



# The Dynamism of Underground Space

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# Large Hadron Collider

– beneath France & Switzerland



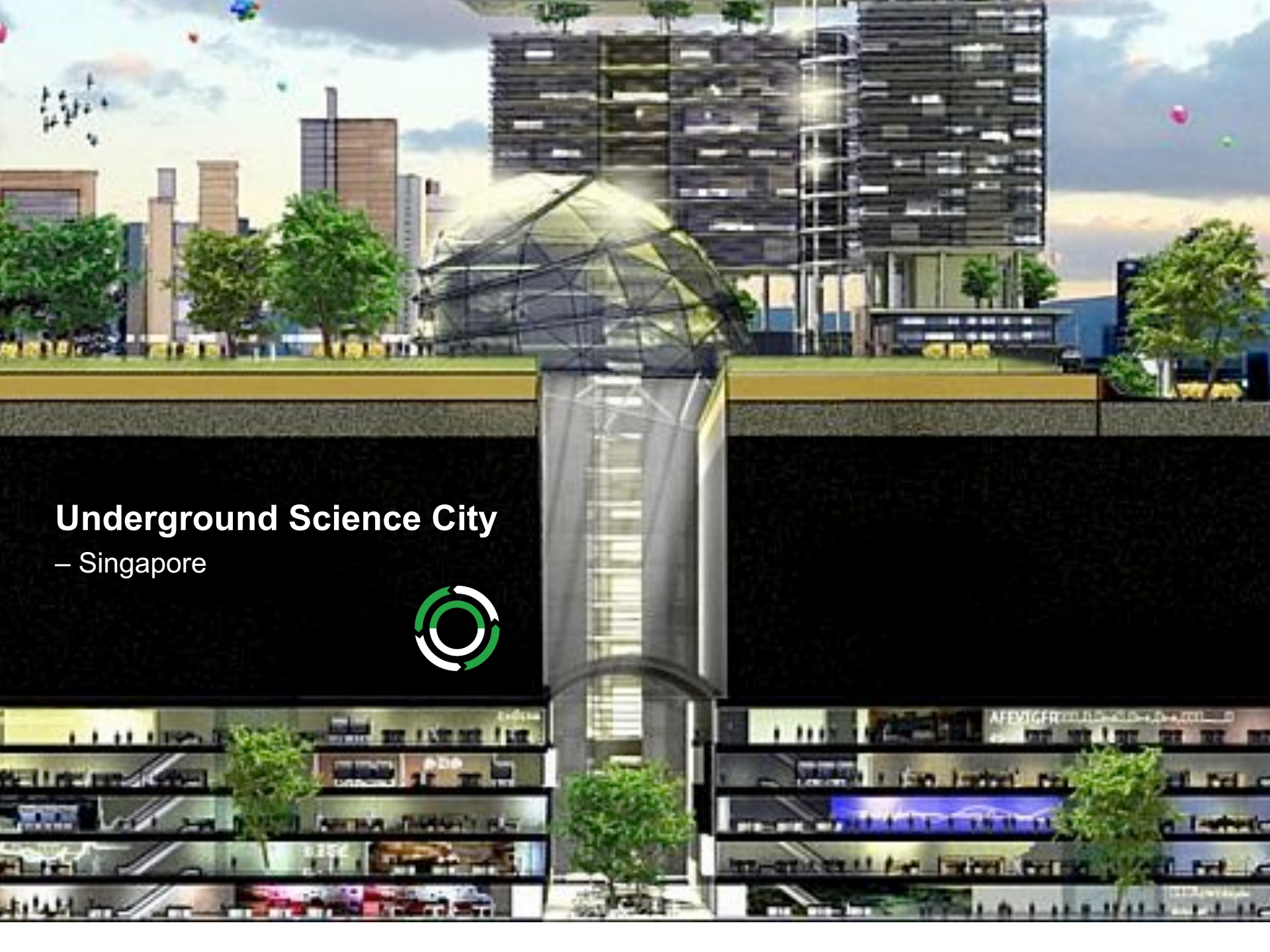


# Dubai

– United Arab Emirates







# Underground Science City

– Singapore



# THE CHALLENGES WE FACE

RESILIENT  
SUSTAINABLE  
INCLUSIVE  
LIVABLE



If the earth must lose that great portion of its pleasantness which it owes to things that the unlimited increase of wealth and population would extirpate from it, for the mere purpose of enabling it to support a larger, but not a better or a happier population, I sincerely hope, for the sake of posterity, that they will be content to be stationary, long before necessity compels them to it

– John Stuart Mill, 1848





**UNDER**  
**PRESSURE**





# CAN UNDERGROUND SPACE HELP?

STORAGE  
MULTI-USE  
CORRIDORS

# Ryukyukan Water Storage Facility

– Tokyo, Japan

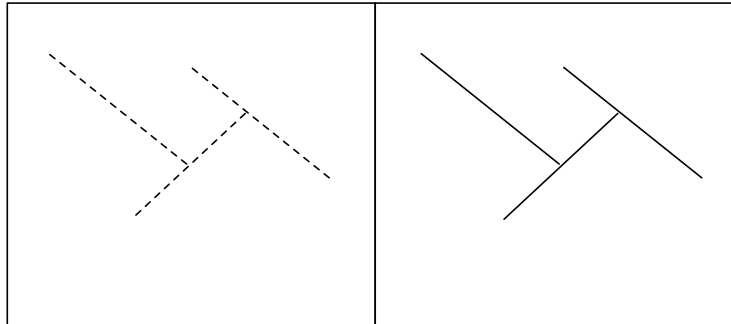




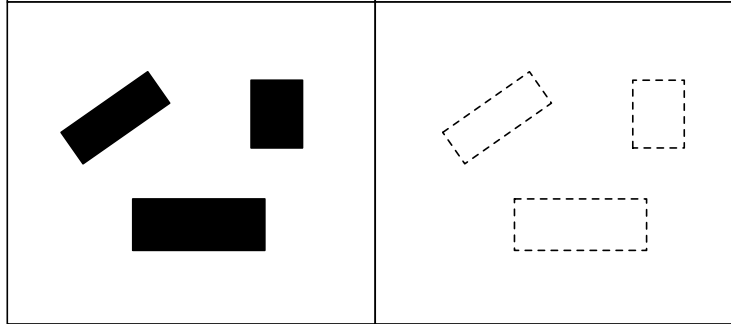


**Museum Park Public Car Park**  
– Rotterdam, the Netherlands

Networks

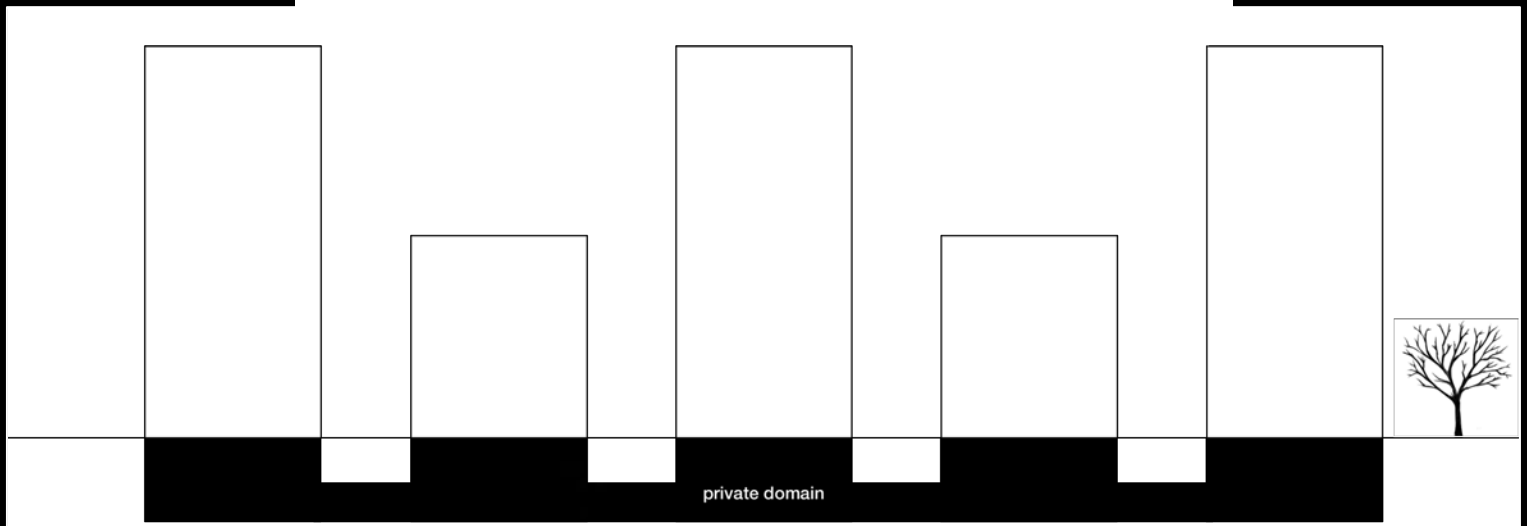


Objects



Private spaces

Public spaces





BEFORE WE  
BECOME TOO  
EXCITED

STARRING  
GEOLOGY



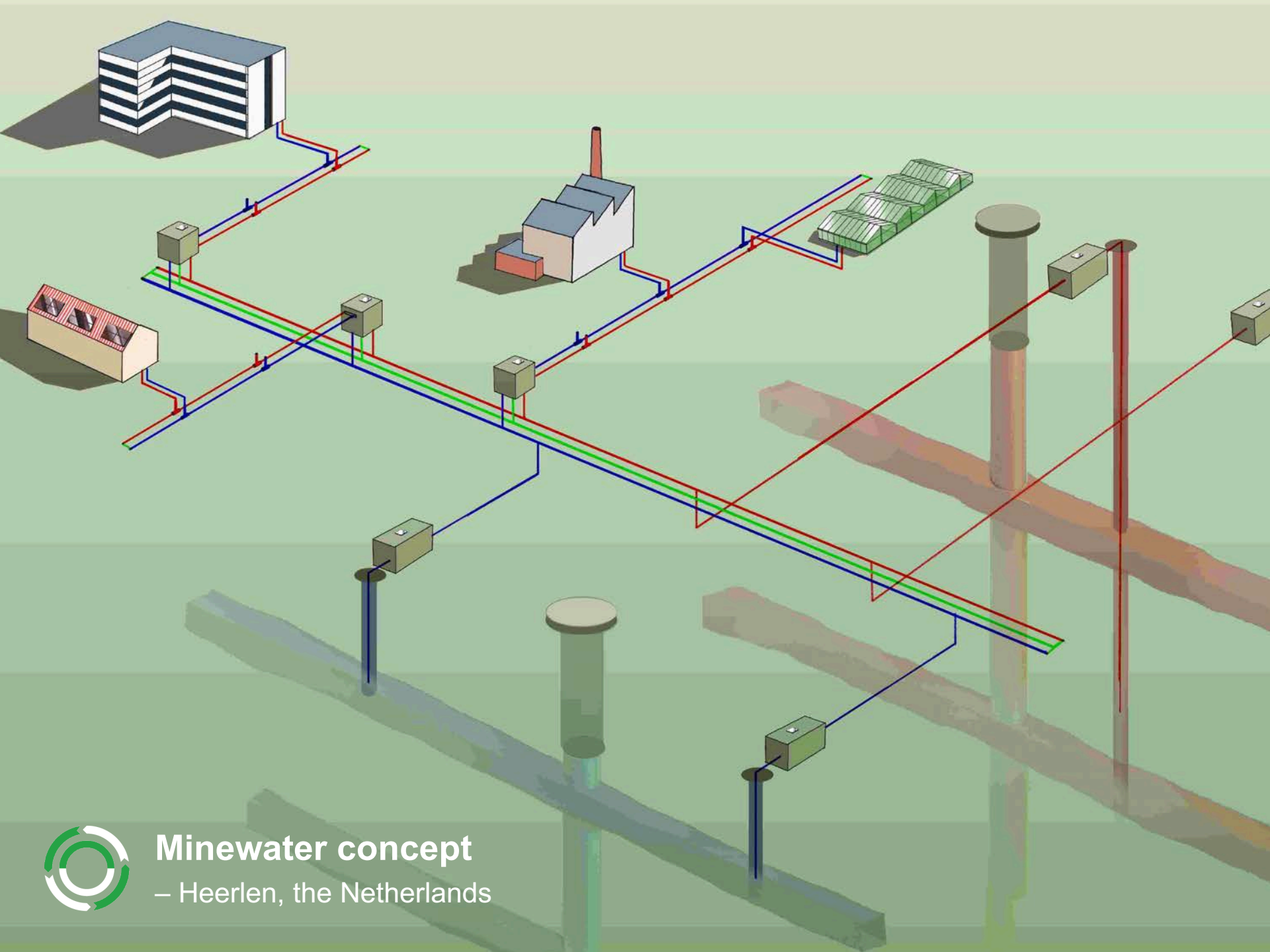
**Grimes Graves Neolithic Flint Mine**  
– Norfolk, United Kingdom





**Subtropolis – Hunt Midwest**  
– Kansas City, Missouri, United States





**Minewater concept**  
– Heerlen, the Netherlands



**CONTAMINATED  
BROWNFIELD**

**CAUTION**

**NO  
TRESPASSING**

  
**WESTWOOD  
COUNTRY CLUB**





# Tecnológico de Monterrey Urban Regeneration Plan

– Monterrey, Mexico



## STREETSCAPE

An improved streetscape that promotes biking and walking, reduces carbon emissions and activates the public realm

1



## SHADE STRUCTURES

Allow for an active public realm even under harsh weather conditions

2

Turf minimizes irrigation needs  
Multi-purpose field

Access to underground parking

Pedestrian-friendly massing articulation

Active frontage

Streetscape design incorporates stormwater infiltration strategies, reducing runoff



Green roofs reduce stormwater runoff while providing pleasant exterior spaces



Interior residential courtyard



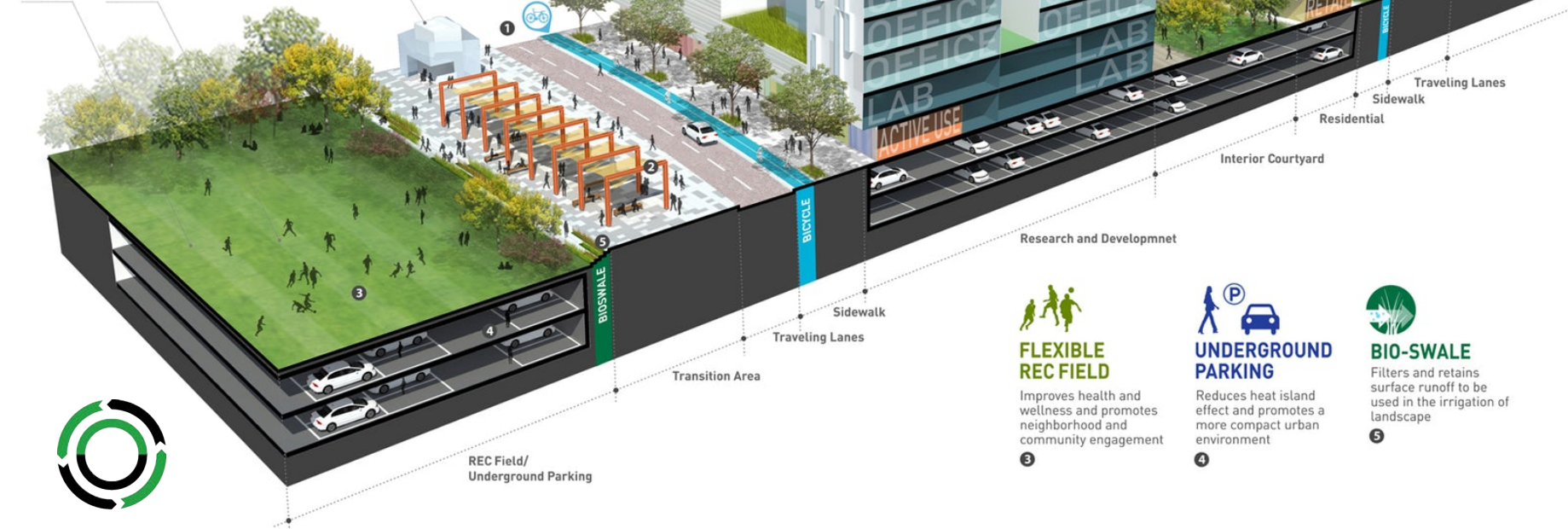
## MIXED USE DISTRICT

Compact urban development facilitates access to district amenities and promotes walkability



## SKYLINE TRANSITION

Building height steps down towards neighborhood



Turf minimizes irrigation needs  
Multi-purpose field

Access to underground parking

Pedestrian-friendly massing articulation

Active frontage

Streetscape design incorporates stormwater infiltration strategies, reducing runoff



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Interior residential courtyard



## MIXED USE DISTRICT

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## SKYLINE TRANSITION

Building height steps down towards neighborhood



## FLEXIBLE REC FIELD

Improves health and wellness and promotes neighborhood and community engagement

3



## UNDERGROUND PARKING

Reduces heat island effect and promotes a more compact urban environment

4



## BIO-SWALE

Filters and retains surface runoff to be used in the irrigation of landscape

5

REC Field/  
Underground Parking

Transition Area

Sidewalk  
Traveling Lanes

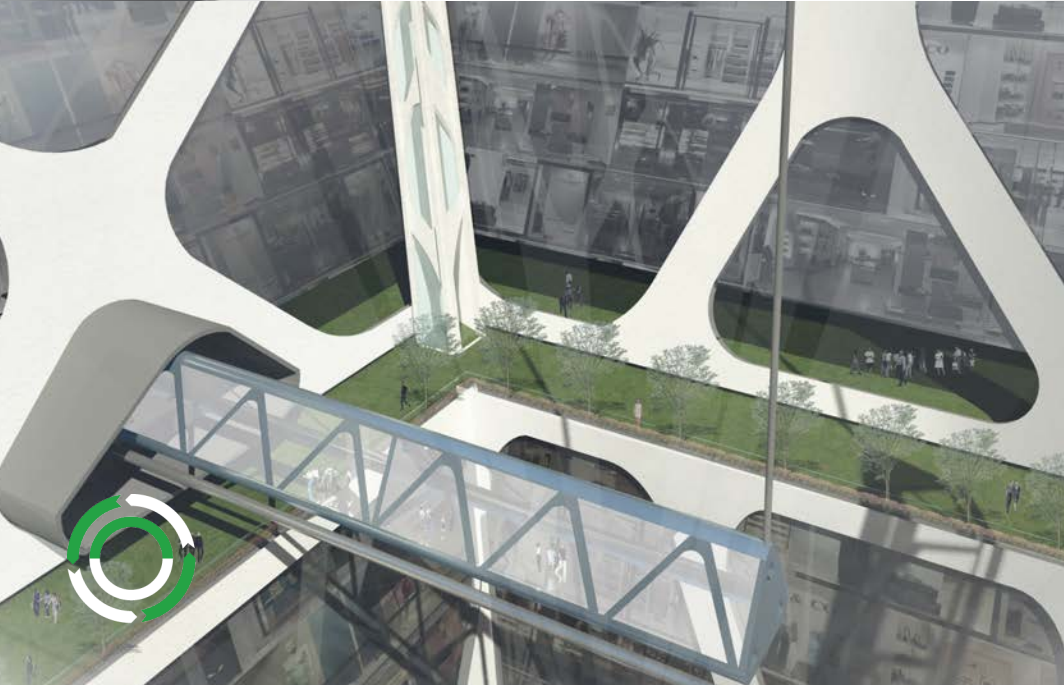
Research and Development

Interior Courtyard

Residential

Traveling Lanes  
Sidewalk



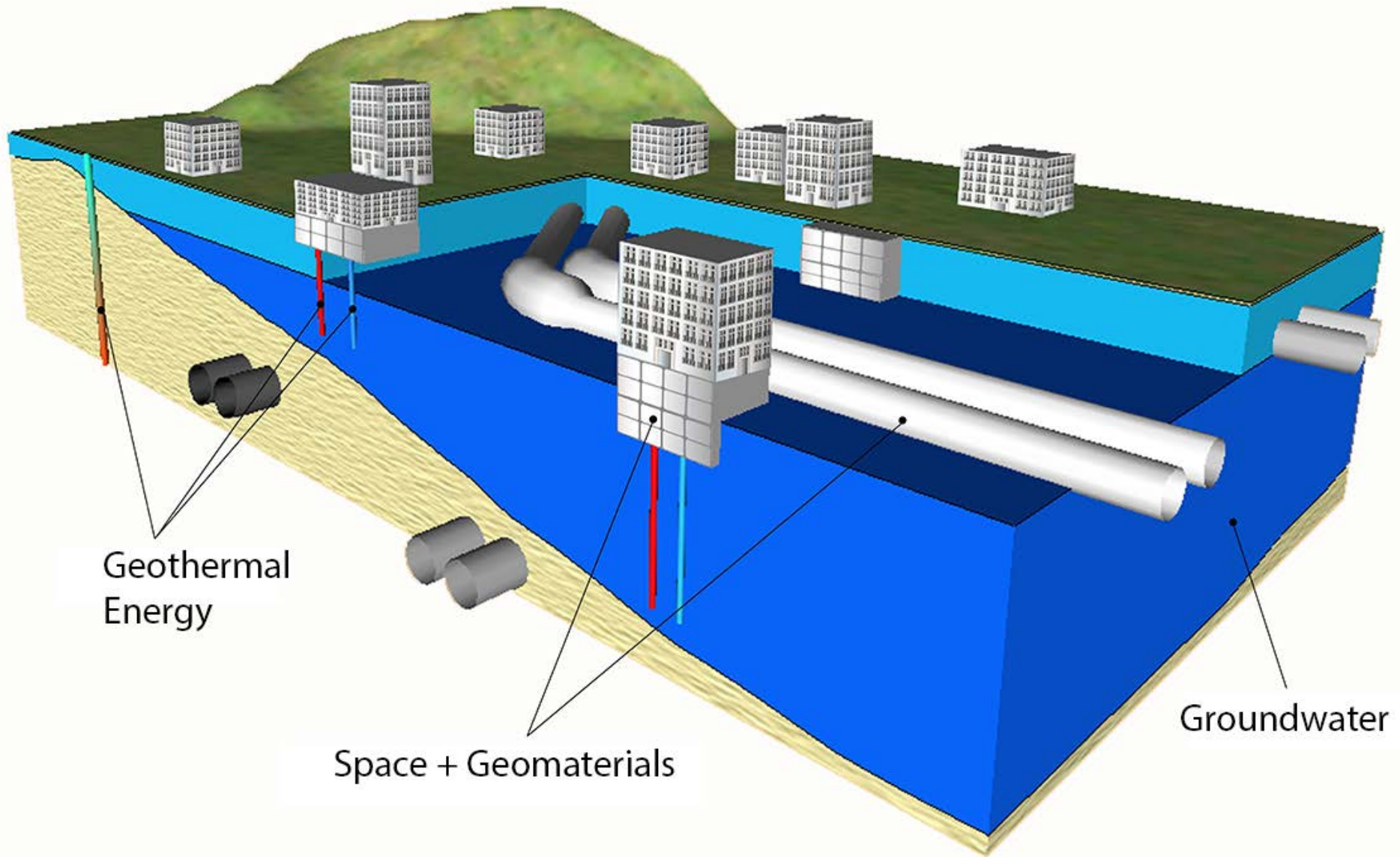


**Skyscraper versus Earthscraper**

# UNDERGROUND SPACE DYNAMISM

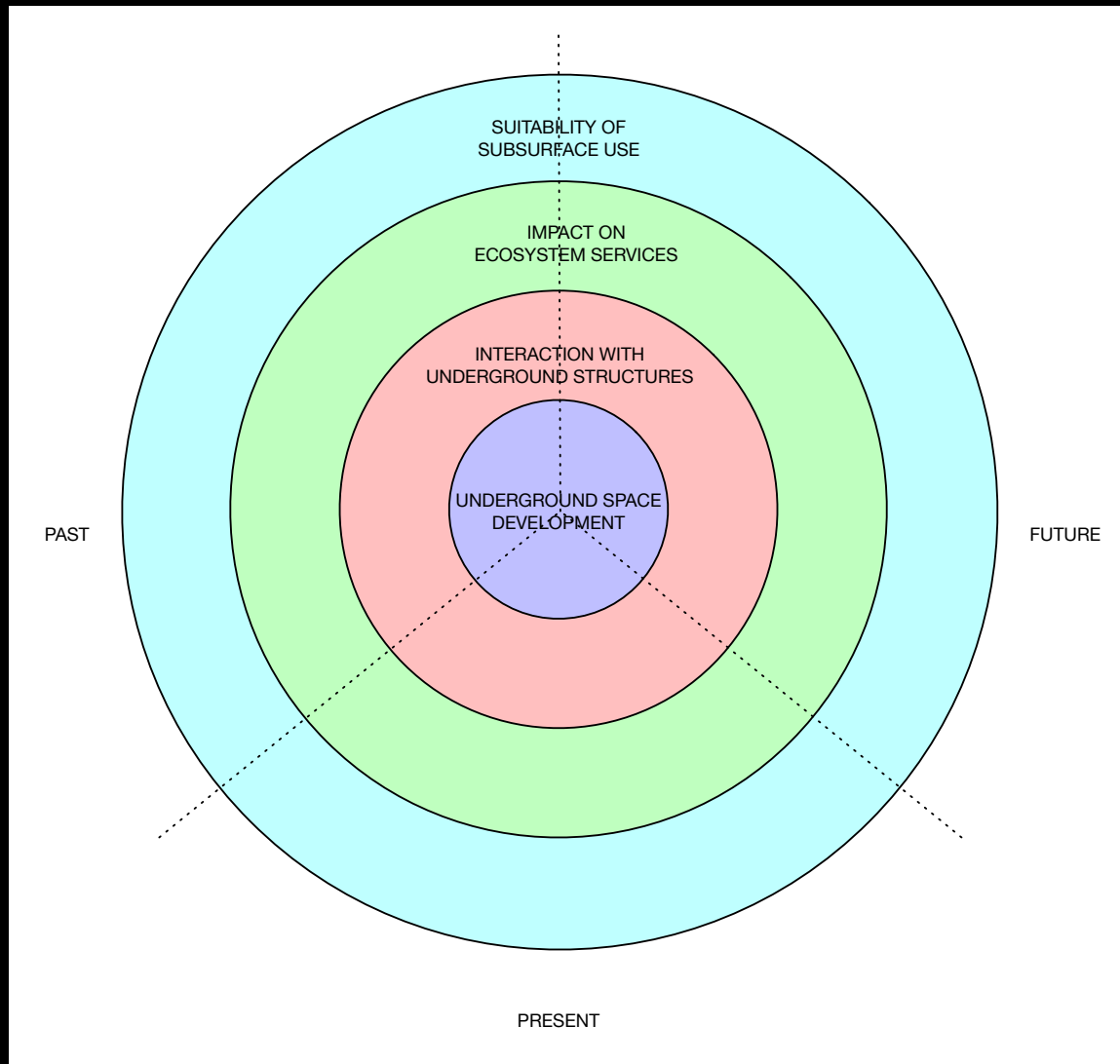
EXPLOITATION  
PRESERVATION





## Deep City Project Model

– EPFL, Lausanne, Switzerland



# Decision Framework for Underground Space Use

– Admiraal/Cornaro



**Underground Space Awareness**

**Strategic Underground Planning**

**Participatory Underground Planning**

**Underground Space Management**



# WHAT UNDERGROUND SPACE HAS TO OFFER

RECONNECTING











UNDERGROUND  
DYNAMISM  
REQUIRES  
COLLABORATION



**PLANNERS**

**ENGINEERS**

**UNDERGROUND SPACE  
DIALOGUE**





# YOUNG PROFESSIONAL'S THINK DEEP PROGRAM (YPTDP)

– ITACUS Activity Group 1 in collaboration with ISOCARP

Glasgow (2016) – Wroclaw (2017)

Dubai, Lyon, and Hong Kong next?





Join the conversation



## ITACUS

- ITA Committee on Underground Space
- International Tunnelling and Underground Space Association
- One of four permanent committees
- Membership open to organisations and institutions
- We 'tell the world' and work towards an urban underground future

Chair Han Admiraal

W [itacus.ita-aites.org](http://itacus.ita-aites.org)



Vice Chair Antonia Cornaro

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LinkedIn group ITACUS



# Our book on Underground Space

## Invisible Spaces Unveiled

Han Admiraal, Enprodes, Netherlands  
Antonia Cornaro, Amberg Engineering, Switzerland

**Description:**

*Invisible Spaces Unveiled* is a broad overview of the concept of underground space development investigating the issues that are associated with the sustainable development of urban underground space and creating the cities of the future.

This book unveils the benefits, the possibilities and world-class examples of underground space development and how that translates into sustainable urbanisation.

Written by an engineer and an urban planner ensuring a balanced view and wide appeal, the book is intended for civil engineers, urban planners, urban designers and architects as well as anyone involved with the future of urban development.



Coming Spring 2018

# Thank you

## Any questions?

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