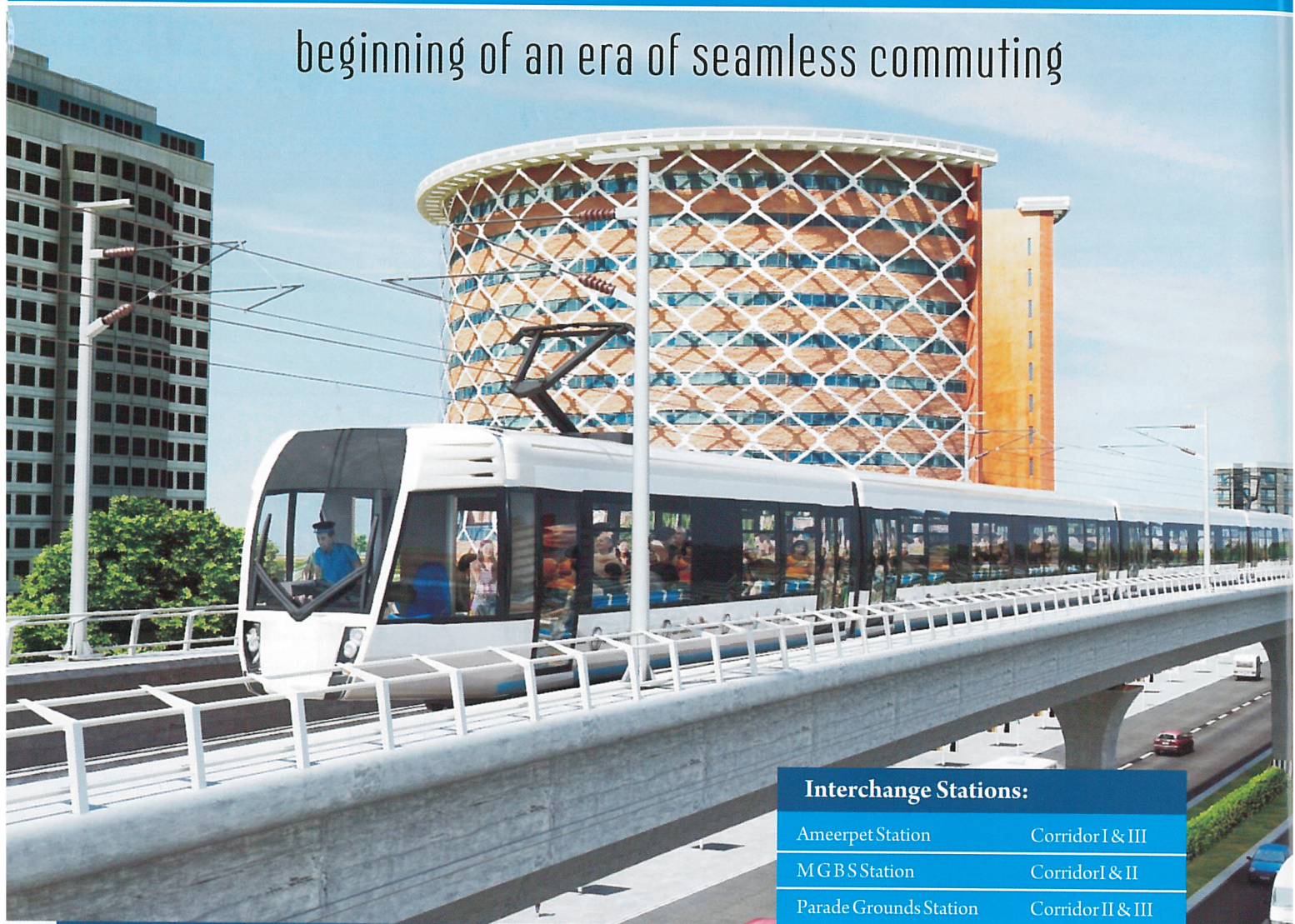


# HYDERABAD METRO RAIL PROJECT

beginning of an era of seamless commuting



## Interchange Stations:

Ameerpet Station	Corridor I & III
MGBS Station	Corridor I & II
Parade Grounds Station	Corridor II & III

## Salient Features

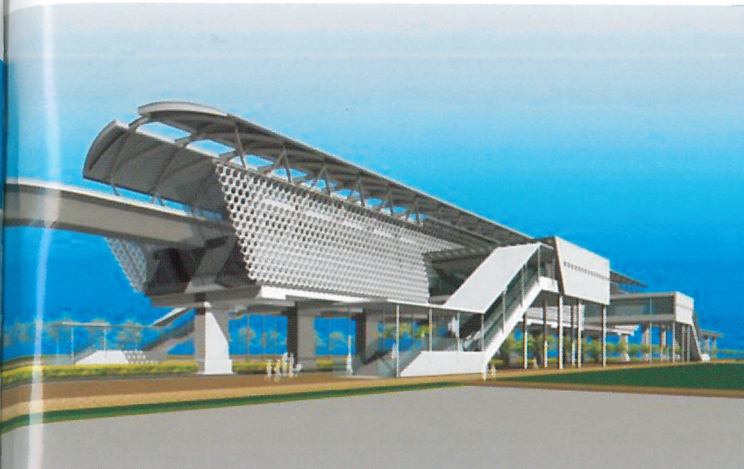
- Green eco-friendly mode of travel – reduces carbon emission, fuel consumption and pollution
- Faster, safer and comfortable air conditioned travel with reduced travel time
- Seamless commuting with ultra-modern coaches
- Connects major offices, retail and residential areas
- Integration with existing rail terminals, MMTS & bus stations
- High frequency of trains – reduced waiting time
- User-friendly elevated world-class stations with lifts, staircases and facilities for the disabled
- Parking facility at strategic locations along the route in the designated P&C areas
- Automatic ticket vending machines and automatic fare collection system
- Feeder buses to stations from different areas of the city
- Commuter-friendly shopping facilities at the concourse level at stations

**L**&T Metro Rail (Hyderabad) Limited will implement the Hyderabad Metro Rail Project. Valued at INR 164 Billion, this Public-Private Partnership (PPP) project will be completed in five years from the appointed date. It is being executed in a Design-Build-Finance-Operate-and-Transfer (DBFOT) basis. The concession period is 35 years, with an entitlement of further 25 years.

The Hyderabad metro network will cover a total distance of ~71 km across three corridors:

- Corridor I : Miyapur to LB Nagar (~29 km, 27 stations)
- Corridor II : Jubilee Bus Stand to Falaknuma (~15 km, 16 stations)
- Corridor III : Nagole to Shilparamam (~28 km, 23 stations)

The metro will include 66 ultra-modern stations with state-of-art depots and complete infrastructure. Metros and MRTS (Mass Rapid Transport System) are emerging as viable solutions to the infrastructure woes plaguing growing cities. The unique L&T Metro Rail Hyderabad Project focuses on integrated public transportation and infrastructure development of Hyderabad in Andhra Pradesh.



## Stations – Corridor I:

Miyapur	JNTU College	KPHB Colony
Kukatpally	Balanagar	Moosapet
Bharat Nagar	Erragadda	ESI Hospital
S R Nagar	Ameerpet	Punjagutta
Irrum Manzil	Khairatabad	Lakdikapal
Assembly	Nampally	Gandhi Bhavan
Osmania Medical College	MG Bus station	Malakpet
New Market	Musarambagh	Dilsukhnagar
Chaitanyapuri	Victoria Memorial	L B Nagar

An urban rejuvenation and redesign effort to transform Hyderabad into a people-friendly 'Green' city, the metro will be an efficient, safe and reliable public transport system. It will decongest the city's roads and provide a seamless transport network to reduce travel time, with the added dimension of augmented comfort levels for the masses. Eco-friendly, it will reduce carbon emissions, both by using zero-emission electricity and by minimizing high-emission road transport.

L&T Metro Rail Hyderabad project will develop 18.5 million sq ft of transit-oriented development in the earmarked parking and circulation areas and depots. Fare box collection from ridership, rentals from transit-oriented space, advertising and carbon credits are expected to contribute to the revenues of the project, which is scheduled to be commissioned by 2016.

Once completed, the L&T Metro Rail Hyderabad Project will transform Hyderabad into one of India's most preferred cities, with integrated urban transport planning using inter-modal connectivity and convenient sky-walks, which will mark the beginning of an era of seamless commuting in India.

#### L&T Metro Rail

Larsen and Toubro Limited was awarded the Hyderabad Metro Rail Project by Government of Andhra Pradesh. L&T incorporated a Special Purpose Vehicle - L&T Metro Rail (Hyderabad) Limited ("The Company") to implement the Project on Design, Built, Finance Operate and Transfer (DBFOT) basis. The Company signed the Concession Agreement with Government of Andhra Pradesh on 4th September, 2010 and completed the financial closure for the Project

on 1st March, 2011 in record six months. A consortium of 10 banks led by the State Bank of India has sanctioned the entire debt requirement of the project. This is the largest fund tie-up in India for a non-power infrastructure Public Private Partnership (PPP) project.

The Company has inducted world class consultants for the execution of this prestigious Metro Rail Project. Some of the renowned consultants are Louis Berger, AECOM Feedback Ventures Consortium, Parsons Brinckerhoff, Halcrow, E&Y etc. The company will develop 18.5 million s.ft. of Transit-Oriented Development (TOD) and is expected to trigger robust economic activity in and around the city of Hyderabad and will generate substantial employment.

#### Metro Development Plan

Comprising three high density corridors, Metro Rail Network will cover a total distance of around 72 km comprising ultra-modern station buildings. This prominent and the largest Metro Project in PPP will have three elevated corridors interlacing the city of Hyderabad having metro stations en route in a distance of 1 km approximately.

Such hi-tech and environment friendly stations would be equipped with escalators, lifts and staircase for the convenience of the passengers. The Metro Rail Network will pass through the principal roads of Hyderabad which connects major bus hubs, residential and commercial spots. The metro would be connected to currently running MMTS services at Bharatnagar, Begumpet, Malakpet and Falaknuma along with cardinal train terminals at Secunderabad, Nampally and Begumpet. The bus depots that would be interlinked

include Miyapur, MGBS, Koti, Dilshuknagar, Charminar and Jubilee Bus Station.

#### Project Highlights

- Elevated world-class station buildings at approximately every kilometre.
- Connects major offices, retail and residential areas - The two tracks (up and down lines) pass through the arterial roads of the city.
- Connects major bus stations at Miyapur, MGBS, Koti, Dilsukhnagar, Charminar and Jubilee Bus Station.
- Integration with existing rail terminals at Secunderabad, Begumpet and Nampally.
- Link to MMTS services at Bharatnagar, Begumpet, Khairatabad, Malakpet & Falaknuma.
- Feeder bus services to stations from different areas of the city is being planned by GoAP.
- Green & Eco-friendly mode of travel - reduces carbon emission, fuel consumption and pollution.
- Faster, safer and comfortable air-conditioned travel with reduced travel time.
- Ultra-modern coaches.
- High frequency of trains reducing waiting time.
- User-friendly stations with lifts, staircases and facilities for the disabled.
- Parking facility at strategic locations along the route at the designated areas provided by the GoAP.
- Automatic ticket vending machines reducing waiting time in queues.
- Automatic fare collection system - hassle free entry and exit from the stations.
- Essential facilities at stations - toilets, public address and information system, telephones.

## Stations – Corridor II:

JBS	Parade Grounds	Secunderabad
Gandhi Hospital	Musheerabad	RTC Cross Roads
Chikkadpally	Narayanguda	Sultan Bazar
MG Bus Station	Salarjung Museum	Charminar
Shalibanda	Shamsher Gunj	Jungametta
Assembly	Nampally	Gandhi Bhavan
Falaknuma		



### Station Concept

The Stations being windows to the metro service are tastefully designed reflecting local culture and flavour, functional aesthetics, user friendly, energy efficient and with a station architecture that is site specific and environmentally compatible. The design identifies significant architectural features which should be taken into account. Along with a responsive design stations offer various facilities for the passengers. Stations will be covered by an overlapping roofing system, open at sides, covering the platform, staircases & escalators designed based on architectural elements and functional aspects.

Hyderabad Metro Rail (HMR) and L&T Metro Rail Hyderabad have finalized 'cantilever' station designs for the elevated project coming up across three corridors. This design prepared by the L&T structural engineers and being attempted for the first time in the country, with pillars in the middle and none on the side, will be the same for 63 of the 66 overhead stations. Designs will be different for three joint stations of Ameerpet (corridor one & three), Parade Grounds (corridor two & three) and Mahatma Gandhi Bus Station-Imliban (corridors one & two).

The cantilever stations of 140 metres length and 20 metres (65 ft) wide will be resting on 10 reinforced central pillars leaving the road below open. They can also accommodate six coach trains. Depending upon the road widths, connecting staircases, lifts and escalators landing on both sides of the road will be built.

With such landing facilities, an average station's width will be 30 metres (100 ft) and wherever the road width is more, the station's width can also be 36 metres wide (120 ft), 45 metres (150 ft) and 60 metres (200 ft) as no further land acquisitions will be done.

Stations will have two levels. Passenger entry and exit facilities with staircases, lifts, escalators will start from the road to the first level or the concourse which will be at eight metres height (26 ft). Passengers with smart cards or after buying tickets at the counters will have to enter the paid area through the 'Automatic Fare Collection' (AFC) gates and then on to the platforms or second levels at 12 metres height (40 ft) through lifts, escalators, staircases to board the trains.

### Eco-Friendly

All the stations will be eco-friendly with light roofing, natural ventilation and hence, minimum power usage. Foolproof security features will be incorporated in the station design with the approval of various security wings of Union Ministry of Home Affairs like access controlled passenger entry with baggage checking arrangements, CCTV cameras and other surveillance equipment similar to an airport.

Latest fire protection and fire detection systems will also be provided. Separate bays for autos and buses, footpaths and parking space for cars and two-wheelers are other station features. As desired by Chief Minister N. Kiran Kumar Reddy, pedestrian facilities like sky-walks below

the viaduct and street furniture at the ground level will be provided separately by HMR.

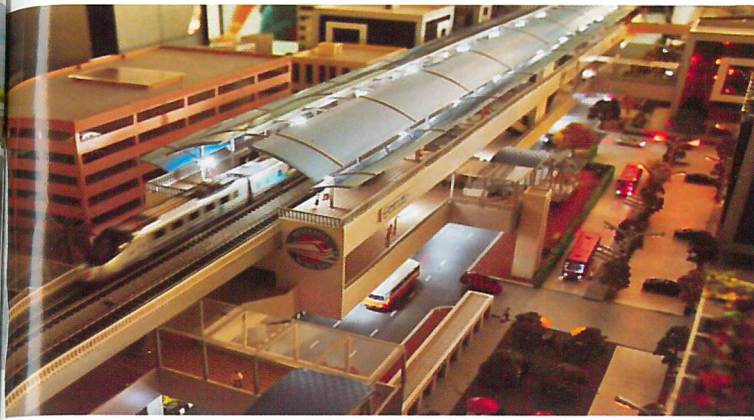
### Technical Influence

The layout of the stations is influenced by the track geometry, operational requirements, predicted passenger flows, ROW availability and electrical & mechanical requirements. The station is divided into public & non-public areas (areas where access is restricted). Architectural planning, also indicates, State of art, Railway engineering equipment's installations at station concourse level for smooth Metro Rail operations and Passenger Safety. Station Manager is located at convenient place with ease of access, if any passenger desire instant helps.

### Rolling Stock Features

Metros around the world are there to give comfort to the commuter and at a price which is easy on the pocket. India's millions and the especially the denizens of Hyderabad will be in for this experience in a few years from today. The specification for standard gauge rolling stock is based on light weight stainless steel/Aluminum-bodied three-car formations, having a trailer car between two motored driving cars. Internal wide gangways will provide ease of passenger movement and assist load distribution. Trains will be air-conditioned throughout with designated space for differently abled persons. LCD screen type route map indicators over all the doors and LCD TVs at suitable locations inside cars shall be provided for infotainment. Safety of commuter and operations is paramount for us





**Stations – Corridor III:**

Nagole	Uppal	Survey of India
NGRI	Habsiguda	Tarnaka
Mettuguda	Secunderabad	Parade Grounds
Paradise	Rasool Pura	Prakash Nagar
Begumpet	Ameerpet	Madhura Nagar
Yusuf Guda	Road No 5 Jubilee Hills	Jubilee Hills Check Post
Pedamma Temple	Madhapur	Durgam Chervu
HITEC City	Shilparamam	

and the trains will have foolproof safety features and on-board fire & smoke detection as well.

Total 171 cars for 57 Trains will be procured for the first phase of the project. Although with many automated functions, the ATO enabled trains will be under driver control. Having all salient features which will add to the comfort and safety of the commuter, it is aesthetics combined with comfort and safety which will win the metro-user and make them addicted. Hyundai Rotem (Korea), were chosen based not only on latest technology and price but also on cost of maintenance, service and availability of spares.

**Depots**

Hyderabad Metro Rail has planned three maintenance facilities (train depots) for stabling and maintenance of trains, rail systems and engineering maintenance vehicles. Each line has a supporting depot where all the trains of that line shall be stabled in night. These maintenance depots are manned round the clock and are equipped with all facilities and resources required for efficient and effective maintenance of rail system assets. The three depots planned in 72 km rail network of Hyderabad Metro Rail are located at:

- Miyapur for Corridor 1 (Miyapur –LB Nagar)
- Falaknuma for Corridor 2 (JBS – Falaknuma)
- Uppal for Corridor 3 (Shilparamam – Nagole)

The Uppal depot is the main depot cum workshop where the overhaul and corrective maintenance facilities for whole fleet are planned. The other two depots have basic facilities for scheduled preventive maintenance and minor corrective maintenance.

**A Global Look**

Metro Rail station design features have been broadly finalized by the L&T Metro Rail Hyderabad Ltd, with approval of the HMR authorities. Foolproof security features will be incorporated in the station design after the approval from various security wings under the Ministry of Home Affairs. The main security features include access- controlled passenger entry, baggage checking system, installation of CCTV cameras and other surveillance equipment, resembling the airport security arrangements. The stations will also be provided with fire protection and detection system.

The station design will also include footpaths, separate bus-ways, auto-ways and car and two-wheeler parking areas. Special pedestrian facilities, including sky-walks below the viaduct and street furniture at the ground level, will give Hyderabad a global city look. There will be 66 stations at 63 locations. Except three joint stations at Ameerpet (corridors I & III), Parade Grounds (corridors II & III) and MGBS (corridors I & II), other stations will be built as cantilever stations, perched on one pillar in the middle only with no side-pillars. The cantilever elevated station design is a rare engineering feat achieved by the L&T structural engineers and will be used first time in India.

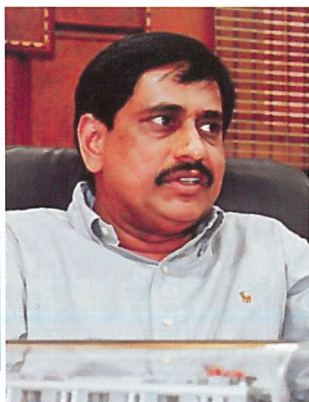
Each Metro station, 140 mtrs long and 20 mtrs (65 feet) wide, is designed to accommodate 6-car (coach) trains. With the entire station resting on around 10 central pillars without any pillars on the sides, the road below will appear open. Depending on the road widths as per the Master Plan, the connecting steel staircases, lifts and escalators will land on both sides of the road.

To avoid additional land acquisition for stations, they will be designed in four categories: 30 mtr (100 ft), 36 mtr (120 ft), 45 mtr (150 ft) and 60 mtr (200 ft) category stations. The stations will be divided into two levels namely ‘concourse level’ and ‘platform level’. Passengers’ entry and exit facilities with staircases, escalators and lifts will begin at concourse level, about 8 mtrs (26 feet) height.

The concourse level, further, will have ‘paid’ and ‘unpaid’ areas. Passengers after buying tickets will enter the paid area through automatic fare collection (AFC) gates. After it, they will reach the platform level, at about 12 meters height, to board the train. The stations are being designed to keep the environment cool naturally.

The stage-I pillar construction works between Nagole and Mettuguda are going on at a brisk pace. 94 pillar foundations have been excavated, 83 foundations, and 38 pillars have been completed so far, besides casting of 111 viaduct segments.

The Hyderabad Metro Rail station design and related features have been finalized with heavy security built into the system. ■



**N.V.S. Reddy, Managing Director, Hyderabad Metro Rail**

“ The Hyderabad Metro Rail station design and related features have been finalized with heavy security built into the system. The cantilever elevated station design for Hyderabad Metro is being carried out for the first time in India, and is a rare engineering feat executed by L&T structural engineers

