

## **OPEN SESSION**

**Planning of Modern Tunnel Projects  
with Emphasis on Urban Area**



# PLANNING OF MODERN TUNNEL PROJECTS

- The rationale & objective of OS subject
- Modern Tunnel Projects (MTP)
  - Tentative definition
  - Some examples
- Key drivers for Modern Tunnel Projects
- Why planning ?
- Approach & example for planning of MTP



1900



2007



2030



2050





















**ITA-AITES**

**WHY GO UNDERGROUND?**

**CONTRIBUTION OF THE USE OF UNDERGROUND SPACE TO SUSTAINABLE DEVELOPMENT**



ITA has been actively promoting the use of underground space : the underground space can offer huge possibilities for satisfying the demands of human mobility, infrastructures, utility connections and enhanced wellbeing in a sustainable development.





But it is a limited resource,  
and it can also be expensive  
and difficult to exploit.







- ❖ In recent years, quite a few modern tunnelling projects have actually been conceived and/or realized around the globe, with each project being developed according to the specifications set by its employer and **incorporating often some innovative technical solutions** and impressive positive economical achievement. This trend in developing modern tunnelling projects is set to increase in the future.
- ❖ As the worldwide leader in the promotion of underground engineering projects ITA has the responsibility to promote for the planning of modern tunnelling projects.





- ❖ The time elapsed from the conception of an engineering work underground to the commissioning of the work is often very long, and sometimes it could even extend over decades.
- ❖ However, in the meantime, the needs, the rules, and the norms as well as the available technologies are continuously evolving.
- ❖ Therefore, a piece of underground engineering work should stand up to be modern and also remain valid for future needs.

**If properly planned and matching with its environment, a tunnel is inherently a durable and sustainable solution!**





## **Lack of proper & coordinated planning can result in:**

- ✓ LONG DELAYS and unjustified COST in the implementation of a project
- ✓ MIS-FITTING of a project with its environment
- ✓ FAILURE to achieve the desired benefits for the Stakeholders
- ✓ NON Durable Project
- ✓ NON Sustainable Project
- ✓ or NON implementation of the Project

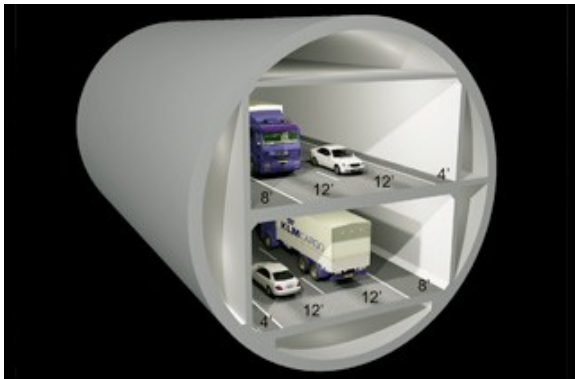
# KEY DRIVERS FOR MODERN TUNNEL PROJECTS

Example planned is the Alaska Viaduct Replacement Project in Seattle

Existing Structure



The Tunnel Solution

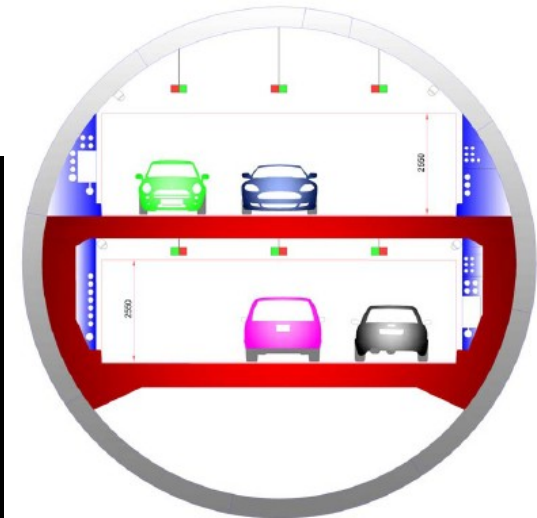
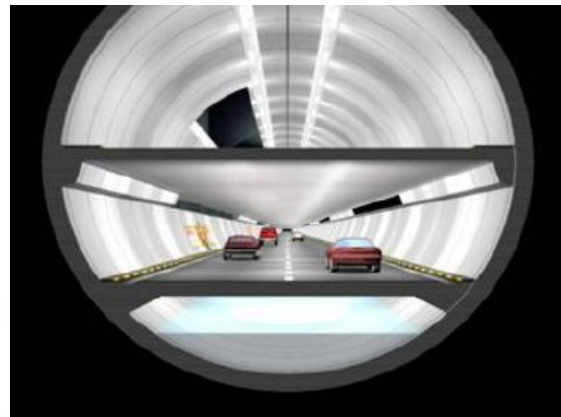
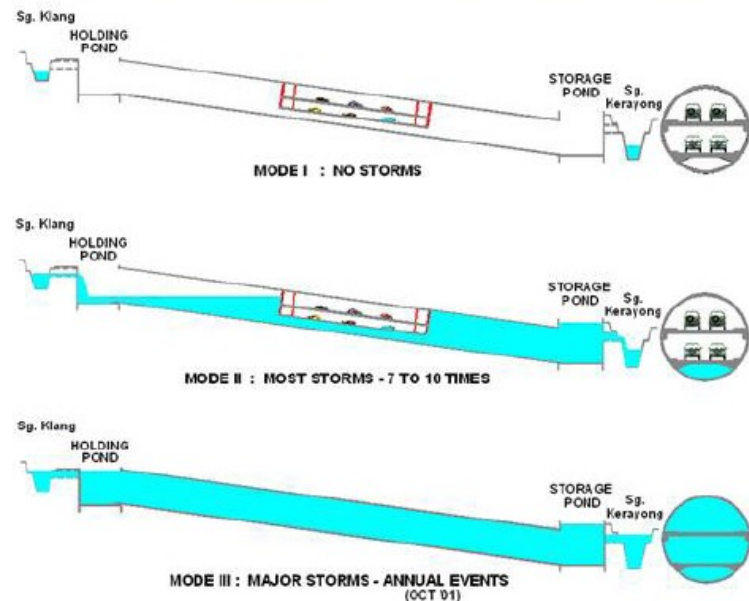




# KEY DRIVERS FOR MODERN TUNNEL PROJECTS



An outstanding hybrid example is the SMART Project in KL, Malaysia.





# KEY DRIVERS FOR MODERN TUNNEL PROJECTS



## M-30 Project in Madrid





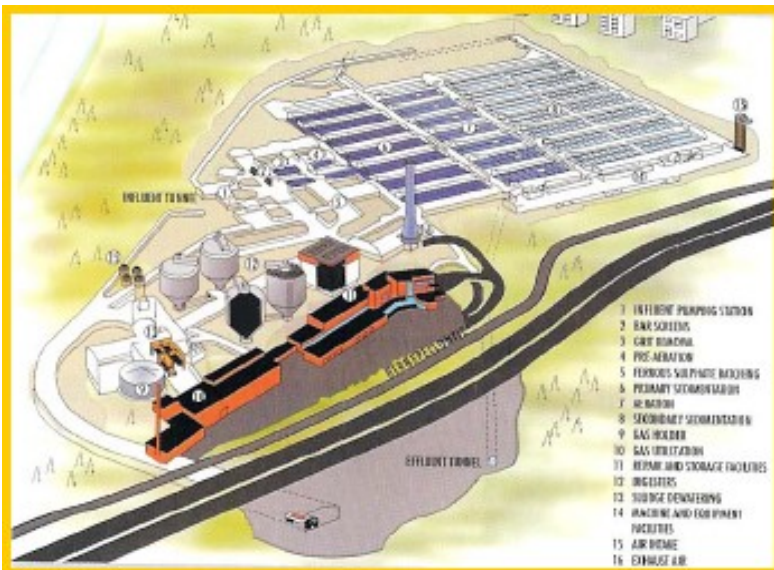
# KEY DRIVERS FOR MODERN TUNNEL PROJECTS



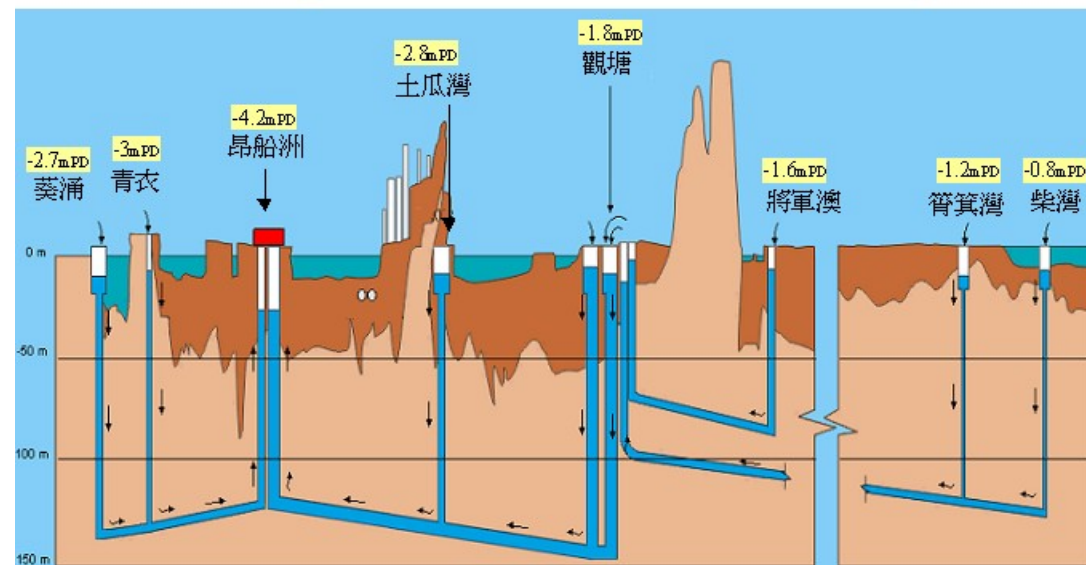
Enormous efforts are being undertaken in the densely populated cities of Asia, Africa and Latin America aimed at establishing properly functioning sewage disposal systems. Examples of this are Hong Kong, New Delhi, Calcutta, Cairo, Buenos Aires, Mexico City, Sao Paulo, and Singapore.

The outstanding example is Deep Sewerage Disposal project in Hong Kong.

隧道系統的橫切面圖



Water water treatment plant in Helsinki



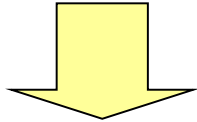
Mostly Inverted siphons

Minimise pumping head  
Meet sediment transport requirements  
Prevent air entrainment

# Problems and Thoughts

## Public Policy

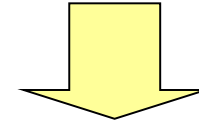
Government:  
Attempted to plan  
everything



Inefficiencies,  
planning lagging the  
market

**vs**

The Market:  
Uncontrolled growth



Continuous Changes  
of the market demand

So...Public Policy now needs to balance the energy of  
the market with the coordination that government  
policy can bring (without stifling growth)





- ✓ What was the problem, i.e., why the “modern” tunnel project was conceived?
- ✓ What was the planner’s approach to find a solution?
- ✓ How was the solution chosen?
- ✓ Was there any alternative to going underground?
- ✓ Was there any other underground solution?
- ✓ Does the chosen solution satisfy also some future needs?
- ✓ With what standard was the project conceived and developed?