment at the central (main) site include Operator Consoles, Laser Printers for reports, 3 sets of Encoding and Sorting Machines for ticket production and various network switches and
routers for connecting the main servers and other central site equipment with ticket handling equipment located at the various stations.

Remote links are established via closed-circuit coaxial cable Ethernet connection. Remotely located equipment are connected to the station’s local area network (LAN) by which they can communicate directly with the Central Processing System server at the main site.

Information exchanged between the Central Processing Server and the remote equipment consist setup parameter files to enable equipment operation (download) and report files (revenue, statistical and equipment status data files (upload).

**Ticket Related Business Processes**

*For LRT1 and LRT2, ticket-related business processes are as follows:*

- Validation and encoding of new magnetic strip tickets: Newly acquired ticket check and validity tests, ticket class assignment, and encoding of other ticket attributes, e.g., security.
- Used ticket sorting and encoding: Tickets recovered from the gates, unsold tickets, problem tickets are recycled, sorted/grouped by ticket classification type and re-assigned attributes and values.
- Revalidated ticket inventory management: counting, labeling and packaging of tickets prior to release to LRTA Treasury.
- Data Reconciliation:
  - reconciliation of daily ticket sales/revenue against AFCS Central Computer System-generated reports;
  - reconciliation of ticket production reports against the Central Computer System records;
  - reconciliation of actual ticket inventory against Stock Ledger Cards.
- Stock Management and allocation of tickets to station tellers: From the production line, tickets are transferred to the Treasury department for subsequent allocation to individual tellers or vending machines.
- Ticket Sales: Single Journey Tickets are sold in vending machines or via live agents positioned at the stations using either Analyzer/Dispenser or Passenger Agent Machines. Stored Value Tickets are only available at the station tellers.
- Traffic Management: Problems emanating from invalid, tampered or vandalized tickets are handled by live agents utilizing fixed or handheld ticket analyzers. Passengers are issued (sold) new tickets and problem tickets collected for return to Treasury.
- Sales Remittance: Sales proceeds, unsold tickets and problem tickets are remitted back to Treasury at end of day.
- Used Ticket Recovery: used tickets (tickets with no fare value remaining) are captured at exit gates and are recovered by Treasury at end of day for recycling.
- Return to Production: Tickets recovered from the gates, unsold tickets and problem tickets are returned by Treasury to the Production department at end of day.
- AFC System administration:
  - report generation from the Central Processing System;
  - configuration of AFCS operating parameters;
  - back-up of data base files of the Central Processing System;
  - AFCS Employee Pass Control;
  - maintenance of AFCS Services Department’s computer assets;
  - software development and training of personnel on AFCS application software and equipment operation.

*For MRT3, ticket-related business processes are as follows:***
- Validation and encoding of new magnetic strip tickets: Newly acquired ticket check and validity tests, ticket class assignment, and encoding of other ticket attributes, e.g., security.
- Used ticket sorting and encoding: Tickets recovered from the gates, unsold tickets, problem tickets are recycled, sorted/grouped by ticket classification type and re-assigned attributes and values.
- Revalidated ticket inventory management: counting, labeling and packaging of tickets prior to release to MRT3 Treasury.
- Data Reconciliation:
  - reconciliation of daily ticket sales/revenue against AFCS Central Computer System generated reports;
  - reconciliation of ticket production reports against the Central Computer System records.
- Stock Management and allocation of tickets to station tellers: From the production line, tickets are transferred to the Treasury department for subsequent allocation to individual tellers or vending machines.
- Ticket Sales: Single Journey Tickets are sold in vending machines or via live agents situated at the stations using either Analyzer/Dispenser or Passenger Agent Machines. Stored Value Tickets are only available at the station tellers.
- Traffic Management: Problems emanating from invalid, tampered or vandalized tickets are handled by agents utilizing fixed or handheld ticket analyzers. Passengers are issued (sold) new tickets and problem tickets collected for return to Treasury.
- Sales Remittance: Sales proceeds, unsold tickets and problem tickets are remitted back to Treasury at end of day.
- Used Ticket Recovery: used tickets (tickets with no fare value remaining) are captured at exit gates and are recovered by Treasury at end of day for recycling.
- Return to Production: Tickets recovered from the gates, unsold tickets and problem tickets are returned by Treasury to the Production department at end of day.
- AFC System administration:
  - report generation from the Central Processing System;
  - configuration of AFCS operating parameters;
  - back-up of data base files of the Central Processing System;
  - maintenance of AFCS Services Department's computer assets.

**Reporting Processes**

Functions currently provided by the Central Processing Systems and Station Processing Systems are the following:

- Edit, display and print system and equipment parameters;
- Generate Operating Console, Maintenance Console and Audit reports;
- View and print Operating Console, Maintenance Console and Audit reports;
- Monitor stations, equipment status, events and alarms;
- Stored Value Ticket and Employee Pass usage enquiries;
- Monitor/delist suspicious tickets;
- System maintenance, housekeeping.

Raw Revenue and Statistical reports output by the AFCS system are reformatted into Excel files by LRTA or MRTC for periodic submission to its stakeholders such as the management, DOTC, Department of Finance (DOF), the Congress and the Senate, etc.

**2.3. Desired AFCS Scheme**
The desired AFCS Scheme will migrate both the stored value ticket and the single journey ticket into contactless variants. This will have substantial operational and maintenance benefits for the overall AFC system.

The following sections explain the desired AFCS scheme from the traveler’s point of view.

**Stored Value Ticket**

The magnetic stored value tickets will be replaced by a contactless smartcard (credit card size) based on the ISO 14443 A or B standard. These cards will typically have a lifetime of at least 4 years thus providing good total cost of ownership. Next to the mandatory smartcard, the proponent may introduce other form factors and media such as key fobs, stickers and NFC-enabled smartphones.

Stored value can be added to the card at existing station ticket offices and ticket vending machines. The proponent may make resell arrangements with retailers and merchants outside stations to resell smartcards and stored value. The stored value will be valid at all lines of the Manila Metro system. The existing Last Ride Bonus (LRB) scheme can be kept in place or is discontinued at will of the DOTC. In each case, the traveler must be incentivized to reuse the SVT – instead of throwing it away.

A deposit or nominal card price can be required from the passenger at sale of the SVT. This will provide an incentive for travellers to reuse the contactless CVT.

**User case - Stored Value Card**

The interoperable Stored Value smart card will replace the existing SVT. The following sections describe the main processes related to SVT usage, information exchange and payments.

**Usage**

**Card Sale**

Passengers will be able to buy the new SV smart card at the station ticket offices, vending machines or any other card retailers. The passenger will indicate the amount of stored value to be loaded on the card and will pay for the stored value and card. The teller will encode the required amount on the card and hands it over.

**Intra Line Usage**

The passenger will approach an automatic gate and checks in at the gate. As contactless reading distance is up to 10 cm, the passenger may retain the card in his/her wallet, thereby reducing the risk of loss. The gate will open and the passenger will travel to the desired destination. At the destination, the passenger will leave the station by tapping the gate with the card again. The applicable amount will be deducted from the stored value and the gate opens.

**Inter Line Usage**

If the passenger wishes to embark on another line, the process of Intra Line Usage will be repeated. The applicable fee will be deducted at check-out. The tariff structure may be optimized to offer a rebate to the passenger for each transfer. In that case, if the entry gate of the line that the passenger transfers to detects that less than 15-45 minutes ago the passenger travelled on another line, the initial fee will not be deducted.

**SV Top-up**

The passenger will – as long as the smart card is valid – be able to increase the stored value by going e.g. to a station ticket office, vending machine or any other load agent. The passenger will pay for the required amount of stored value, and the teller or machine will encode the new stored value.

**Information flow**

Each interaction between an SV smart card and AFCS equipment (Level 1) will create a transaction.
that is registered in two ways:
1. the transaction will be registered on the card
2. the transaction will be registered on the equipment and sent to the central clearing house

At sale of the SV smart card, two transactions will be created:
1. Sale of card & application
2. Sale of stored value

Each transaction will contain key information, such as:
- Date & time
- Current and previous stored value
- Transaction sequence number
- Unique application identifier
- Unique equipment identifier
- Identifier of the business entity providing the service
- And some information of the previous (n-1) transaction as read from the card

During a check-in, a check-in transaction will be registered on the card. During check-out, the check-in will be analyzed by the automatic gate and the travel price will be calculated according to the business rules. The business rules (set of parameters) will be downloaded to the Level 1 devices on a daily basis.

The central clearing house will validate each transaction against another set of business rules. Each transaction passing these validations will be cleared. In case the transactions represent sales or usage (implying a transfer monetary value), the cleared transactions will be settled on a regular (e.g. daily) basis. As the central clearing house receives all transactions, the actual state of the card can be rebuilt by the card issuer by maintaining the so-called ‘card master’.

Money flow
Card Sale
When a card is sold to a passenger (card price + initial stored value), the card retailer will transfer the card price to the card issuer; and will forward the stored price to the float. Note that the sales will be consolidated per day meaning that per retailer, only two money transfers will be performed.

Usage
All the cleared transactions representing a change in stored value on cards will be consolidated on a daily basis per operator (PTO) by the clearing operator. The total value of all SV travels will then be forwarded to the operator.

SV Top-up
The sum of all top-ups per load agent per day will be forwarded to the float account.

NB: as the central clearing house determines all the amounts, the top-up and usage per business entity will be able to be combined into a single net transfer between card issuer and operator.

Fees
Per transaction, a nominal fee will be payable from operator to the card issuer/clearing house entity

As the contactless smartcard will be read by equipment at up to 10 cm distance and through non-metallic material, the cards may remain in the traveler’s wallet whilst tapping the contactless reader at the check-in and check-out equipment.

Single Journey Ticket
The SJT will be replaced by an ISO 14443 A/B compliant contactless form factor. The form factor will be recycled to offer value for money. Form factors that are commonly applied internationally are contactless tokens and contactless tickets. It is assumed that a token-based single journey system is introduced by the proponent.

The token can be bought at existing ticket sales locations and are valid for a pre-specified maximum amount of stations or maximum value of travel. A token will not be interoperable, meaning that operators will not accept the tokens of other operators. A token will thus be valid either on LRT1 and 2, or MRT3 (and in the future MRT7, PNR). In order to distinguish between tokens of operators, the operator name or line number will be engraved and color-coded on the token.

**User case - Single Journey Token**
The single journey token will be the Single Journey Ticket. The following sections describe the main processes related to SJT usage, information exchange and payments.

**Usage**

**Token Sale**
The passenger will buy the SJT at a station ticket office, vending machine or any other token retailer. The passenger will indicate the amount of stations to be traveled. The teller will hand over a pre-encoded token or encodes the token on the spot. The passenger will pay for the token and receives it.

**Intra Line Usage**
The passenger will approach an automatic gate and will check in at the gate. As contactless reading for tokens is only a few centimeters, the passenger will physically tap the reader. The gate will open and the passenger will travel to the desired destination. At the destination, the passenger will leave the station inserting the token in the slot on the exit gate. The gate will open in case the SJT was valid. In case the SJT was not valid, to be determined business rules will determine the proper course of action: a) token retained, gates stays closed, passenger needs to buy a Paid Exit Token; b) token is returned to passenger.

**Inter Line Usage**
The SJT will only be valid on a single line.

**Information flow**
Each interaction between an SJT and AFCS equipment (Level 1) will create a transaction that is registered in two ways:

1. the transaction is registered on the card
2. the transaction is registered on the equipment and send to the central clearing house

At sale of the SJT, a single transaction will be created:
- Sale of product

Each transaction will contain key information, such as:
- Date & time
- Product type
- Unique product identifier
- Transaction sequence number
- Unique application identifier
- Unique equipment identifier
- Identifier of the business entity providing the service
- And some information of the previous (n-1) transaction as read from the card

During a check-in, a check-in transaction will be registered on the card. During check-out, the
check-in will be analyzed by the automatic gate and exit will be granted upon passing the business rules. The business rules (set of parameters) will be downloaded to the Level 1 devices on a daily basis.

The central clearing house will validate each transaction against another set of business rules. Each transaction passing these validations will be cleared.

**Money flow**

**Token Sale**

When a token is sold to a passenger, the product retailer will transfer the token price to the product owner. As the scheme will likely start simple, meaning that the service operators sell their own tokens, the operators will retain the money.

**Usage**

The central clearing house will clear the SJT transactions. As there is no transfer of money associated (as long as the retailers and operators are the same entity), there will be no settlement. In case other retailers are connected to the system, these retailers will transfer the sale price to the float from where the clearing operator will distribute the money to the product owners.

**Fees**

Per transaction, a nominal fee will be payable from operator to the card issuer/clearing house entity.

Similar to the existing SJT, the contactless tokens will have a validity of a single day once sold to a passenger. To convenience the passengers, the token may be used to enter the system from any station on a line and is valid for entry for the entire day. This will be made possible by the greater security and anti-cloning features offered through contactless technology.

Equipment such as gates will be able to read the token at up to a few centimeters. The passenger taps the token to open the gate at check-in, and inserts the token into the gate at check-out. The exit gates collect the tokens for reuse. The cost of maintaining the handling mechanism in gates is much lower for contactless tokens compared to magnetic tokens.

**Concessionary products**

In the Philippines, government mandates that certain concessionary groups receive a discount on governmental services such as public transport. Currently, the recognized concessionary groups are:

1) Senior citizens, and 2) Persons with disability. Both groups are eligible for a 20% discount on the standard fare. In the near future, students may be considered as a concessionary group as well.

In order to cater for these concessionary groups in the new AFCS:

- Passengers who believe that they are eligible for a concessionary discount use the current processes to show the transport operators that they are eligible for discounted fares.

- In case the passenger wishes to travel on the interoperable smartcard, after proof of eligibility, the transport operator loads a discount product on the smartcard with a validity that matches the validity of the ID shown (i.e. Senior Citizen’s ID, Fare ID issued by NCDA or Student ID). The products provide a discount (e.g. 20%) on the standard fare matrix. The passenger tops-up the stored value on the smartcard using regular top-up channels, such as TVMs and ticket offices.

- In case the passenger wishes to travel on a single journey product, the passenger buys a single journey medium for the discounted price.
In order to be able to detect fraud with discounted cards and single journey media, two possible solutions (that can be applied complementary to each other) are envisaged:

- The media are visually distinctive – which allows inspectors to easily verify that a passenger travels on a concessionary product. Sufficient procedural measures must be taken to effectively detect fraud (e.g. by inspecting each passenger)
- The discount products trigger an audio signal at check-in and check-out. Procedural measures must be taken to detect fraud effectively, but not each passenger has to be checked. In addition, the signal generated by the equipment can be tailored to the specific needs of a concessionary group (i.e. extra loud for people with hearing impairments).
3. Implementation Model

3.1. Business Model

Introduction

The business model of the AFCS Scheme will provide an adequate framework for the business rules governing the operation and management of the AFCS. These business rules will align all parties involved and secure the long-term viability of the scheme – including line, modal and functionality extensions such as supporting micropayments and loyalty outside the public transport domain.

In order to ensure the long-term viability, the business model is based on international best practices of schemes that have grown and extended functionality (such as seen in The Netherlands, Hong Kong, etc.). A proper set-up of the right business rules and responsibilities right from the start of the system is considered as mandatory for a smooth integration of new operators and acceptance points.

The business model takes the internationally acclaimed ISO 24014 standard as a basis, but to keep it simple, the technical roles mentioned in this standard are combined and mapped into a simplified organizational structure. As long as all responsibilities are properly assigned, and the right business rules defined and agreed, the organizational structure is fit to cope with extensions to the AFCS.

Roles and Responsibilities

The business model describes the organization of the AFCS. All required functions in the AFCS are assigned to roles in this business model. Each of the roles must be assigned to at least one entity in order for the AFC system to function properly.

The roles in an AFC system with interoperability of media and products are defined in ISO-IEC 24014-1 (International Organization for Standardization). This ISO standard is taken as a baseline business model that defines the functions of and interfaces between technical roles within the system. A generic interoperable AFCS is defined in ISO 24014-1. This section applies the generic Interoperable Fare Management System to the desired interoperable AFCS scheme envisaged for Metro Manila light rail system.

A mandatory requirement for the Manila AFCS is that interoperable travel on stored value is supported across LRT/MRT metro lines (and future extensions/expansions). An interoperable stored value or e-purse product must be introduced to accommodate this requirement. The table below reflects the introduction of this interoperable product, and associated role (Load Agent) of retailing the e-purse.

Table 4 - Manila AFCS Business Model ISO roles

<table>
<thead>
<tr>
<th>ISO Role</th>
<th>Manila Technical Role</th>
<th>Manila Organizational Role</th>
<th>Manila Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registrar</td>
<td>Registrar</td>
<td>Scheme Provider</td>
<td>AFCS Scheme Provider</td>
</tr>
<tr>
<td>Security Manager</td>
<td>Security Manager</td>
<td>Scheme Provider</td>
<td>AFCS Scheme Provider</td>
</tr>
<tr>
<td>Application Owner</td>
<td>Application Owner</td>
<td>Card Issuer</td>
<td>Proponent</td>
</tr>
<tr>
<td></td>
<td>Media Issuer</td>
<td>Card Issuer</td>
<td>Proponent</td>
</tr>
<tr>
<td>Customer Services</td>
<td>Customer Services</td>
<td>Card Issuer</td>
<td>Proponent</td>
</tr>
<tr>
<td>Collecting &amp; Forwarding</td>
<td>Collecting &amp; Forwarding</td>
<td>Clearing and Settlement</td>
<td>Proponent</td>
</tr>
<tr>
<td>Service Operator</td>
<td>Service Operator</td>
<td>Service Provider</td>
<td>LRT/MRT/etc..</td>
</tr>
</tbody>
</table>
Moreover, the roles of Clearing and Settlement, Scheme Provider, Card Issuer and Service Provider are introduced. These organizational roles combine technical functions and organizational responsibilities that are closely related and reinforce each other.

**Figure 1 - Graphical overview of Manila AFCS Business Model**

3.2. **Value Chain**

The **Value Chain of the Manila AFCS**

The value chain for the Manila AFCS business model defines the relationship between the business model roles in terms of the value chain for services and fees. For ease of understanding, a non-prescriptive example has been described below.

*(continued on next page)*
<table>
<thead>
<tr>
<th>Role</th>
<th>Registrar</th>
<th>Security Manager</th>
<th>Application Owner</th>
<th>Media Issuer</th>
<th>Customer Services</th>
<th>Collecting &amp; Forwarding Operator</th>
<th>Application Retailer</th>
<th>E-purse Owner</th>
<th>Product Owner</th>
<th>Load Agent</th>
<th>Product Retailer</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registrar</td>
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<td>Security Manager</td>
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<td>Media Issuer</td>
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<td>Customer Services</td>
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<td>Collecting &amp; Forwarding Service Operator</td>
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<td>Application Retailer</td>
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<tr>
<td>E-purse Owner</td>
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<tr>
<td>Product Owner Load Agent</td>
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<tr>
<td>Product Retailer</td>
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<td>Customer</td>
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</tbody>
</table>

Figure 2 - Value chain for Manila AFCS business model
The above table lists the financial relationships between each of the technical roles on the business model. The table is read as follows: at each intersection between a role in the columns and a role in the rows, the role in the column receives the product, service or fee.

The role in the row provides the product, service or fee. As an example, the Application owner (third column) receives a service from the Collecting and Forwarding role, and receives a price for the application from the Application Retailer. The Application Owner (third row) pays a fee to Customer Services, to the Collecting and Forwarding and to the Application Retailer role.

**Figure 3 - Value Chain**

A distinction is made between primary processes and the supporting processes. This is further shown in the above figure.

The primary process (black arrows) is the use of transport services (16), for which the Service Operator is remunerated for its services according the rules agreed with the Product Owner (6) or E-purse Owner (5).

The two main secondary processes are the issuance of media (red arrows), and the sales of products and stored value (blue arrows). The red arrows (1), (2) and (8) show the financial relations between the Customer, Application Retailer and Application owner for the Fare Media Issuance process. The Fare Media issuance process further includes the fulfillment of the media to the customer (15) and the payment of a fee to the Application Retailer (7). The customer may top-up his or her e-purse (12), or buy a product (14). The load agent and product retailer receive a fee from the respective product owners (11, 13).

**Application of the Value Chain in Manila**
For the Manila AFCS, the fee structure between the PTOs and the AFCS operator is collapsed into a single fee collectable by the Proponent. This is the transaction fee: this fee combines the CS fee, Clearing fee, Retail fee and Load fee. The transaction fee is a per-transaction fee payable from operator to the Proponent.

Financial Settlement

The Collecting and Forwarding role (Clearing and Settlement organizational role) performs not only the clearing of transactions, but also the settlement of payments amongst Service Providers and between Card Issuer and Service Providers.

3.3. Business Rules

The transition to a new system will not affect the existing business rules (between DOTC and operators, between operators and passengers) substantially. Both ticket types will be kept in place and the tariff structures will be kept as-is. The Last-Ride-Bonus (LRB) on SVT will be replaced by a loyalty scheme in which a single ride is free after a certain number of journeys. The Stored Value Card will allow the passengers to travel with one purse on both metro-systems.

The introduction of the interoperable card will then allow the DOTC and operators to gradually increase the advantages of the Stored Value card compared to the Single Journey Ticket by e.g.:

- Integration of fares: a transfer rebate may be given to passengers with one or more interchanges (between lines) in their journey. In a truly integrated fare system, a transfer does not affect the price of the travel, only the distance travelled influences the journey price. The rebate itself may be offset by an increase in passengers, and due to the higher share of SV smart card as preferred payment method (lower operational and maintenance cost SV smart card compared to SJT)
- Introduction of automatic top-up services by linking the Stored Value card to e.g. banking accounts or mobile phone accounts
- Introduction of weekly, monthly and yearly passes that will allow the passenger to travel unlimited on one or more lines
- Accepting the SV smart card on other modalities such as PNR
- Introducing new – value added – services linked to the SV smart card.

3.4. Governance and Decision making

A proper governance model of the AFCS Scheme will be key to keep the scheme in line with the changing needs through time of the different key stakeholders. Decision making about changes to the scheme will therefore follow decision-making procedures that balance the needs of these stakeholders.

The governance model is envisaged to take shape as follows:

- Each identified key stakeholder will be classified as a Scheme Participant. Each Scheme Participant will have a (similar) contract with the Scheme Provider. The contract will define the governance model and decision-making procedures that the Scheme Participants and Scheme Provider need to adhere to.
- The initial group of participants will be limited to the Proponent and the Service Operators (LRT/MRT).
- The Scheme Provider will maintain the current specification, business rules and regulations that the Participants need to adhere to.
• Scheme Participants and Scheme Provider will propose changes to the specification, rules and regulations by submitting a Change Request to the Scheme Provider

The high-level change procedure will be envisaged as follows:

• The Scheme Provider will assess the Change Request and verifies whether the change does or does not negatively impact the security and interoperability of the scheme
• In the first case, the Change Request will be denied, but in the latter case a proposal on how to implement the requested change will be formulated by the Scheme Provider and that proposal will be submitted for formal decision making to the Change Advisory Board.
• Each Participant will have a member in the Change Advisory Board. The board will formulate an advice to the Client Advisory Board.
• Well-defined stakeholders (i.e. service operators, government, passenger advocacy groups) may assign a member to the Client Advisory Board. The Client Advisory Boards will decide (wherein decision making is either unanimous by a qualified majority, to be determined as part of the initial set of business rules) whether to accept the change.
4. Project Scope

4.1. Desired AFCS Project

The AFCS project to achieve this will comprise:

- Finance, install, construct, refurbish and maintain the automatic gates for the existing Light Rail Systems, insofar as deemed necessary by the Private Proponent for the implementation and operation of the new AFCS in line with the following points and including a full renewal of level 1 infrastructures for MRT3;

- Finance and install the required electronic infrastructure and hardware to accommodate the AFCS system particularly the back office connecting infrastructure, station AFCS infrastructure and services;

- Design, install and construct the new AFCS which will be a system accommodating contactless smartcard (credit card size) technology based on the ISO 14443 A/B standards for the stored value ridership, and ISO 14443 A/B contactless token (coin format) technology for the single journey ridership;

- The full responsibility for system integration and Full Systems Acceptance (FSA) allowing the inclusion of other transport modes and extension/expansion of existing Light Rail Systems in the AFCS system and/or develop into a generic contactless micropayment solution fulfilling other commercial functions; and

- Operate and maintain the AFCS for Light Rail Systems and such other Public Transport Operator for a Concession Period of ten (10) years beginning at FSA.

4.2. High Level Functional Architecture

The internationally recognized five-level architecture shall be applied to the AFCS. The following levels are defined:

- **Level 0**: the contactless token or smartcard.

- **Level 1**: the front-end equipment that interact with Level 0. These are for example:
  - Validation equipment such as gates and turnstiles;
  - Ticket Vending Machines that sell cards, tokens and stored value;
  - Enquiry machines, that allow passengers to enquire their remaining balance;
  - Point of Sales devices, used by tellers in station ticket offices to sell cards, tokens and stored value.

- **Level 2**: Station level equipment. All front-end equipment is connected to the Station Computer System.

- **Level 3**: Line level equipment. All station level equipment along a metro line is connected to a Central Computer System.
- **Level 4**: Central Clearing House System (CCHS). Each of the Central Line Systems connects with a single Central Clearing House System. The CCHS shall be linked to further systems, such as Management Information systems, Customer Service systems, Card/Application issuance systems etc.

The figures below provide a schematic overview of this architecture.

**Figure 4 - High Level Systems Architecture**

The gates and points of sale are connected via a local area network to the station computers. The station computer is responsible for storing and forwarding data to and from Level 1 devices. In case the network connection to Level 1 temporarily fails, these devices are able to function in a stand-alone mode.
4.3. System Components

**Level 0: Contactless Smartcards and Tokens**
The contactless smartcards and tokens shall be ISO 14443 compliant and both of either type A or type B. The chip and application technology should be widespread and proven in the AFCS industry. The products should be largely commercial off the shelf to mitigate the risk of a vendor lock-in.

The contactless smartcards do not have to be fitted with a contact interface; it is not required in the public transport domain, and this contact interface increases the price of the card and furthermore has a negative influence on the durability. Dual interface cards may however be issued in combination with value added services.

**Security**
A security breach or hack of the contactless technology will negatively influence the trust in the system and may force the service providers to forcibly migrate, thereby incurring large costs. The proponent shall show that the chosen contactless technology and supporting security architecture are fit-for-purpose for the lifetime of the system (20 years) or provides sufficient flexibility to upgrade to future state-of-the-art technology. A competent security evaluator shall be selected by the implementing agency’s Project Management Office to evaluate this.

**Level 1: Validation and Sales Devices**
The automatic gates of LRT1 and LRT2 shall be equipped with contactless readers. As contactless technology has become a commodity, including refurbishing magnetic AFC equipment to contactless AFC equipment, it is possible and at the will of the proponent to retrofit equipment or replace...
equipment – as long as the performance requirements are met for the duration of the contract. Each entry gate is fitted with a single contactless reader. Each exit gate is fitted with a contactless reader, and a token acceptance slot. Each reversible gate combines the above: the entry and exit side are fitted with a contactless reader; the exit side is furthermore fitted to accept contactless tokens. The contactless readers and token acceptance slots shall interface with the gate via standardized interfaces to receive power; connect to Level 2; and to interface with the gate business logic (allow/deny entry). Each contactless reader shall have sufficient ISO/IEC 7816 SAM-slots (Secure Application Module) supporting high baud rates.

The contactless readers shall adhere to the ISO 14443 standard and must support both type A and B. The ISO 10373-6 test specification shall be applied to enforce compliance.

By fully conforming to the ISO 14443 standard, future extensions of the system in terms of media is warranted. This means that acceptance of e.g. NFC capable devices (such as mobile phones) is not prohibited.

For the desired AFCS, the current magnetic Level 1 equipment (AG, E/S, TVM, AD) for LRT1/LRT 2 needs to be upgraded to support contactless AFC. For MRT3 new level 1 equipment is needed. Depending on the type of equipment, one or both of two possible upgrade options for LRT1/LRT2 must be chosen.

These are the following:
1. Retrofit the existing infrastructure component with a ‘contactless upgrade kit’.
2. Renew the existing infrastructure component with a contactless capable variant.

For each component, bidders are encouraged to determine the most optimal solution in terms of retrofitting or replacing of current equipment components, given a set of performance requirements and minimum service levels. For each of the lines, the following tables depict the amounts of equipment assumed to be required/desired. We emphasize that these are reference indications and the Prospective Bidder is encouraged to develop its own analyses and optimization of the required equipment.

**Level 2/3: Station and Line Systems**

The Station Computer Systems control all the Level 1 devices and function as a store-and-forward hub in the communication between Level 1 devices and Level 3. The Central Line System (Level 3) system not only functions as a store-and-forward hub between Level 2 and 4, but is also used as a Management Information System. The Level 3 system may also be used to set line specific parameters (such as tariff tables, point-to-point station matrices) that are required in Level 1 devices to operate according to the agreed business rules and tariff schemes.

The functionality of Level 2 and 3 systems therefore does not change substantially as a result of the desired system architecture.

**Level 4: Central Clearing House System**

**Clearing and Settlement**

The Central Clearing House System provides the following functions:

- Validation and clearing of all transactions, including SJT, discounted tickets, employee passes. These transactions include:
  - Validation;
  - Product Sales;
  - Stored Value load;

---

1. Where for MRT3, the Proponent is required to install all new gates.
- Application/Media issuance and sales;
- Media recycle;
- Application blocking;
- Media blocking;
- Stored Value blocking.

- Settlement of value transactions. All transactions that represent a value are settled on a daily basis.
- Customer Management. All relevant organisations participating in the scheme are registered in the system.
- Reporting: An array of reports can be generated.
- Fraud detection and analysis. Transactions are validated according to rules specifically targeted to detect fraud scenario’s (insider and outsider).
- Blacklist management. Blacklists from different roles are consolidated for download to Level 1 devices.
- Device management. All AFCS devices are registered in the system.

The central clearing house component is assumed to be a typical scalable modular, off-the-shelf system. If the Prospective Bidder chooses to buy the clearing operation and card services as a service, the investment costs related to the clearing house component will fall away, but a fee per transaction will appear in the Prospective Bidder’s business case instead. It is up to the Proponent to determine the most optimal mix between buying systems and buying services.

**Card Issuer**
The Card Issuer issues the transport application on a medium and is owner of the stored value product. In the latter role it is responsible for maintaining the ‘float’ of stored value and ensuring that sufficiently top-up point are available to passengers.

The Card Issuer’s systems typically consist of functional modules. The Card Issuer’s systems may interface with third party systems (other than Level 3) for extended functionality, such as SMS top-up provided by Mobile Network Operators or issuance of the application with stored value on banking cards.

### 4.4. System Architecture Options

The market for (integrated) contactless AFC systems is becoming mature now that contactless AFC systems have been operational for up to 15 years in many cities and countries. More and more suppliers offer cost-efficient solutions to operators that make for instance use of increasing availability of bandwidth and decreasing latency in network connections. The bid documents will abstract from specific requirements that may lead to a specific system architecture. This enables Bidders to propose their most cost-effective solution. Examples of different system architectures are provided below.

**Legacy System Architecture**
In the legacy system architecture, each of the levels 2, 3 and 4 are physical systems installed on location or under control of the respective owners of such systems. For redundancy, each of the systems (at least Level 2 and 3) is duplicated.

**Centralized Virtualized System Architecture**
The virtualized system architecture is characterized by a central environment (i.e. located at a hosting provider) that runs all or most applications in a virtualized environment that allows almost seamless scaling of the system. In this architecture option, the operators of L2, 3 and 4 devices connect with thin clients (terminals) to their respective applications.
Systems as a Service
With the rise of software or functions provided as a service, this model is being copied by AFC integrators. In order to minimize the start-up costs, proponents could offer to use (redundant) capacity in an existing clearing house, and reuse the operational processes that are already in place. There are many proven AFC issuance and clearinghouses in Asia that provide the functions required of the Manila Central Clearing House System

4.5. Equipment

The tables below indicate the amount of Level 1 to Level 3 systems the Proponent will upgrade/replace and maintain.

Table 5- Desired AFCS equipment LRT 1

<table>
<thead>
<tr>
<th>Station</th>
<th>TVM</th>
<th>AG</th>
<th>AD</th>
<th>SCS</th>
<th>CCS</th>
<th>E/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baclaran</td>
<td>2</td>
<td>18</td>
<td>6</td>
<td>1</td>
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<td>0</td>
</tr>
<tr>
<td>Edsa</td>
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<td>31</td>
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<td>0</td>
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<tr>
<td>Libertad</td>
<td>1</td>
<td>16</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gil Puyat</td>
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<td>20</td>
<td>7</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>V. Cruz</td>
<td>1</td>
<td>10</td>
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<tr>
<td>P. Quirino</td>
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<td>16</td>
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<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>P. Gil</td>
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<td>10</td>
<td>4</td>
<td>1</td>
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<td>0</td>
</tr>
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<td>U.N. Avenue</td>
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<td>5</td>
<td>1</td>
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<td>0</td>
</tr>
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<td>Central Terminal</td>
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<td>0</td>
</tr>
<tr>
<td>Carriedo</td>
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<td>D. Jose</td>
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<td>Bambang</td>
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<td>0</td>
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<td>Blumentritt</td>
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<td>A. Santos</td>
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<td>10</td>
<td>3</td>
<td>1</td>
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<td>0</td>
</tr>
<tr>
<td>R. Papa</td>
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<td>8</td>
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<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5th Avenue</td>
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<td>6</td>
<td>1</td>
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</tr>
<tr>
<td>Monumento</td>
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<td>38</td>
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<td>0</td>
<td>0</td>
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<td>Balintawak</td>
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<td>18</td>
<td>8</td>
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<tr>
<td>Roosevelt</td>
<td>2</td>
<td>18</td>
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<tr>
<td>Depot</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
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<td><strong>Total</strong></td>
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<td>111</td>
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Table 6- Desired AFCS equipment LRT 2

<table>
<thead>
<tr>
<th>Station</th>
<th>TVM</th>
<th>AG</th>
<th>AD</th>
<th>SCS</th>
<th>CCS</th>
<th>E/S</th>
</tr>
</thead>
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<tr>
<td>Recto</td>
<td>8</td>
<td>35</td>
<td>3</td>
<td>1</td>
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<tr>
<td>Legarda</td>
<td>9</td>
<td>22</td>
<td>2</td>
<td>1</td>
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<td>0</td>
</tr>
<tr>
<td>Pureza</td>
<td>6</td>
<td>14</td>
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<td>1</td>
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<td>0</td>
</tr>
<tr>
<td>V. Mapa</td>
<td>3</td>
<td>14</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>J. Ruiz</td>
<td>3</td>
<td>14</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gilmore</td>
<td>4</td>
<td>14</td>
<td>2</td>
<td>1</td>
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<td>0</td>
</tr>
<tr>
<td>Betty Go</td>
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<td>14</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cubao</td>
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<td>40</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
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<td>Anonas</td>
<td>6</td>
<td>20</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Katipunan</td>
<td>12</td>
<td>29</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Santolan</td>
<td>12</td>
<td>13</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Depot</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>82</td>
<td>229</td>
<td>27</td>
<td>11</td>
<td>1</td>
<td>2</td>
</tr>
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</table>

Table 7- Desired AFCS equipment MRT 3

<table>
<thead>
<tr>
<th>Station</th>
<th>TIM</th>
<th>AG</th>
<th>AD</th>
<th>SCS</th>
<th>CCS</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Avenue</td>
<td>2</td>
<td>20</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Quezon Avenue</td>
<td>3</td>
<td>20</td>
<td>7</td>
<td>1</td>
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<td>0</td>
</tr>
<tr>
<td>GMA-Kamuning</td>
<td>1</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Araneta-Cubao</td>
<td>3</td>
<td>22</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Santolan-Annapolis</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ortigas</td>
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<td>10</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Shaw Blvd</td>
<td>4</td>
<td>20</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Boni</td>
<td>3</td>
<td>10</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Guadalupe</td>
<td>2</td>
<td>8</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Buendia</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ayala</td>
<td>2</td>
<td>10</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Magallanes</td>
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<td>10</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Taft Avenue</td>
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<td>15</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Depot</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>28</td>
<td>171</td>
<td>81</td>
<td>13</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
4.6. Transition Scheme and Implementation Schedule

A smooth introduction of the contactless fare collection system is required to maintain the support of passengers.

However, the transition from magnetic to contactless should be fast for the majority of the passengers because:

- Maintaining and running two different fare collection systems alongside each other is costly
- If the behavior of passengers is not consistent between one passenger and the other, passengers tend to make mistakes or be annoyed. If passengers can copy the behavior of other people, the learning curve associated with a new system (and associated optimal behavior) is steep.

Figure 6 - Transition Timeline

Therefore the AFC system is to be introduced gradually – one gate at a time – but for both SJT and SVT at the same time. If at each station one gate and one ticketing office is able to accept contactless AFC, a short pilot (1 months) with a selected group of passengers is performed. The main goal of this pilot will be to test all processes around supporting two AFC systems, so that the gradual transition of the remainder of the Level 1 devices will go smoothly.

The remainder of the Level 1 devices is not upgraded station by station, but gradually with all stations in parallel. The share of new contactless cards and contactless tokens sold must be kept in line with the capacity of contactless AFC supporting equipment. The transition speed can be adapted according to the performance of the system and supporting processes. The figure above provides an abstract overview of the preferred transition scenario.

In any case, the date of FSA (Full Systems Acceptance) is no later than 1 January 2015.
4.7. Further Roll-Out

The AFCS system has been designed to start small but able to accommodate a roll out into other modes of transport and or micro-payment services outside of public transport. After the gradual introduction of the AFCS, a number of core services (Card Issuance and Clearing) are in place and the contactless smartcard (SVT) can emerge as a strong brand – like the Octopus Card in Hong Kong or the Oyster Card in London.

In order to create a strong brand, international projects have shown that a large and favorable user base within public transport is required prior to expanding the use of the card to non-public transport markets.

Therefore potential rollout approaches are to take shape as follows.

1. Roll out on the core Light Rail network (this project),
2. Introduce the AFCS immediately when extensions to this network come into operation (this project);
3. Roll out to other transport modalities, and become the preferred payment method within public transport, (discretionary) in order to:
   4. Roll out to parking, small merchants, vending machines, etc, to become the preferred micro payment method. (discretionary)

Steps 3 and 4 might be implemented in parallel if some non-transport applications can help to grow the card base quickly.

See the figure below for a graphical depiction of this approach.

**Figure 7 - Roll out approach**

Prospective Bidders will be asked to develop a roll-out strategy in the Project Development Plan.

4.8. Connecting Extensions to the AFCS

The AFCS operator’s central systems (Clearing House and Card Issuer) shall be scaled such that the extensions to the Light Rail Network can be accommodated in terms of card issuance and transaction processing (Level 4 and Level 0).

The extensions that the AFCS operator must be prepared for are:
As the Scheme Provider maintains all relevant specifications to develop Level 1, 2 and 3 devices, those elements of the AFCS for the extensions can be sourced from any competent market party.

However, the Prospective Bidder must offer a callable option for additional Level 1-3 systems that can be implemented at the extensions. After certification of the devices by the Scheme Provider, the new extensions can accept the SV smart card and SJT.

4.9. Connecting Other Transport Modes to the AFCS

In order to connect other transport modalities to the AFCS, it is advised to create an additional set of business rules that accommodate the tariffs, processes and responsibilities that these transport modes are used to. For instance, bus operators might prefer a check in only system, and small operators will not be able to service a AFCS level 2/3 by themselves.

Close cooperation with each transport modality is required to determine an acceptable set of business rules.
5. **Contracting Approach**

5.1. **Legal Framework for Concession**

The procurement procedure employed for this project is through the Solicited Proposal mode under R.A. 7718 including its most recent July 2012 Implementing Rules and Regulations (BOT Law and IRR). A dual stage process will be used where bidders are first asked to undergo a pre-qualification process where legal requirements, experience/track record and financial capacity will be evaluated.

After pre-qualification, the DOTC/LRTA will issue tender documents upon which the pre-qualified bidders will base their respective technical and financial bid. Only pre-qualified bidders will be allowed submit their technical and financial bid for the project.

The procurement process will commence with the publication of the invitation to pre-qualify on 17 December 2012. The new AFCS is aimed to be fully operational on January 1, 2015.

5.2. **Contractual Structure**

Agreement

The tender will lead to contracting of an integral solution for the AFCS system in one tender procedure.

The resulting contract will be characterized by different obligations depending on the different levels of the AFCS. First, Levels 4 and 0 will have similar obligations.

Second, Levels 1 to 3 will be grouped into 1 to have the same obligations as well. Importantly, there will be one single contract encompassing all the obligations in each level.

The table below demonstrates the contract structure.

**Table 8 - Overview of Contract Structure**

<table>
<thead>
<tr>
<th>Level</th>
<th>Contract type/main conditions</th>
<th>Counterpart after FSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 4</td>
<td>Type Build Own Operate contract or BOT</td>
<td>DOTC/LRTA</td>
</tr>
<tr>
<td></td>
<td>Duration FSA + 10 years</td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>Type Build or Rehabilitate, Transfer and Maintain</td>
<td>PTOs</td>
</tr>
<tr>
<td></td>
<td>Duration FSA + 10 years</td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
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<td>PTOs</td>
</tr>
<tr>
<td></td>
<td>Duration FSA + 10 years</td>
<td></td>
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<tr>
<td>Level 1</td>
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<td>PTOs</td>
</tr>
<tr>
<td></td>
<td>Duration FSA + 10 years</td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Type</td>
<td>Contracting objectives</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Level 0</strong></td>
<td>Card issuer operation</td>
<td>DOTC/LRTA</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>FSA + 10 years; exclusivity expires after FSA + 5 years</td>
<td></td>
</tr>
</tbody>
</table>

**Table 9- Contracting objectives per level**

**Level 0 – Cards and tokens**

The AFCS operator should be responsible for level 0 as part of the end-to-end solution.

These obligations should have a duration similar to the level 4.

**Level 1 – Gates/readers etc.**

- This choice should not affect the robustness of the system. That is why the integral responsibility for the functionality should not stop at FSA, and the contract should include a maintenance period of 10 years.

- After FSA, the capacity of the level 1-3 functionality is fixed. Further enhancements are the responsibility of the PTOs.

- The AFCS operator should be able to charge a maintenance fee for the duration of this integral responsibility after FSA to recoup investment and opex.

- To ensure an efficient interfacing with the PTOs, the Level 1-3 infrastructure will be transferred to the PTOs at FSA.

**Level 2 – Station AFCS infrastructure and services**

- For LRT 1/LRT 2, it should be the consortium’s decision whether it needs new infrastructure for this or whether it can refurbish existing infrastructure. For MRT 3, new Level 1 equipment is a minimum requirement.

**Level 3 – PTO AFCS infrastructure and services**

- Levels 1 – 3 need to be developed for LRT 1 and 2 and MRT 3 only as part of the end-to-end solution.

**Level 4 – Central Clearing-house**

- A new level 4 will need to be developed that must be operated by the AFCS operator for a period long enough to (i) recoup investment and (ii) ensure that a robust system is in place after the period. This can imply that the Operator builds a new Level 4 or that it uses an already existing Level 4.

- The Level 4 functionality should be able to accommodate all foreseeable usage of it for an operational period of 10 years within the framework set by the business rules. This means that it must be able to accommodate autonomous growth of traffic and growth through new light rail lines.

- The AFCS operator should be able to charge a transaction fee for every transaction that goes through the clearing-house as compensation for its investment and operational expenditure. The height of this fee (e.g., as a percentage of turnover handled by the system) is a competitive element in the tender.

- At the end of the contract period, the AFCS Scheme Provider/Authority can retender the functionality.

**System integration**

- To ensure an overall end-to-end solution being delivered, there will be one tender procedure that awards one contract to one consortium.

- The end-to-end functionality of the system is tested in Full Systems Acceptance procedures.

- Maintenance or Operation responsibilities are added to ensure the functionality of the AFCS after FSA.
responsibilities.

For the transport functionality, these obligations are enforceable. The operator has the right to add other functionality within the framework set by the Business rules.

Any costs that cannot be compensated through the exploitation of additional functionality should be recouped through the transaction fee. If the revenues from level 0 functionality is large enough, it may affect the transaction and maintenance fees charged for levels 1-4.

After an initial exclusive period, other card issuers are allowed into the arena to foster innovation and to further the use of the AFCS to its full potential.

**An integral solution**

The approach to the tender does not split design, products and services (including maintenance) into separate tender procedures, but aims to source an integral solution for the whole of its primary processes: from distribution, trip registration, to processing and clearing. The Prospective Bidders will offer an integrated solution whereby the full responsibilities of a system integrator shall be accepted.

The contract structure is such that Full Systems Acceptance (FSA) is foreseen before any payment to the Proponent can take place. FSA can only take place if and when it is demonstrated that the systems works integrally up to specifications.

**An Open Architecture**

The need for an open architecture is emphasized:

- The design of the system should be such that at each level widely acknowledged standard protocols are accepted. Thus, the extensions to the existing light rail system and other transport modes, are free to select their own systems if replacements or additions are needed and are not in any circumstance ‘locked-in’ to the winning bidder.

- The proposed system architecture should be such that it is guaranteed that the standards can and will be supported over time and that the replacement of such systems in the future can and will take place within a competitive environment.

- Prospective Bidders will be requested to introduce modularity in the design and implementation of the system. This aims to support the roles and responsibilities for the different ‘levels’ of the AFCS, but also supports the introduction of an open architecture. The Prospective Bidders will be asked to describe their open architecture in Stage 2 of the bidding process.

**A Scalable System**

The public transport system is expected to grow considerably over the next 5 to 10 years. It is adding extensions and new lines to the light rail system. These developments will increase ridership on the light rail system in total, but it will also increase ridership on the existing LRT 1/2 and MRT 3 lines. This anticipated growth, together with the objective to ‘plug on’ the new light rail extensions to the AFCS and the vision to connect other transport modes and services to the AFCS leads to a design requirement of scalability.
Prospective Bidders will be asked to demonstrate the scalability of their solutions in their detailed Technical Proposals in due course.

5.3. Contract’s Commercial Characteristics

Risk allocation

The tables below summarize the risk allocation for each level of the AFCS.

The AFCS operator is integrally responsible for the Level 4 functionality throughout the contract period. It needs to ensure that throughout the contract duration, the functionality is robust and performs up to standard.

For Levels 1-3, the picture is somewhat different. It is mostly up to the operator to decide what infrastructure needs to be built new and what can be refurbished. The AFCS operator will assume the responsibility vis-à-vis the current station set-up. The maintenance and performance obligation is applicable to the systems that are transferred to the PTOs at FSA. If the PTOs change the station layout, or want to increase capacity of the stations, that is not part of the AFCS operator’s responsibility and the PTOs should discuss with the AFCS operator how to accommodate this.

For Level 0, that realistically should be looked at in conjunction with level 4, the risk allocation is somewhat different. The operator assumes the responsibility for the level 0 functionality for the same period as it is responsible for the level 4 functionality. Five years after FSA however, the operator loses its exclusive rights to be the only level 0 entity that can interact with the Central Clearing-house.

From that point onwards, also other card issuers can enter the system and develop services and new business models.

Table 10 - Preliminary Risk Allocation Development, Installation/Construction and Operations

<table>
<thead>
<tr>
<th>Nature of Risk</th>
<th>Private Sector</th>
<th>Government</th>
<th>PTOs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development Phase</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statutory Clearances (Certificate of Non-Coverage)</td>
<td>All approvals/permits relating to environmental clearances are to be obtained by the Private Proponent. The DOTC is required to provide all reasonable support and assistance to the Private Proponent.</td>
<td>However, filing of the CNC with the Environmental Management Bureau for purposes of NEDA submission will be performed by the DOTC.</td>
<td></td>
</tr>
<tr>
<td>National Computer Center (NCC) Certificate</td>
<td></td>
<td>The DOTC shall have the responsibility of securing the NCC Certification that the AFCS is included in the DOTC’s Information System Strategic Plan/Information System Plan and consistent with the Government Information Systems Plan or its successor plans.</td>
<td></td>
</tr>
<tr>
<td>Consent of Metro Rail Transport Corporation (MRTC) and Light Rail Transit Authority (LRTA)</td>
<td></td>
<td>The DOTC shall secure the timely consent of MRTC and LRTA (through a Board Resolution issued for this</td>
<td></td>
</tr>
</tbody>
</table>
### Nature of Risk

<table>
<thead>
<tr>
<th>Nature of Risk</th>
<th>Private Sector</th>
<th>Government</th>
<th>PTOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Sector and Government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing Risk (Access to debt financing)</td>
<td>The Private Proponent should take on the financing risk. It has to arrange funds on its own and without any support from DOTC to achieve Financial Close. The Financial Close shall be obtained on the date determined in the Concession Agreement.</td>
<td>The concession framework seeks to provide for protection of debt and equity investment in the Private Proponent in case of termination due to Force Majeure. The level of protection if the form of termination payment varies based on the nature of event of default as may be specified in the Concession Agreement.</td>
<td></td>
</tr>
<tr>
<td>Installation/Construction Phase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Risk (Meeting the Minimum Performance and Specification Standards [MPSS])</td>
<td>The Private Proponent is responsible for ensuring the design of the AFCS is in accord with the specifications provided in the MPSS which design must be verified by an Independent Consultant.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay Risk (Delay in construction/installation)</td>
<td>The Private Proponent is expected to complete installation and construction within the time period stipulated in the Concession Agreement. Delay attributable to failure on the part of the Private Proponent (this will be further specified and detailed during procurement preparation) shall have result in pre-defined penalties charged to the Private Proponent. Delay also results in the consequential delay in the start of commercial operations resulting to delay in revenue realisation. Delay in construction/installation will not extend the Concession Period.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Construction/Installation Risk (cost overruns, contractor competent, site preparation, etc.)</td>
<td>The Concession Agreement seeks to allocate other construction/installation risk to the Private Proponent. Any escalation in costs, due to inflation or other reasons, have to be borne by the Private Proponent.</td>
<td></td>
<td></td>
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<tr>
<td>Performance Risk (Adherence to quality and functionality standards)</td>
<td>The Private Proponent should ensure that the AFCS (clearing house, contactless smartcards, etc.) should be able to accomplish/undertake the functionalities and technical specifications as required under</td>
<td></td>
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</tbody>
</table>
the MPSS. Also, the gates to be installed should be in accord with the quality and technical requirements of the MPSS. This should be verified by an Independent Consultant.

| System Integration Risk (Linking of Subsystems) | The Concession Agreement lodged unto the Private Proponent the risk of linking together different subsystems and software applications physically and functionally into one system and ensure that it functions according to the MPSS. |
| Local Permits/Clearances (securing necessary licenses, permits and clearances) | The Private Proponent shall ensure that all permits, licenses and clearances required for the installation, construction, operation and maintenance of the AFCS are properly secured. |
| Completion Risk (Full Systems Acceptance) | The Private Proponent shall have the responsibility of ensuring that the AFCS shall be capable of performing its designed functionalities in accordance with the MPSS. In addition, the Private Proponent shall be responsible and have the obligation to conduct systems acceptance tests which shall be accepted by the Independent Consultant. Any remedial measures to correct any defect/glitch in the system shall be borne by the Private Proponent. |

**Operations Phase**

<p>| Market/Demand Risk (Ridership of LRT Lines 1 and 2 and MRT 3) | The DOTC shall not guarantee the demand/ridership for the LRT Lines 1 and 2 and MRT 3, hence the Concession Agreement allocates the Demand/Market risk to the Private Proponent. However, this risk may be mitigated if there is reduction of demand in LRT Lines 1 and 2 and MRT 3, which is directly attributed to the unsatisfactory performance of the LRTA/DOTC in operating the three lines. In which case, the Concession Agreement shall allow adequate compensation for the Private Proponent or extension of Concession Period. To the extent that the reduction in the ridership demand is attributable to the operation of the LRT Lines 1 &amp; 2 and the MRT 3 (i.e. failure to operate within the maximum downtime level), the demand risk would be borne by DOTC and LRTA. In this instance, the DOTC has to provide adequate compensation or extension of the Concession Period in favour of the Private Proponent. The situations falling in this risk shall be outlined in the Concession Agreement. |</p>
<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Description</th>
<th>Condition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regulatory Risk</strong></td>
<td>Significant increase in the ridership fares</td>
<td>If the DOTC/LRTA alters the fares such that the ridership significantly diminishes and negatively impacts the revenues of the Private Proponent, the DOTC/LRTA has to compensate the Private Proponent. The conditions that fall within this category shall be indicated in the concession agreement.</td>
<td></td>
</tr>
<tr>
<td><strong>Availability Payment Risk</strong></td>
<td>To the extent that the DOTC cannot meet its obligation to pay the maintenance and transaction fee, which would impact on the financial viability of the Project, the Private Proponent has to undertake the risk of not meeting its financial obligations, the consideration of which are wholly or partly based on the fees to be paid by the DOTC/LRTA.</td>
<td>Both DOTC and LRTA have the obligation to pay the Private Proponent maintenance and transaction fee for the use of the AFCS under the Concession Agreement. Default on the part of DOTC and LRTA may be considered Material Adverse Government Action (MAGA) which may give rise for DOTC/LRTA to compensate the Private Proponent.</td>
<td>DOTC is operating MRT 3. At present, LRTA is operating LRT Line 1 and 2. Thus, they are considered PTOs. PTOs shall have the obligation to pay the Private Proponent maintenance and transaction fees under the Concession Agreement for the use of the AFCS.</td>
</tr>
<tr>
<td><strong>Industrial Relations Risk</strong></td>
<td>The Private Proponent shall be responsible for all risks in relation to the personnel under its employ.</td>
<td>The DOTC/LRTA shall be responsible for all their current employees, which will be retrenched once the AFCS Project becomes operational. The employees who will be retrenched are those which may have redundant functions with the personnel to be hired by the Private Proponent for the Project.</td>
<td>The Private Proponent and the DOTC/LRTA will bear their own industrial relations risk.</td>
</tr>
<tr>
<td><strong>Operation and Maintenance Risk</strong></td>
<td>Risk associated to the operation and maintenance of the AFCS during the Concession Period shall be for the account of the Private Proponent. Under the Concession Agreement, Private Proponent shall be liable for penalties for exceeding allowable systems downtime, etc.</td>
<td>DOTC/LRTA shall be liable to the Private Proponent for any loss attributable to failure of the former to fulfil its obligations under the Concession Agreement without the fault of the latter.</td>
<td></td>
</tr>
<tr>
<td><strong>Performance Risk</strong></td>
<td>The Private Proponent shall ensure systems availability as provided in the Concession Agreement. Failure to do so will subject the Private Proponent to penalties.</td>
<td>DOTC/LRTA shall be liable to the Private Proponent for any loss attributable to failure of the former to fulfil its obligations under the Concession Agreement without the fault of the latter.</td>
<td></td>
</tr>
<tr>
<td><strong>Stored Value Integrity Risk</strong></td>
<td>Risks associated to the integrity of the combined stored value (float account) and the associated ability to settle the PTO revenues shall be for the account of the Private Proponent.</td>
<td>PTOs shall have the obligation to implement Private Proponent’s security policies required to protect the integrity of the float. PTOs are subject to liabilities and PTOs shall have the obligation to implement Private Proponent’s security policies required to protect the integrity of the float.</td>
<td>PTOs shall have the obligation to implement Private Proponent’s security policies required to protect the integrity of the float. PTOs are subject to liabilities and PTOs shall have the obligation to implement Private Proponent’s security policies required to protect the integrity of the float.</td>
</tr>
<tr>
<td><strong>Interface Risk</strong></td>
<td>Under the Concession Agreement the Private Proponent (together with the PTO) assumes the risk to interface the AFCS with other PTOs. It should ensure that the AFCS (while initially covering LRTA Lines 1 and 2 and MRT 3) can be used and be availed of by other PTOs (i.e., busses, taxi cabs, non-transport related payments) during the Concession Period.</td>
<td>The PTO shares the interface risk. PTOs have the obligation to ensure that it adheres to the technical specifications of its hardware and software as described in the Business Rules in order to seamlessly link up with the AFCS.</td>
<td></td>
</tr>
</tbody>
</table>

| **Project Life Cycle Risks** |  |  |
| **Financial Risk (Foreign currency and interest rate fluctuations)** | The Concession Agreement assumes that Private Proponent will take on financial and all commercial risk arising from foreign currency and interest rate fluctuations. |  |

| **Debt Repayment Risk (Inability to pay debt)** | The Concession Agreement expressly state that Financing Risk shall be borne by the Private Proponent. As borrower of the funds, it also has the concurrent responsibility of ensure that debts obtained for project shall be repaid on the date it falls due. |  |

| **Life Cycle Management Risk (Obsolescence)** | The Private Proponent assumes that risk of obsolescence of the hardware and software of the AFCS. Any systems updates that are required and within the contemplation of the MPSS should be for the account of the Private Proponent. |  |

| **Private Proponent Failure Risk (Bankruptcy)** | Through its capital contribution, the Private Proponent assumes the risk of its insolvency/bankruptcy during the development and operational phase of the project. | DOTC/LRTA is exposed to certain ‘residual’ risk related to the private proponents failure or bankruptcy (retendering costs, reputational damage, potential backlog in regular and major maintenance expenditure, etc.) |
Legal and Regulatory Risks (Material Adverse Government Action, Change in law)

- Any change in the taxes, which can be passed on to the passengers of the Light Rail Systems does not fall under the purview of Material Adverse Government Action.
- The Concession Agreement to provide for protection of the Private Proponent’s returns in the event that there is a Material Adverse Government Action in form of change in law or imposition of additional taxes. If a Change in Law results in a decrease in cash flow by a stipulated amount and Private Proponent has taken reasonable mitigation steps, the Private Proponent is eligible for compensation from the DOTC. The compensation may in the form of rescheduling of the construction period, extension of the concession period or any other mechanism mutually agreed upon by both the parties.

Force Majeure Events (Acts or events that cannot be foreseen or even if foreseen, are beyond the reasonable control of the Parties, or unavoidable despite the exercise of due diligence)

- The party adversely impacted by the force majeure event shall be responsible for taking such actions as may be reasonably necessary to mitigate the adverse effects of the Force Majeure Event acting in accordance with Prudent Industry Practice. In case the adverse effects thereof could not be so mitigated, the Party invoking a Force Majeure Event shall be excused from performance of those obligations which are affected by the occurrence of the force majeure event.

Payment streams

There will be the following payment streams to the proponent:

- The availability payment, referring to the amount received to for investments and maintenance of levels 1-3.

- The card issuance fee received from the passengers for giving them the card – this is determined to be 20 peso (2013 price level) and is put in place only to incentivize passengers to not lose the card.

- The transaction fees received for clearing and settling transactions at level 4 (required to allow determination of a – market – price for services with a view to connection of new operators or other card issuers after the exclusivity period)

- Other revenue resulting from ancillary services – like loyalty schemes, connecting merchants, etc.
PART II

6. Procurement

6.1. Legal Basis of Procurement

The competitive public bidding process shall be conducted in accordance with the procurement rules and procedures for public bidding set under Republic Act No. 6957, as amended by Republic Act No. 7718 and its Revised Implementing Rules and Regulations (2012). This is supplemented by the Guidelines on the Preparation, Review and Approval, and Implementation of Information and Communications Technology (ICT) Projects Proposed for Financing under the BOT Law adopted by the NEDA Board, through ad referendum, in its Resolution No. 10 (s. 2003).

6.2. Dual-stage Process

The bidding shall be conducted following a two-stage process. The salient features of the bidding process in Section 7 of this Information Memorandum.

6.3. Key Documentation

The key documents for the AFCS Project are as follows:

a. Instructions to Prospective Bidders including its Annexes;
b. Information Memorandum;
c. Instructions to Bidders including its Annexes;
d. Draft Concession Agreement including its Annexes; and
e. Draft Minimum Performance and Specification Standards including its Annexes.
# Outline of the Bidding Process

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Party Responsible</th>
<th>Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publication of Invitation to Pre-qualify to Bid</td>
<td>DOTC/LRTA</td>
<td>December 17, 2012</td>
</tr>
<tr>
<td>Issuance of the Instructions to Prospective Bidders</td>
<td>DOTC/LRTA</td>
<td>From December 18, 2012 up to February 14, 2013</td>
</tr>
<tr>
<td>Qualification Documents Submission Date</td>
<td>Bidders</td>
<td>February 14, 2013</td>
</tr>
<tr>
<td>Opening of Qualification Documents</td>
<td>DOTC/LRTA</td>
<td>February 14, 2013</td>
</tr>
<tr>
<td>Notification of the results of evaluation of the Qualification Documents</td>
<td>DOTC/LRTA</td>
<td>March 6, 2013</td>
</tr>
<tr>
<td>Issuance to Instructions to Bidders, Draft Concession Agreement &amp; Draft MPSS</td>
<td>DOTC/LRTA</td>
<td>March 11, 2013</td>
</tr>
<tr>
<td>Pre-Bid Conference(s)</td>
<td>DOTC/LRTA</td>
<td>March 25, 2013</td>
</tr>
<tr>
<td>Deadline for Bidder's Comments to the Instructions to Bidders, Draft Concession Agreement &amp; Draft MPSS</td>
<td>Bidders</td>
<td>May 16, 2013</td>
</tr>
<tr>
<td>Issuance of Final BOT Agreement and MPSS</td>
<td>DOTC/LRTA</td>
<td>May 23, 2013</td>
</tr>
<tr>
<td>Bid Proposals Submission Date</td>
<td>Bidders</td>
<td>June 14, 2013</td>
</tr>
<tr>
<td>Opening of Technical Proposal</td>
<td>DOTC/LRTA</td>
<td>June 17, 2013</td>
</tr>
<tr>
<td>Notification of the results of evaluation of the Technical Proposals</td>
<td>DOTC/LRTA</td>
<td>July 5, 2013</td>
</tr>
<tr>
<td>Opening of Financial Proposal</td>
<td>DOTC/LRTA</td>
<td>July 5, 2013</td>
</tr>
<tr>
<td>Notification of the results of the evaluation of the Financial Proposals</td>
<td>DOTC/LRTA</td>
<td>July 19, 2013</td>
</tr>
<tr>
<td>Issuance of Notice of Award</td>
<td>DOTC/LRTA</td>
<td>July 30, 2013</td>
</tr>
<tr>
<td>Submission of Post-Award Requirements</td>
<td>Winning Bidder</td>
<td>August 19, 2013</td>
</tr>
<tr>
<td>Issuance of Notice of complete compliance with all Post-Award</td>
<td>DOTC/LRTA</td>
<td>August 23, 2013</td>
</tr>
</tbody>
</table>
7.1. **Pre-Qualification**

The Prequalification, Bids and Awards Committee (PBAC) to be constituted by the DOTC and LRTA will conduct the Pre-Qualification of Prospective Bidders. Prospective Bidders may be partnerships, corporations, or unincorporated consortiums of two or more partnerships and/or corporations. During the Pre-Qualification stage, Prospective Bidders will have to submit documents that establish that they meet the legal, technical, and financial requirements set by the DOTC and LRTA for the AFCS Project.

Prospective Bidders will be asked to apply to pre-qualify to bid by submitting their Qualification Documents, as described in greater detail in the Invitation to Prospective Bidders. After reviewing the submitted Qualification Documents, the PBAC will determine which Prospective Bidders fulfill the requirements to pre-qualify and inform all Prospective Bidders who are pre-qualified. Only Pre-Qualified Bidders will be invited and allowed to submit a Bid for the Project.

7.2. **Preparation of Bid Proposals**

After Pre-Qualification is completed, the PBAC shall issue Instructions to Bidders to all Pre-Qualified Bidders. The Instructions to Bidders shall provide in detail the form and required contents of the Bid Proposals, the detailed procedures to be followed for submission, bid evaluation, and post-bid requirements.

The Draft Concession Agreement shall likewise be provided to all Pre-Qualified Bidders to give each the opportunity to comment on the draft. The PBAC may consider these comments in refining the Draft Concession Agreement leading up to the issuance of the final Concession Agreement on which the Pre-Qualified Bidders must base their bids. This will ensure that binding unconditional bids are submitted on the basis of the final Concession Agreement.

7.3. **Pre-Bid Conferences and Bid Bulletins**

Following issuance of the Instructions to Bidders, the PBAC will organize a Pre-Bid Conference to allow Bidders to raise questions and issues regarding the AFCS Project, the Bidding Process, the Instructions to Bidders, and the Draft Concession Agreement. During this period, PBAC may consider to refine said documents taking into account the comments from the Bidders.

The PBAC will issue Supplemental Bid Bulletin/s through which it announces the Bid Proposals Submission Date, issues any amendment to the Instructions to Bidders and provide the final Concession Agreement, no sooner than ninety (90) days after Prospective Bidders are notified of their pre-qualification.

7.4. **Submission of Bid Proposals**
The Pre-Qualified Bidders will be asked to Bid for the Project by submitting their Bid Proposals which will include both Technical and Financial Proposals, a Bid Security, as well as other supporting documents on Bid Proposals Submission Date.

7.5. Bid Evaluation

After submission of Bid Proposals, the PBAC will review Technical and Financial Proposals. The PBAC will first review the Bidders’ Technical Proposals and evaluate them. Bidders will be informed as to whether their Technical Proposals were rated passed. The PBAC will return the Financial Proposals and Bid Securities of Prospective Bidders whose Technical Proposals did not pass the evaluation.

For the Technical Proposal, the evaluation on a pass/fail basis shall involve the assessment of the technical, operational, environmental, and financing viability of the Bidder’s Technical Proposal vis-à-vis the prescribed requirements and criteria/minimum standards and basic parameters prescribed in the bidding documents. In addition, PBAC will evaluate the: (i) System Architecture Document; (ii) Functionality Description; and (iii) Updated Project Management Plan.

Only those Bids that have been determined to have positively passed the first stage of evaluation shall be qualified and considered for the evaluation of its Financial Proposal. Financial Proposals of Bidders whose Technical Proposals were rated passed will be opened and evaluated at a later date, with completion of the evaluation of the Financial Proposals no later than fifteen (15) days after completion of the evaluation of the Technical Proposals.

For the Financial Proposal, the evaluation shall involve the assessment and comparison of the financial proposals of the Bidders, based on the parameters stated in the Bidding Documents.

The Bidder with the lowest Net Present Value (NPV) of the Transaction Fee and the Availability Payment per January 1, 2013 will be evaluated as the highest ranked bidder. The discount factor used for this NPV calculation will be stated in the bidding documents. Note that the NPV can be negative due to the fact that either/both the Transaction Fee or/and the Availability Payment can be negative – indicating that the Bidder intends to pay a fee to DOTC/LRTA instead of receiving one.

7.6. Awarding of Bidder and Issuance of Notice of Award

The highest ranked Bidder will be designated the Winning Bidder, and the PBAC will recommend to the DOTC Secretary that the Winning Bidder be issued a Notice of Award. Within three (3) calendar days from the PBAC recommendation, the DOTC Secretary shall, with the concurrence of LRTA, approve the award and, within five (5) calendar days from such approval, issue the Notice of Award to the Winning Bidder. This Notice of Award shall indicate the requirements that have to be submitted before the signing of the Concession Agreement.

7.7. Signing of Concession Agreement
The Winning Bidder will have to comply with all the requirements stated in the Notice of Award within twenty (20) calendar days from official receipt of the Notice of Award. Failure to comply with the requirements in the Notice of Award within the prescribed 20-day period will result in the forfeiture of the Bid Security and the cancellation of the Notice of Award. Within five (5) calendar days from the receipt by the PBAC of all the requirements of the Notice of Award, the DOTC Secretary shall determine and notify the Winning Bidder of its compliance with all the requirements of the Notice of Award. Within five (5) calendar days from receipt by the Winning Bidder of such notice from the DOTC Secretary, the Winning Bidder will have to enter into the Concession Agreement with the DOTC. Failure to enter into the Concession Agreement will result in the forfeiture of the Bid Security and the cancellation of the Notice of Award.
PART III

8. The Philippines

8.1. Macroeconomic Outlook

The Philippine economy is estimated to expand by 5.4% in 2012. Forecasts for 2013 are set around 6% growth. Private consumption, amounting currently to roughly 70% of GDP, will expand by 5.1% - contributing a little under 4% to overall economic growth. Analysis has it that private consumption will be underpinned by moderate global growth, through remittances from overseas labour and continued government transfers.

Fixed investment will grow at a slower rate in 2013, reflecting in part a temporary slowdown from the strong expansion seen in 2012. Being given investment-grade rating by international credit-rating agencies will also likely provide a big boost. Between 2014 and 2017 real GDP is expected to average 5.9% per annum. Both private consumption and investment are expected to grow at similar levels. Export growth between 2014 and 2017 is estimated to average 7.4% per year. Import growth will be largely linked to this as import-export flows are substantially comprised of parts/goods assembly activities.

Table 11 - Economic growth

<table>
<thead>
<tr>
<th>%</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>5.4</td>
<td>6.0</td>
<td>6.0</td>
<td>5.7</td>
<td>6.0</td>
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<tr>
<td>Estimates</td>
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<td>Forecasts</td>
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<tr>
<td>Private consumption</td>
<td>5.3</td>
<td>5.1</td>
<td>5.8</td>
<td>5.6</td>
<td>5.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Government consumption</td>
<td>9.8</td>
<td>6.1</td>
<td>6.3</td>
<td>5.9</td>
<td>6.4</td>
<td>6.2</td>
</tr>
<tr>
<td>Gross fixed investment</td>
<td>8.5</td>
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<td>5.7</td>
<td>5.6</td>
<td>6.2</td>
<td>5.8</td>
</tr>
<tr>
<td>Exports of goods and services</td>
<td>7.7</td>
<td>5.1</td>
<td>7.4</td>
<td>6.9</td>
<td>7.7</td>
<td>7.3</td>
</tr>
<tr>
<td>Imports of goods and services</td>
<td>3</td>
<td>3.7</td>
<td>7.1</td>
<td>6.6</td>
<td>7.5</td>
<td>6.4</td>
</tr>
<tr>
<td>Domestic demand</td>
<td>3.6</td>
<td>5.3</td>
<td>5.8</td>
<td>5.5</td>
<td>5.8</td>
<td>5.4</td>
</tr>
<tr>
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<td>3.2</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Industry</td>
<td>5</td>
<td>4.2</td>
<td>5.3</td>
<td>4.7</td>
<td>5.7</td>
<td>5.7</td>
</tr>
<tr>
<td>Services</td>
<td>6.4</td>
<td>7.6</td>
<td>6.9</td>
<td>6.2</td>
<td>6.6</td>
<td>6.4</td>
</tr>
</tbody>
</table>

(Source: Economist Intelligence Unit 2012)

8.2. Taxation

Corporate Income Tax

Generally, a corporation organized and existing under the laws of the Philippines is subject to a regular corporate income tax (RCIT) of thirty percent (30%) imposed on its taxable income derived during each taxable year from all sources within and without the Philippines. However, beginning the fourth taxable year immediately following the year it commenced business operations, a minimum corporate income tax (MCIT) of two percent (2%) of the gross income is imposed on a corporation

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1 Republic Act No. 8424, as amended, ("Tax Code"), Sec. 27(A)(1).
when the MCIT is greater than RCIT. Any excess of the MCIT over RCIT shall be carried forward and credited against the RCIT for the three (3) immediately succeeding taxable years.³

Based on earlier discussions, the Private Proponent may have the following principal sources of revenue:

(a) A predetermined transaction fee (i.e., a volume-based fee per AFCS transaction) paid by the PTOs;
(b) An annual availability payment paid by the PTOs; and
(c) A card issuance fee⁴ paid by passengers upon issue of a SVT smart card.

These principal sources of revenues are subject to either RCIT or MCIT.

Value Added Tax

Value-Added Tax (VAT) is a form of sales tax. It is a tax on consumption levied on the sale, barter, exchange or lease of goods or properties and services in the Philippines and on importation of goods into the Philippines. It is an indirect tax, which may be shifted or passed on to the buyer, transferee or lessee of goods, properties or services.⁵

Any person who, in the course of trade or business, sells barters, exchanges, leases goods or properties, renders services, and any person who imports goods shall be subject to the value-added tax (VAT)⁶ equivalent to twelve percent (12%)⁷ of the gross selling price or gross value in money of the goods or properties sold, bartered or exchanged, such tax to be paid by the seller or transferor⁸; or gross receipts derived from the sale or exchange of services, including the use or lease of properties⁹.

The predetermined transaction fee and the annual availability payment paid by the PTOs are income derived from the sale of services (i.e., operation of the AFCS) by the Private Proponent which is subject to VAT. On the other hand, the card issuance fee paid by passengers upon issue of the contactless smart cards is also subject to VAT since this income is derived from the sale of goods.

Local Government Taxes

Consistent with the principle of local autonomy of Local Government Units (LGUs) under the 1987 Philippine Constitution¹⁰ and the authority of LGUs under the Local Government Code (LGC)¹¹ to levy taxes, fees and charges, LGUs are permitted by law to control business and activities within their respective political subdivisions.

(a) Local Business Tax

Business enterprises are required to pay local business tax on the amount of gross sales or receipts of a business establishment for the preceding year using the rates of taxes provided under a specific ordinance issued by the LGU for each type of business.

The gross amount received from the sale of services (income from the predetermined transaction fee and the annual availability payment paid by the PTOs) and sale of goods (income from the card issuance fee paid by passengers upon issue of the contactless smart cards) are subject to local

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³Id., Sec. 27(E).
⁴Not in the nature of a deposit to answer for the loss and damage of the card.
⁵Tax Code, Sec. 105.
⁶Id..
⁷Revenue Memorandum Circular Nos. 7-2006, 8-2006, and 22-2006.
⁸Tax Code, Sec. 106.
⁹Id., Sec. 108.
¹⁰1987 Philippine Constitution, Art. X, Sec. 5.
¹¹Republic Act No. 7160 ("RA 7160").
business tax. Each LGUs may have different tax rates but the same should not exceed three percent (3%) of the gross sales or receipts of the preceding calendar year.\(^\text{12}\) This tax is paid in the LGU where the Private Proponent registers its principal place of business.

(b) Real Property Tax

The Real Property Tax (RPT) is a levy on real properties, such as land, buildings, machinery and other improvements affixed or attached to real properties not specifically exempted under the law.

The RPT rates vary per LGU as it is fixed by the respective provincial or city council. The rates, however, must be within the ceiling prescribed under the LGC of two percent (2%) for cities and municipalities within Metro Manila\(^\text{13}\) plus one percent (1%) for special education fund\(^\text{14}\) or a maximum of three percent (3%) of the fair market value of the property, based on an assessment level set by the LGU.

In the case of the AFCS Project, the Private Proponent would necessarily introduce machinery\(^\text{15}\) and other improvements\(^\text{16}\) affixed or attached to the train stations. Part of the obligation of the Private Proponent is to supply the gates to LRT 1/2 and MRT 3 and set up the central clearing house. For the gates, this may not be subject to RPT because the obligation is limited to installation and maintenance. Once installed, ownership of the gates will be transferred to the PTOs. On the other hand, there may be basis to subject the machinery and other improvements comprising the central clearing house because these are exclusively used by the Private Proponent to conduct its business or activity - that is - to operate the AFCS of LRT 1/2 and MRT 3.

8.3. DOTC

Mandate

The DOTC was originally created by former President Ferdinand Marcos as the Ministry of Transportation and Communications on 23 July 1979.\(^\text{17}\) After the 1986 People Power Revolution, it was reorganized as the DOTC.\(^\text{18}\)

The DOTC is the primary policy, planning, programming, coordinating, implementing, regulating, and administrative entity of the executive branch of the government in the promotion, development, and regulation of dependable and coordinated networks of transportation and communications systems, as well as in the fast, safe, efficient, and reliable postal, transportation, and communication services.\(^\text{19}\)

Powers of the DOTC

The DOTC, as the main transport planning and implementing agency of the government, is mandated to take on not only the responsibility of promoting, developing and regulating

\(^{12}\) Id., Sec. 143 in relation to Sec. 151.

\(^{13}\) Id., Sec. 233 (b).

\(^{14}\) Id., Sec. 235.

\(^{15}\) “Machinery” embraces machines, equipment, mechanical contrivances, instruments, appliances or apparatus which may or may not be attached, permanently or temporarily, to the real property. It includes the physical facilities for production, the installations and appurtenant service facilities, those which are mobile, self-powered or self-propelled, and those not permanently attached to the real property which are actually, directly, and exclusively used to meet the needs of the particular industry, business or activity and which by their very nature and purpose are designed for, or necessary to its manufacturing, mining, logging, commercial, industrial or agricultural purposes (RA 7160, Sec. 199(o)).

\(^{16}\) “Improvement” is a valuable addition made to a property or an amelioration in its condition, amounting to more than a mere repair or replacement of parts involving capital expenditures and labor, which is intended to enhance its value, beauty or utility or to adapt it for new or further purposes (RA 7160, Sec. 199(m)).

\(^{17}\) Executive Order No. 546 (1979).


\(^{19}\) Executive Order No. 292 (1987), as amended, ("Administrative Code") Book IV, Title XV, Sec. 2.
transportation networks but to deliver the related services that comes with it as well. Among the powers of the DOTC are the following:

1. Formulation of national policies for the preparation and implementation of integrated and comprehensive transportation and communications systems at the national, regional and local levels;

2. Establishment and administration of programs for transportation and communications and calling on any agency to assist in the preparation and implementation of such programs;

3. Administer and enforce all laws, rules and regulations in the field of transportation and communications;

4. Coordinate with the Department of Public Works and Highways in the different aspects of all infrastructure projects and facilities of the Department. However, government corporate entities attached to the Department shall be authorized to undertake specialized railways projects and facilities as directed by the President of the Philippines or as provided by law;

5. Issue certificates of public convenience for the operation of public land and rail transportation utilities and services;

6. Establish and prescribe rules and regulations for the issuance of certificates of public convenience for public land transportation utilities, such as motor vehicles, trimobiles and railways; and

7. Determination of charges pertinent to the operation of public land transportation utility facilities and services (except in cases where charges or rates are established by international bodies or associations of which the Philippines is a participating member or by bodies or associations recognized by the Philippine government as the proper arbiter of such charges or rates).\footnote{Id., Sec. 23.}

**Organizational Structure**

The DOTC consist of the Department Proper, the Department Regional Offices, the Land Transportation Franchising and Regulatory Board, and the Attached Agencies.\footnote{Id.}

The attached agencies to the DOTC are the following: The Philippine National Railways, the Maritime Industry Authority, the Philippine National Lines, the Philippine Aerospace Development Corporation, the Metro Manila Transit Corporation, the Office of Transport Cooperatives, the Philippine Ports Authority, the Philippine Merchant Marine Academy, the Toll Regulatory Board, the Light Rail Transit Authority, the Transport Training Center, the Civil Aeronautics Board, the National Telecommunications Commission and the Manila International Airport Authority.\footnote{Id.}

**Fee Regulation**

As mentioned, one of the powers of the DOTC is to determine, fix or prescribe charges or rates pertinent to the operations of public land transportation utility facilities and services. This includes railway systems with the exception of those where charges or rates are established by international

\footnote{Regulation of trimobiles has been transferred to LGUs by Republic Act No. 7160.}
\footnote{Administrative Code, Sec. 3.}
\footnote{Id., Sec. 23.}
\footnote{Id., Sec. 23.}
bodies or associations of which the Philippines is a participating member or by bodies or associations recognized by the Philippine government as the proper arbiter of such charges or rates.\(^{24}\)

8.4. LRTA

**Mandate**

During the time of former President Ferdinand E. Marcos, the State's policy is to promote the harmonization of the common carrier services in the most effective manner for both the public who avail of the facilities and the investors/operators who provide the transportation services with the ultimate goal of achieving a strong transportation sector.\(^{25}\)

To carry out the aforementioned policy, the LRTA was created on 12 July 1980.\(^{26}\) The LRTA is a corporate body primarily responsible for the construction, operation, maintenance, and/or lease of light rail transit systems in the Philippines.\(^{27}\) It is an attached agency to the DOTC.

**Powers of the LRTA**

The law creating the LRTA enumerated its general and specific powers which are to be exercised by its Board of Directors. Among its general powers are the following:

1. To acquire or dispose of any assets subject to limitations provided by law and invest such proceeds to expand its income to promote its objectives; and

2. To determine the fares payable by persons travelling on the light rail system, in consultation with the Board of Transportation [now DOTC].\(^{28}\)

Further, it is notable that one of the specific powers of the LRTA is to provide comprehensive policy guidance for the development, operation, and promotion of a light rail transit system.\(^{29}\)

**Organizational Structure**

The powers and functions of the LRTA is vested in and exercised by its Board of Directors. The Board of Directors is composed of the Secretary of Transportation and Communications as Chairman; the Secretary of Finance, the Secretary of Economic Planning, the Secretary of Public Works and Highways, the Secretary of Budget and Management, the Chairman of the Land Transportation Franchising and Regulatory Board, the Chairman of the Metropolitan Manila Development Authority, as ex-officio member; and (1) representative from the private sector to be appointed by the President.\(^{30}\)

**Fee Regulation**

\(^{24}\)Id., Sec. 3.

\(^{25}\)Executive Order No. 603 (1980), Sec. 1.


\(^{27}\)EO 603, Sec. 2.

\(^{28}\)Id., Sec. 4.

\(^{29}\)Id., Sec. 5.

\(^{30}\)Id., Sec. 3.
One of the general powers of the LRTA is to determine the fares payable by persons travelling on the light rail system, in consultation with the DOTC. Given that the powers of the LRTA are exercised by its Board of Directors, the fare rates are therefore ultimately regulated by the LRTA Board of Directors. Since the Secretary of the DOTC sits as the Chairman of the LRTA Board, the latter’s approval is likewise deemed the approval of the DOTC.

In accordance with DOTC Department Order No. 99-1210 s. 1999 (DO 99-1210), LRTA was designated to be the “Central Clearing House” for DOTC mandated to collect and allocate revenues of LRT 1/2 and MRT 3. In the exercise of its functions under DO 99-1210, LRTA will be guided by a Committee on Fare Policy and Central Clearing House (CFPCCH) composed of the following officials:

1. **Chairman** - DOTC Undersecretary for Transportation

2. **Members** – LRTA Administrator, EDSA LRT (now MRT 3) Project Director, DOF Representative, DBM Representative, NEDA Representative and LTFRB Chairman

DO 99-1210 authorized the CFPCCH to resolve the issues affecting the AFCS of Lines 1, 2 and 3, and future LRT-MRT Lines, namely: (a) fare and fare structure; (b) discount structure and selling procedure; (c) last ride bonus; (d) transfer time between lines; (e) allocation of revenues between lines; and (f) ticket design and ticket encoding standards.

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31 Id., Sec. 4.
32 Entitled “LRT-MRT Fare Policy and Central Clearing House”.