DEEP TUNNEL SEWERAGE SYSTEM - SUSTAINABLE WATER MANAGEMENT: SINGAPORE

Singapore, Southeast Asia

Year of Initiation: 2000

Project Highlights

- **Innovative and Integrated Water Management Approach**
- **Centralized waste water treatment system**
- **DTSS is a superhighway for Singapore's used water management**
- **Massive public education and awareness is a key factor for the success of DTSS**

Background

Deep Tunnel Sewerage System (DTSS) is a massive integrated water management project that caters to the country's long term clean water needs through the collection, treatment, reclamation and disposal of used water from industries, homes and businesses. It is a perfect example that incorporates the concept of integrated land and water management for achieving sustainable environment.

Project Objectives

The DTSS project aims to improve Singapore's water conveyance and treatment system while reducing the land occupied by the used-water infrastructure on the island by 50%

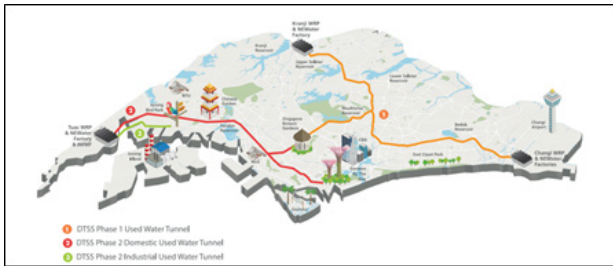
Key Stakeholders

Singapore's National Water Agency, Ministry of Environment and Water Resources, National Environment Agency of Singapore

Project Approach

DTSS project is being developed in two phases and is proposed to be completed by 2022. The key aspects of the project include:

- Construction of two large tunnels, 6.5 m in diameter and 80 km long, located ~ 50 m below the surface to carry the used water to the three centralized water reclamation plants (WRPs)
- WRPs will treat and purify sewage into clean, high-grade reclaimed water, while the effluent will be discharged through deep sea



Financial Structure of "Climate Emission Capping for Buildings" law

- The first phase of the DTSS project was completed with an investment of $2.7 billion and the project is self-financing through retained earnings
- In 2005 Public Utilities Board (PUB) issued the bond for $400 million, while in 2010 PUB received an operating grant of $185 million

Achievements

Benefits

- Reduction in water consumption from 165 liters per person per day in 2003 to 155 liters per person per day in 2009
- Reduction in water losses, i.e., non-revenue water
- Centralized water management system ensuring minimum land utilization
- Development of replicable model for other cities across the world

Co-benefits

- Behavioral changes among residents mediated through tariff structure
- Economic benefits and cost-effective model

Success Factors

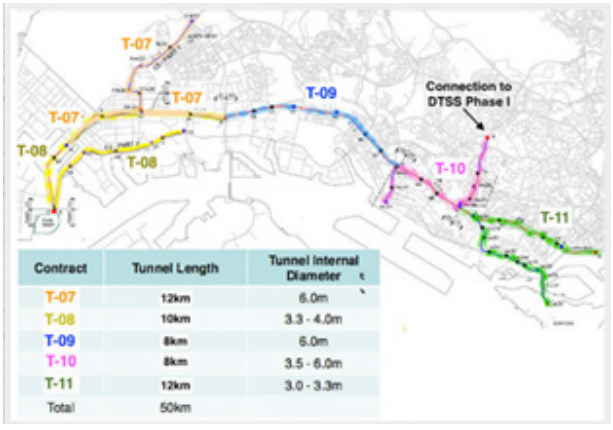
- Effective policy implementation and law enforcements
- Effective Institutional and legislative management
- Effective engineered and technological solutions

Limitations

- Unprecedented costs associated with the centralized water management system

Future Prospects

Phase II of the DTSS project commenced in 2016 and is envisaged to be completed by 2022



Contract	Tunnel Length	Tunnel Internal Diameter
T-07	12km	6.0m
T-08	10km	3.3 - 4.0m
T-09	8km	6.0m
T-10	8km	3.5 - 6.0m
T-11	12km	3.0 - 3.3m
Total	50km	

Source: https://pearl.niua.org/sites/default/files/books/GP-GL2_SANITATION.pdf

For more Information

https://www.aecom.com/sg/projects/deep-tunnel-sewerage-system-phase-2/

https://www.arcadis.com/en/global/what-we-do/our-projects/asia/singapore/deep-tunnel-sewerage-system/