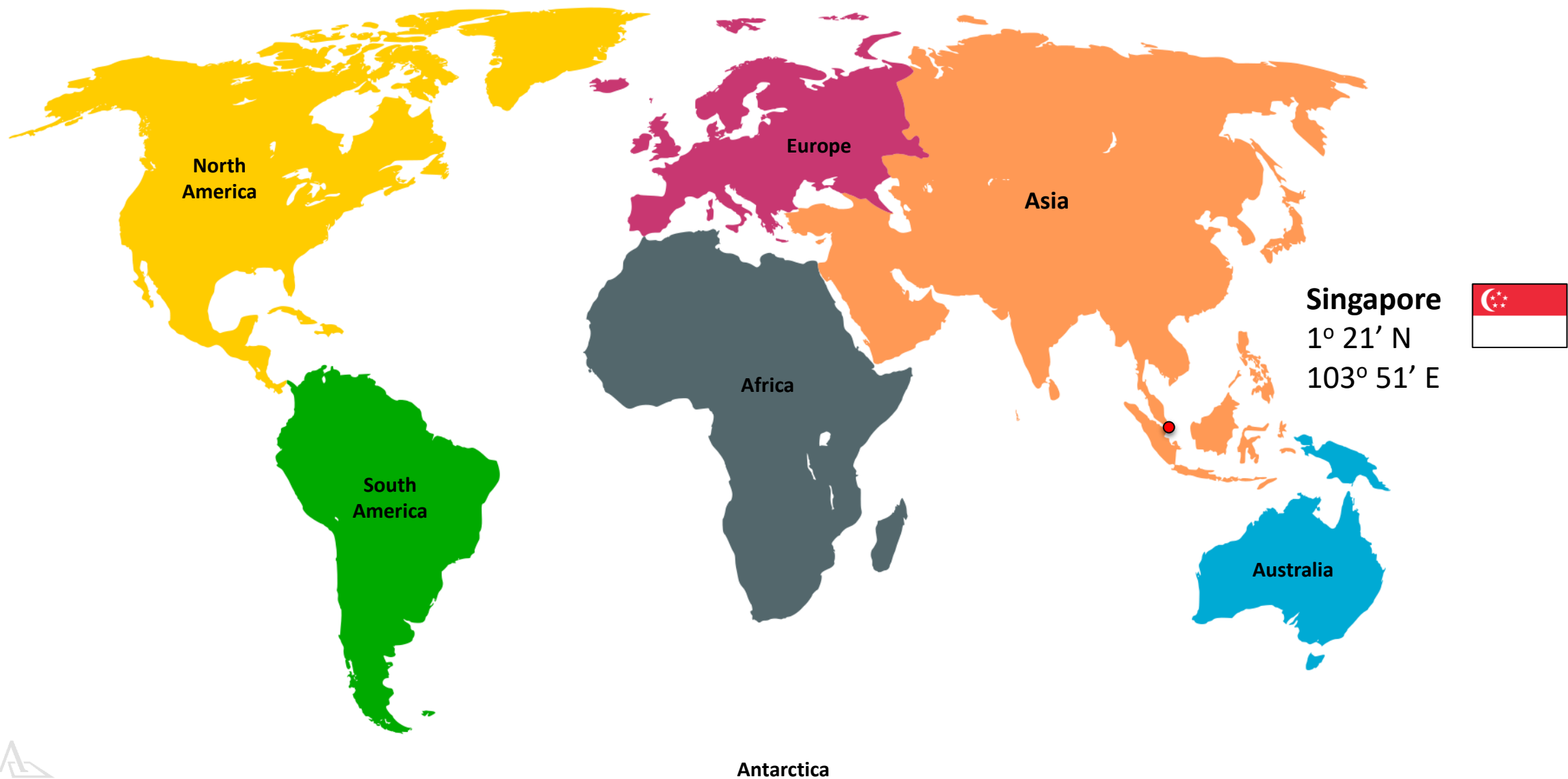




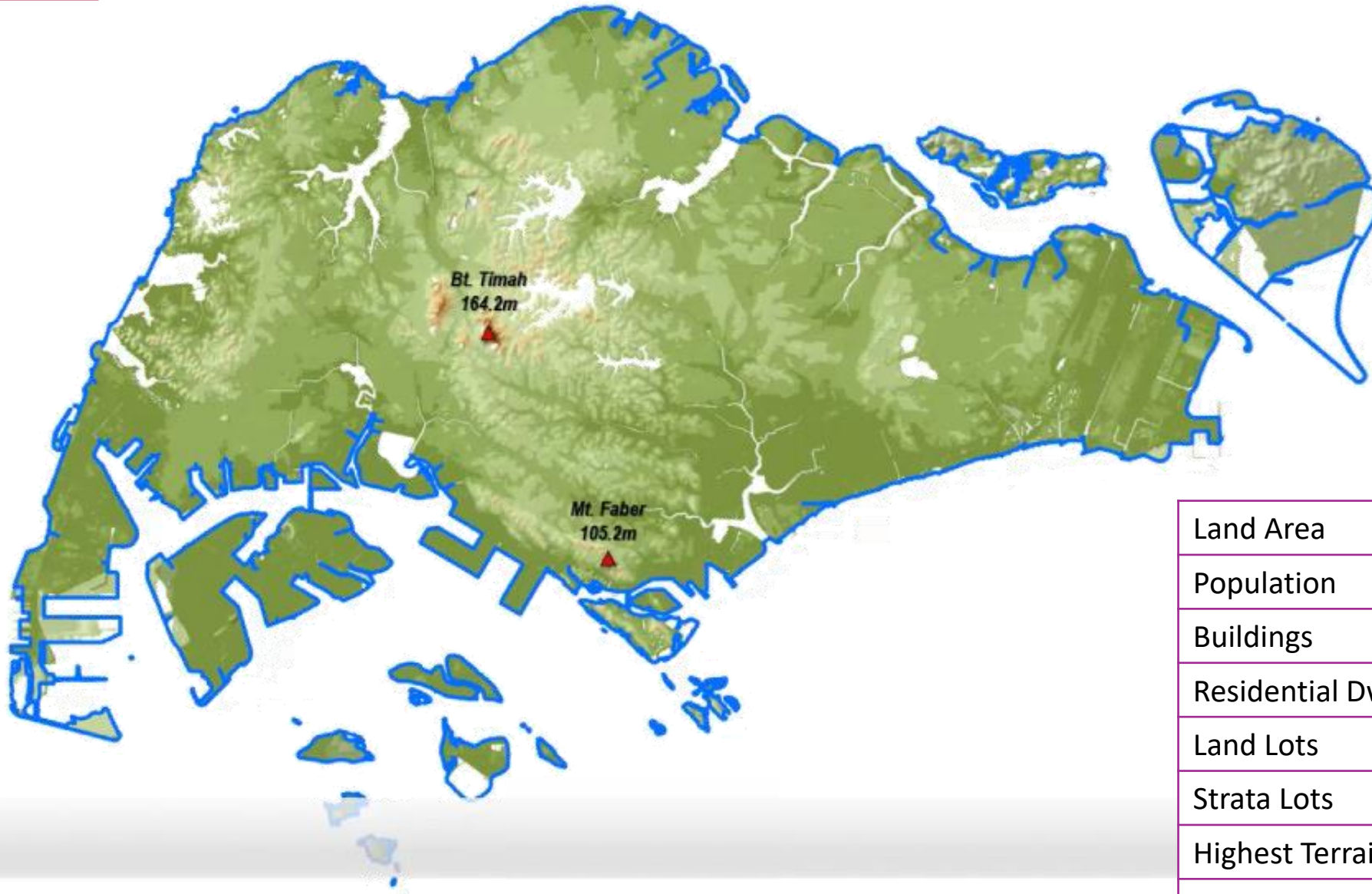
Regional Development of Land Administration and Cadastre System - Singapore

LIMITED LAND • UNLIMITED SPACE

Singapore



Some Information about Singapore



Land Area	735.4 sqkm
Population	6.04 million
Buildings	170,000
Residential Dwellings	1,563,000
Land Lots	146,542
Strata Lots	1,726,338
Highest Terrain	164.2m
Trees	7 million

Digitalisation of Cadastre in Singapore

Cadastral

Aboveground Mapping

Underground Mapping

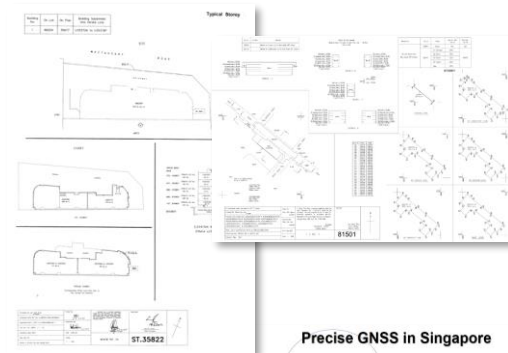
Before 2004

Paper Plan



2004

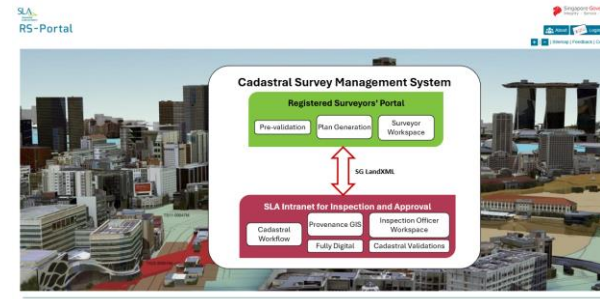
- Coordinated Cadastre with SVY21 (2004)
- Image Plan (2005)



Coordinated & Electronic

2018

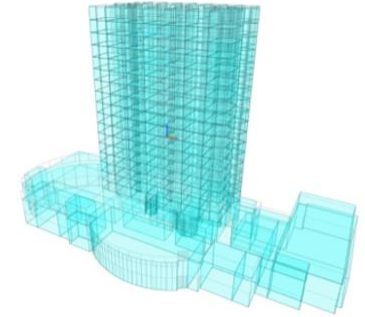
Digital Cadastre with SG LandXML



Partially-Digital

AI-enabled Cadastre

3D Cadastre in BIM (IFC-SG)



Full Digital

Paper

Benefits

SG LandXML

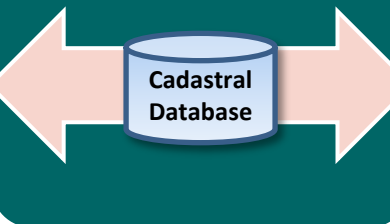


SG LandXML Specification

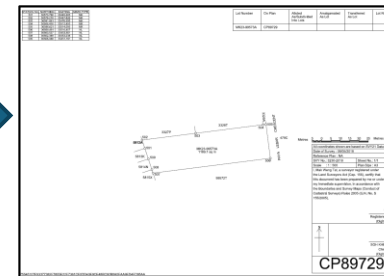


Cadastral Survey Management System

- Cadastral Rules Validations
- Highly Automated
- Data Integrity Checks
- Online Plan Generation
- Quick Response



Cadastral Plans



- Faster issuance of Titles
- Improves the quality of plan data
- Automates digital plan examination process
- Reduces submission errors due to missing or incorrect information
- Reduces duplication of data
- Saves time because data does not need to be re-entered
- Enhances the accuracy of the Cadastral database
- Provides a standard data exchange format for sharing and collaboration
- Single source of truth from SG LandXML

National 3D Mapping Programme

Maps



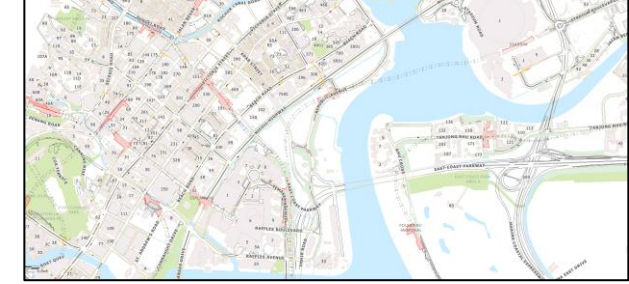
Topographical Map



Digital Terrain Map

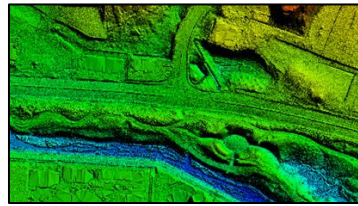


3D Map

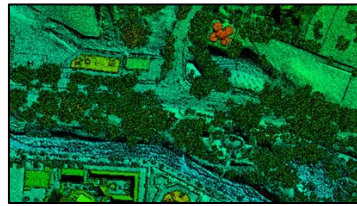


High-resolution Map

Model



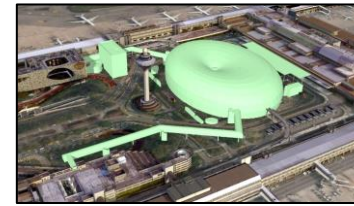
Digital Terrain Model (DTM)



Digital Surface Model (DSM)



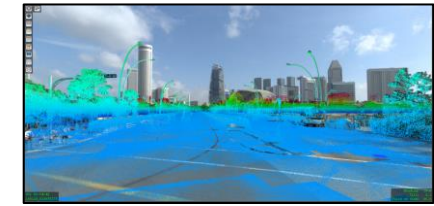
True Orthophoto



Building Model



Mesh Model

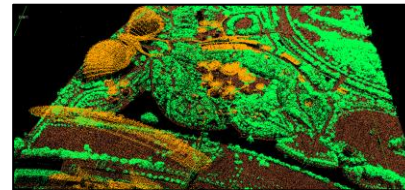


3D Mapping Cloud

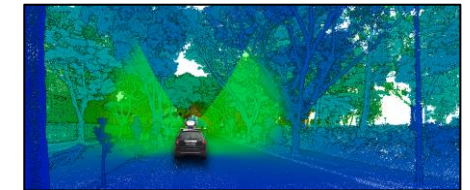
Technology



Aerial Mapping



Mobile Mapping

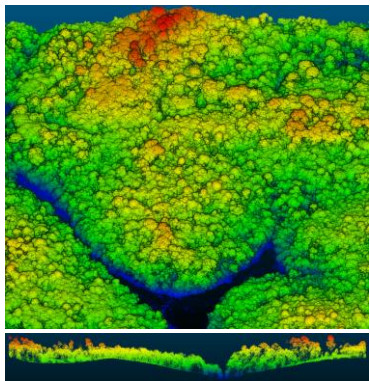


National 3D Mapping Programme

Sustainability



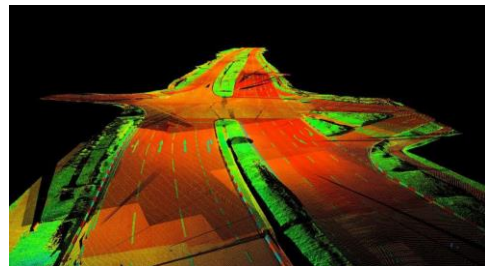
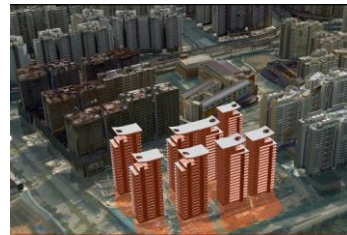
Solar Potential Map



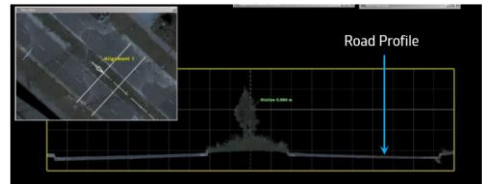
Carbon Estimation

Planning & Infra Development

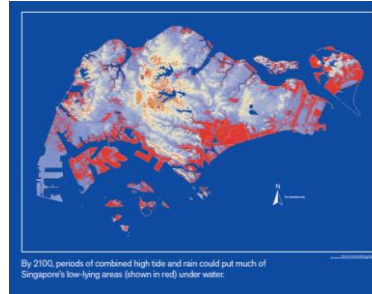
Shadow Analysis



Road Planning & Design



National Security & Safety

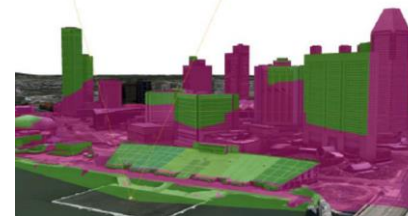


Flood Risk Map

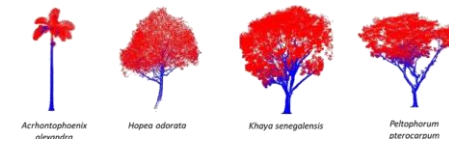
Electronic Aerodrome Terrain & Obstacle Chart for Airports



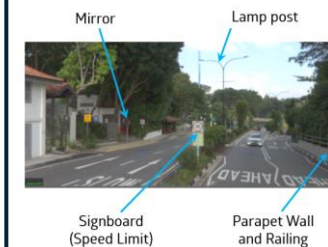
Emergency Response Preparations



Operation & Digital Transformation

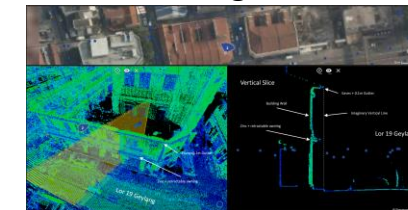


Tree Management

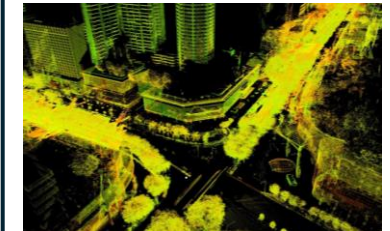


Asset Mapping

Investigation



Smart Nation & Innovation



Autonomous Mobility



Engagement

Underground Mapping

Why?

- Land is scarce in Singapore
- Developments increasingly going underground
- Competing requirements, need regulation

Current State



Underground utilities data often inaccurate, incomplete, not up to date



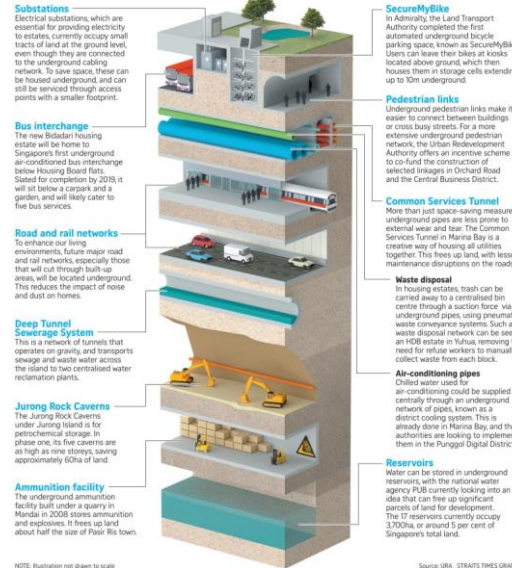
Long and costly planning, design, and development of infrastructure



Potential disruption of services

Finding space for the future

To use our space more efficiently, the Government is looking to launch its Underground Master Plan in 2019. Here are some subterranean ideas that are being explored.



t n p NEWS SPORTS ENTERTAINMENT LIFESTYLE RACING READ E-PAPER

Contractor accidentally cuts cables causing fibre broadband outage for 10,000

This article is more than 12 months old

David Sun
© Nov 15, 2018 06:00 am

A contractor accidentally cut through several fibre cables in Tampines yesterday, causing a fibre broadband outage in the east of Singapore.

The unidentified contractor, who was performing construction works along Tampines Avenue 9, cut through the cables at about 2.50pm.

This affected an estimated 10,000 end-users in Pasi Ris, Tampines, Changi and Loyang.



Civil engineering contractor fined for damaging water main; causing loss of 1.8 million litres of water



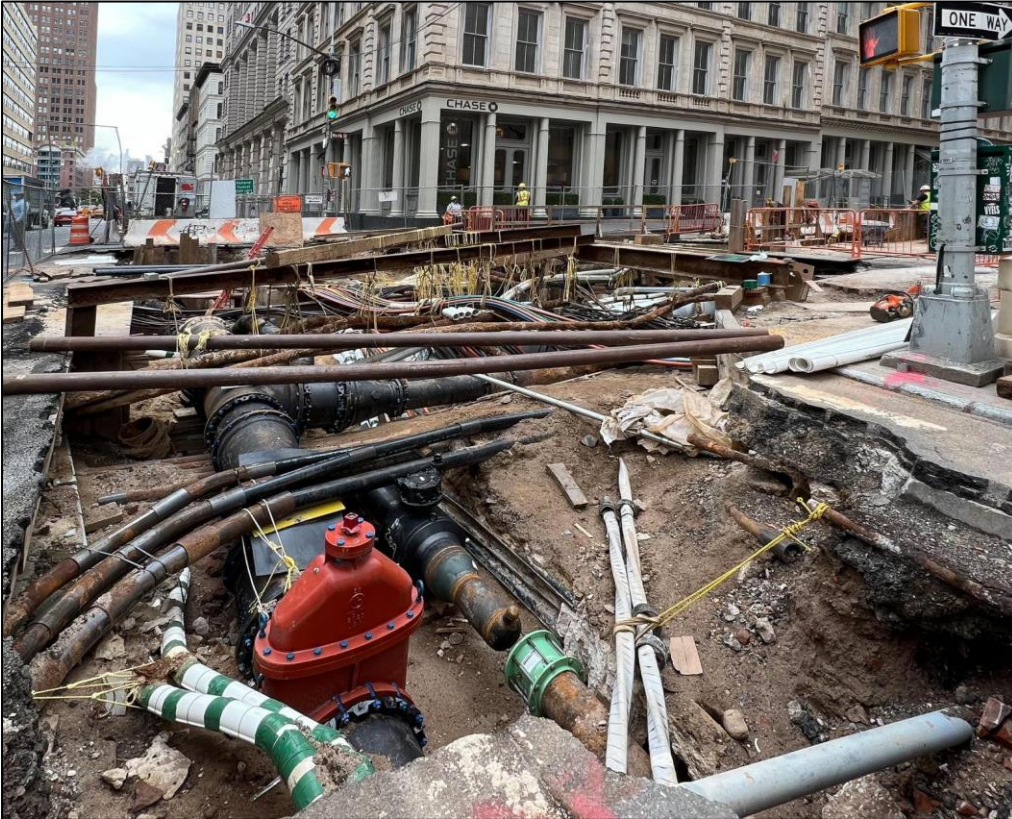
Johannes Tjendro

01 Jun 2021 11:40AM
(Updated: 01 Jun 2021 11:40AM)



Underground Mapping

What it actually is 🤯 🙈



What we hope it is 😊 👍



Reliable information on underground utilities will lead to better decision making and save resources

Summary



Land Administration

- Optimises land use and improves planning outcomes
- Promotes sustainable land management, benefiting environment and community
- Minimises risks, enhancing economic development and efficient land markets



Undi-Undi 2020
Majlis Perbandaran Seremban
Majlis Perbandaran Seremban



THANK YOU

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