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Singapore's 4th desalination plant in Marina East will have areas that are open for visitors



An artist's impression of the new Keppel Marina East Desalination Plant. PHOTO: KEPPEL CORP

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Lin Yangchen (mailto:linyc@sph.com.sg)

SINGAPORE - Think desalination plants and hulking, fenced-up facilities that are strictly off limits to casual visitors might come to mind.

But Singapore's fourth desalination plant, to be completed in January 2020, will open its gates to people, who can roam its 20,000 sq m grassy roof. From the roof, which can take up to

700 people, they may catch a glimpse of the Central Business District, unlike the three preceding plants in Tuas.

Construction of the Keppel Marina East Desalination Plant kicked off on Thursday (June 29). In what is thought to be a world's first, the plant will also be able to treat either salty water from the sea or freshwater from Marina Reservoir, saving energy during wet weather when the latter is abundant.

Minister for the Environment and Water Resources Masagos Zulkifli, one of the seven senior government and Keppel officials who wielded gold-painted shovels at the groundbreaking ceremony at Marina Barrage on Thursday, said desalinated water is a "weather-resilient source" crucial to a reliable water supply for the country, and praised the latest plant as an example of multiple land use for the benefit of the community.

He added that public-private partnerships like the one that created this plant have enabled Singapore to harness new technology cost-effectively.

The plant will be built and operated by Keppel Infrastructure Holdings under the Design, Build, Own and Operate model and will produce 30 million gallons a day (mgd) of drinking water. Keppel declined to reveal its cost.

A fifth desalination plant of similar capacity is due on Jurong Island by 2020.

One of the key processes in desalination is reverse osmosis, which forces water through a salt-retaining membrane at high pressure.

The latest plant sports a separate "dual flow chamber" with a valve that can switch between feeding seawater and reservoir water into the plant.

When reservoir water is used, lower pressure - and less energy - is needed for reverse osmosis, and fewer steps are required in the water treatment process.

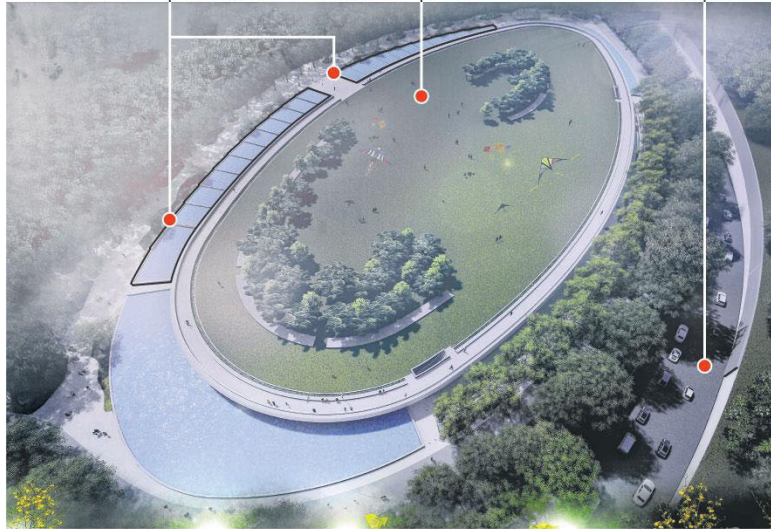
Novel features

The Keppel Marina East Desalination Plant, to be completed in 2020, will be capable of treating either seawater or freshwater and will feature public recreational areas linked to the Park Connector Network.

Cascading water features

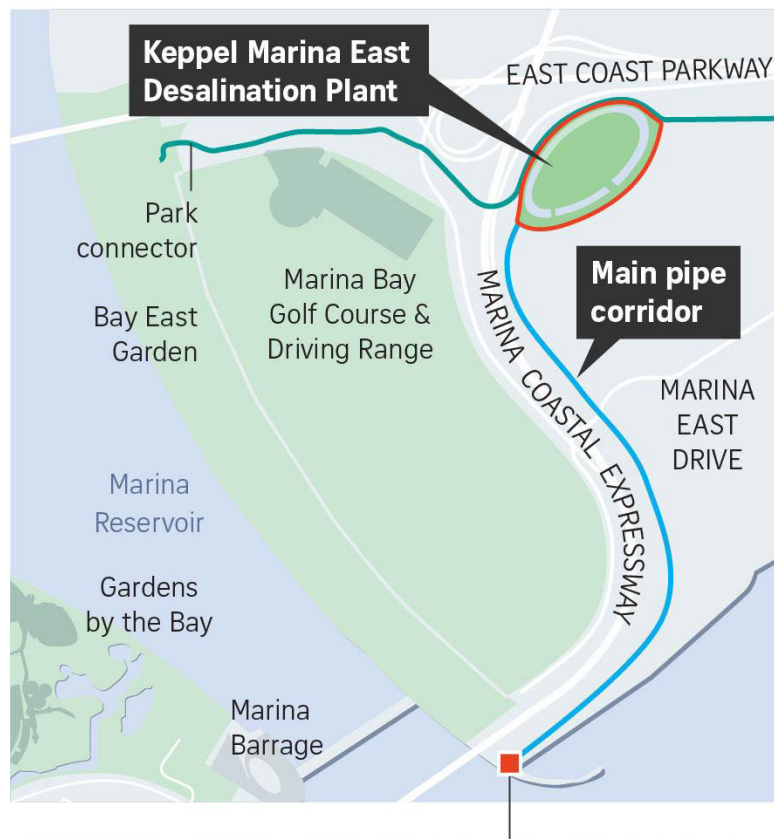
20,000 sq m roof garden accessible to the public

Marina Coastal Expressway



Facts and figures

- Area: 3ha
- Capacity: 30 million gallons of drinking water a day
- Underground water treatment facilities
- Cooled by natural ventilation
- Harvests rainwater for greenery and water features





Sources: PUB, KEPPEL CORPORATION, NPARKS
 ARTIST'S IMPRESSION: KEPPEL CORPORATION
 STRAITS TIMES GRAPHICS

Mr Masagos noted that the dual-mode desalination process took the Government years of research and testing to make it practical at a large scale, through a 1mgd pilot plant in Pasir Ris that was set up back in 2007.

With the first round of water price hikes in Singapore taking effect on July 1, Mr Masagos reiterated that the "right-pricing" of water will enable continual investments in and maintenance of water infrastructure that have helped Singapore avoid the water supply problems that many countries face.

Despite the scale of the project, Keppel said people who walk past its future facility will hardly notice its presence.

The water treatment machinery will be underground, while plants - the botanic kind - and water features on its above-ground structure will blend with the Eastern Coastal Park Connector Network that will run next to it, explained Keppel.

There will also be a viewing gallery with glass panels through which the desalination equipment can be observed, but access will be by appointment for security reasons.

Keppel Infrastructure chief executive Ong Tiong Guan said the latest design challenges conventional ideas of how a desalination plant or infrastructural facility should look and

function. "Engineering and design excellence can go hand-in-hand as we push for sustainable urbanisation," he added.

When asked by reporters, Mr George Madhavan, director of national water agency PUB's 3P Network Department, said future dual-mode plants located at other coastal reservoirs are a possibility among many others that the agency explores in its efforts to boost water security.

Desalination is expected to meet up to 30 per cent of Singapore's water demand by 2060, up from 25 per cent now. But the actual increase in desalination capacity will be more than what that figure suggests, as water demand is expected to double over that period.

Desalination, which debuted in Singapore in 2005, is one of four National Taps in the country's long-term water strategy, the others being reservoir water, imported water and NEWater.



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