

Republic of the Philippines
LIGHT RAIL TRANSIT AUTHORITY
Pasig City

**MAINTENANCE
OF THE
MANILA LRT LINE 2 SYSTEM**

Terms of Reference

August 9, 2017

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ARTICLE 1 PREFACE

The construction of LRT Line 2 from Recto to Santolan started in 1997 with government funding and ODA loan from the Japan Bank for International Cooperation. The commercial operation commenced between Santolan and Cubao in April 2003 and was extended to Legarda in April 2004. The final station Recto opened in October 2004.

This Term of Reference (TOR) describes the maintenance requirements of LRT Line 2 System being considered under this tender and the conditions set forth for its execution throughout the validity of the contract, including performance requirements that will be required of the bidders. Further, this Term of Reference shall be read in conjunction with Instruction to Bidders and all other bid documents and other supplemental document that may be issued during the conduct of the tender and until final award. In the event of inconsistency between provisions of documents, the more stringent condition logically in favor of LRTA shall prevail, except where expressly clarified in writing by LRTA.

This TOR contains detailed description of the works to be performed and the performance requirements on the basis of which the Bidder is expected to determine the goods and services that he will furnish LRTA at a certain price.

This is the working documents of the maintenance contract to be entered into by the winning Bidder with LRTA. It sets out the obligations of the winning Bidder and that of LRTA in legal form.

ANNEXES

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ARTICLE 2 Maintenance Objectives

The principal objective of this undertaking is to assure the performance of the complete maintenance requirement of LRT Line 2 systems towards optimum utilization of all resources to sustain an effective, safe and cost efficient operation of LRT Line 2, through the services of a maintenance contractor. By this, the following shall be endeavored to be achieved:

- a. High level of availability and reliability for every system and equipment, enough to support daily operational requirements towards satisfactory services to all customers and stake holders.
- b. Complete performance of all required maintenance and timely execution of repairs, to assure system and equipment preservation and keeping correct level of performance, (even) including innovations towards equipment service life extension.
- c. Establish and maintain a progressive and complete maintenance and repair activities data file that are structured and readily useable, including materials management and historical records.
- d. Maintain an effective and sufficient maintenance organization thru continuous staff training.

ARTICLE 3

Definition of Terms

Terms defined below have the meanings set forth below for all purposes. "Include", "includes" and "including" are deemed to be followed by "without limitation" whether or not in fact followed by such word or words of like import. "Writing", "written", "hard copy" and comparable terms refer to printing, typing and other means of reproducing words in a visible form. References to a Person are, unless the context otherwise requires, also to its permitted successors and assigns. "Hereof", "herein", "hereunder" and comparable terms refer to the entire instrument in which such terms are used and not to any particular article, section or other subdivision thereof or attachment thereto. References to any gender include, unless the context otherwise requires, references to all genders, and references to the singular include, unless the context otherwise requires, references to the plural and vice versa. "Shall" and "will" have equal force and effect.

Agreement means the LRT Line 2 Maintenance Agreement and exhibits, schedules and annexes between the winning Bidder and LRTA, and any subsequent addendum or revision thereto. Used in the same meaning and context of Contract.

Bidder means the applicant who has submitted a bid in accordance with the Bid Documents. It shall include members of a firm, partnership, corporation, consortium, or joint venture partners.

Capital Spares means system equipment, machinery, hardware, software and repairable parts and assemblies, regardless of unit value, necessary for the maintenance and repair of the System and that remain the property of LRTA. Provided that in cases where non-repairable, non-salvageable spare parts necessary for the operation, maintenance and repair of the equipment which will have a unit value of Ten Thousand (Php10, 000.00) Pesos or more, OR may only be procured based on a minimum order quantity or it such part/s may only be procured as an assembly or module, which will have an acquisition cost of more than of Ten Thousand (Php10, 000.00) Pesos, such spare parts shall also be considered Capital Spare. This definition applies to all capital spares except rolling stock & spare parts, and train on-board equipment listed in Annex G.

Commencement Date means the date when the contractor is obliged under the contract to commence work. It may be fixed or stated in the employer's Notice to Proceed.

Computerized Maintenance Management System means a computer-based maintenance information system containing records of certain physical assets of the LRT Line 2 System and capable of maintaining inventory, generating work orders, purchase orders and requisitions, scheduling maintenance, and keeping equipment and Spare Parts history.

Consumables are those supplies listed in Annex F. All other supplies, goods, materials, parts and items that are physically used up in performing maintenance on, or in operation of equipment/machinery, including all non-repairable, non-salvageable spare parts necessary for the operation, maintenance and repair of the equipment having a unit value of less than Ten Thousand (Php10,000.00) Pesos.

Contract means the duly perfected and approved Contract for Maintenance of LRT Line 2 System and such further documents as may be expressly incorporated in the Notice of Award and the Contract. This term is used in the same meaning and context of Agreement.

Contractor means the winning bidder, established maintenance company or a grouping of established maintenance company with whom LRTA enters into a Maintenance Agreement to undertake the activities herein specified.

Contract Price means the sums stated in the Contract as payable to the Contractor for the execution and completion of the Works and remedying any of the defects therein, subject to such addition thereto or deduction therefrom as may be made under the provisions contained or stipulated in the contract.

Contract Time means the period stipulated in the Contract for the completion of the works including any authorized extension(s) of such period.

Corrective Maintenance means maintenance that takes place on a non-routine basis, usually after equipment has failed, or departed from its designed tolerances to such an extent that a faulty condition occurs. (Also, referred to as unscheduled maintenance)

Cost means actual costs and expenses incurred in relation to the relevant matter or thing.

Day means the calendar day.

Depot means the administrative building and maintenance and storage facilities ancillary to the LRT Line 2 System located along Marcos Highway, Santolan, Pasig City.

DOT means the Department of Transportation.

Emergency means any occurrence requiring immediate action and constituting a serious hazard to the safety of persons or property or materially interfering with the safe or environmentally sound operation of the System.

Employer means the Light Rail Transit Authority (LRTA).

Engineer means the designated head of the LRTA Engineering and Maintenance Department.

Engineer's Representative means a person appointed from time to time by the Engineer to be his authorized representative.

Event of Force Majeure is defined in Clause 22 of the General Conditions of the Contract

Good Industry Practice shall mean, at the time of the performance of the relevant Service, any of the practices, methods, procedures and acts, engaged in, approved or accepted by a significant portion of the rail transit system maintenance industry at such time, or where no appropriate practices, methods, procedures or acts of such nature have been so approved or accepted, any of the practices, methods, procedures and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could reasonably have been expected to accomplish the desired result at reasonable cost consistent with good business practices, reliability, safety and expedition. "Good industry practice" is not intended to be limited to a single or optimum practice, method, procedure or act to the exclusion of others, but rather is to include any of a number of possible practices, methods, procedures or acts.

Heavy Maintenance means maintenance, which takes place when the equipment has been removed from its designated operational position, usually undertaken in a workshop. (Also referred to as equipment overhaul)

Key Personnel means the Contractor's Representative, the Project Manager and Department Managers, and similar rank and position referred or alluded to in the Bid Documents.

Light Maintenance means maintenance which takes place on the equipment either in its operational position or in the case of vehicles in the designated light maintenance area.

LRTA means the Light Rail Transit Authority

Maintenance means an activity, including but not necessarily limited to, visual inspection, adjustment, replacement, repair or overhaul carried out on equipment, sub-systems or systems which results in the item undergoing attention being preserved within or returned to its design tolerances.

Maintenance Month means each period of one month commencing on the first day of the month and on the same of each month thereafter.

Maintenance Specifications means the specifications and procedures of repair and maintenance of the System contained in LRTA's Operations and Maintenance Manuals or as provided by the Contractors as part of their bid proposal.

Maintenance Year means any one-year period comprising twelve (12) maintenance months; provided, however, that the last Maintenance year shall end on the last day of the Term.

Notice of Award means the formal acceptance by the LRTA of the Bid Proposal.

Notice to Proceed means the date when the Contractor is obliged under the contract to commence the works not later than 10 days from the receipt of the notice.

Operating Assumptions means the operating assumptions described in the Bid Documents.

Operator means the LRTA or its duly franchised assignee or duly appointed agent-manager or any other Person appointed by LRTA to operate the System.

Operator's Required Number means the number of LRT Line 2 System train sets, which Operator requires to be in Revenue Service during a given Service Period.

Performance Requirements means the requirements of reliability, availability, safety, customer service and service recovery that the contractor must meet to satisfy the contract obligations.

Preventive Maintenance means maintenance which is undertaken on a routine basis before an item deteriorates outside its design tolerance, which brings it within tolerance, to such an extent that it will remain so until the next maintenance attention.

Permits means all national, provincial and local licenses, permits, authorizations, and other approvals of government authorities, including but not limited to environmental permits, and occupancy or operating permits, and any agreement, consent or approval from or with any Person required by Applicable Law or otherwise necessary for performance by LRTA and Contractor of their respective obligations under this Agreement.

Person means a natural or juridical person, individual, a corporation, a partnership, a limited liability company, an association, a trust or any other entity or organization, including a governmental authority.

Rail Authority or LRTA means the Light Rail Transit Authority, a government agency created under Executive Order 603 with principal address as follows:

Light Rail Transit Authority
Administration Building
LRTA Line 2 Depot
Marcos Highway, Santolan, Pasig City
Metro Manila Philippines

Services means all obligations of Contractor under this contract including the supply of spare parts, capital spare for rolling stock, consumables, performance of all maintenance works, technical assistance to LRTA and other materials or equipment stipulated hereunder or required for maintenance and janitorial services.

Site means the land and other places on, under, in or through which the LRT Line 2 System is constructed, operated or maintained, and includes the eleven (11) stations, the Depot, and ancillary facilities, and where the works are to be executed.

Tender means the Contractor's price offer to the Employer for the execution and completion of works.

Utilities means any and all electrical power, water, gas, telephone and other utilities necessary or desirable to perform the Services.

Working Day means a day (other than a Saturday, Sunday, Legal Holiday or Declared Holiday) when banks are open for the transaction of business in the Philippines.

Works means all activities required for the maintenance of the LRT Line 2 system.

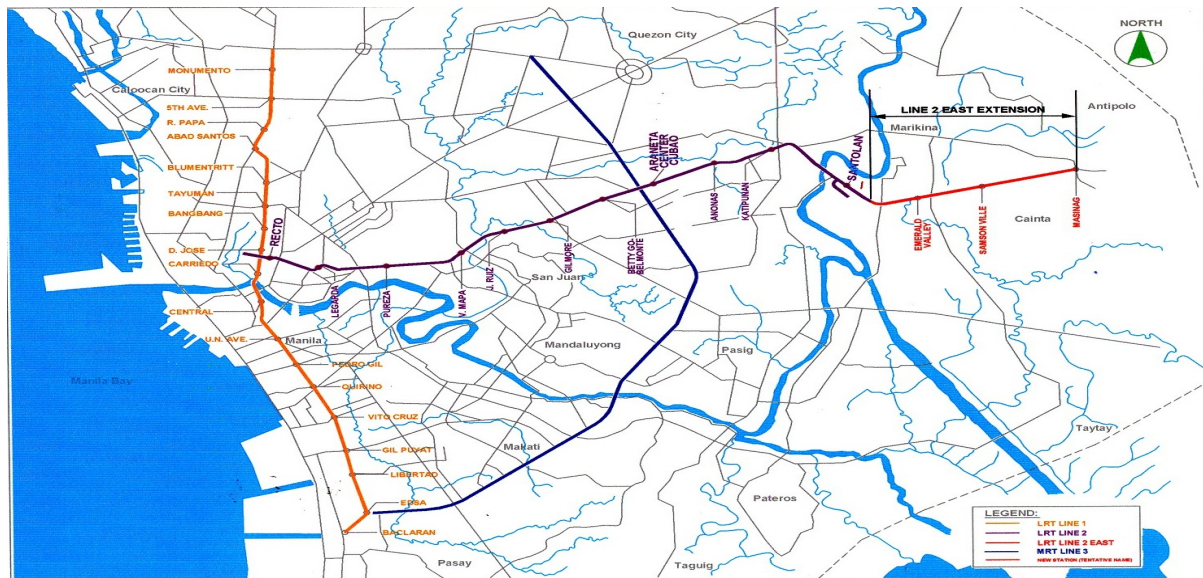
ARTICLE 4 LRT LINE 2 SYSTEM DESCRIPTION

4.1 Alignment and Track Configuration

LRT Line 2 runs generally east-west over 13.4-km of double tracks on mostly elevated structure crossing LRT Line 1 at the Old Bilibid Area C.M. Recto Avenue to the Depot Santolan Street along Marcos Highway. The alignment crosses MRT3 at Cubao, with a passenger connection between them via adjacent property development. There are 11 stations, one of which is underground.

Station	Street Alignment / Cross Street	Placement in R-O-W	Platform		
			Location	Length	Width
Recto	Claro M. Recto Avenue Evangelista/Calero Street	Center of Street	Side	100m	3.5m
Legarda	Legarda/Bustillos Street	North of San Beda College	Side	100m	4.5m
Pureza	Magsaysay/Aurora Blvd.	Center of street	Side	100m	3.5m
Araneta	Magsaysay/Araneta Avenue	Center of street	Side	100m	3.5m
J. Ruiz	Aurora/G. Reyes Street	Center of street	Side	100m	3.5m
Gilmore	Aurora Blvd./Gilmore Street	Center of street	Side	100m	3.5m
Betty G-Belmonte	Aurora Blvd./Rosario Drive	Center of street	Side	100m	3.5m
Cubao	Aurora Blvd. Mainline Station	Center of street	Side	100m	8.375m
			Side	100m	9.0
		Shuttle Station	Side	150m	12.0m
Anonas	Aurora/Anonas	Center of street	Side	100m	4.5m
Katipunan	Aurora/Katipunan (UG)	Underground	Side	150m	4.5m
Santolan	Marcos Highway	South of Marcos Highway	Center	120m	4.5m

The entire length of the guideway, except the shuttle track at Cubao, is bi-directional, double track with two-way operation. Trains operate in the forward direction on the right hand track, except at ends-of-line or during emergencies.



Automatic track switches are provided at mainline junctions and end-of-line terminals:

- a. Double crossover west and a single crossover east of Santolan station.
- b. Two 150m-pocket tracks with single turnouts each end for emergency operations - west of Katipunan and east of V. Mapa stations.
- c. Single crossover east of Cubao station.
- d. Single switch east of Cubao station for shuttle track.
- e. Single crossover west of Legarda station.
- f. Double crossover west of Recto station.

Tail tracks approximately 190 meters long are provided at Recto and Santolan stations for temporary storage of vehicles. Cubao station is provided with a shuttle turnback track of about 495 meters.

The underground section is about 700 meters, east and west of Katipunan station.

It is the intention of government to extend the line to Masinag, in Antipolo. This means 4 route km more of track and 3 additional stations.

4.1.1. Depot

Stabling, maintenance and repair of rolling stock is conducted at the Depot located along Marcos Highway, Santolan in Pasig City near the Marikina boundary. The yard is designed to accommodate 24 trains (at 4car/train). Buildings on site house the Control Center, vehicle and system maintenance shops, material storage, administrative and support facilities. From the mainline tracks along Marcos Highway, the depot is accessible via double tracks east and single track west of Santolan Station.

Electric traction power is supplied to the HRVs from a nominal 1500V dc overhead Catenary system connected to 6 rectifier substations distributed along the line and in the depot. Two pantographs mounted on each HRV train set collect current from the overhead contact system. Both running rails of each track are used for the traction power negative return (except in turnouts), together with rail and track cross bonding at frequent intervals.

4.1.2. Track Structure and Layout

The track structure comprises UIC54 rails grade 1100 on curved track 300m radius or less and grade 900 on tangent or curved track over 300m radius. Track gauge is 1435mm but widened to 1441mm on curves with radius smaller than 300m but larger than 100m. Minimum radius of tracks on the mainline is 175m and 100m at the Depot area. Curved tracks with radius 300m or less are provided with checkrails.

Track type is direct fixation using PANDROL VIPA baseplate assemblies for the main and connecting lines. Sliding arrestors are provided at track ends. In the Depot area, track types are ballasted with timber ties for standard and special trackwork or with pre-stressed concrete ties for tangent tracks, and shop tracks consisting of pit, embedded, and transition tracks, all of which are provided with bumper posts and wheel stoppers at track ends.

Various special trackwork is provided in the main track layout as described in Section 4.1.

4.1.3. Emergency Walkway System

An insulated centre walkway connecting passenger stations is provided for emergency evacuation of passengers. Insulated outer walkway is installed at special trackwork areas and is connected to linking centre walkways by special crosswalks. Generally, walkways follow the route of the main systems cables.

4.2. Signaling System

The signaling system of Line 2 comprises Automatic Train Control (ATC) in which the normal mode of operation is automatic, although the on-board attendant executes opening and closing of the train doors. However, facilities are provided for manual driving under signaled and non-signaled (in case of emergency) conditions.

The ATC system consists of the following subsystems:

- a. Automatic Train Protection (ATP)
ATP maintains safety of operation including separation of trains running on the same track and over signal-interlocked routes. ATP includes both wayside and train mounted vital safety functions.
- b. Automatic Train Operation (ATO)
ATO controls the normal train operating functions including propulsion, coasting and braking in accordance with station location, track characteristics such as gradient and curvature, and the performance of rolling stock.
- c. Automatic Train Supervision (ATS)
ATS directs train operation to provide a scheduled service under normal conditions and the best service possible under abnormal conditions.

The signaling system is state of the art and uses “off the shelf” standard materials and equipment wherever possible to provide the highest levels of reliability, maintainability and safety performance.

The signaling system is of the fixed block type using audio frequency track circuits and is designed with the performance of rolling stock and civil restrictions such as track grade/curvature effects, in accordance with operating criteria. Speed profiles are therefore derived from rolling stock acceleration and braking performance data, civil restrictions and operating times to achieve sustainable “service” headway of a minimum 100 seconds. Audio frequency track circuits also allow the transfer of data to the on-board ATC system to automatically control the train-operating speed. The ATO drives the train from station to station smoothly and effectively. It stops the train at the required platform position with good accuracy and enables the opening of the correct side doors so that the on-board attendant can open and close the doors when required.

ATS operational control equipment is located in the Operations Control Center (OCC) and selects and controls the setting of signaled routes automatically in accordance with timetable (or manually if required) through electronic interlocking located in SER's (Signal Equipment Rooms) at relevant stations and also in the Depot. The ATS monitors the movement of trains along the whole of the line and transmits commands through the track rails and over wayside cables and loops. Each train is automatically (or manually by the operator) assigned a unique operational number, which is tracked through the ATS system and displayed on the train supervisors console in the OCC.

Switches at Mainline and Depot crossovers are dual control electric powered and hand-operated (in case of emergency) with electro-mechanical locks.

The Depot is fully controlled by the OCC although the trains do not operate with ATS functionality, the on-board attendant driving the train manually albeit in restricted speed (maximum 25km/h) mode. Train detection is with track circuits using wayside color light signals to authorize movement and identify the route.

4.3. Telecommunication Systems

The communication system includes Master Clock, SCADA, Telephone, Digital Trunked Radio, Audio Paging System (APS), CCTV, FOTL, UPS, train voice and data communications subsystem and other ancillary subsystems.

4.3.1. Master Clock

A common standard time generated by the Master Clock system using GPS antenna and receiver is distributed throughout the LRT Line 2 control center, depot and stations. Also it provides custom interfaces and protocols of date and time-of-day to the SCADA System, Digital Trunked Radio System, Audio Paging System, CCTV System, Automatic Fare Collection System and Signaling System. The date and time-of-day data replaces the date and time-of-day in each system. The intent is to provide identical date and time-of-day on all workstations and logging reports without time-setting human activity.

4.3.2. Supervisory Control and Data Acquisition (SCADA)

The Supervisory Control and Data Acquisition System (SCADA) is a computer-based system with GUI workstations at OCC, the main servers at Depot TER and remote terminal units (RTU) at stations TER and rectifier substation provides supervisory control and centralized monitoring of a variety of facilities throughout the LRT Line 2. The major systems supported by the SCADA system are the traction power rectifier substation, station substation, fire alarm, escalators, elevators, and electrical/mechanical systems at stations and communications alarms.

4.3.3. Telephone

The IP telephone system is used for voice communication throughout Line 2 and between Line 1 and Line 2. The principal components of the IP telephone system are the EPABX, OSP cable in various pair counts, protected MDF, Local Distribution Box, cross connect wire (analog), CAT5 UTP cable (IP), telephone drop wire, office telephones and weatherproof wayside telephones. The EPABX telephone system is SOFTCO 5816 installed at Depot TER to serve the Depot and the 11 Line 2 Stations. The EPABX serves 331 telephones at the Depot, Station Rooms and wayside. A Main Distribution Frame (MDF) is located in the Depot Line 2 TER and terminates telephone lines from the fiber optic system for the station and wayside telephones. The MDF also terminates PLDT subscriber lines to 8 trunk lines. A digital attendant console handles incoming calls and has an automatic call diversion.

4.3.4. Digital Trunked Radio

The LRT radio communication uses the Tetra five channel trunked two-way UHF radio system which allows the Authority personnel to communicate between Operation Control Center (OCC), trains, rail service vehicles, mobile and personal portable handheld radio units. The trunking operation is fast, completely automatic and essentially transparent to radio users' voice and data communications. The system configuration supports individual identification for each radio to provide convenient selective call operation. The Tetra five channel trunked radio system is comprised of Five (5) base stations to support full radio coverage for Depot, Stations, RSS as well as coverage in the vicinity of Masinag and Tutuban area.

4.3.5. Audio Paging System (APS)

The LRT Line 2 Depot and stations is equipped with an Audio Paging System (APS). The Control Centre communications link to transmit music or announcement to every passenger station is through the Fiber Optic transmission line. Authorized Personnel at each passenger station are able to make announcements by overriding the Control Centre music or voice transmission. In the Depot and stations, the APS includes a link to the station Fire Alarm Control Panel (FACP) such that when the fire microphone PTT is depressed, the APS speakers is muted so that a fire message is not interfered with. This event is also indicated at the control center as an "in-use" display for this station. The principal components of APS are the microphones, mixers, amplifiers and speakers at the stations. At the Depot, microphone, music (or program) sources, mixers, amplifiers, control PC at the OCC, and speakers in the Depot Area are provided.

4.3.6. Closed Circuit Television (CCTV)

Digital Closed Circuit Television (IP-CCTV) cameras are provided at Line 2 Depot and Stations for operations and security purposes. The system devices support color pictures as well as monochrome. Camera views are selectable with video matrix switcher at OCC using keyboards and a PC with graphical user interface.

The principal components of the CCTV system are the cameras, video patch panels, and fiber optic video multiplexer at the stations. At the Depot, the principal components are the video monitors in the OCC, the video matrix switcher, fiber optic video multiplexer, the graphic user interface (GUI) PC program, and the video transmission between the stations and the control center. The video matrix switcher, video patch panels, cable terminations and other equipment are installed in the communications equipment cabinets in TER. An IP CCTV camera are also installed in Depot, RSS, Reversing tracks, and Stations to provide high definition video quality with video analytics and video walls inside the Operations Control Center for security and operations utilization.

4.3.7. Fiber Optic Transmission Line (FOTL)

The Line 2 Fiber Optic Transmission Line (FOTL) system is a full SDH ADM (Synchronous Digital Hierarchy Add Drop Multiplexer) system. It is capable of transmitting all voice, data and video communications from the stations to the control center. These supports the communication requirements of the following systems: AFC, CCTV, Clock, EPABX, APS, Radio, SCADA, Signaling, P1 MIS and P3 BMS. The network consists of SDH nodes at 11 remote stations and 1 central station. In the remote stations, the SDH nodes are interconnected with a 1st order multiplexer, through E1's in order to provide the required channel circuits. In the depot, an additional cross-connect is installed. The fiber optic cable consists of 2 X 24 and 2 X 36 single mode fiber cores. All cores are terminated on dedicated optical patch panels within the communication cabinets at stations and Depot TER.

4.3.8. Uninterruptible Power Supplies (UPS)

An 8-hr UPS is provided to meet the power requirements of communication systems in every TER (Telecommunication Equipment Room) at stations and Depot. The principal components of the UPS are the inverter, battery charger, and batteries, self-contained freestanding cabinet with microprocessor based control/metering and LCD screen displays for operator monitoring.

4.4. Automatic Fare Collection System (AFCS)

The ticketing system of Line 2 is a contactless smart card. The system comprises eighty two (82) ticket vending machines, twenty seven (27) Point of Sales (POS), two hundred twenty nine (229) automatic gates; eleven (11) station computer (SC); one (1) Central Computer System Real Operator (CCSRO) and Monitoring Control Workstation(MCW).

Among others, the tap in/tap out AFCS aims the customers with the ability to purchase stored value cards (SVS's) or single journey tickets (SJT's) from a ticket vending machine (TVM) or from existing ticket office tellers via point of sales (POS) terminals, safely and securely enter the transport network through automatic gates (AG's).

The ticketing system follows level 0 – level 4 AFCS architecture and processes and will to accurately forecast travel demand and travel patterns, which in turn contribute understanding and developing future transport schemes within and outside the Metropolitan manila area.

4.5. Overhead Catenary System

LRT Line 2 utilizes a 1500 V dc OCS with an auto-tensioned (AT) simple two-wire catenary (messenger and contact) on the mainline and a fixed termination (FT) single contact wire, direct suspension tramway type in the Depot. Both types employ double insulation.

4.5.1. Mainline Route

For auto-tensioned catenary, conductor tension remains relatively constant with the use of balance weights anchored at both ends for a full-tension length. A fixed termination at one end and a balance weight anchor at the other have been used for half-tension lengths. OCS on crossovers utilizes a spring tensioner at one end and a fixed termination at the other. Midpoint anchor assembly has been used to limit the effects due to a wire breakage or de-wirement in a full-tension length.

OCS is sectionalized by means of insulated overlaps on the mainline and mechanical bridging section insulators on crossovers. Feeders consisting of insulated cables are routed along the guideway. Surge arresters are installed at appropriate points. Motor operated disconnect switches are provided at selected areas for operations and maintenance flexibility.

4.5.2. Depot Yard and Workshop

In the Depot, contact wires are terminated directly to a pole or to the workshop building with the result that the conductor tension varies with temperature.

OCS is sectionalized by means of mechanical bridging section insulators. Non-bridging section insulators are provided at the entrance to the workshop and truing machine building. Surge arresters are installed at appropriate locations. Manual operated disconnect switches are provided at selected locations for operations and maintenance flexibility.

4.6. Power Supply System

The LRT Line 2 electrical power system consists of six (6) Rectifier Switching Stations (RSS) located strategically along the mainline route and in the Depot and a Workshop Switching Station (WSS) in the Depot:

RSS # 1 -	At Recto passenger station
RSS # 2 -	At Pureza passenger station
RSS # 3 -	At J. Ruiz passenger station
RSS # 4 -	About midway between Betty-Go Belmonte and Cubao passenger stations
RSS # 5 -	About midway between Anonas and Katipunan passenger stations
RSS # 6 & WSS	- Santolan Depot

Power is supplied by MERALCO at 34.5kVac at each RSS and WSS which converts the supply feed into 1500Vdc as traction power to the trains and low voltage (480Vac or 220Vac) as auxiliary power to its building services. In addition, each RSS provides 6.6 KV ac auxiliary power supplies which run along the transit guideway and provides power source to each passenger station. Each 6.6kVac circuit emanates from two different RSS via 6.6 KVac ring main unit switchgear assemblies

Rectifier Switching Stations - Equipment Breakdown

Location	Equipment										
	34.5Kv Swgr	6.6Kv Swgr	220v Swgr	Rectifier Unit	1500Vdc Swgr	Negative Panel	Battery & Battery Charger	Rectifier Transformer	Auxiliary Transformer	RMU & Sub assy	LBS, Disc Sw
RSS 1	1	1	1	1	1	1	1	1	1		
Recto									2	1	
Legarda									2	1	
RSS 2	1	1	1	1	2	1	1	2	1		
Pureza									2	1	
V Mapa									2	1	
J Ruiz									2	1	
RSS 3	1	1	1	1	1	1	1	1	1		
Gilmore									2	1	
Betty Go									2	1	
RSS 4	1	1	1	1	1	1	1	1	1		
Araneta									2	1	
Anonas									2	1	
RSS 5	1	1	1	1	2	1	1	2	1		
Katipunan									2	1	
Santolan									2	1	
RSS 6	1	1	1	1	2	1	1	2	1		
WSS				1	1	1		1	2		2
Depot											3
Total	6	6	6	7	10	7	6	10	30	11	5

4.7. Rolling Stock

The vehicles are stainless steel and LAHT (Low Alloy High Tensile) steel, four-axle cars. Four motored vehicles make up a train consist with the two end vehicles having one cab each (cab positions at both ends of the train consist) and the two middle vehicles are motorcars without cab. The train configuration is therefore Mc-M-M-Mc.

Two bogies are provided beneath the under frame of each vehicle with one ac induction motor-mounted on each axle of each bogie. Each vehicle has ten passenger doorways, five per side directly across from one another.

4.7.1. Electromechanical

Unlike Lines 1 and 3, the vehicles for Line 2 are of the heavy metro type, single rigid car body with 4 motored axles. Current fleet size is 72 HRVs configured in 18x4-car-train sets.. Each car is 22.5 meters long and 3.2 meters wide.

4.7.2. Physical Characteristics

The following physical characteristics indicate critical vehicle dimensions shown in millimeters (mm).

(a)	Car body Length	22,500
(b)	Over Coupler Length	23,300
(c)	Train length (over anti-climber)	92,600
(d)	Car body width	3,200
(e)	Overall width	3,200
(f)	Floor height	1,100
(g)	Roof height	3,700
(h)	Roof mounted equipment height	max 4,100
(i)	Pantograph lock-down height	max 4,100

(j)	Pantograph height working range	4,300-6,400
(k)	Normal Contact Wire Height	4,700
(l)	Coupler height	750
(m)	Wheel diameter (new/worn)	850/790
(n)	Wheel base	max 2,300
(o)	Between bogie centers	15,800
(p)	Width of side door openings	1,400
(q)		

Traction and Control System

(a)	Traction Motor	Ac Induction bi-motor 2 per-bogie (4 per car)
(b)	Control system	VVVF inverter control system

Brake System

(a)	Service	Dynamic (regenerative and rheostatic) Braking and pneumatic disk brake
(b)	Emergency	Same as service brake

Car body

(a)	Car body Shell	Stainless steel
(b)	Under frame	Stainless steel and LAHT steel
(c)	Floor	Stainless steel keystone plate. 16 mm thick ply metal and 4-6 mm thick covering or approved equivalent
(d)	Side wall lining	Melamine faced ply metal and/or fiberglass reinforced plastic (polyester)
(e)	Ceiling Lining	Melamine and/or polyester faced ply metal.
(f)	Coupler	Mechanical couplers for cab ends semi-permanent coupler for non-cab ends
(g)	Door	Double sliding type 5 each side per car. 1,400 mm opening width
(h)	Gangway	Open type, effective inside width 1,500 mm
(i)	Window	6 mm tinted safety glass Upper: open (inboard swing) Lower: Fixed
(j)	Seat	Longitudinal bench type fiberglass reinforced plastics. Smooth with no seat place forming
(k)	Pantograph	Single knuckle type, two per four car train set

- (l) Air Conditioner Roof mounted unitized type.2 units per car

Bogie

- (a) Type Outboard journal bearing and bolsterless type with slip/slide function and hubodometer
- (b) Wheel Rolled wheel
- (c) Primary Suspension Elastomeric spring
- (d) Secondary Suspension Diaphragm type air spring with self-leveling function
- (e) Car body roll angle 3° maximum

Passenger Capacity

	<u>Mc</u>	<u>M</u>	<u>Train</u>
Seated	54 x 2	62 x 2	232
Standee (4 p/m ²)	193 x 2	206 x 2	798
(7 p/m ²)	338 x 2	360 x 2	1,396
Total (4 p/m ²)	247 x 2	268 x 2	1,030
	392 x 2	422 x 2	1,628

- Notes - (1) Computations assume standees occupy two wheelchair spaces per car.
 (2) 10 seats per car are reserved for the elderly and disabled

Weights and Axle Load

The following weights are in kilograms (kg) and are based on 65 kg per passenger. The vehicles are designed not to exceed the following weights.

	<u>Mc</u>	<u>M</u>
AW0: tare weight	41,000	39,050
AW1: AWO + seated passengers	44,510	43,080
AW2: AW 1 + 4 p/m ² standee	57,055	56,470
AW3: AW 1 + 7 p/m ² standee	66,480	66,480
AW4: AW3 + 0.25 g dynamic load	83,100	83,100
Max. axle load under condition AW3	Not to exceed	16,850

Performance Characteristics

The following performance characteristics are met under condition AW3.

- (a) Max service speed 80 km/h
- (b) Max acceleration 1.30 m/sec²
- (c) Max service deceleration 1.30 m/sec²
- (d) Emergency deceleration 1.50 m/sec²

Severity of Service

The vehicles are to meet the conditions of four (4) hour peak operation twice a day at loads of AW3 or higher with a 100 second service headway

Wayside Characteristics

(a)	Rail profile	UIC 54 kg/m
(b)	Track gauge	1,435 mm
(c)	Track center distance	4,400 mm (nominal on tangent)
(d)	Min. horizontal radius	175 m (Line) and 100 m (Depot)
(c)	Min. Vertical radius	3000 m
(f)	Max. grade	5 %
(g)	Max super elevation	130 mm
(h)	Height of platform from top of rail	1,100 mm
(i)	Line Voltage	Nominal 1,500 V dc Max. 1,800 V dc Min. 1,050 V dc

Criteria

Typical characteristics of the Metro Manila environment are:

(a)	Ambient temperature	Max. 40°C Min. 15° C
(b)	Relative humidity	Max. 100% Min. 60 %
(c)	Max rainfall	60 min. rating 120 mm/hr 30 min. rating 180 mm/hr 10 min. rating 270 mm/hr
(d)	Max wind velocity	60 m sec.

Train and Platform Clearance

The maximum gap between the train and station platforms in the door areas is limited to 75mm.

4.7.3. STANDARDS

The materials, components and equipment were designed and built to conform to at least one or more of the following standards:

ARR	Association of American Railroads. USA
AISI	American Iron and Steel Institute. USA
ANSI	American National Standards Institute. USA
AREA	American Railway Engineering Association, USA
AS	Australian Standards, Australia
SAA	Standards Australia, Australia
BS	British Standards, UK
BSI	British Standards Institution, UK
CAN	National Standards of Canada, Canada
DIN	Deutsches Institute for Normung, Germany
JIS	Japanese Industrial Standards, Japan
PNS	Philippine National Standard, Philippines
BPS	Bureau of Product Standards, Philippines
ISO	International Standardization for Organization
UIC	International Union of Railways Standards
IEC	International Electro technical Commission
PEC	Philippine Electrical Code
EN	European Norms

ARTICLE 5

LRTA PROGRAMS AND INITIATIVES

5.1. LRT Line 2 EastExtension Project / O&M Project

- 5.1.1. The LRTA is undertaking a project to extend the existing LRT Line approximately 4.14km south from the Santolan end of the existing line to Masinag, Antipolo City. The extension will use a compatible technology and be fully integrated with the existing LRT Line 2, to allow the smooth running of trains throughout the integrated system of the existing line and the extension line.
- 5.1.2. DOTr is likewise preparing to procure the LRT Line 2 System Operation and Maintenance Project under a PPP/BOT scheme.

ARTICLE 6

Hours of Revenue Service Operations

- 6.1. Daily service hours will normally be 18 hours per day - from 4:30 AM to 10:30 PM. Minimum service headway during peak hours is one hundred (100) seconds, with an average commercial speed of thirty-five (35)kph and maximum operating speed of eighty (80) km/h. Standard dwell time at stations is thirty (30) seconds. One-way trip will take about twenty-one (21) minutes.
- 6.2. Passenger demand in Metro Manila does not necessarily follow the pattern of light traffic during midday, evening and weekend periods, with lighter traffic on Sundays and holidays. It is anticipated that peak periods will require a total of fourteen (14) trains, while off-peak periods will need at least eight (8) trains. Actual requirements will be determined according to actual demand.

ARTICLE 7

REQUIREMENTS

7.1. General

The bidder is required to submit, as part of the bid documents and his maintenance implementation programs, the following Plans and Programs.

7.1.1. Maintenance Plan - The Maintenance Plan shall describe all maintenance activities and the methodology that will be used for its effective and efficient execution, towards fulfilling all tender requirements. This shall include lists of activities and schedules throughout the duration of the maintenance Contract.

In order to ensure bidders are sufficiently familiar with the technical aspects of the system, LRTA will provide access to all existing and available manuals and maintenance documents, including but not limited to the following:

- a. **Training Manuals.** These are documents for all systems equipment which are available for use in training Contractor's staff.
- b. **Operation and Maintenance Manuals.** Manuals that describe the maintenance activities and procedures for each system, including repair and reconditioning.

- c. **Overhaul Manual.** Describes major reconditioning and restoration works including testing and verification of operation.
- d. **Parts Catalogs (with illustration).** Comprehensive listings and catalogs for parts of equipment and System.
- e. **System As-Built Drawings.** All available “As Built Drawings” of the system.
- f. **Maintenance Guide/Checklists.** All maintenance guide and checklist already established and currently in use in the maintenance of LRT Line 2 system.
- g. **Line 2 Maintenance Records.** All compiled maintenance and performance records of all equipment and system.

7.1.2. Maintenance Transition Plan - To assure the smooth take over and maintain continuity of all maintenance activities being performed by the present maintenance contractor, the Maintenance Transition Plan shall define activities and procedures to be followed in the take over and assumption of all current maintenance activities and incidental works. The contractor shall undertake all measures to assure smooth maintenance take over.

The Transition Plan shall also include activities and procedure that will assure smooth and seamless transfer back to LRTA or transfer to any succeeding maintenance contractor of all maintenance activities and records, including all hand over activities without cost to LRTA at the end of the contract.

The take over and assumption as well as the transfer back maintenance transition time shall not be less than sixty (60) calendar days.

7.1.3. Policy and Procedure Plan –The bidder shall prepare and submit a general description and outline of the bidder’s program regarding policies and procedures that will be adapted for the performance of system maintenance. The policy and procedure plan shall be consistent with tender requirements and shall cover, but not limited to, policies and procedures related to, employment, safety, and health, interfacing with the LRTA and other LRTA Contractors, community relations, environmental responsibilities and others. The Plan shall later be developed by the Contractor to a Policy and Procedures Manual to guide the performance of the contract.

7.1.4. Emergency Response Plan - Consistent with the scope and nature of the Maintenance Contract, the Emergency Response Plan shall show activities and procedures to be followed by the Contractor in responding to various foreseeable emergencies that may affect the System such as earthquake, typhoon, flooding, loss of power, derailment, accident, fire, medical emergencies, bomb attack, gas attack or other acts of violence or sabotage. The Plan shall be complementary to existing LRTA Emergency plan and Procedures.

7.1.5. Security Plan – The Bidder shall prepare and submit plans for the security and protection of maintenance facilities and personnel under the control of the Contractor. The Security Plan shall be later develop to include details consistent with existing LRTA CSO policy and procedures.

7.1.6. Loss Prevention Program - The Loss Prevention Plan shall indicate measures to protect equipment and facilities against loss or damage.

7.1.7. Safety Plan - The Safety Plan shall demonstrate clearly the proposal for achieving effective and efficient safety practices in the performance of all maintenance activities and other contract obligations. The Safety Plan should include the safety procedures, regulations and implementation guidelines and policy for ensuring safety including Hazard Analysis and preventive actions.

7.1.8. Quality Assurance Plan - The Quality Assurance Plan shall indicate the approach and procedures intended to be employed to assure and maintain quality of all works, documentation, data and data control, materials, tools and equipment throughout the implementation of the contract.

The Quality Plan shall include the following:

- All quality assurance and quality control procedures proposed by the Contractor for his use in the execution of the Works.
- The Contractor's proposals for internal quality assurance audits and reporting.
- A statement detailing the quality records that the Contractor proposes to keep, the time during which they will be prepared and the subsequent period and manner in which they will be stored.
- Inspection and test plans for activities requiring inspection and testing. The plans shall identify the inspection and testing required and who is responsible.

The quality plan shall be updated as necessary from time to time to incorporate, all changes to the Contractor's procedures or any changes that LRTA may require. The Contractor shall submit a Quality Organization chart.

7.1.9. Human Resource Plan - The human Resource Plan shall include a general description and outline of the bidder's program regarding hiring and management of employees of the maintenance organization. The Plan shall include an outline of the projected manpower complement necessary to fulfill all maintenance requirements which shall be strategically distributed among various disciplines of the system and to be immediately deployed (or gradually deployed to full complement) from the start of the implementation of the contract until the end of the contract period. The plan shall cover policies regarding personnel hiring, conditions of employment and termination, benefits management, compensation schedules, skills assessment, development and pooling, including job requirements and descriptions. All programs and policies shall be in accordance to and compliant with present local labor laws.

7.1.10. Training and Skills Development Plan - Supplemental to the Human Resource Plan, this shall define a training program that will be implemented to ensure that work skills and competency of the employees are developed and maintained to the required level.

7.1.11. Laboratory Instrument and Tools/Equipment - Supplemental to the Maintenance Plan, a comprehensive list of instruments, tools and/or equipment (test equipment, basic tools and electronics laboratory equipment, power tools, and similar) deemed needed, on top of all instrumentation, tools and equipment owned by LRTA and declared to be made available to the Contractor, shall be governed by applicable provisions of Republic Act No. 9184, Government Procurement Reform Act and its Revised Implementing Rules and Regulations.

7.1.12. Procurement and Delivery Plan – the Contractor shall submit a Procurement and Delivery Plan with respect to all spares listed in Annex G detailed on a monthly program following the yearly program provided in said Annex G, including warranty package for a period not less than two (2) years

7.1.13. Organizational Structure - The Contractor shall maintain its organizational structure until the end of the Contract period. No modification thereof shall take place without the written consent of the LRTA.

Upon award of Contract, all plans and programs shall be updated not later than 30 days from the start of the contract to fully consider the actual current system status and maintenance requirements and corresponding implementing procedures shall be prepared and submitted to LRTA. All plans and programs shall be validated and updated annually or as often as may be deemed necessary.

7.2. Joint and Several Liabilities

If the Contractor constitutes (under the applicable Laws) a joint venture, consortium or other grouping of two or more persons:

- (a) these persons shall be deemed to be jointly and severally liable to the LRTA for the performance of the Contract;
- (b) these persons shall notify the LRTA of their leader who shall have authority to bind the Contractor and each of these persons; and
- (c) the Contractor shall not alter its composition and legal status without the prior written consent of the LRTA.

7.3. Staffing

The Contractor must have suitably qualified personnel with appropriate track record in electrified railway systems maintenance. For this purpose, a Project Manager and three (3) Department Managers (Rolling Stock, Electronics and Infrastructure) must be duly nominated by the Contractor and their curriculum vitae must be submitted together with the Bid Documents.

POSITION	TOTAL ACCUMULATED EXPERIENCE IN RAILWAY INDUSTRY	MAINTENANCE EXPERIENCE IN RAILWAY	EXPERIENCE IN MANAGERIAL POSITION
Project Manager	20 years	15 years	5 years
Rolling Stock Department Manager	15 years	10 years	5 years
Electronics Department Manager	15 years	10 years	5 years
Infrastructure Department Manager	15 years	10 years	5 years

Names and work experience of all personnel and staff of the Contractor including newly hired personnel shall be submitted first to LRTA for approval before deployment. The LRTA shall have the right to assess the Contractors Technical Personnel capability and shall have right to cause the replacement of those not qualified or those who had previously committed violation of any LRTA guidelines and policies.

7.4. Works to be performed by the Contractor

- 7.4.1. The Contractor shall be responsible for organizing, staffing, managing, financing and carrying out the maintenance of all assets employed in LRT Line 2 for the purpose of providing railway services to the prescribed performance requirements.
- 7.4.2. The Contractor shall also be responsible for obtaining business permits and/or licenses, visas and work permits for foreign personnel, recruiting of local labor and complying with all national and local regulations including the payment of all fees and costs thereof.
- 7.4.3. While the employment of foreign experts is at the option of the contractor, the LRTA expects the Contractor to maximize local hires but should minimize hiring of foreign staff for the entire duration of the contract.

7.5. Operating Rules

The LRTA has prepared a Rule Book which states requirements for safe railway operations, special working arrangements and engineering works on the railway. The Contractor and his staff and sub-contractors must comply with this document at all times and with other operations procedures in force.

7.6. Types of Maintenance

Equipment and system maintenance is classified generally into preventative maintenance (scheduled maintenance) and corrective maintenance (unscheduled maintenance).

7.6.1. Preventative Maintenance – consists of routine tasks which are scheduled and performed at specified intervals, time or distance related. This would include inspection, cleaning, lubrication, testing and replacement of parts as necessary, to ensure that the equipment or system will perform reliably and safely until the next specified interval. For rolling stock in particular this may also be further divided into light and heavy maintenance. Light maintenance is defined as maintenance activity which takes place on equipment or systems *in situ*, carried out on a frequent basis. Heavy maintenance is defined as maintenance activity which takes place on equipment which has been removed from its operational position. This usually takes place in a workshop and is also referred to as equipment overhaul, and is carried out relatively infrequently.

7.6.2. Corrective Maintenance – consists of non-routine tasks, usually after equipment or systems have failed and created a faulty condition. These may be of a minor or major nature, requiring maintenance activity *in situ* or the equipment has to be removed from its operational position.

- a) Minor corrective maintenance shall be limited only to repairs, involves no replacement of capital spares, and shall be performed outright.
- b) Major corrective maintenance involves replacement, installation, or use of capital spare parts.

7.6.3. Special Repairs – These are corrective activities which are unforeseen and not directly as a result of negligence by the Contractor or his staff. Maintenance activities, which may be considered as Special Repair but directly a result of negligence by the Contractor or his staff, shall be performed outright by the Contractor at his own expense.

7.7. Special Repairs / Minor Project

Special Repairs means any repair of the System which may be required by LRTA in writing outside of the regular maintenance schedule as defined in this TOR, which may become necessary as a result of any damaged thereto caused by any event including any act of God or force majeure; Provided that such act is not directly attributable to or is the result of any act or negligence by the contractor or his staff in carrying out the requirements of this contract; Provided further that an event as defined in this provision shall cover but shall be limited to the following: design defects which became apparent only during the contract implementation, third parties, which shall include subcontractors of the Contractor.

The following, but not limited to, shall give rise to special repairs unless attended by the contributory negligence of the Contractor:

- a) Failure of the LRTA or any of their respective affiliates, contractors, subcontractors or Representatives to operate the LRT Line 2 System in accordance with the stipulated operating manuals and the Rule Book;
- b) Acts of passengers or trespassers other than LRTA or maintenance personnel resulting in failure of or interruption to service;
- c) Failure of LRTA or any of their respective affiliates, contractors, subcontractors or representatives to make equipment and Systems or any portion thereof available to the Contractor for scheduled maintenance in accordance with the requirements of the approved Manuals and the Operating Assumptions, unless this affects availability of such;

- d) Actions of unauthorized or unqualified persons, unless such actions are the consequence of negligence of the Contractor;
- e) Animals, birds or foreign objects, unless when such are the consequence of negligence of Contractor.
- f) An Event of Force Majeure, consistent with Clause 22 of the General Conditions of the Contract (GCC);
- g) Vandalism or other criminal activity;
- h) Outside ambient conditions which exceed 40° Celsius under shade or 100% relative humidity;
- i) High winds exceeding sixty (60kph) kilometers per hour.
- j) Flooding, unless when such is the consequence of negligence of Contractor, such as improper provision or maintenance of drainage.

Minor projects are LRTA undertaking for additional facility, modification, alteration, rehabilitation or upgrading of existing facility to improve LRT operational capabilities. This may include office renovation, alteration, rehabilitation or upgrading and the like.

The Contractor as part of his contract responsibilities shall provide assistance to LRTA in the assessment preparation and implementation of special repair works and minor projects.

LRTA reserve the right to award the Special Repair or Minor Project to the Contractor as a variation order or bid out the work, allowing the Maintenance Contractor to participate in the bidding.

However, minor repair of facilities and/or office shall be under the sole account of the Contractor.

7.7.1 Actions on Special Repairs and Emergency Cases

Special Repairs as defined above and as all events which are not directly the result of negligence by the Contractor or his staff in carrying out contract requirements are classified as requiring Special Repairs

- a. All emergency disruptions such as collision, derailments, accidents of any type, earthquakes etc. shall be attended to immediately.
- b. In the event of a collision, accident or derailment, the maintenance Contractor shall assist the LRTA in identifying the cause of accident and evaluate the feasibility and cost of effecting repairs.

In all emergency cases involving danger or threat to property or life, the Contractor is under obligation to render assistance and aid to restore normal train operations and preserve or maintain safety of passengers and LRTA personnel as well as to protect LRTA facilities and properties.

7.8. Depot and Yard Operations

All train and rail borne equipment movements within the Depot area will be under control of and conducted by the Contractor's staff that has been specifically qualified by LRTA in coordination with the OCC. The initial Train Preparation shall be conducted by the Contractor, witnessed by LRTA Train Operator, consistent with existing LRTA guidelines and procedures. Movement of trains and rail borne equipment shall be done by authorized personnel only. The Contractor will need to establish a liaison office to interface with LRTA operations to ensure train movements are properly managed.

7.9. Updating of Manuals

During the Contract Period, the Contractor shall formulate and issue all required manuals according to their submitted programs and plans and shall review each manual (including those provided by the LRTA) annually and issue to all holders of the document revised pages as necessary to keep the document up to date and/or to revise information or procedures. The manuals shall also be made available on electronic support (cd, dvd, usb, diskettes etc.) for reproduction and revision. Revisions occurring before the annual review shall be incorporated and issued simultaneous with their implementation.

7.10. Procurements

- 7.10.1. The Contractor, as part of the contract obligations, shall assume the responsibility of procuring and supplying of all Capital Spares for Rolling Stock and Train On-Board Equipment listed in Annex "G". The cost of the items specified in Annex G, plus delivery, insurance, custom duties taxes and all other similar expenses to serve and fulfill all preventive and corrective maintenance requirements during the entire period of the contract, shall be for the account of the Contractor.
- 7.10.2. Similarly, the Contractor shall also be responsible for the procurement and supply of all consumables, including cost of these items, plus delivery, insurance, custom duties taxes and all other similar expenses.
- 7.10.3. All other remaining Capital Spares of the Line 2 System shall be provided by LRTA.
- 7.10.4. Procurement and supply shall include among others, sourcing, evaluation, testing, receiving, warehousing, issuance to user, and disposal, including all necessary documentation and recording. Among the conditions and requirements are:
 - a. The Contractor shall provide a New Computerized Maintenance Management System capable of managing and tracking maintenance activities and resources including materials management.
 - b. The system to be employed shall provide access to the LRTA authorized personnel through a workstation dedicated to LRTA for routine inspection and compliance audit as required.
 - c. Any stored and or generated data and information from this system shall also be provided to LRTA as part of contract obligation. It shall become LRTA's property upon termination/end of Contract including hardware, software and proprietary rights shall be assigned to LRTA.
 - d. The Contractor shall work back and incorporates the existing maintenance data to the new CMMS.
 - e. Familiarization and effective understanding on the use of the CMMS for both Contractor and LRTA Staff shall be upon the initiative on own expense of the Contractor.
 - f. All purchases shall be in accordance with the LRTA approved specifications. The Contractor may look for acceptable sources other than the original equipment manufacturers and any alternative parts or products for repair and replacement of spare parts to assure steady supply of quality parts subject to testing and validation of acceptability by the LRTA.
 - g. The separate local warehouse areas for parts and materials under responsibility of the Contractor will be provided by LRTA and shall be administered by the Contractor under its full and sole responsibility. Any repair or improvement of the designated local warehouse area, including provision of security shall be at the cost of the Contractor.

- h. For its own account, the Contractor shall segregate and dispose all waste and hazardous materials in accordance with the Philippine Ecological Solid Waste Management Act of 2000.
- 7.10.5. To facilitate immediate availability of some parts and consumables, LRTA shall make available to the Contractor existing inventory of items available at central warehouse subject to utilization procedure and conditions to be agreed upon between LRTA and the Contractor.
- 7.10.6. As part of the present Line 2 Maintenance Contract, consumables and capital spares have been provided by the LRTA to the Contractor. Some of these have already been supplied and the remainder is in the process of being supplied. The Maintenance Contractor will assume responsibility for these during the contract period. These will be available to the Contractor at no immediate cost. These consumables and capital spares shall be used by the Contractor for preventative or corrective maintenance or for special repair, if needed. But, at the end of the Contract period, the quantity of consumables and capital spares shall be the same as the quantity of these items which were made available at the commencement of the Contract, and the duty to replenish them of the same quality shall be to the sole account of the Contractor.

7.11. Audit of Spares and Supplies

- 7.11.1. The Contractor shall maintain books and records of his inventory and unit prices. The books and records shall be available to the LRTA for inspection and audit at any given time or as required. They shall be available on-line as part of the Computerized Maintenance Management System. The Contractor shall maintain adequate supply of capital spares, materials and consumables readily available in the warehouse of the Contractor necessary for scheduled and unscheduled maintenance and Special Repairs. The Contractor will also assist LRTA in facilitating the return of items under warranty (previously purchased by the LRTA).
- 7.11.2. The Contractor and the Engineer or its duly representative shall monitor the consumption rates of spare parts and adjust the required stock levels. The required levels of all consumables must have a buffer stock level within the range of at least 30% of the whole monthly requirement for each System, consistent with the indicated quantities/items in AnnexF.
- 7.11.3. The Contractor shall submit a monthly delivery and consumption report on consumable items used in the course of the implementation of the project subject to random audit by LRTA.
- 7.11.4. Original equipment may only be modified with prior written approval of LRTA. When original equipment is modified, the Contractor will accordingly revise and arrange the inventory of spare parts subject to the LRTA's approval, for the disposal of spare parts no longer required.

7.12. System and Equipment Maintenance Records

- 7.12.1. The Contractor shall establish and maintain documentation and records of all undertaking in the conduct and performance of all contract obligations. The documentation and records shall include but not limited to correspondences, minutes of meeting, policy procedures,

maintenance program and the like and all maintenance and repair records for each and all system and equipment of LRT Line 2 system.

- 7.12.2. All documentation shall be compiled in a structured manner that will allow easy review and extraction of data as may be necessary. Maintenance records shall be established using CMMS structured and encoded in accordance to CMMS defined data base hierarchy and grouping. Similarly, procurement and inventory control records shall be as provided in the CMMS to maintain parity and consistency to LRTA procurement and inventory records. All records and data base shall be available to LRTA for inspection and review or audit as may be required any time upon due notice and a copy of such shall be furnished to LRTA.
- 7.12.3. All maintenance records and documentation shall be handed over to LRTA at the end of the contract period.

7.13. Operations Control Center (OCC) – Maintenance Liaison

The Contractor will need to establish a maintenance liaison team to be stationed/ assigned in the OCC to cover 24 hours 7 days a week operation throughout the duration of the Contract. The purpose of the liaison team is to ensure that any activity requiring maintenance involvement is addressed immediately. The team will perform and coordinate maintenance / technical activities and interface with the OCC, train and station staff, and the Contractors' sub-contractors, as appropriate, but should always be consistent with the LRT Line 2 OCC Procedures and traffic rules. It is therefore understood that power supply management through the use of SCADA at the OCC be the responsibility of the Contractor.

7.14. Communications System

- 7.14.1. The LRT 2 System is equipped with both telephone and radio communication systems designed for use by the operations and maintenance personnel.
- 7.14.2. The Contractor will be issued portable radios as may be appropriate for the efficient maintenance of the System, subject to agreement on the protocol of shared use. The cost of maintenance and repair of these portable radios will be the responsibility of the Contractor, and should be returned in its original useable condition to LRTA at the end of the Contract, Traffic Rules and Policies, OCC Procedures and proper maintenance should be complied by the Contractor for efficient/effective communications.
- 7.14.3. The Contractor shall be responsible only for the permits and certifications necessary for the operation of the portable radios issued to them, in accordance to the prescribed rules and guidelines of the National Telecommunications Commission.

7.15. Access to and Possession of the Guide way and Stations

The LRTA shall provide the Contractor necessary access to the guide way and stations for the purpose of right of way maintenance work at all times when the System is not operating, also known as "maintenance period or non-revenue time". However if revenue service has to be extended, the maintenance period shall also be adjusted in consideration with the scheduled revenue service. The Contractor may occupy parts of the guide way and stations during hours of operations particularly during emergency repairs or if no disruption to normal revenue operations may be caused or subject to agreement with the LRTA.

ARTICLE 8 PERFORMANCE REQUIREMENTS

- 8.0.1. The most vital area of rail operation needed to perform consistently in order to provide and maintain safe and reliable railway service to the satisfaction of customers is the train service. The train service includes: Rolling Stock, Signaling, Power and Catenary, Track Works and Telecommunications. Unreliability or loss of availability of any of these sub-systems directly affects revenue operation.
- 8.0.2. The focus of performance requirements, therefore, will be on these sub-systems. It shall be the responsibility of the Contractor to maintain and monitor the performance of all systems that contribute to the full realization of the required train service, including any and all necessary corrective and mitigating measures to insure meeting all performance requirements.
- 8.0.3. All maintenance works as listed in the approved maintenance program, including overhauling and servicing shall be performed as scheduled. It shall be the responsibility of the Contractor to ensure that all maintenance works for each systems/sub-systems and/or equipment are completely performed as scheduled. Except where the cause is beyond control of the Contractor, failure to meet this requirement would warrant application of corresponding penalty base on the cost of the un-performed works and/or withholding payment for any portion of works not performed as verified and confirmed by LRTA Engineering Department.
- 8.0.4. Determination of actual compensation on a monthly basis of the Contractor shall be based on the unit rates for operational equipment enumerated in the financial proposal of the Contractor. However, the Contractor shall be deducted with the corresponding cost of the capital spares that were not procured based on the procurement and delivery plan.

Likewise, the Contractor shall comply with the minimum Key Performance Indices (KPI) for operational equipment and as provided for in its Approved Maintenance Schedule. Failure to meet these minimum KPIs shall be subject to the Penalty Provisions provided for in Article 9.

- 8.0.5. The Performance Requirements provided in Article 8 shall be monitored and implemented, subject to the strict implementation of the Penalty Provisions as provided for in Article 9. The release of the Contractor's actual compensation shall be subject to the application of these penalty provisions.
- 8.0.6. The projected monthly service billing is based on the turn over to the Contractor of fourteen (14) train sets. Should LRTA turn over less than fourteen (14) train sets then the actual billing should be adjusted according to number of train sets actually turned over by LRTA with proper reference to the provided KPIs.
- 8.0.7. The Contractor is under obligation to procure and deliver all parts and items listed in Annex G. The procurement and delivery by the Contractor shall be in accordance with the Procurement and Delivery Plan submitted by the Contractor as part of its submission. The items/parts listed in the Procurement and Delivery Plan shall have classification whether it is an OEM or not. The Contractor must likewise submit a sworn commitment and undertaking to supply all the parts listed in Annex G on time and a guarantee to supply with warranty in accordance to the Procurement and Delivery Plan, including drawings issued by the OEM for each and every OEM parts listed in Annex G.
- 8.0.8. Obsolescence or non-availability in the market of the said items/parts listed in Annex G shall not be defense and justification against the Contractor's commitment to procure and deliver.
- 8.0.9. Failure of the Contractor to procure and deliver the said parts in accordance with its submitted Procurement and Delivery Plan inclusive of duly granted time extension, if any, shall automatically merit said Contractor liability for liquidated damages for the delay and shall pay the LRTA liquidated damages, not by way of penalty, an amount equal to one-tenth (1/10) of one percent (1%) of the cost of the delayed goods scheduled for delivery for every day of delay until such goods are finally delivered and accepted by LRTA.
- 8.0.10. LRTA need not prove that it has incurred actual damages to be entitled to liquidate damages. Such amount shall be deducted from any money due or may become due to the supplier, or collected from

any securities or warranties posted by the supplier, whichever is convenient to the procuring entity concerned. In no case shall the total sum of liquidated damages exceed ten percent (10%) of the bid price for the subject item/s, in which event LRTA may rescind this contract and impose appropriate sanctions over and above the liquidated damages to be paid, and/or call upon the performance bond of the Contractor.

- 8.0.11. Any and all deliveries of parts listed and not listed in Annex G shall be subjected to testing and acceptance procedure of LRTA.
- 8.0.12. Any and all other rolling stock spares and train on-board equipment not included in Annex G necessary to sustain the operation of the herein identified fourteen (14) train sets shall likewise be the sole and exclusive responsibility, account and cost of the Contractor. The Contractor has the option to repair, retrofit or procure and deliver the necessary spare parts.
- 8.0.13. If LRTA is able to provide the needed capital spares for the non-operational units except for rolling stock and other on-board equipment, the Contractor must restore the equipment / system within forty eight (48) hours upon delivery of capital spares. Failure to meet this requirement would warrant the application of corresponding deduction based on unit rates as provided under the Contract.

8.1. Number of Trains to be Turned Over by LRTA and Number of Trains Required for Revenue Service

- 8.1.1. Operating time is from 4:30am to 10:30pm daily. The requirement of the Contract is that the number of train set available for service must always be two (2) train sets greater than timetabled requirements.
- 8.1.2. LRTA shall turn over to the Contractor ten (10) operational train sets upon the start of the contract.
- 8.1.3. A minimum of ten (10) trainsets shall be available for revenue service at all times. Failure to meet this requirement would warrant application of corresponding penalties as defined in Article 9.
- 8.1.4. Train sets for insertion into service should be reliable, safe and efficient for revenue operation (all sub-systems shall be at 100% operational conditions). Additional trains during off-peak hours and/or additional operating hours shall be at the discretion of LRTA.
- 8.1.5. LRTA need not prove that it has incurred actual damages to be entitled to liquidate damages. Such amount shall be deducted from any money due or may become due to the contractor, or collected from any securities or warranties posted by the contractor, whichever is convenient to the procuring entity concerned. In no case shall the total sum of liquidated damages exceed ten percent (10%) of the bid price for the subject item/s, in which event LRTA shall automatically rescind this contract and impose appropriate sanctions over and above the liquidated damages to be paid.

8.2. Availability and Reliability of Rolling Stock

- 8.2.1. The Rolling Stock shall be maintained and kept in good operating condition to allow continuous train service. It shall be the responsibility of the Contractor to ensure that all Rolling Stock are maintained, repaired and tested for continuous and reliable operation without any service interruption of more than 15 minutes. In general, all Rolling Stock shall remain substantially operational and available for revenue service, and any down time as a result of the equipment failure shall not be more than eight (8) hours revenue operation stoppage. The requirement shall be consistent with Article 6, Hours of Revenue Service Operations of this Terms of Reference.

- 8.2.2. Except where the cause is beyond control of the Contractor, failure to meet this requirement would warrant application of corresponding re-compensation based on unit rates as provided under the Contract.

8.3. Availability and Reliability of Signaling System

The Signaling system shall be maintained and kept in good operating condition to allow and support safe and continuous train service. It shall be the responsibility of the Contractor to ensure that the Signaling System is maintained, repaired and tested to insure continuous and reliable operation without suffering any service affecting failures causing interruption of service of more than 10 minutes. In general, the Signaling System shall remain substantially operational at all times, and any down time of any section or function shall not be more than two (2) hours and shall not result to stoppage of revenue operation. In cases wherein manual cranking of point machine is required, it shall be the responsibility of the Contractor to provide the needed manpower to perform the manual cranking of point machine until such time the Signaling system is normalize.

Failure to meet this requirement would warrant application of corresponding re-compensation based on unit rates as provided under the Contract.

Moreover, the manual cranking of the point machine must be under the supervision of the LRTA Operations Personnel.

8.4. Availability and Reliability of Power and Catenary System

The Power and Catenary systems shall be maintained and kept in good operating condition to allow and support continuous train service. It shall be the responsibility of the Contractor to ensure that the Power and Catenary Systems are maintained, repaired and tested to insure continuous availability for operation without any limitations to operational requirements. In general, the Power and Catenary Systems shall remain substantially operational and available at all times, and any down time of any section or function shall not be more than four (4) hours and shall not result to stoppage of revenue operation. In cases wherein manual control and monitoring of Rectifier Substations (RSS) is required due to a non-operational SCADA system, the Contractor shall provide manning services on RSS until such time the SCADA system is normalize.

Failure to meet this requirement would warrant application of corresponding re-compensation based on unit rates as provided under the Contract.

8.5. Availability and Reliability of Track Works

The Track Works and permanent ways shall be maintained and kept in good condition to allow and support continuous train service. It shall be the responsibility of the Contractor to ensure that the Track Works and permanent ways are maintained, repaired and tested to insure continuous availability for operation without any limitations to operational requirements. In general, the Track Works shall remain available at all times, and any down time or limitation of use shall not be more than six (6) hours and shall not result to stoppage of revenue operation.

Failure to meet this requirement would warrant application of corresponding re-compensation based on unit rates as provided under the Contract.

8.6. Availability and Reliability of Telecommunication System

The Telecommunication systems shall be maintained and kept in good operating condition to allow and support continuous train service. It shall be the responsibility of the Contractor to ensure that the Telecommunication Systems are maintained, repaired and tested to insure continuous and reliable operation without suffering any service affecting failures causing interruption of service of more than 10 minutes. In general, the Telecommunication Systems shall remain substantially operational and available at all times, and any down time of any section or function shall not be more than two (2) hours and shall not result to stoppage of revenue operation.

Failure to meet this requirement would warrant application of corresponding re-compensation based on unit rates as provided under the Contract.

8.7. Availability and Reliability of Station and Depot Ancillaries

All Station and Depot shall be maintained and kept in good operating condition to allow and support continuous train service. It shall be the responsibility of the Contractor to ensure that All Station and Depot Ancillaries are maintained, repaired and tested to insure continuous and reliable operation without suffering any service affecting failures causing interruption of service of more than ten (10) minutes.

The Station and Depot Ancillaries shall remain substantially operational and available at all times, and shall not result to stoppage of revenue operation. Any down time of any section or function shall not be more than the following allotted time;

a. Workshop Equipment	Maximum of three (3) hours per equipment
b. Track works Equipment	Maximum of three (3) hours per equipment
c. Portable Generators	Maximum of three (3) hours per equipment
d. Water Pumps	Maximum of four (4) hours per equipment
e. Fire Suppression FM200	Maximum of four (4) hours per equipment
f. Generator	Maximum of twelve (12) hours per equipment
g. Train Wash	Maximum of twelve (12) hours per equipment
h. Ventilation System	Maximum of twelve (12) hours per equipment
i. Truing Machine	Maximum of twelve (12) hours per equipment
j. Chilled Water System	Maximum of twelve (12) hours per equipment
k. Rail Borne Vehicles	Maximum of twelve (12) hours per equipment

All other Station and Depot Equipment and Ancillaries shall have a maximum downtime of three (3) hours per equipment.

Failure to meet this requirement would warrant application of corresponding re-compensation based on unit rates as provided under the Contract.

8.8. Maintenance Manpower

To provide an efficient and effective maintenance service in accordance with the performance requirements and the Contractor shall consistently deploy, provide and maintain a minimum manpower requirement of two hundred fifty two (252) essential personnel. In cases of resignation and other reasons that resulted to deviation on the manpower count, the Contractor shall have fifteen (15) working days to replace the personnel.

The Contractor shall submit in advance the monthly man count, personnel list and shift schedules. Likewise, for billing and payment purposes the Contractor shall submit appropriate proof of payment of its laborer/personnel monthly compensations.

Failure to meet this requirement would warrant application of corresponding re-compensation based on unit rates as provided under the Contract.

Table of Organization

See Annex A

8.9. Janitorial Services

The Contractor shall provide and supervise the janitorial services affecting the maintenance works for three (3) major asset items:

- a. Workshop at Depot;
- b. Rolling Stocks at Depot Stabling;
- c. Rectifier Substations.

The Contractor, during the contract period shall provide and maintain a minimum of eighteen (18) manpower janitorial services.

The Contractor shall submit in advance the monthly man count, personnel list and shift schedules. Likewise, for billing and payment purposes the Contractor shall submit appropriate proof of payment of its laborer/personnel monthly compensations.

Except where the cause is beyond control of the Contractor, failure to meet the minimum manpower requirement would warrant application of corresponding re-compensation based on unit rates as provided under the Contract.

8.9.1. For the Santolan workshop area, the janitorial services shall involve the following:

- Mopping, cleaning and polishing
- Disposal of office wastes once every day;

8.9.2. For each six (6) RSS, the janitorial services shall involve the following:

- Mopping and sweeping as needed, 3x a day;
- Cleaning of wall panels, stairway, and handrail grill every day;
- Fumigation and Disinfestations twice a month;
- Removal of graffiti when necessary;
- Provision of 4 sets (1 for recyclable, 1 for non-recyclable) of trash bins and the disposal of their contents once a day;
- Washing of external surface walls such as but not limited to external metal panel;
- Removal of dust, spider webs, grease and other foreign materials present on the ceilings once a month;
- Cleaning of roof panels, gutter and downspout as needed or annually.

8.9.3. For every rail vehicle the maintenance contractor shall perform the following cleaning works:

- Mopping and sweeping of dirt and removal of litter and trash inside the vehicle
- Washing of external areas at end of day, at the Depot, at least 3 times a week;
- Cleaning of internal areas of vehicle at end of day, at the Depot, on a daily basis.

While Article 8.9 defines the basic scope of requirements and frequencies, successful completion of cleaning responsibilities will be judged on actual results. This may sometimes require additional cleaning or adjustments to the basic requirements and the Contractor will need to respond to these at no extra cost to the contract. LRTA's judgment on cleanliness standard shall be final.

8.10. Drug Testing

The Contractor shall cause the random and comprehensive drug testing of not less than twenty (20) percent of its personnel on a yearly basis to be administered by an independent and competent third party but under the sole and exclusive cost and account of the Contractor.

ARTICLE 9 Penalties for Failure to Meet Performance Criteria

Corresponding penalties will apply should the Contractor fail to meet the required performance criteria as defined in Article 8 of this Terms of Reference. The criteria shall focus on:

- a. Failure to restore equipment / system within the allowable downtime affecting revenue operation – the Contractor's compensation shall be deducted with the applicable unit rates based on the revenue loss due to cancelled trips for failure to restore the equipment / system within the allowable downtime.
- b. Failure to restore equipment / system within the allowable downtime upon delivery of spare parts – corresponding penalty rate per equipment / system shall apply on top of the deducted compensation consistent with Article 8 of this Terms of Reference.
- c. Failure to provide the required number of train set for revenue service in accordance to Article 8.1 of this Terms of Reference – corresponding penalty per train set shall apply consistent with the equivalent percentage per train set, on top of the deducted compensation consistent with Article 8 of this Terms of Reference.
- d. Failure to meet the minimum manpower requirement – the Contractor's compensation shall be deducted with the corresponding unit rates of every staff that the Contractor failed to provide.
- e. Failure to provide the minimum number of trainsets for revenue service as specified in Article 8.1.3 – the Contractor's compensation shall be deducted with the applicable unit rates based on the revenue loss due to cancelled trips.

Applicable penalties are outlined in Annex E. LRTA shall have the outright authority to impose the corresponding penalties incurred by the Contractor, deductible on the Contractor's Monthly Payment.

ARTICLE 10 GENERAL CONDITIONS

10.1. Project Location

The work under this Contract is located at the LRTA Depot, the LRT Line 2 Revenue Line including stations, terminals, rectifier substations, the connecting line, and all other LRT Line 2 System assets and facilities.

10.2. Ownership and Maintenance

Full ownership of the depot, equipment, facilities and spares of Line 2 System, and other items turned over to the Contractor at the start of the contract period, shall remain with the LRTA.

The Contractor shall maintain the LRT Line 2 facility for and on behalf of LRTA during the contract period. Unless otherwise stipulated, all expenses attendant to the maintenance of the facility, e.g., spare parts, labor costs, and other incidental expenses thereof shall be for the account of the Contractor.

10.3. LRTA's Representative

The LRTA Engineering and Maintenance Department shall monitor the performance of maintenance activities by the contractor to ascertain complete and proper execution of all work requirements in the contract. It shall be the responsibility of LRTA Engineering and Maintenance Department to verify and certify any and all declared work accomplishment and claim for payment by the Contractor.

Should contract performance requirements are not met, Engineering and Maintenance Department shall, after discussion of facts and issues with the Contractor, determine and recommend any applicable penalty claim against the Contractor in accordance to contract conditions.

10.4. Maintenance Facilities and Equipment

Existing maintenance facilities, equipment, rail borne maintenance vehicles, tracks maintenance equipment, fixtures and tools needed for maintenance will be made available to the Contractor without expense to the Contractor. The Contractor will be responsible for the cost of maintenance and repair of these items. Also included and covered by the immediately preceding sentences are tools and equipment listed in Annex B (Diagnostic Tools and Equipment). Procurement of any additional tools, diagnostic and testing equipment, laboratory instruments, and other special tools and equipment, including replacements of those originally furnished shall be governed by applicable provisions of Republic Act No. 9184, Government Procurement Reform Act and its Revised Implementing Rules and Regulations. Maintenance of these items shall become the responsibility of the Contractor and should be returned in their original serviceable conditions to LRTA at the end of the Contract period.

All spare parts except capital spares required to maintain and repair the above mentioned equipment shall be provided by the Contractor.

10.5. Warranty

Some systems and equipment may still be under "Contractor's/Supplier warranty during the contract period. The Contractor, as part of this Contract, will be required to provide assistance and advice to LRTA for effective management of warranty monitoring and claims, including providing liaison with the concerned contractors/supplier in behalf of LRTA for any warranty rectification.

10.6. Technical Assistance to LRTA

The Contractor as part of his obligation shall, upon request from the LRTA, provide technical assistance and advisory services to LRTA for the proper implementation of the contract(s) related to the LRT line 2 system operations and maintenance. Technical assistance shall also include but not limited to coordination, equipment intervention and operation, and facilitating access to activities of other LRTA projects requiring work interface to existing Line 2 System. The Contractor shall give full and complete technical assistance to LRTA in developing the facilities for commercial spaces and activities.

10.7. Training

Using the maintenance manuals and other resources available in the library of the LRTA, the maintenance Contractor shall provide a continuous training program for all maintenance staff to ensure that their competencies. This shall be integral to the Contractor's proposed human resource development program that will: (i) identify the personnel to be trained, (ii) design and/or identify appropriate training courses within and outside the organization, (iii) provide and undertake the training without work disruption, and (iv) evaluate the course' cost-effectiveness. Where possible, the Contractor shall tap existing institutions in and out of the country and avoid creation of separate facilities and training resources.

10.8. Seamless Transition

The contractor shall undertake to satisfy the requirements of LRTA and or whoever is the succeeding maintenance contractor for the smooth transition and continuation of all maintenance activities at the end of his contract. A transition time of not less than sixty (60) days shall be allowed with no extra cost to LRTA in accordance with the Transition Plan and Procedures.

10.9. Quality Assurance

The Contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. The system shall be in accordance with the details stated in the Contract. The Engineer or its representative shall be entitled to audit any aspect of the system.

Details of all procedures and compliance documents shall be submitted to the Engineer or its representative for information before each execution of Works is commenced. When any document of a technical nature is issued to the Engineer or its representative, evidence of prior approval by the Contractor himself shall appear on the document itself.

Compliance with the quality assurance system shall not relieve the Contractor of any of his duties, obligations, or responsibilities under the Contract.

10.10. Computerized Maintenance Management Systems

- 10.10.1. The Contractor shall provide a computerized maintenance management system (CMMS) to be utilized in the performance of obligations under the maintenance contract, including procurement and inventory control. This system permits the integration of scheduled and unscheduled maintenance jobs; the proper inventory and control of all spare parts, equipment and supplies; the recording, monitoring and control of actual inspections, repairs, and other jobs done, as well as functions for procurement and inventory control.
- 10.10.2. The Contractor shall provide all necessary work stations, including LRTA requirement, with complete and licensed software application to facilitate real time maintenance management of all system and related activities. The installation shall include, hardware, peripherals, structured cabling, LAN and interface software, as may be necessary.
- 10.10.3. The Contractor shall establish the necessary equipment and maintenance activity hierarchy following the program structure and functionality to allow maintenance activity and records integration, including materials management, control and monitoring. Progressively, and throughout the contract period, entry of maintenance data, update of maintenance management and system structure shall be continuously undertaken by the Contractor with all information, data and corresponding files properly transmitted and informed to LRTA. LRTA shall be informed to any improvement introduced thereto or information and data encoded or loaded to the system. The Contractor shall be responsible for the maintenance and system administration of all related hardware and keep the work stations always in good operating conditions.
- 10.10.4. Upon expiry of the agreement or upon termination of the contract, the CMMS shall be turned over to LRTA in good and fully functioning condition including copies of installation software, with completely updated data base to the latest maintenance activity, including records of all procurement and inventory. The new CMMS shall become the property of LRTA at the end of the contract, inclusive of software, licenses, hardware and all contained records and data.

10.11. Inventory Management Services

In addition to the procurement and inventory management for all parts, the Contractor shall provide Inventory Management Support to LRTA Materials Management and Warehousing Office. Support services shall include among others:

- Monthly submission of inventory of rotational spare and consumables quantity and status
- Monthly submission of consumption updates.
- Assistance in the physical inventory and parts identification

10.12. Future Requirements

In the event of any capacity expansion on additional equipment and facilities LRT Line 2 or where more trains may be required for the existing line, an amendment of adjustment in the maintenance contract may be facilitated in accordance with applicable provisions of the Republic Act 9184, Government Procurement Reform Act and its revised Implementing Rules and Regulations.

10.13. Facilities for Staff and Labor

The Contractor shall provide and maintain facilities for its personnel. The Contractor shall not permit any of its personnel to maintain any temporary or permanent living quarters within the structures forming part of LRTA property.

10.14. Health and Safety

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's personnel, and that suitable arrangements are made for all necessary hygiene requirements and for prevention of epidemics.

The Contractor shall appoint a safety officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents and ensure the safety of all concerned individuals and assets. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.

The Contractor shall send to the Engineer or its duly representative, details of any accident as soon as practicable after its occurrence, but not later than 24 hours. The Contractor shall maintain records and make reports concerning health, safety, and welfare of persons, and damage to property, as the Engineer may reasonably require.

10.15. Insurance for Contractor's Personnel

The Contractor shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's personnel.

The LRTA shall be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of Employer's personnel.

The insurance shall be maintained in full force and effect during the whole time that these personnel are utilized in anyway in the execution of the Works. For a Subcontractor's employees, the insurance may be affected by the Subcontractor, but the Contractor shall be responsible for compliance with this Section.

10.16. Contract Period

The Contractor must be capable and committed to the implementation of the maintenance contract for Five (5) years. However, after the first three (3) years, the contract may only be continued for the next two (2) years depending on the satisfactory performance of the contractor in relation to the performance requirement of the Contract.

10.17. Billing and Compensation

The Contractor shall utilize a billing form that will be provided by LRTA for the Contractor's Monthly Payment that shall outline in detail all the expenses and consumption for the maintenance services rendered. The payment for

the delivery of capital spares shall be in accordance to the submitted Procurement and Delivery Plan consistent with the programmed procurement as prescribed in Annex G.

The Maintenance Contractor shall submit to the LRTA proof of purchase, shipping documents, certificate of origin, manufacturers and warranty certificate.

10.18. Conflict Resolution

In the event of any conflict arising from the Contract between the LRTA and the Contractor, the parties shall endeavor to settle their conflict amicably, failing which the same shall be submitted first to Arbitration, with the Court of competent jurisdiction in the Philippines as a last resort.

10.19. Regular Maintenance Coordination Meeting

Regular maintenance coordination meeting shall be held once a week, to be attended by LRTA personnel from Engineering, Safety & Security, Operations and the Contractor.

10.20. Exclusions

Except for items that are excluded from the Contractors scope of work, the Contractor shall be responsible for maintaining the System in accordance with the terms and conditions set forth in this Terms of Reference and the Maintenance Agreement. This will include cleaning and janitorial services, Scheduled and Unscheduled Maintenance and Special Repairs of all structures, systems and Rail Vehicles.

The LRTA will provide and specify, for use of the Contractor, office space and facilities intended for engineering and maintenance which were constructed as part of the System. In addition, the LRTA will pay for all utility service, electricity, water, and telecommunications - except where separately defined and measured connections for utility services are provided for maintenance activities and shall be limited to existing installations that are operations and maintenance related. Any additional installation or connections undertaken by the Contractor to meet their own needs shall be for the account of the Contractor. These are however, subject to the compliance by the Contractor to the house rules and regulations of LRTA.

ARTICLE 11 Scope of Maintenance Service

A table of the scope of services is included for reference under this Article. The Contractors responsibility includes all systems, equipment, buildings, stations, facilities necessary for operations of LRTA Line 2, irrespective of whether it is specified in the table or not.

11.1. TABLE 1: SCOPE OF MAINTENANCE SERVICE

ITEMS	OUT OF SCOPE	IN SCOPE OF WORK	REMARKS
1. Maintenance Service			
1.1 TRAINSET			
(1) Inspection, Maintenance and Repairs		✓	
Inside activity at the Depot		✓	
(2) Interior Cleaning		✓	
(i) In the Depot		✓	
(ii) In the mainline	✓		
(3) Exterior Cleaning		✓	
(4) Repainting		✓	
(5) Motor rewinding		✓	
1.2 MAINTENANCE OF WAY			

ITEMS	OUT OF SCOPE	IN SCOPE OF WORK	REMARKS
1.2.1 Guideway Structure			
(1) Inspections, Maintenance & Repairs		✓	
(2) Cleaning and Repainting		✓	
1.2.2 Station Facilities/Equipment and Depot Building			
(1) Inspection, Maintenance & Repairs		✓	
(2) Station Cleaning including Technical Equipment Rooms		✓	
(3) Cleaning Facilities		✓	
(4) Re-Painting		✓	
(5) Lighting Maintenance		✓	
(6) Siphoning of Septic Tanks		✓	
(7) Infestation Management		✓	
(8) Katipunan Chiller Chemical Water Treatment		✓	
(9) Motor rewinding		✓	
1.2.3 Tracks			
(1) Inspections, Maintenance & Repairs		✓	
1.2.4 Walkway			
(1) Inspections, Maintenance & Repairs		✓	
1.2.5 Traction Power Substation			
(1) Inspections, Maintenance & Repairs		✓	
(2) Testing of Silicon-Oil Immersed Transformers		✓	
1.2.6 OCS			
(1) Inspections, Maintenance & Repairs		✓	
1.2.7 Signaling			
(1) Inspections, Maintenance & Repairs		✓	
(2) Motor rewinding		✓	
1.2.8 Communications			
(1) Inspections, Maintenance & Repairs		✓	
1.2.9 CCTV			
(1) Inspections, Maintenance & Repairs		✓	
1.2.10 AFC			
(1) Inspections, Maintenance & Repairs	✓		
1.2.11 Escalators/Elevators			
(1) Inspections, Basic Maintenance & Repairs		✓	
1.2.12 Rail borne Vehicles			
(1) Inspections, Maintenance & Repairs		✓	
1.2.12 Depot Equipment			
(1) Equipment for Trainset		✓	
(2) Equipment for other than Trainset		✓	
1.3 UNSCHEDULED MAINTENANCE			
(1) Maintenance service for Trainset		✓	
(2) Maintenance service for other than Trainset		✓	
1.4 SPECIAL REPAIRS			Refer to Article 7.6 and Article 7.7
(1) Maintenance Service for Trainset			
(2) Maintenance service for other than Trainset			
2. Equipment and Facilities			
2.1 Equipment supplied during present Maintenance Contract period		✓	
2.2 Maintenance Equipment for Trainset		✓	

ITEMS	OUT OF SCOPE	IN SCOPE OF WORK	REMARKS
2.3 Maintenance Equipment for other than Trainset		✓	
2.4 Warehouse Facilities and Supported Equipment for Spare parts		✓	
2.5 Furnishing and Fixtures in the warehouse		✓	
2.6 Repair of Office Facilities, Furniture and Equipment.		✓	
3. Spare Parts			
3.1 Trainset		✓	
3.2 Train On-Board Equipment		✓	
3.3 Walkway	✓		
3.4 Station and Depot Building	✓		
3.5 Track	✓		
3.6 Traction Power Substation	✓		
3.7 OCS	✓		
3.8 Signaling	✓		
3.9 Telecommunications	✓		
3.10 CCTV	✓		
3.11 AFC	✓		
3.12 Escalators/Elevators	✓		
3.13 Stations and Depot Equipment	✓		
3.14 Rail borne Vehicles	✓		
3.15 Maintenance Equipment	✓		
4. Consumable Materials			
4.1 Tickets, etc.	✓		
4.2 Consumables for the management of operation	✓		
4.3 Trainset			
(1) Consumables for the Maintenance and repair		✓	
4.4 Guideway Structure			
(1) Consumables for the Maintenance and repair		✓	
4.5 Station and Depot Buildings		✓	
(1) Consumable for the Maintenance and repair		✓	
(2) Painting		✓	
(3) Lighting Equipment			
(i) Offices for the Owner		✓	
(ii) Other (maintenance facilities & equipment)		✓	
4.6 Tracks			
(1) Consumable for the Maintenance and repair		✓	
4.7 Walkway			
(1) Consumable for the Maintenance and repair		✓	
4.8 OCS			
(1) Consumable for the maintenance and repair		✓	
4.9 Signaling			
(1) Consumables for the maintenance and repair		✓	
4.10 Telecommunications			
(1) Consumable for Maintenance and repair		✓	
4.11 CCTV			
(1) Consumable for Maintenance and repair		✓	
4.12 AFC			
(1) Consumable for Maintenance and repair	✓		
4.13 Escalators/Elevators			
(1) Consumable for Basic Maintenance and repair		✓	

ITEMS	OUT OF SCOPE	IN SCOPE OF WORK	REMARKS
4.14 Depot Equipment			
(1) Consumables for the Equipment Maintenance and Repair		✓	
(2) Annual Consumables for the Equipment, after warranty period		✓	
4.15 Rail borne Vehicles			
(1) Consumable for Maintenance and repair		✓	
Note: In general, all consumables after the warranty period shall be supplied by the Contractor		✓	
5. COMMON SERVICE			
5.1 Office Building Construction	✓		
5.2 Utility			
(1) Electricity	✓		
(2) Water			
i) Water for Trainset maintenance	✓		
ii) Water for other than Trainset in the depot	✓		
iii) Water for stations	✓		
iv) Water for maintenance office	✓		
(3) Telephone Service			
i) For maintenance		✓	
ii) For line transfer and minor alterations		✓	
5.3 Maintenance of Landscaping at depot	✓		
5.4 Waste Management			
(1) Collection of all waste related with Trainset in the depot.		✓	
(2) Collection of all waste other than Trainset in the depot	✓		
(3) Management of outside activities for 5.4(1) and 5.4(2)	✓		
5.5 Maintenance Management System			
(1) Maintenance for Hardware		✓	
(2) Maintenance for Software		✓	
5.6 Revising and Updating of System As-Built Drawings and Manuals		✓	
6. DEPOT OPERATION			
(1) Trainset shifting for maintenance		✓	
(2) Trainset shifting for the revenue service		✓	
(3) Trainset operation control in the Depot		✓	
(4) Switch operation		✓	
7. LABOR FOR MAINTENANCE			
(1) Maintenance for Trainset		✓	
(2) Maintenance for other Assets		✓	
(3) Parts management		✓	
(4) Parts management for other than Trainset		✓	
(5) Maintenance for equipment other than for office use of LRTA		✓	

ARTICLE 12 SAFETY OBJECTIVES

The Safety Plan required by Article 7.1.7 must be consistent with the high level safety objectives and targets already determined by LRTA for Line 2. These are:

12.1. Safety Awareness

To achieve and maintain a high level of safety awareness among staff in all divisions/ departments and at all levels.

Targets

- Maintain “Safety” as a standing agenda item in all communication meetings with staff.
- Maintain an LRT Line 2 Safety Promotion Program.

12.2. Passenger Safety

To maintain and improve passenger safety through safety management

Targets

- Zero passenger fatalities.
- Number of serious injuries to passengers to be at or below 2.0 per 25 million passengers.
- Maintain a passenger safety promotion program.

NB: Serious injuries to passengers are those which require admission to hospital for observation or treatment immediately after an accident, but exclude suicide, attempted suicide or the passenger’s mental condition.

12.3. Staff Safety on the Operating Railway

To maintain and improve staff safety on the operating railway

Targets

- Zero staff fatalities.
- Staff lost time injury frequency rate to be at or below 1.0 per 200,000 person hours worked.

NB: 1. Staff injuries are those where a staff member, as a result of an accident whilst on duty, is unable to work for one complete shift or more immediately following the accident.
2. 200,000 person hours is approximately 100 staff per year

12.4. Contractor Safety on the Operating Railway

To maintain and to enforce the Contractors’ Safety Management Systems

Targets

- Zero fatalities to contractors’ staff.
- Reportable accident rate of contractors’ staff to be at or below 0.65 per 100,000 person hours worked.

12.5. Interface Safety for Construction Activities on the Operating Railway

To ensure safe railway operation during construction activities in the vicinity of the operating line by continuous review of risk and taking of adequate precautionary measures, including protection and supervision

Targets

- Zero events causing serious injury to passengers or the public, damage to the operating railway, or serious incident involving train services arising from construction interface activities.

12.6. Risk Management of the Operating Railway

To implement a planned systematic approach to risk management, involving hazard identification, risk evaluation, and implementation of cost effective control measures to reduce risk

Targets

- Complete identification of safety critical items.
- Review the Risk Analysis, Management and Control System at regular intervals.
- Reduce the number of significant hazards identified by 10% each year.

12.7. Safety of New Equipment and Systems Acquired for the Operating Railway

To ensure safety of new equipment and system types acquired for use on the operating railway

Targets

- Zero accidents on the operating railway arising from the use of new equipment or systems.
- Ensure every safety critical or safety-related project has a published safety plan, which is audited regularly. e.g. Train Set Availability
- The proposed Safety Plan must state clearly who will be responsible for leadership in each of these target areas and how the targets are to be met.

ARTICLE 13 REPORTING OBLIGATIONS

13.1. Contractor's Obligations

The Contractor shall provide such information and other assistance as the LRTA may reasonably request to comply with the LRTA's needs and requirements that relates to the maintenance and repair of the System.

a) Weekly Report

The Contractor shall prepare and submit to the LRTA weekly accomplishment report, in a form reasonably acceptable to the LRTA, relating to the Services, the condition of the System and other information reasonably requested by the LRTA and will form part of the monthly report.

The weekly report should indicate, at the minimum, the following:

- Preventive maintenance activities, by discipline, reflecting in detail the tasks performed in relation to the planned against actual maintenance activity.
- Corrective maintenance activities, by discipline, reflecting in detail the tasks performed.
- Consumed/used spares and consumables in relation to the preventive and corrective maintenance activities.
- Notable incidents.
- Any other requirements as required under Article 8 Performance Requirements. e.g. Train Set Availability

b) Monthly Report

The Contractor shall prepare and submit to the LRTA monthly reports, in a form reasonably acceptable to the LRTA, relating to the Services, the condition of the System and other information reasonably requested by the LRTA.

The monthly report should indicate, at the minimum, the following:

- Number of service failures, as recorded by the OCC, by discipline.
- Number of service minutes lost, by discipline.
- Reliability trends, for each discipline.
- Notable incidents.
- Outstanding concerns
- Actions in hand to address failures and unreliability trends.
- Safety record, number of incidents staff injury and their nature. Preventative measures planned or carried out.
- Any other requirements as required under Article 8 Performance Requirements. e.g. Train Set Availability

c) Annual Report

In addition to the Monthly Reports, the Contractor shall furnish to the LRTA, an annual report in a form reasonably acceptable to the LRTA, certifying as to the completion and results of all maintenance activities and reviewing the performance of the System for the preceding service year. This shall also include records and reports of rates of wear for critical and high value wearable parts, summary and analyzed report of corrective work, in addition to summary reports of parts and materials consumption. This should also include plans for the maintenance organization for the forthcoming year.

d) Event Report

The Contractor shall notify the LRTA orally and in writing (written notice may be delivered electronically), as soon as reasonably practical after becoming aware of the occurrence of any incident resulting in serious bodily injury or loss of life, the entire System or a material portion thereof being inoperable, or serious damage to the site ("Unusual Incident"). A complete description of any such incident, including the time and location of the incident, an explanation of what occurred and the action taken by all parties, shall be included in the Monthly Report

e) Service Report

The Contractor shall inform the LRTA in writing within twenty-four (24) hours of any circumstances resulting in delay of any train for more than thirty(30) minutes, more than ten (10) trains late in any day, or cancellation of more than 2 trains, when the cause is known to be or is likely to have been an equipment failure, defect or irregularity.

ARTICLE 14
Good Industry Practice

The observance of “Good Industry Practice” as adequately defined in Article 3 shall be applied to promote a mutual concern not only for the benefit of each party but to always look for an acceptable resolution should any conflict or disagreement arises. The guiding principle is always that whatever is the best for LRTA and the government as a whole shall be the prime concern on this contract but also allowing a decent profitability for the Contractor.

Preparedby:

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