

# TERRATEC DELIVERS A NEW ROCK EPB TBM FOR MUMBAI SEWAGE DISPOSAL PROJECT



*TERRATEC delivers 3.14m diameter Rock EPB TBM for Mumbai Sewage Disposal Project-Stage II, PST-2 in India.*

**T**ERRATEC is pleased to announce the delivery of a 3.14m Rock EPB Tunnel Boring Machine for the Mumbai Sewer Disposal Project (MSDP) Stage-II – PST2 in Mumbai, India by J Kumar and Michigan Engineers Private Ltd. (MEPL) Joint Venture for client Brihanmumbai Municipal Corporation (BMC).

For the Mumbai sewerage segmental tunnels, TERRATEC has secured all required machines, including the two Tunnel Boring Machines (TBMs) for the project (packages PST-1 & PST-2). These TBMs consist of

a Rock Slurry TBM and a Rock EPB TBM, designated for the construction of the 5.8-kilometer Mumbai Priority Sewer Tunnel (PST-1) and the 4.7-kilometer Priority Sewer Tunnel (PST-2), respectively.

The Mumbai Sewer Disposal Project plays a crucial role in enhancing the quality and reliability of wastewater collection, treatment, and disposal processes, with a focus on minimising the environmental impact associated with wastewater. This initiative emphasises

efficient and sustainable wastewater management to create a healthier and improved environment for the residents of Mumbai.

TERRATEC 3.14m Rock EPB Tunnel Boring Machine is designed to operate under various geological conditions, including silty sand, silty clay, boulders, breccia, basalt, clay with gravel and thylolite. The TBM features mixed type cutterhead, 27 back-loading disc cutters of 17", a high-speed main drive capable of 8 revolutions

per minute, and an active articulation system that can handle a minimum curve radius of 95m.

TERRATEC Rock EPB TBM has been designed to work with a 4+1 universal segment design, utilizing reinforced concrete segments of different lengths (1000mm and 650mm), to navigate sharp curves in complex geological conditions effectively. This adaptability allows the machine to avoid obstacles, follow specific routes, and accommodate existing structures above ground, ensuring precise and efficient tunnel construction. The TBM is equipped with a Single Track Gantry Type backup system with 17 decks and a total length of 122m, with muck removal, segment transport,

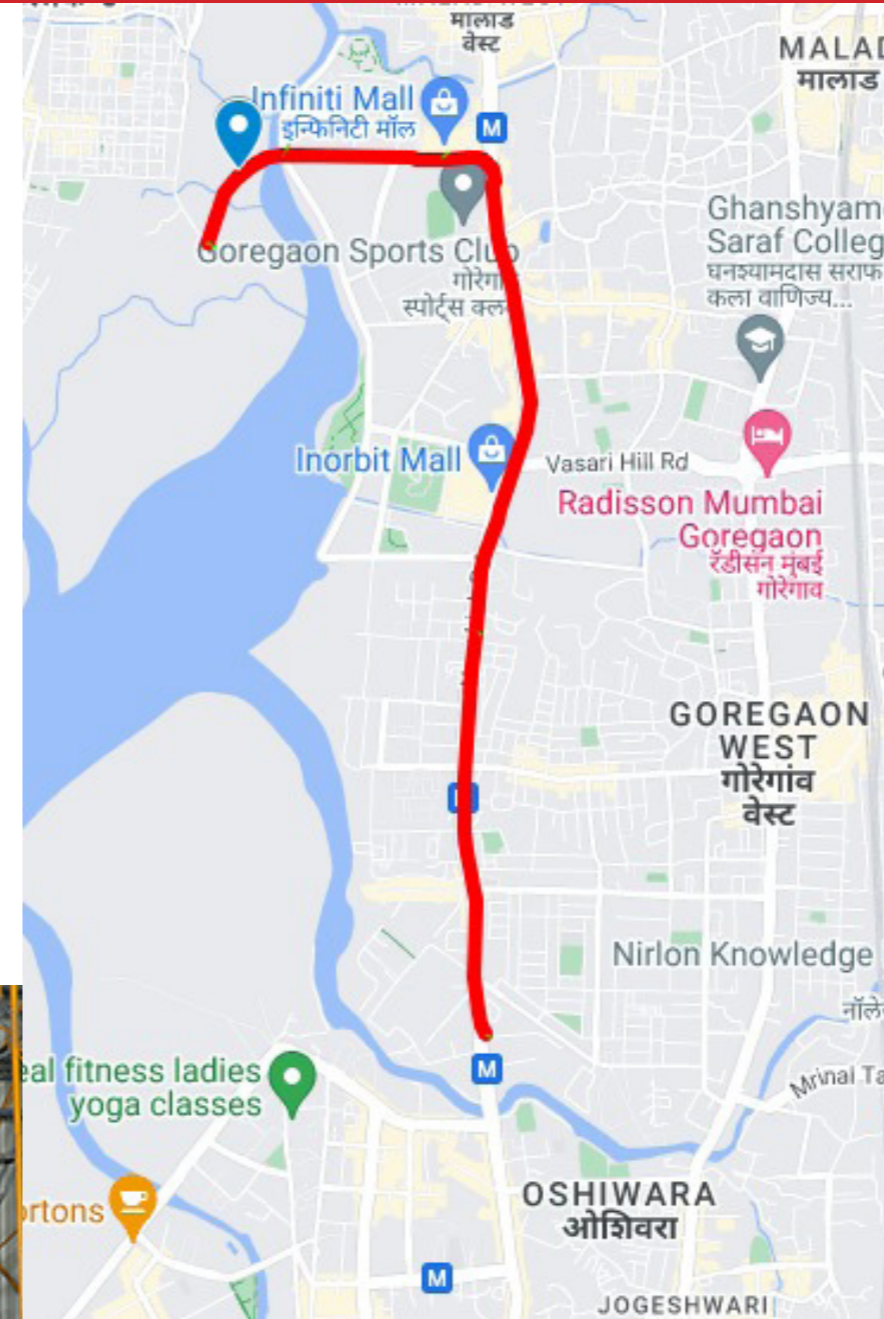
and logistics supply managed via locomotive and muck cars.

Facing significant challenges related to the project's alignment, such as manoeuvring through a 90-degree road intersection and working around piles supporting an overhead metro line, the TBM has been specifically engineered to function within an exceptionally wide horizontal radius. This modification has eliminated the need to excavate a shaft at the congested intersection, resulting in time and cost savings while preventing significant traffic disruptions during construction. This innovative approach, being introduced for the first time in India, includes utilizing different segment ring lengths (1000mm and 650mm) to enable the TBM

to navigate sharp curves with a radius of up to 95m.

In a related development, the 3.85m Diameter Rock Slurry Tunnel Boring Machine (TBM) by TERRATEC was successfully deployed in the Mumbai Sewer Disposal Project (MSDP) Stage-II – PST1 in February and a refurbished tunnel boring machine S80B, operated by the J Kumar Infraprojects – Michigan Engineers JV, achieved its second breakthrough at Mumbai's Kurla West neighbourhood for the 6.40 km Mithi River Quality Improvement Project's Package IV.

The MSDP – Stage II Priority Works project involves constructing a sewer tunnel along Link Road to connect



Don Bosco Junction to the existing Malad Pumping Station, among other connections and shaft constructions. This initiative aims to reduce wastewater flow into existing collector sewers, decommission pumping stations, expand sewage collection networks, construct new pumping stations, establish wastewater treatment facilities, and implement treated effluent disposal systems. The treatment plants are expected to recycle an impressive 2,464 million liters of sewage per day, contributing to reduced water pollution levels and the restoration of Mumbai's Mithi and Oshiwara rivers.

TERRATEC has been chosen for the Mumbai Sewer Disposal Project Metro Rail Project due to TERRATEC's successful track record on projects such as Phase III & IV of the Delhi Metro, Lucknow Metro, Pune Metro, Kanpur Metro, Ahmadabad Metro, Surat Metro and Mumbai Metro. This is a result of tailor-made robust TBM design, prompt onsite assistance, availability of TBM spares, and highly skilled specialised support throughout tunnelling operations.



## TERRATEC ROCK SLURRY TBM EXCELS IN MUMBAI SEWAGE DISPOSAL PROJECT

**T**ERRATEC proudly announces the successful deployment of its 3.85m Diameter Rock Slurry Tunnel Boring Machine (TBM) in the Mumbai Sewer Disposal Project (MSDP) Stage-II – PST1. Executed through J. Kumar-MEPL JV, the project is a significant stride in enhancing Mumbai’s sewage infrastructure, overseen by the Brihanmumbai Municipal Corporation (BMC).

TERRATEC has secured all machines for Mumbai’s sewerage segmental tunnels, providing two Tunnel Boring Machines (TBMs) for the

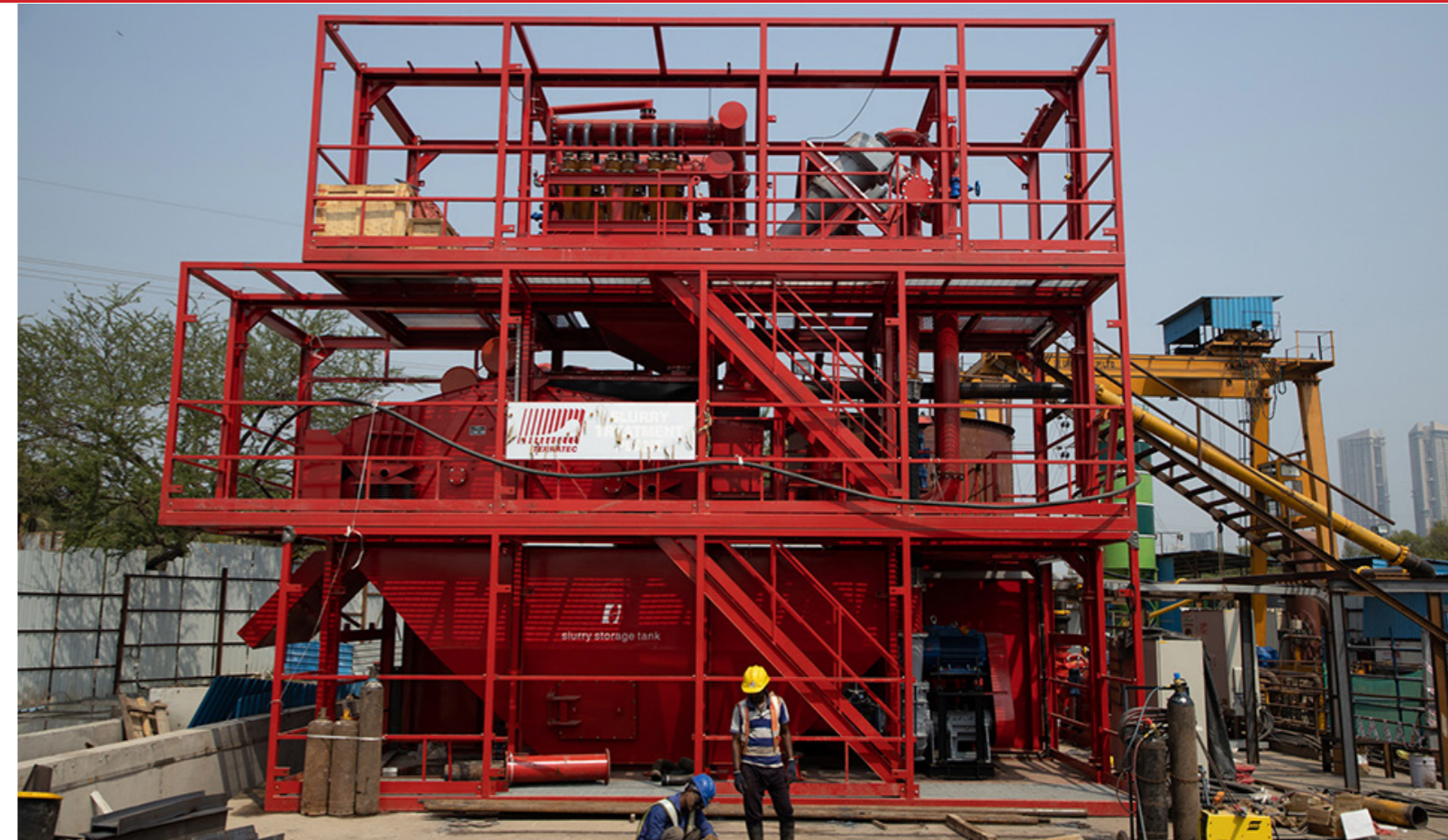
project (packages PST-1 & PST-2). These TBMs comprise a Rock Slurry TBM and a Rock EBP TBM, intended for the construction of the 5.8-kilometer Mumbai Priority Sewer Tunnel (PST-1) and the 4.7-kilometer Priority Sewer Tunnel (PST-2), respectively.

Commencing excavation after a successful Site Acceptance Test, TERRATEC 3.85m Diameter Rock Slurry Tunnel Boring Machine operates under diverse geological conditions, including weathered/fresh breccia and basalt. Starting its excavation from the Malad Shaft S07 Pumping Station in the Creek

area, the Rock Slurry TBM achieves a daily excavation rate of up to 14 rings when encountering fresh rock.

The Mumbai Sewer Disposal Project is pivotal for improving the quality and reliability of wastewater collection, treatment, and disposal processes. The endeavor minimizes the environmental impact associated with wastewater, emphasizing efficient and sustainable wastewater management for a healthier and enhanced environment for Mumbai’s residents.

*TERRATEC 3.85m diameter Rock Slurry TBM is making strides in Mumbai Sewage Disposal Project-Stage II, PST-1 in India.*



TERRATEC Rock Slurry TBM features a Slurry System controlling excavation face pressure, 23 number of 15” replaceable disc cutters, a high-speed main drive capable of 8 revolutions per minute, and an active articulation system accommodating a minimum curve radius of 250mR. The TBM’s hydraulic main drive, due to size constraints, includes a shield integrated man lock.

The TERRATEC Rock Slurry TBM employs a 5+1 universal type segment design, featuring reinforced concrete segments that are 200mm thick and 1200mm wide. To efficiently manage slurry removal and treatment, the TERRATEC Slurry Transportation System and Slurry Treatment Plant are

utilized.

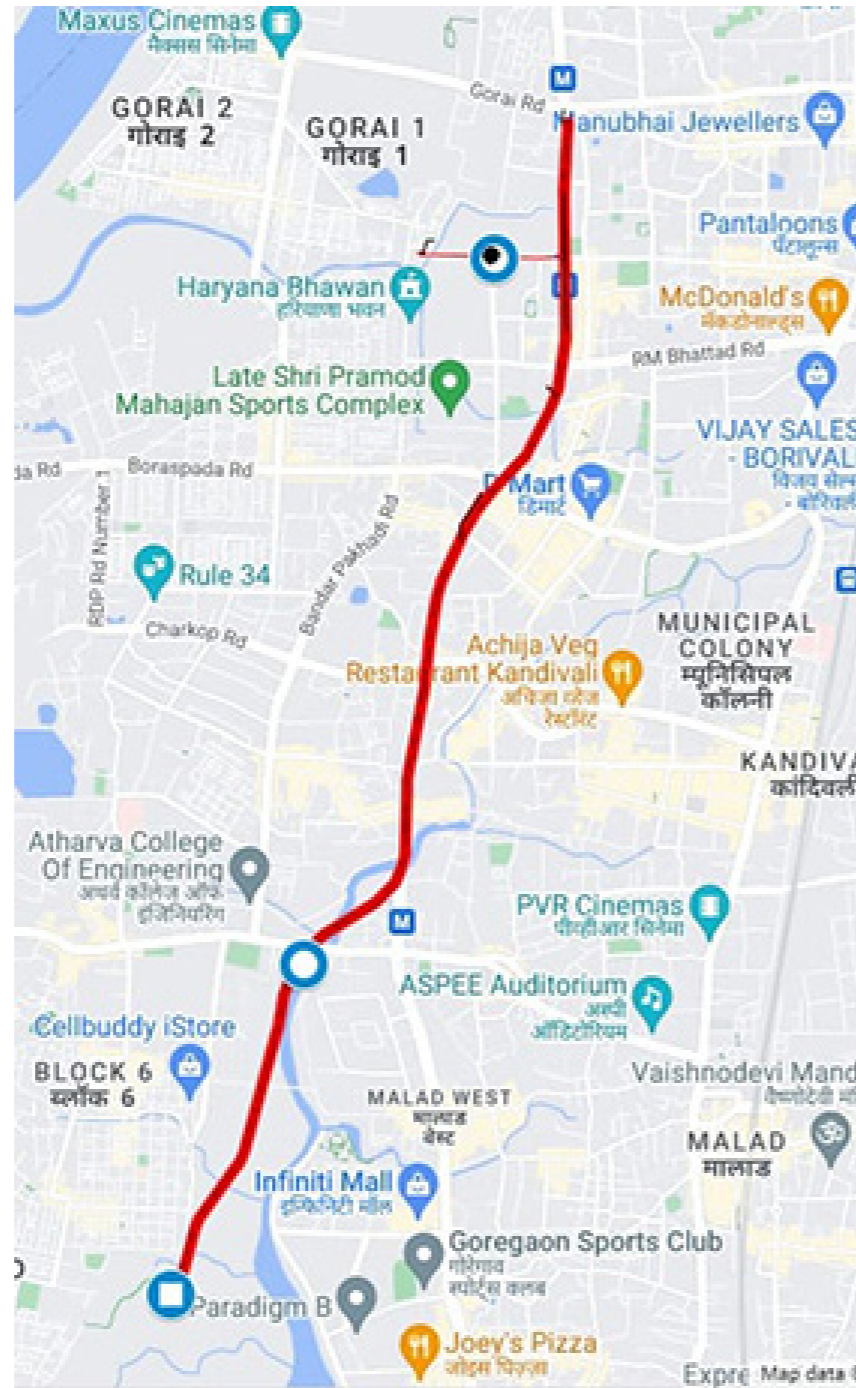
The system utilizes a Centrifugal Slurry Pump for effective slurry removal, while the Slurry Treatment Plant incorporates advanced mud treatment technology and a remote-control maintenance system. This combination ensures not only efficient excavation over long distances but also cost-effectiveness throughout the process.

The MSDP – Stage II Priority Works project includes a sewer tunnel along Link Road, connecting Don Bosco Junction to the existing Malad Pumping Station. Another branch sewer tunnel connects from the Gorai Pumping Station, and a tunnel runs from the existing

Malad Pumping Station to the proposed Malad IPS at Malad WwTF. This project involves constructing shafts and upstream connections to reduce wastewater flow into existing collector sewers and decommission pumping stations.

The comprehensive project expands sewage collection networks, constructs new pumping stations, establishes wastewater treatment facilities, and implements treated effluent disposal systems. These treatment plants are projected to recycle an impressive 2,464 million liters of sewage per day, reducing water pollution levels and rejuvenating Mumbai’s Mithi and Oshiwara rivers.

In another related development, the Mithi River Water Quality Improvement Tunnel project recently witnessed the successful deployment of the refurbished TERRATEC 3.14 EPB TBM. Previously utilized for the completion of the Mumbai Sewer Disposal Project (MSDP) Stage-II Priority Works, will achieve its second breakthrough in the first week of February under the joint venture of J Kumar Infraprojects and MEPL. The 3.14m EPB TBM demonstrated remarkable progress, with a monthly advancement of 370m, a commendable feat considering its size.



## TERRATEC HARD ROCK DOUBLE SHIELD TBM IS BELTING ALONG WITH ITS CONTINUOUS CONVEYOR ON THE VISHNUGAD-PIPALKOTI

TERRATEC is delighted to announce that the Ø9.86m Hard Rock Double Shield TBM has made significant progress for the Vishnugad-Pipalkoti Hydropower Project in India. The machine excavated an impressive 431 meters in January 2024.

TERRATEC Ø9.86m Hard Rock Double Shield TBM is the largest Double Shield Machine in the Indian Himalayan Region. The machine is presently working for Hindustan Construction

Co. Ltd. of India, the primary contractor for this project. Situated in the Uttarakhand state, approximately 500 kilometers northeast of Delhi, the project encompasses the construction of dams, waterway tunnels, vertical shafts, and a powerhouse boasting a generating capacity of 444 MW.

The Double Shield TBM has been specifically designed for the construction of a crucial low-pressure head race tunnel, integral to the hydroelectric power system. This TBM is

outfitted with customized features aimed at efficiently completing the 13km tunnel. The project entails the implementation of a run-of-river scheme, incorporating the construction of a diversion dam measuring 65 meters in height across the Alaknanda River, with power generation facilitated by a gross head of 237 meters.

The reservoir is slated to hold a gross storage capacity of 3.63 million cubic meters, of which 2.47 million cubic meters will serve as

TERRATEC's Hard Rock Double Shield TBM is making great progress for the Vishnugad-Pipalkoti Hydropower project.



live storage. A diversion cum spill tunnel, intake tunnels, underground sedimentation chambers, a headrace tunnel, a surge shaft, pressure shafts, and penstocks, along with two separate underground caverns for turbine and transformer installations, constitute the water conductor system.

The alignment for the Vishnugad-Pipalkoti Hydropower project primarily traverses Dolomitic Limestone (33%) and Slates (64%), with the remaining 3% passing through critical geological sections. These sections include Thrust Zones, Shear Zones, and Fault Zones, which pose significant challenges necessitating the TBM's specialized engineering.

Moreover, TERRATEC is providing the Continuously Advancing Tunnel Conveyor for the project. Designed to meet the specific demands of the project, the TERRATEC Continuously Advancing Conveyor will have a length of 13 km and operate at a rate of 1200t/h. The conveyor is capable of efficiently handling the various materials extracted by the Tunnel Boring Machine along the entire length of the tunnel. The conveyed materials are expected to vary from sandy gravel to boulders, showcasing the robust capabilities of TERRATEC's conveyors.

TERRATEC's unique and patented design of the Advancing Tail Piece levels

the Tunnel Conveyor using an active hydraulic system to match the steering/ rolling position of the TBM. This enables the smooth negotiation of any horizontal and vertical curves.

The TBM's CutterHead boasts 19" disc cutters and twelve large bucket openings, facilitating excavation through expected hard rock with its 4,200kW electric main drive delivering a torque exceeding 22,000kNm. As the TBM advances, universal reinforced concrete lining rings, 1,500mm wide and 350mm thick, are installed, each comprising five segments plus a key.

The addition of 444 MW capacity in the Northern region will



significantly alleviate peaking power shortages, with the project designed for 1657.09 MU energy generation. Notably, 13% of free power allocated to Uttarakhand will allocate 1% for local area development.

TERRATEC has been chosen for the tunnel package in Vishnugad-Pipalkoti Hydropower Project due to TERRATEC's track record, including successful projects like Phase III & IV of the Delhi Metro, Lucknow Metro, Pune Metro, Kanpur Metro, Ahmadabad Metro, and Mumbai Metro, attributed to its robust TBM design, onsite assistance, readily available TBM spares, and highly skilled specialized TBM support throughout tunnelling operations.

## WHEREABOUTS

Meet TERRATEC at WTC 2024!



**WTC 2024**  
April 22-24 | Shenzhen, CHINA

To subscribe to this newsletter, please contact:  
info@terratec.co

