

First Steps Being Taken To Revitalize Coast, But Availability Of Sand, Uncertainty Of Cost & Environmental Concerns Plague Project



1. 2.25-km road and promenade from Mahim Causeway to Land's End, built on land reclaimed in the late 1990s. Environmental activists claim this killed the ecology of Mahim Bay and Mahim Creek and the pattern of the Mithi. Government reports called for conservation not reclamation

3. At present, due to reclamation, sewage and toxins from Mithi collect in the Bay and don't get flushed out, say activists

5. PWD is now testing sand in the Mahim seabed to check if it is suitable for transporting to Dadar and Prabhadevi for beach nourishment

4. Reclamation along Bandra has led to sea forcefully hitting the seafront from Mahim to Worli, speeding up erosion from beaches and sea bed, say environmentalists

6. If Mahim sand passes test, PWD will initiate pilot project to nourish 500 metres of beach from Chaityabhoomi to mayor's bungalow

7. After sand is deposited at Dadar beach, GEO-TUBES filled with more sand from Mahim would be placed 100 metres from building walls to protect shore & seabed
 • A geo-tube is made up of geo-textile polypropylene, multi-woven fabric. It is circular, measures 20 metres in length and has five holes
 • During high tide, seawater enters and leaves, but sand remains
 • This system was successfully used at INS Hamla, Marve

8. If pilot project is successful, PWD will attempt to nourish entire 4-km Dadar-Prabhadevi stretch

REBUILDING THE COAST

DEBATE: IS NOURISHMENT VIABLE?

IS BEACH NOURISHMENT THE ANSWER TO CHECKING SAND EROSION AT THE DADAR-PRABHADEVI BEACH? LINAH BALIGA FINDS OUT

Genesis of the plan: Architect P K Das submitted a Beach Nourishment Plan (BNP) to the BMC for a 1.2-km stretch of Dadar beach (Kirti College to Hinduja Hospital) which was approved in 2003. Das's BNP proposed to restore the beach to a vital, public space and to check erosion. The plan: a) nourish, regenerate and expand the beach; b) redevelop existing approach

roads, gardens, hawkers' stalls, steps, ramps and podia; c) provide public conveniences, general lighting and security; and d) maintain cleanliness by extending sewage outfalls and providing effective solid-waste management.
 Sand, comprising silt from Mithi River, would be dredged from Mahim Bay, washed and put on Dadar

beach. It would then be covered with a top layer imported from elsewhere in Maharashtra. The plan is part of Das's Open Mumbai exhibition, which is on at NGMA till April 7.
 The Public Works Department (PWD) has begun testing sand at Mahim, but PWD officials said importing a top layer for aesthetic reasons may be too expensive.

NOURISHING BEACH IS SUSTAINABLE

We had submitted a report in 2002 prepared by Dr Z S Tarapore, ex-director of Central Water Power and Research Station (CWPRS), who brought to our notice that sand can be dredged from Mahim Bay. The final report by DHI Water and Environment, Copenhagen, was submitted in 2003, confirming this. We spent Rs 25 lakh, through privately mobilized funds, for the study. Ironically, the PWD and BMC are now spending the same amount for the same work.

Fugro Survey India Ltd and DHI Water and Environment did the first deep-sea survey (bathymetric study) and wave-pattern study. After that, DHI did hydraulic and coastal studies, wave modelling and hydro-dynamic modelling to see the viability of beach nourishment. Now, the PWD report can formally establish if sand can be used from Mahim Bay sand would be dredged with a pump, laid along Dadar beach and then the geo-tube technology would be used. It's only the top sand, needed for aesthetic purposes, that needs to be brought from outside.

This BNP is environmentally sustainable and supportive. It doesn't involve civil construction or construction of sea walls, which are detrimental to coastal protection. It is also cost-effective. It takes less time to implement a BNP as compared to civil construction methods. Moreover, you'll get a natural beach as a public space at a location that was originally the heart of Mumbai's central district.

The cost of replenishing lost sand is small when compared to the cost of repairing sea walls. We have given a calculation for replenishing the sand every three to five years.

BNP is used in most parts of Europe and the United States. In India, INS Hamla (Marve), Dahanu beach and Vishakapatnam are examples of beach nourishment. This isn't a new science. In fact, many countries have banned sea-wall construction for being environmentally detrimental. Nourishment re-establishes the natural wave patterns and ecological systems in which sand is regenerated to protect our coast. So you're bringing natural conditions back.



P K Das, ARCHITECT & WATERFRONT RESTORATION EXPERT

REVERSE RECLAMATION TO STOP DADAR EROSION

The MMRDA and MSRDC have already killed the ecology of Mahim Bay and Mahim Creek, which is an estuary of the Mithi River. The working pattern of the Mithi has been destroyed.

Before reclamation for the approach to the sea link, the marine ecosystem was full of life. Now, when it is dead, they are talking of nourishment, which isn't the right word. It is foolish of the PWD to try and beautify a dead beach. From Mahim Causeway to Bandra Land's End a length of 2.25 km and width of three-quarter km was reclaimed. They started in 1999 and stopped in 2002 when residents complained. But eventually they finished it in patches.

The approach to the sea link should have been a bridge, but it is a road on reclamation. It was recommended in government reports that there should be in-situ conservation and not reclamation. There was the Paranjape Committee report of 1987, Central Institute of Fisheries Education report of 1992 (submitted to MMRDA), state Mangrove Committee report of 1993



Girish Raut, ENVIRONMENTAL ACTIVIST AND MAHIM RESIDENT WHO CAMPAIGNED AGAINST RECLAMATION IN BANDRA



Tetrapods have been placed along some parts of the coast to counter the force of the waves

(with NIO involvement); a central government Neeri study in 1994-96 and a 1997 BNHS report for the Union environment ministry. Despite these reports, the state government went ahead with reclamation. As a result, sand from Worli to Mahim was wiped out because the tide was blocked from entering Mahim Creek and started hitting with force elsewhere. At the same time, the Mithi River was blocked from entering the Arabian Sea. The sandy bed present for centuries eroded. The flushing of Mahim Creek, which receives 80 crore litres of sewage and chemicals a day, was stopped. The creek turned into a toxic pond.

As per the topography and slope, the creek moves towards Mahim Bay and the Arabian Sea. Dadar, Mahim and Prabhadevi beaches were harmed. There was also loss of stabilization on the shore.

To make matters worse, some agency removed thousands of trucks of sand from the north side of Mahim Bay two years ago. Nobody knows where they took the sand.

The solution is to go to the root of the problem and remove the reclamation from Mahim Causeway to Land's End and build a bridge instead of a road. Sand deposition will return to its original form.

Also, if you bring in sand from Ratnagiri or Dahanu, you will deprive their ecosystems. Sand isn't a dead material, it's a life-form habitat. Beach nourishment will not help filter toxic elements and provide a habitat for life forms.

RECLAIMING LEADS TO MORE PROBLEMS

Beach nourishment is nothing but reclamation. So, if you reclaim somewhere, repercussions will be felt elsewhere. Take the case of the sea link's approach road. Reclaiming the eroded area will only erode some other beach. In Chennai, nourishment was done at Marina beach and its repercussions were felt in a fishing village that was a few miles away.



Ashok Ravat, SHIVAJI PARK ALM ACTIVIST

STABILIZING SHORELINE SHOULD BE FIRST PRIORITY

Worldwide there are many examples of environmentally friendly beaches and beach nourishment done due to erosion—like in Singapore, the United States and Europe. But the PWD should focus on what its purpose is—stabilization of the shore, beautification, recreation and/or promenades. Stabilization

should be the first priority. A study on erosion and siltation should also be conducted, the causes of the erosion should be carefully studied before going ahead with any beach nourishment. All like-minded experts dealing with environment and oceanography should form a think tank and help plan this project.

Shankar Gajbhiye, SCIENTIST IN-CHARGE, NATIONAL INSTITUTE OF OCEANOGRAPHY, MUMBAI

SANDS OF TIME STRIPPED FROM Dadar beach

Linah Baliga | TNN

An ambitious plan to restore the eroded Dadar beach, which is today more of a garbage dump than a sandy shore, has been stalling ahead, with the state Public Works Department (PWD) currently testing the availability and suitability of sand at Mahim Bay. If suitable, the sand would be transported to help nourish 500 metres of beach from Chaityabhoomi to the mayor's bungalow. If that pilot project is a success, then the entire 4-km stretch from Prabhadevi to Hinduja Hospital, Mahim, would be revitalized.

The plans, however, are steeped in uncertainty and controversy, with government officials saying they are unsure of the cost of transporting top-sand to Dadar and some environmentalists saying the beach is today dead because of reclamation at Bandra that should be reversed.

DIGGING FOR SOLUTIONS

- The Dadar-Prabhadevi beach is a 4km stretch from Worli Village to Mahim fort. It covers an area of over 50,000 sq m
- The sandy beach has eroded, with most parts rendered inaccessible
- Properties along the beach have been exposed to high tide, so boulders have been dumped to halt erosion
- This affects public movement and adversely affects the coast
- It is being proposed that the beach be restored as a public space and erosion be checked

Source: P K Das & Associates

As it stands, erosion plagues the decrepit Dadar beach, which is today more of a garbage dump than a sandy shore. Architect P K Das first gave birth to the idea of using a Beach Nourishment Plan (BNP) in Dadar, when he gave Mhada and then the BMC a BNP in the early 2000s. The PWD is today working on a Rs 15-to-20-crore Dadar-Prabhadevi plan, with Rs 5 crore expected from the civic body and the rest from the state.

Last year, on May 15, the PWD's coastal wing began a preliminary 'trial bore' study at Mahim Bay to check the quality of sand there. The boring was stopped in December 2011 due to the code of conduct for the civic elections. The tests have been restarted and boring has been completed at six sites. Work is on at another 24.

"Before April 15, we will complete the boring and by April-end we will get the soil investigation report, complete with the type of sand available in Mahim Bay.

After further investigation, we will prepare a detailed report and give it to the BMC," said Santosh Sawant, harbour engineer, PWD.

It is possible that the Mahim sand is found suitable, but for aesthetic reasons the top layer will have to be brought from elsewhere in the state. "If we have to buy sand from outside, our total cost may go up to Rs 30 crore. If it's too expensive, we will find another alternative. So far, this is the only solution," said Sawant.

The PWD has appointed a local agency, Suryantak Constructions, which has a laboratory that specializes in subsoil investigations, to examine the sand at Mahim. The BMC has already allocated Rs 25 lakh for the trial bore investigation. A boring machine is kept on a floating barge and drilled into the subsoil. It then takes samples from 5 to 25 m below the soil.

The report will also be sent to the Central Water Power and Research Station in Pune for the design of geo-tubes for Dadar beach. This high-volume dewatering system helps prevent coastal erosion. The 20-metre-long tubes, filled with sand, would be placed horizontal to the coast about 100 metres from the compound walls of buildings. They would protect the beach from erosion by currents, and also allow only water to filter back to sea while the sand is trapped in the geo-tube. The geo-tube would become rigid and elliptical. It would function like a tetrapod, reducing wave pressure during high tide. It could take three to five years for Dadar beach to be restored.

Sawant said the beach nourishment work will not be awarded to any private agency. "The protection and nourishment of that beach will be done by the coastal division of the PWD. Also, CWPRS in Pune is a central government agency and has experts in waterfronts," said Sawant.

In Phase II, the PWD has plans to convert Dadar's shoreline into a tourist attraction, like at Juhu and Girgaum. There are plans to build a promenade or walkway along the periphery of the beach, with work being carried out by the civic body.

Meanwhile, residents are hoping the government does a competent job. "The government has spent a huge amount installing boulders in some pockets of the beachfront, thereby making them inaccessible. It has spoiled the look of the seafront. Why is the PWD allocating money in bits and installments? Every year, the BMC shells out Rs 75 lakh and appoints contractors to clean the stretch from Prabhadevi to Mahim. The beach, however, continues to resemble a garbage dump," said Ashok Ravat of the Shivaji Park ALM.

Our concern is that whatever is done should be done in a synchronized manner. The right hand should know what the left hand is doing. They have put boulders at some places and tetrapods in other places. To overcome the high tide, some places have a retaining wall. So, what's the bund for? We don't want a haphazard job. The citizens' opinions should be considered

— Tasneem Shukul | G-NORTH CITIZENS' FORUM

If we have to buy sand from outside, our cost may go up to Rs 30 crore. If it's too expensive, we'll find another alternative. So far, this (Mahim sand) is the only solution

— Santosh Sawant | HARBOUR ENGINEER, PWD

TOI Interactive 'WORK ON MARINE DRIVE BEAUTIFICATION'S PHASE-II MUST START'

Q. Will sand from Mahim help rebuild the Dadar-Prabhadevi stretch, or do the authorities need to look at other options? Will the beaches dying along the bay ever be revived?

EMAIL: speakout@timesgroup.com with 'Dadar' in the subject line

SMS: Type **SO** <space> **DADAR** <space> your views and name. SMS to **58888**

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We asked readers if the Marine Drive revamp lacks colour? Should the state consult with residents and begin work on Phase II of the project? Here are some of your replies:

The Phase-I revamp of Marine Drive was primarily structural and enabling in nature. Phase-II, estimated at Rs 100 crore, is ambitious and comprises all the aesthetic sections of the work which, when completed, will be visible to all. However, the BMC needs to interact with architects and residents. Work must start immediately.

— Bikram Banerjee

Most buildings that face the Marine Drive wear a sorrowful

look as they have not been painted since long. The blame may lie with the salty air. — Mahavir Tewari

The state can spend as much as it wants on parks and statues, to make the Marine Drive more attractive, but citizens will just end up painting the walls red with paan spit and litter the paths. It is a shame that due to the ignorance of a few, cities are deprived of a clean environment. — Karl Behramfram