

METRO  
CUBE

ADDING NEW DIMENSIONS



## MD SPEAKS

Ms. Ashwini Bhide, IAS

The month witnessed heavy rainfall as expected and being the first monsoon of the Metro-3 execution, we insisted the contractors to ensure minimum impact on traffic movement and public in the vicinity of construction site with assistance from Mumbai Traffic Police. The contractors have begun to implement traffic diversion plans as per Traffic Police approval.

Three system tenders (Package 11A & 11B of Power Supply and Traction, Package 15 of TVS-ECS) which were scheduled to receive this month are postponed to August, due to anticipated impacts of GST.

Invitation for bid was issued to 5 pre-qualified bidders for STPT (signalling & train control, platform screen doors and telecommunication) on 21st July. The contract for depot civil work is finally awarded to M/s. Sam (India) Builtwell Pvt. Ltd. who has also constructed metro depots in Delhi and Lucknow previously. The work is expected to start shortly.

The statutory audit for financial year 2016-17 is completed and approved by the board.

Our request for JICA second tranche loan has been recommended by MoUD to Department of Economic Affairs and DEA has included it in JICA rolling plan for the financial year. JICA is expected to start their processes for second tranche with fact finding/appraisal mission. MMRC and JICA have agreed to conclude the process of signing loan agreement before the end of the financial year.

We are happy to share that MMRC has received satisfactory observations from the High Court committee appointed to oversee tree transplantation and undertaking given.

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## TBM FAT UGC - 05

Metro-3 project's first Tunnel Boring Machine (TBM) had undergone Factory Acceptance Test (FAT) last month. This month, two other TBMs located in Delhi have been put through the same vigorous test procedure, with approval being granted by MMRC for their delivery to Mumbai by early September 2017.

The two TBMs were manufactured by Terratec Ltd., a world renowned Australian manufacturer of TBMs. The FAT which involved over 70 mechanical inspections and 40 functional tests was witnessed by representatives of MMRC, GC, contractor and supplier. Functional testing of TBM involves putting the machine through a series of representative tests that simulate the operation in tunnelling conditions.

The Terratec TBMs will be used to construct the tunnel between BKC - Dharavi - Vidyanagari Stations, a total distance of approximately 5km.

### Measurements of TBM

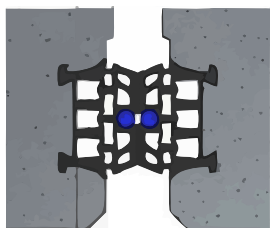
- Diameter - 6.61m
- Total length - 72m
- Total weight - 579 tonnes
- Cutter head weight - 53 tonnes
- Number of cutting teeth - 80
- Excavation rate - 1.5m per hour
- Power consumption - 900kw.
- Total length of cables - 5km
- Total length of hydraulic hose - 3km



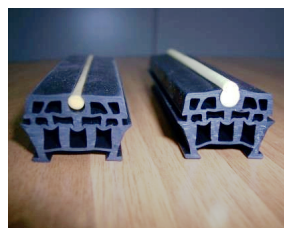
Rear view of TBM with support gantries

## EPDM GASKETS FOR TUNNEL LINING

EPDM (ethylene propylene diene monomer (M-class rubber)) gaskets serve a very important purpose of maintaining the tunnel free from the ingress of water and prevention of water affecting the operation of systems or any related electrical equipments. As EPDM gaskets need to perform this task throughout the life span of the metro (for Metro-3 is 120 years), testing of the gaskets and ensuring quality assurance in the manufacturing process is crucial for the successful operation of the metro.



Hydrophilic EPDM sealing gasket gives a "double-insurance" sealing to the concrete segment. Once EPDM gasket is leaked, hydrophilic rubber strip will slowly expand by swelling water to prevent water in, playing a second waterproof role.



EPDM gaskets installed in the tunnel segments produce a peripheral watertight seal around the complete tunnel.

Sources: [www.famaspa.it](http://www.famaspa.it) ; [www.epdmrubberseal.com](http://www.epdmrubberseal.com)

## MD SPEAKS

*Continued from page 1*

We have finalised appointment of consultant GDS Architects for detailed architectural design and PMC for the redevelopment buildings at Girgaon - Kalbadevi, through e-tendering process. MMRC and GC are jointly pursuing with MHADA for the required NOCs for the redevelopment buildings and confirmation of authorised tenants.

MMRDA has offered R&R colonies for compensatory tree plantation and transplantation. We have initiated tree plantation work at these locations with an intention to create shaded community spaces and children's play areas for these R&R colonies.

This month's review and detailed site visit to the seven packages and alignment with a view to jump start construction activities at all work fronts and timely mobilisation of TBMs was fruitful and the contractors, general consultants and MMRC officials are now fully geared to utilise the next working season effectively and if possible recover some of the time lost due to court cases. I am confident that the TBMs will start arriving by next month and that will elevate project implementation process.

MMRC addressed the senior members of editorial teams of major print media to give them larger picture of the project, also to understand the complexity and challenges involved and seek media cooperation in all possible ways. This will be continued as part of our Information outreach process and with wider cross section of Media.

## TREE TRANSPLANTATION

Tree transplantation of tree no.124 at Siddhivinayak was arranged on 15th June 2017 as a demonstration of best international practices to all concerned CJV, GC, MMRC and sub-contractor staff. Mr. Richard Thomas (GC Tree Consultant) along with his team led the execution of the task.

### STEP 1 Site Preparation:

The preparatory stage of tree transplantation involve creating a tree protection zone and propping the tree with GI pipes for additional support. This secures the tree from falling during excavation and restricts movement/disturbances around tree that can compromise the structural integrity. A root-ball diameter is established to guide the excavation.

### STEP 2 Excavation:

After determining the required root-ball diameter, excavation around the tree is done using manual labour. Large structural roots are cut using equipments like pruning shear or chain saw, followed by immediate application of rooting hormone (growth stimulant) on fresh cuts. The depth of excavation is determined by the presence of large structural roots under the soil. Final root-ball (the mass formed by the roots of a plant and the soil surrounding them) shaping and digging is done manually before packing and lifting.

### STEP 3 Root-ball Packing:

Before lifting and transporting the tree, its root-ball should be packed firmly to minimise damage to roots and its structural integrity during transit. Tools like web-slings, bow-shackles, ratchet strap assembly, ropes, plastic wrap and green shade net are used in this process.

### STEP 4 Lifting & Transportation:

The tree is securely packed using ratchet assembly and web-slings are installed around the root-ball to distribute the weight evenly and to avoid any injuries or damage to the trunk. After packing root-ball and preparing tree for lifting, the tree is transported to the new location with the help of crawler cranes.

### STEP 5 Planting:

At the receiving site, the tree is placed into the pit (about 1.5 times the root-ball size) maintaining original soil level of the root-ball. The tree is secured into position using external support of GI pipes as anchors and is watered sufficiently.

During the demonstration, the contractors were instructed to undertake tip pruning in about 10% of the lower branches to encourage new growth in the coming season.

### Details of the tree transplanted during the demonstration:

Name - Asupalav (Polyalthia longifolia)

Approximate girth - 2 feet

Approximate height - 20 feet

Total trees to be transplanted along the 26 stations of Metro-3 is approximately 1727 out of which so far 536 trees have already been transplanted. Each package contractor has appointed their own tree experts/sub-contractors to carry out this task with proficient and scientific approach. Various locations where the trees are being transplanted as of now are Aarey Colony, Juhu Wireless Station Compound (AAI) and some pockets identified around the station areas.



Root-ball excavation



Packing of root-ball



Packed root-ball



Tree Transportation



Tree planted at receiving site



KNOW YOUR STATION - MUMBAI CENTRAL



Forecourt of Mumbai Central Railway Station



Bellasis Bridge



View of Station from Bellasis Bridge



1. Maratha Mandir
2. Maratha Mandir's Babasaheb Gawde Institute Of Technology
3. Reserve Bank of India
4. MSRTC Intercity Bus Depot
5. Imperial Towers
6. Tardeo RTO
7. National Museum of Indian Cinema
8. Jaslok Hospital
9. Breach Candy Hospital
10. B.D Petit Parsee Hospital
11. Sophia Centre for Women's Studies and Development
12. Shree Mahalakshmi Temple
13. Industrial Training Institute
14. Nair Hospital
15. Wockhardt Hospital
16. BEST Bus Depot
17. Russian Centre for Science & Culture
18. Consulate General of Indonesia
19. Consulate General of Italy
20. Central Drugs Standard Control Organization
21. Consulate General of Japan

Mumbai Central suburban station, earlier known as Bellasis Road station was established in 1930 to function in the Western Suburban Railway catering local and inter-city trains.

The station is actually located in Tardeo, however after the establishment of Mumbai Central railway station, this area came to be known as Mumbai Central, by the name of the station.

The first mill in Mumbai, The Bombay Spinning and Weaving Company was set up in Tardeo in 1856, followed by mushrooming of multiple mills around this area which then was an important commercial and industrial activity in Mumbai generating employment for thousands of immigrants. This also led to establishment of miscellany of community including Parsis, Muslims, Gujarathis and local Maharashtrians.

Presently the area around Mumbai Central is going through rapid redevelopment of old housing as well as mill lands which is visible through high rise towers such as The Imperial Twin Towers popping up in the locality.

The new development also brings in destinations for hotels, corporate offices and business centres which very well justifies the demand for mass transit for accessibility to these destinations.

Towards the western edge is Cumballa Hill, an opulent district housing several High Commissions and Consulates.

Mumbai Central Metro station is located adjacent to the suburban station and will cater to all of these important users.

The metro station will serve as an interchange between MSRTC bus service, western railway line and metro.

Map Source: www.loginmumbai.org

## EXPERT SPEAKS

*Mr. Sudhir Badami, a civil engineer from IIT Bombay and transportation analyst, was on GoM's Steering Committee and MMRDA's Technical Advisory Committee on BRTS for Mumbai. He was also a member of erstwhile Research & MIS Committee of Unified Mumbai Metropolitan Transport Authority (UMMTA). He was member of Bombay High Court appointed erstwhile Road Monitoring Committee (2006-07).*



*Presently, he is a member of the committee appointed by the High Court to enable railways accessible for persons with disabilities. He is a prolific communicator through his writings, talks, presentations, social media with strong web presence.*

*This article is an excerpt of his original article 'The Tussle over Mumbai's Development Plan' published on [www.moneylife.in](http://www.moneylife.in) on 10th March 2017, which presents a strong view on the development and nurturing green zones in Mumbai. The excerpt particularly gives a different insight about the Aarey Land, its history and role in Mumbai's ecology and how the Metro-3 car depot and proposed station can actually benefit the environment around Aarey with enhanced public accessibility.*

The revised Development Plan for MCGM was presented to the Corporation on 6<sup>th</sup> March 2017. A viewpoint on the provisions of development plan for the Aarey area is presented in this article. Prima facie all does not seem to be lost, especially in connection with Aarey area, but a campaign seems to be brewing to oppose the placing of Metro-3 car shed at Aarey.

Mumbai hitherto had areas, where normal development could take place, and the Non-Development Zone (NDZ) areas which are now been re-categorised as Special Development (SDZ) Zone I and Zone II, paving the way for development of what was earlier NDZ.



*The Aarey colony shares its borders with the Sanjay Gandhi National Park. Traveling on these internal Aarey roads does give an impression that one is in a forest, but a satellite image of the area tells us the true situation.*

The Ministry of Environment, Forests and Climate Change (MoEFCC) expressed no objections to development of salt pans and marshy lands, thus releasing lands for affordable housing and public amenities.

However, to preserve "the only lung space" of the city, the revised DP has identified the hitherto NDZ of Aarey area into the now designated green area. Approximate breakup of the 930Ha of Aarey area is - 30Ha for Metro-3 car shed, 113Ha for zoo-cum-botanical garden and 787Ha as green. The Metro-3 Car shed of 30Ha occupies the edge of the Aarey area, adjacent to Jogeshwari Vikhroli Link Road, just after the SEEPZ flyover.

Thankfully, MMRC has proposed a railway station too in the Aarey area, allowing access to zoo-cum-botanical garden and the other green space easily.

There are various views among some NGOs and individual activists who concentrate their attention on environment and ecology. While what they do is laudable, they also unfortunately equate short-term loss with long-term loss and create public opinion detrimental to the majority.

In the early developmental years of Greater Bombay, Aarey was developed mainly as a milk colony, where fodder was grown to feed the dairy animals. With no record of water shortage, fodder development and milk supply was an assured activity.

It needs to be understood that while large lands cultivated fodder, only access roads or pathways had trees. Thus, the Aarey area was never a forest per say. Of course, that does not mean that trees be chopped in Aarey area indiscriminately, which the plan does not.

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Surroundings of IIT Bombay, year 1958

Source : [www.phy.iitb.ac.in](http://www.phy.iitb.ac.in)

Recent view of the IIT Bombay campus

Source : [www.ir.iitb.ac.in](http://www.ir.iitb.ac.in)

## SHIFTING OF PYLONS IN AAREY YARD

Metro-3 car depot is located at Aarey and Reliance Infra substation is located in the close vicinity of the depot site. One of the challenges involved in depot construction is that, four (04) EHV pylons of incoming two 220kV transmission lines are infringing with the proposed depot area where multiple yard tracks are to be finally laid. These tracks will be electrified on 25kV traction system. In such circumstances it becomes obligatory either to modify the pylons to obtain required vertical electrical clearances or to relocate the pylons.

Raising height vertically was not found technically feasible solution as the transmission lines are terminating in substation and need minimum termination angle. Alternate option was to 'short terminate' the 220 kV incoming lines, have transition substation in advance, take 220 kV lines via high capacity underground cables up to Reliance substation and physically remove the infringing pylons to make space for track lines in depot.

As pylon shifting work is a pre-requisite for commissioning of car depot, MMRC team has finalized technical scheme using expertise of Interim Consultant in consultation with Reliance Infra. The finalized scheme will have small termination switch yard and double cable ducts to be laid up to Reliance substation for which minimum 7200 sqmt land will be required. Location of land parcel was identified to save maximum trees in the vicinity and allotment of land was obtained from State Government.

To fast track the above works, bids were simultaneously invited and are scheduled for opening on 28th July 2017. Scope of work entails broadly as "Dismantling and removal of 04 nos of 220kV pylons & modifying the transmission lines of R-Infra 220kV Borivali -Aarey (Double circuit) and 220kV & 33kV Versova/Goregaon- Aarey (Multi circuit) to underground EHV cable system with termination arrangement at switch yard located outside the depot boundary".

With the dedicated team of MMRC and GC, it is aimed to complete this challenging task in 14 months.

## EXPERT SPEAKS

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Example of IIT Bombay can make this case relevant. IIT Bombay was founded in 1959 on near barren land between Powai and Vihar Lakes and the current JVLR. The formal tree plantation activity started in the early 1970s. By 1995, there was considerable growth of trees and some kind of forest evolved and continues to exist in 2017, despite a three to four-fold increase in human population within the campus.

It would be wrong to say that there is no bio-diversity. There is plenty of variety of flora and fauna in the campus of about 450 acres. This happened because of an institution coming there allowed growth of nature in the campus and ensured that the greenery was well maintained.

There is no need for citizens/activists to feel that the 787Ha of land in the Aarey area, designated to remain green, will be grabbed by land sharks and Mumbai will be denied its "only breathing space" that can double up for recreational activities for Mumbai residents. In the present state, while the Aarey area has some trees and plenty of fodder cultivation, it is being used as recreational area in a very limited way. One of the reasons for its limited use as a recreation area is that it is not easily accessible from different parts of Mumbai.

With the development of the zoo-cum botanical-garden in the Aarey area, easy access to it by Metro-3 and with proper public transport, more people would be able to benefit out of this "new enhanced lung space."

Reach Sudhir Badami at  
[sudhirbadami@gmail.com](mailto:sudhirbadami@gmail.com)



## MD REVIEWS THE WORK OF METRO-3

MD, MMRC, Ms. Ashwini Bhide visited the entire alignment to review civil work under progress in Metro-3 alignment. The work on the casting yards at all seven packages is in full swing and work at stations has also picked up. The launching shafts for the Tunnel Boring Machines (TBMs) in Naya Nagar, Azad Maidan and Pali Ground are in advanced stage of completion.

Ms. Bhide said, "the progress of the work have been satisfactory and is expected to be completed by 2021. We at MMRC, are taking all the necessary measures for the timely completion of the project."

TBMs are expected to begin the tunneling work from October 2017, with the first TBM being launched from the launching shaft at Naya Nagar. The entire Metro-3 project is divided into two phases with Phase I - Aarey to BKC line expected to be completed by September 2020 and Phase II - BKC to Colaba line expected to be completed by March 2021.



MD, MMRC, Ms. Ashwini Bhide welcoming Secretary – Ministry of Housing & Urban Affairs and new Chairman of Board of Directors Mr. Durga Shanker Mishra, IAS

### MMRC Control Room

Contact us @ 8291751545 to report monsoon related grievances pertaining to Metro-3 construction work.

## CONTRIBUTIONS:

### Articles

Ramesh Sharma  
John Celentano  
Vaidehi More  
Vaibhav Rajee

### Editing and Graphics

Pallavi Kulkarni  
Neethu Mathew

## MMRC AWARDS DEPOT CIVIL WORK CONTRACT

MMRC has awarded its final civil works contract to Delhi based construction company M/s. Sam (India) Builtwell Pvt. Ltd. for construction of Metro car depot at Aarey Colony. The tenders for construction of depot, metro station, work workshop buildings and vehicular underpass along the Marol – Moroshi road and allied works was invited in January 2017.

The car depot is designed for 35 rakes of 8 car trains within 25 ha area. The awarded cost of work is Rs. 328 Crores. M/s. Sam (India) Builtwell has previous experience of construction of such depot for Delhi Metro and Lucknow Metro.

The scope of the contract includes preparatory earthwork and development of depot area, tree cutting/transplantation, 2.0 km long RCC boundary wall, 2.5 km storm water drains, diversion of 1100 m MCGM water mains, rain water harvesting system, effluent system plant, sewage treatment plant, train maintenance shed and vehicular underpass. Key facilities such as Operational Control Centre, Administration & Training School and depot station would also be constructed in this contract. Separate system contract will be awarded for track works, under floor wheel lathe and wash plant, depot auxiliary substation and other miscellaneous systems that will also be provided in depot area. The civil work for the car depot is expected to be completed in two and half years of commencement.

### Connect With Us

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 Mumbai Metro Rail Corporation, MMRC

[www.mmrcl.com](http://www.mmrcl.com)

### Mumbai Metro Rail Corporation

NaMTTRI Building,  
Plot No. R-13, 'E'- Block,  
Bandra Kurla Complex, Bandra (E),  
Mumbai 400051.



Website Link

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