



## Common Geographical Information System Platform (CGISP)

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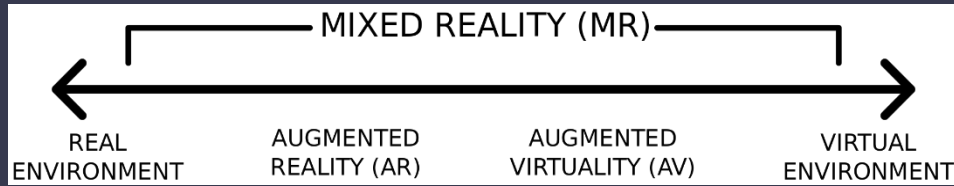
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# Current Development of the Mix Reality Technology



- Mixed reality refers to a continuum that encompasses both virtual reality (VR) and augmented reality (AR)
- NOT Comfortable to wear
- Expensive device
- NOT Accurate and stable
- Limited access
- Not easy to update resource
- Not Sustainable





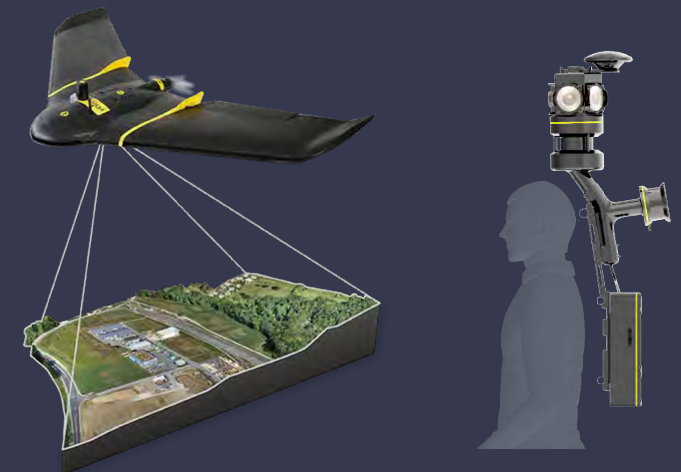
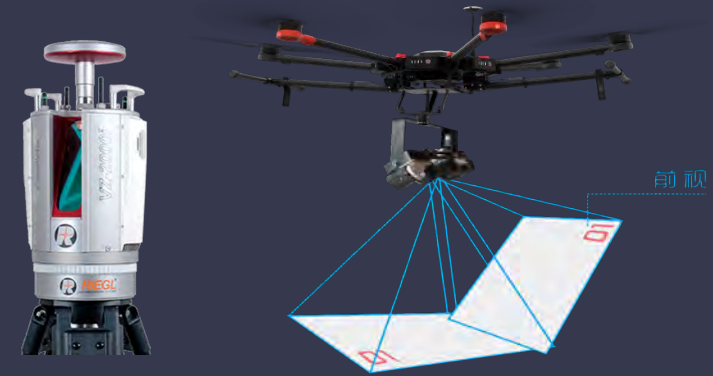
# CGISP = Mixed Reality Platform

## Digital Twin + Augment Design

- Design
- BIM
- GIS



- Reality
- 3D Surveying





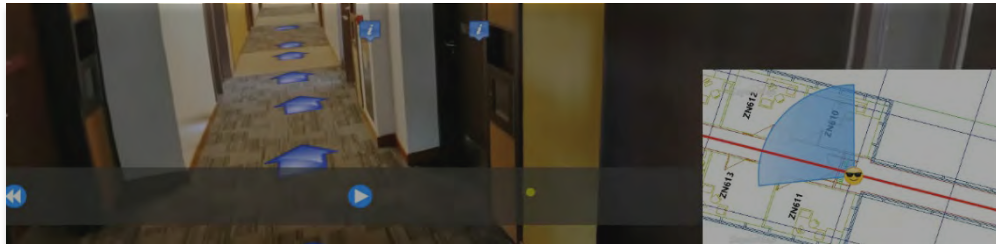
A digital copy of the real world





### Data Capture from Inside

Support 3D Laser Scan, 2D floorplan, 720° Panorama  
BIM models, IoT sensors



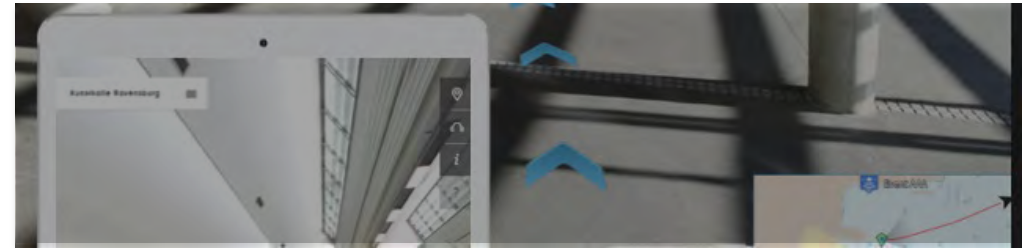
### Industrial Solution

Support Spatial analysis, Network Analysis, 3D analysis  
Based on data hosted on the server  
For various industrial applications



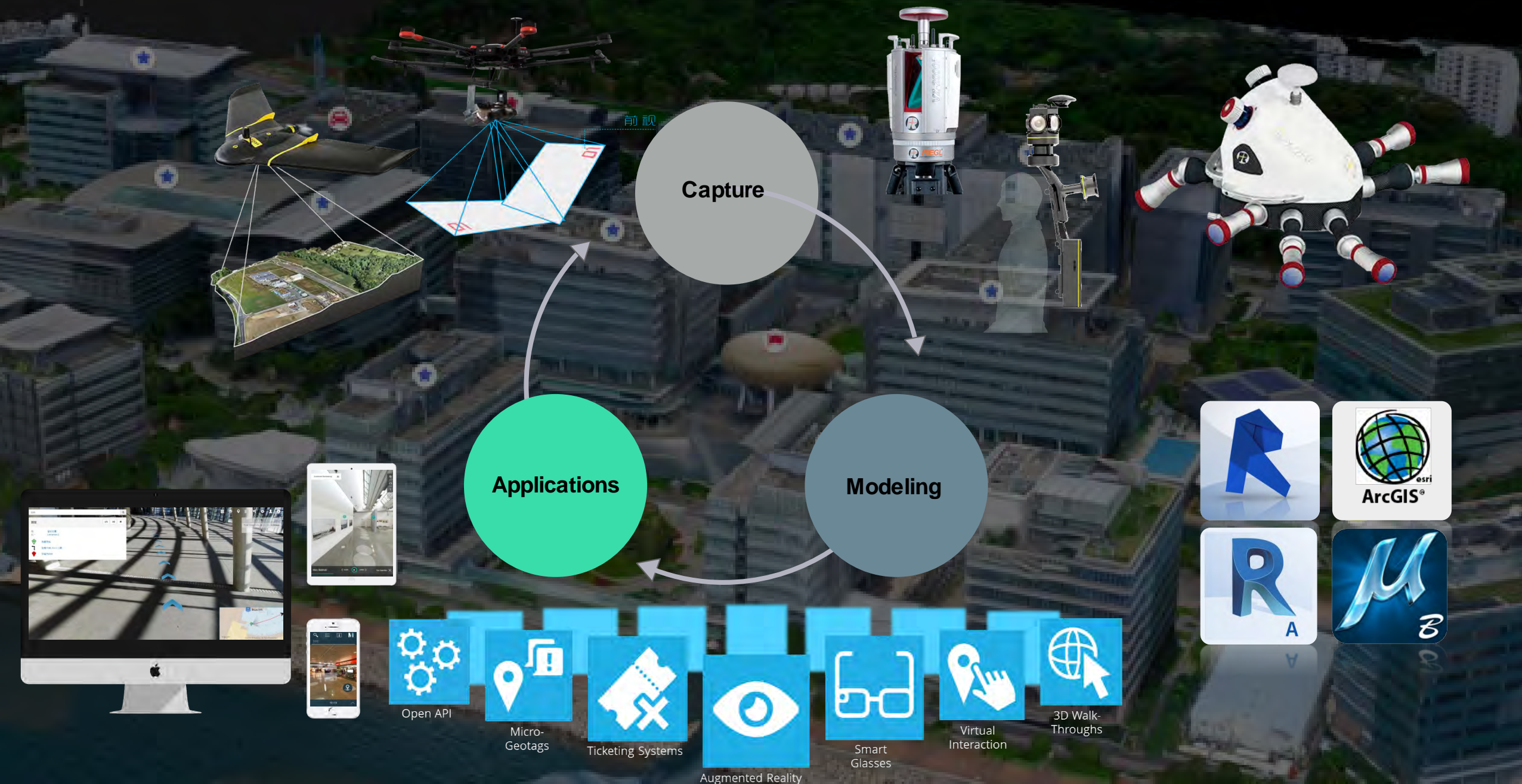
### Data Capture from the outside

Support Aerial photo, Videos, Streetview,  
3D Mesh models, 3D Building models, Basemap

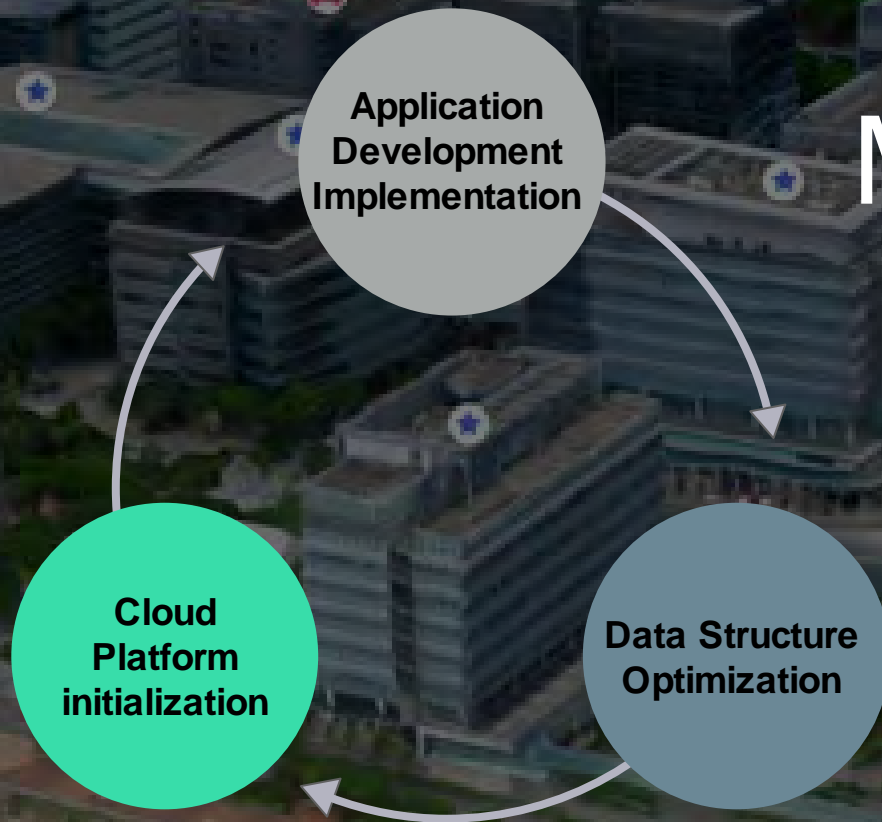


### Data integration with big data

Support millions of data and thousands of  
layers rendering on a single platform  
Powered by WebGL







# Mixed Reality Platform

- Access Anywhere
- Access data any time
- Standardized input and output
- Powerful analytics function
- Customizable
- Easy to share
- Cross platform
- Animation

## ≡ Online meeting and collaboration

### The future Situation

- Cov-19 may last a very long time, social distancing will also last for a long time
- Distance business will grow and become very normal just like Office software
- Online meeting will reduce the time of travelling, keep safe distance
- Site inspection will lost details of the site and time consuming
- It is hard to make decisions on site

### Benefit with the MR Platform

- Keep an 3D digital documentation/form of the civil project
- Team can collaborate on a 1:1 copy of the reality online.
- No need a group of people to do site inspection together
- All progress reality data will keep online and access anywhere any time you want
- Advanced 3D survey technologies can reduce the data collection cost and time



# Data Gathering

## Government Data

- Map API (LandsD)
- Digital Terrain (LandsD)
- iB1000 & iB5000 (LandsD)
- Gazette Road (CEDD)
- Outline Zoning Plans (PlanD)





# Data Gathering

## UAV Data

- Orthophoto
- 3D Mesh Model

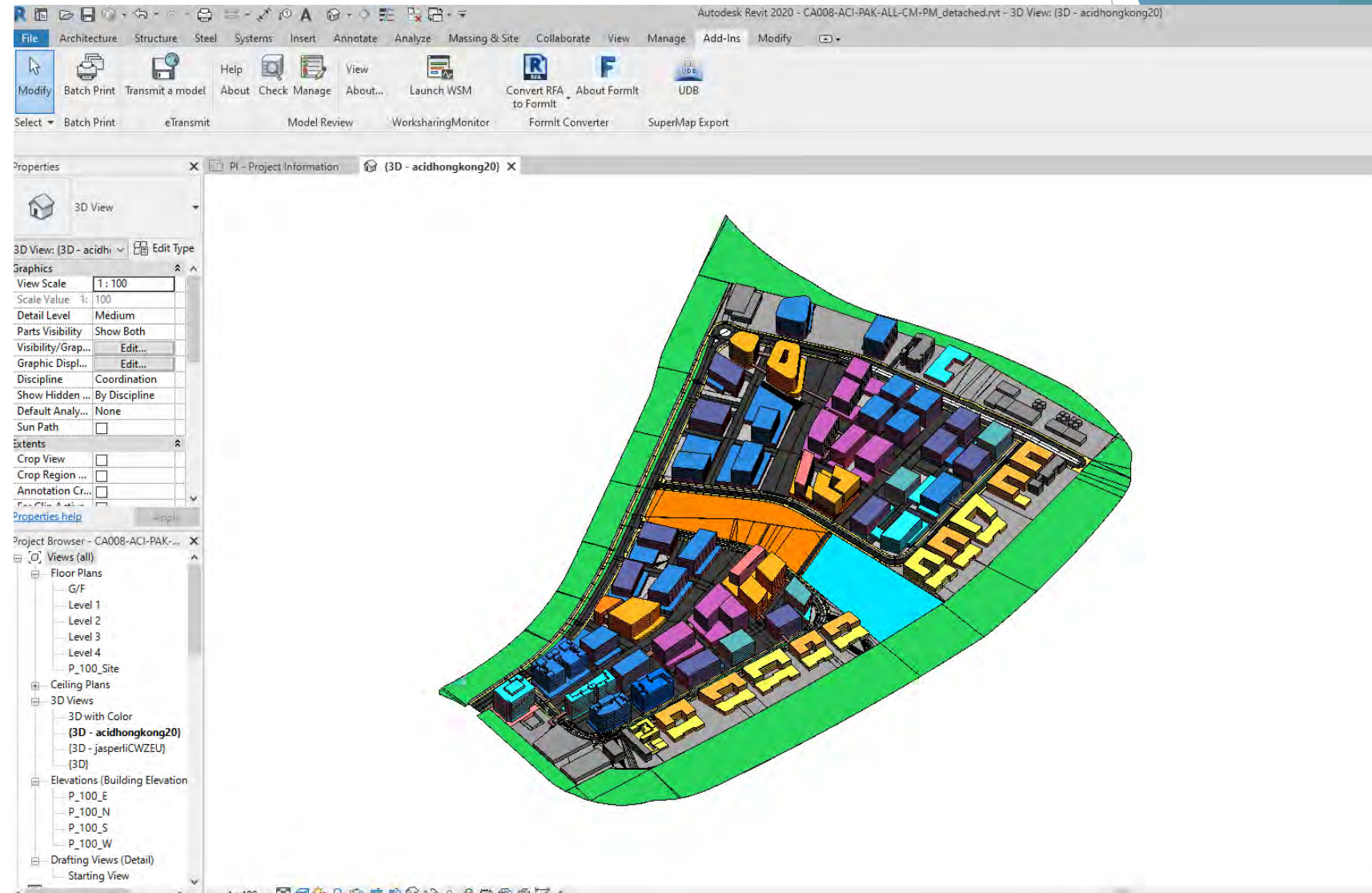




# Data Gathering

## BIM Model

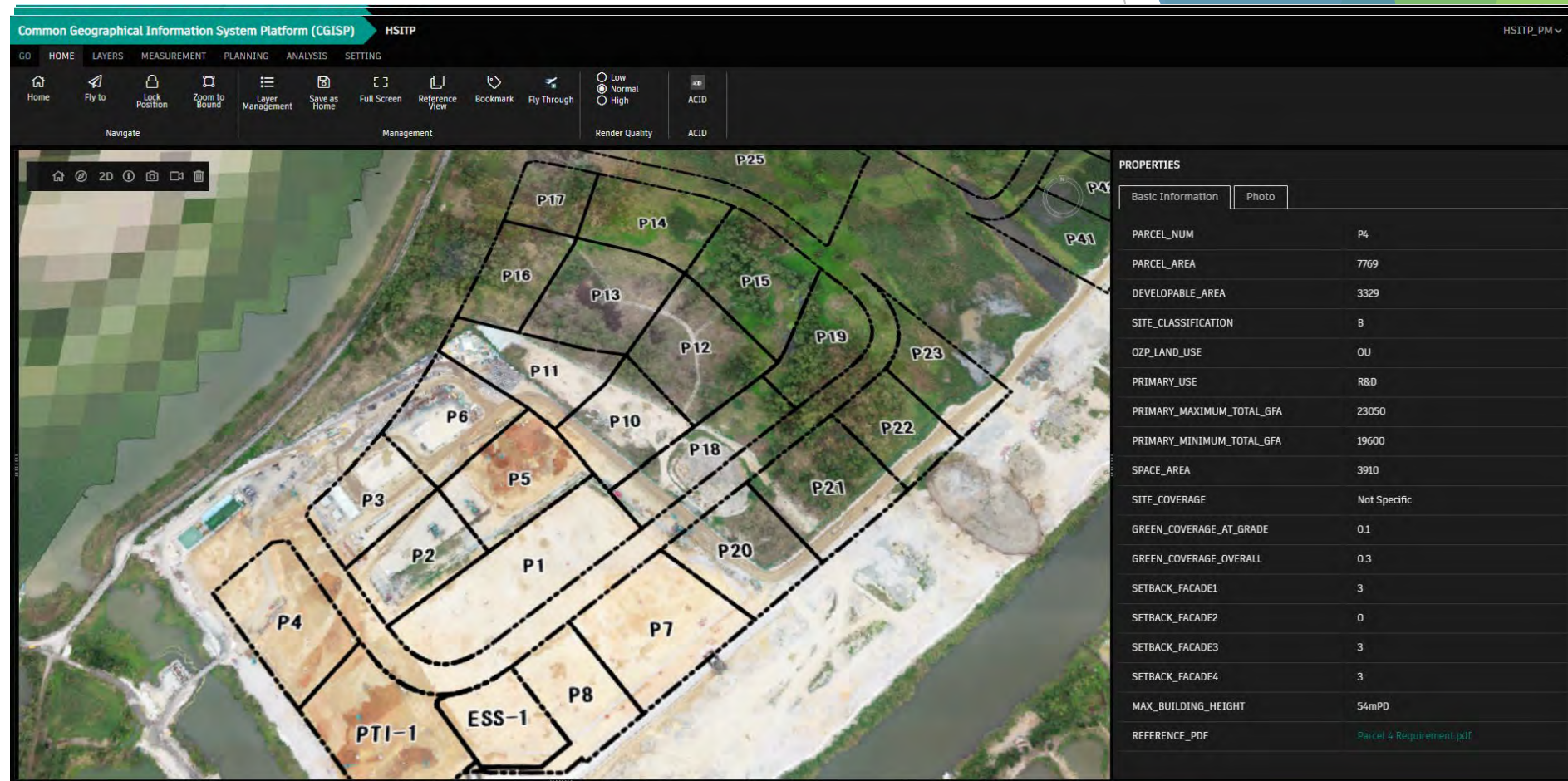
- Road Network
- Building Massing
- Basement



# Data Gathering

## Development Data

- Master Layout Plan
- View Corridor
- Breezeway
- EVA
- Parcel Requirement
- .....





# Quick Scenarios

Show different scenarios

- The Park Overview
- Basement view
- Road Network
- Detailed view of 45 Parcels



# Development data visualization

- Setback Line
- Wind and View corridors
- EVA
- Open Space
- Max Building Height
- Buffer Zone





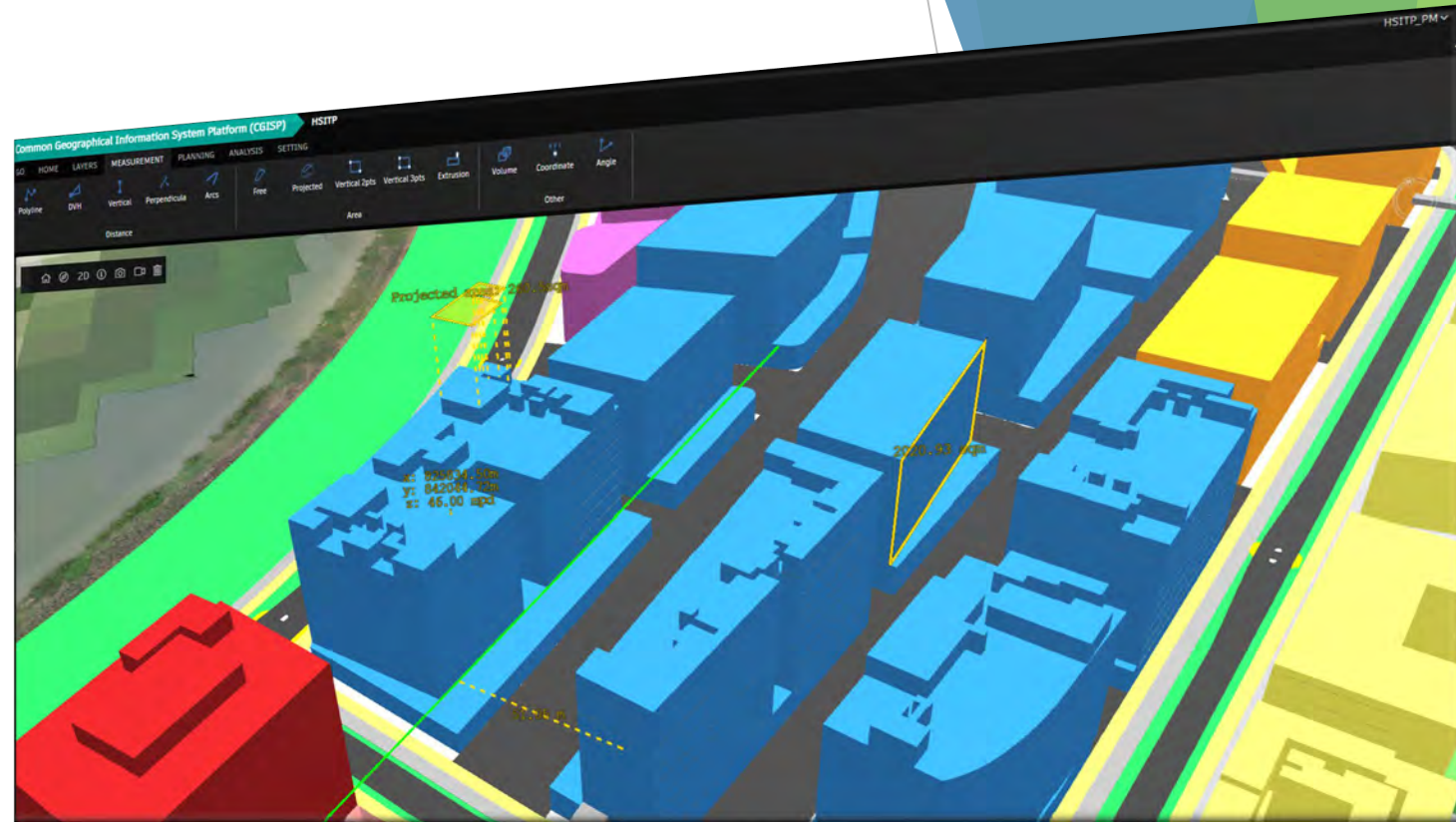
# Development Phasing Strategy

- ▶ Show the development of the park by years
- ▶ 4D Animation
- ▶ Progress overview of each factors



# Easy measurement

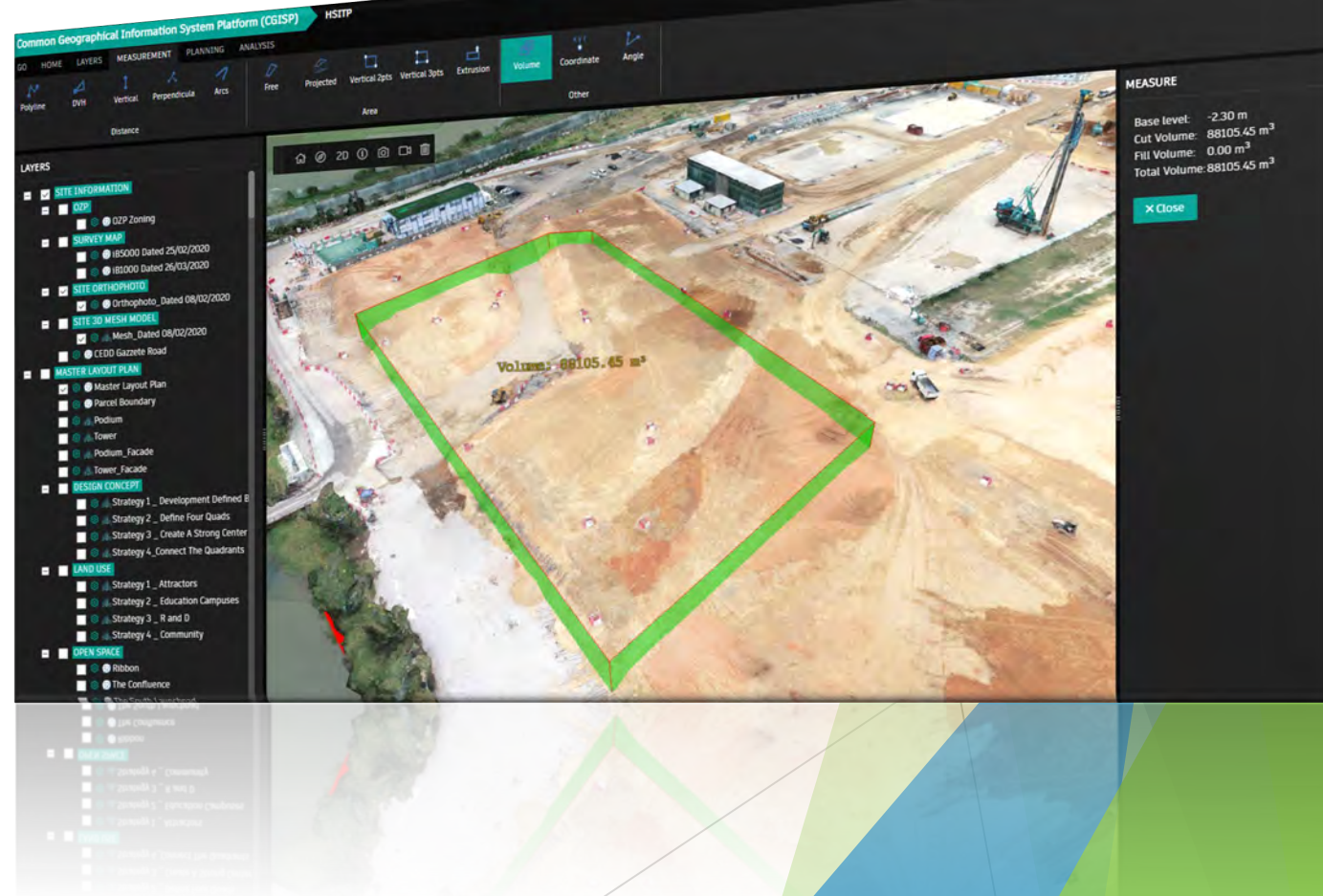
- ▶ Distance & Area & Level
- ▶ Based on design data / Reality data





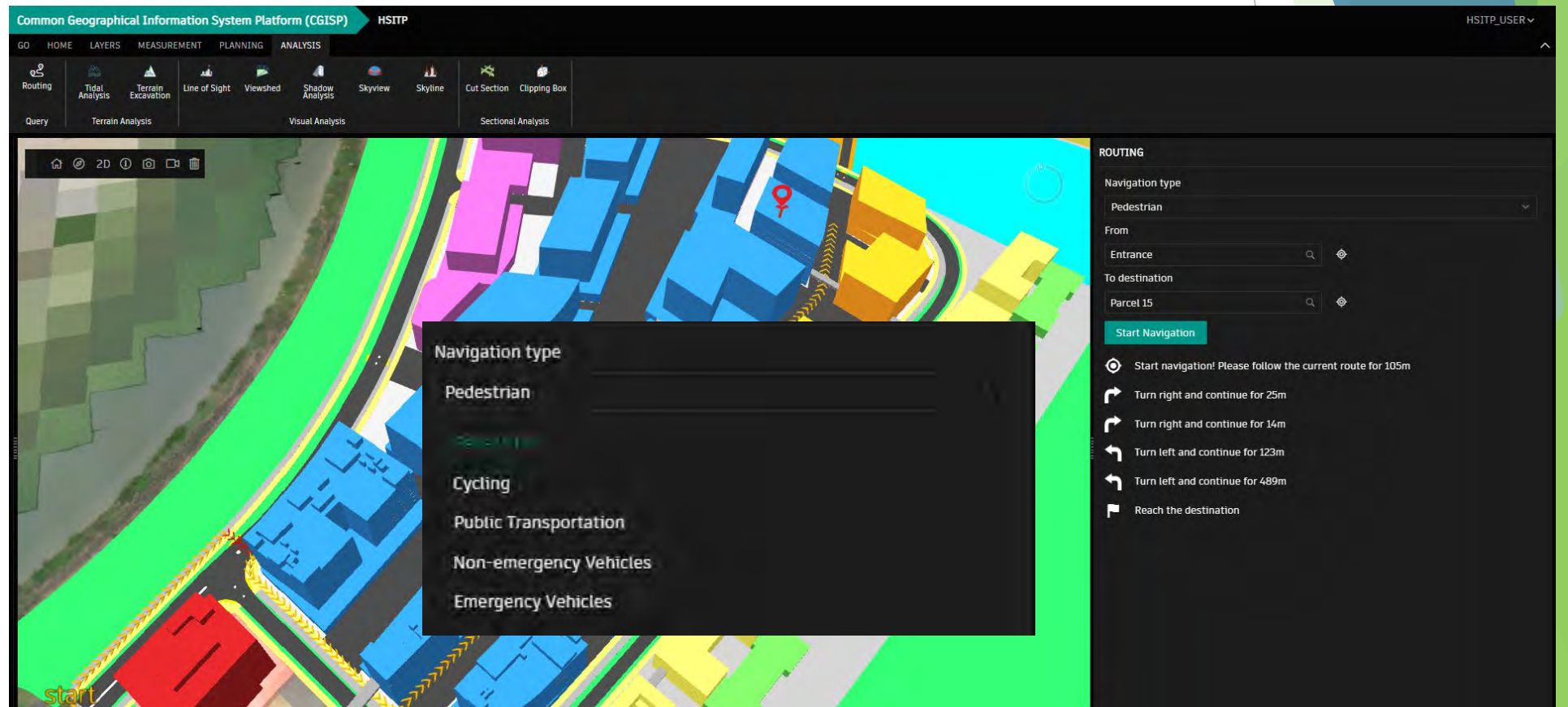
# Terrain Analysis

- ▶ Estimate quantity of cut and fill
- ▶ User defined area of interest for the calculation
- ▶ Calculation based on reality 3d mesh data



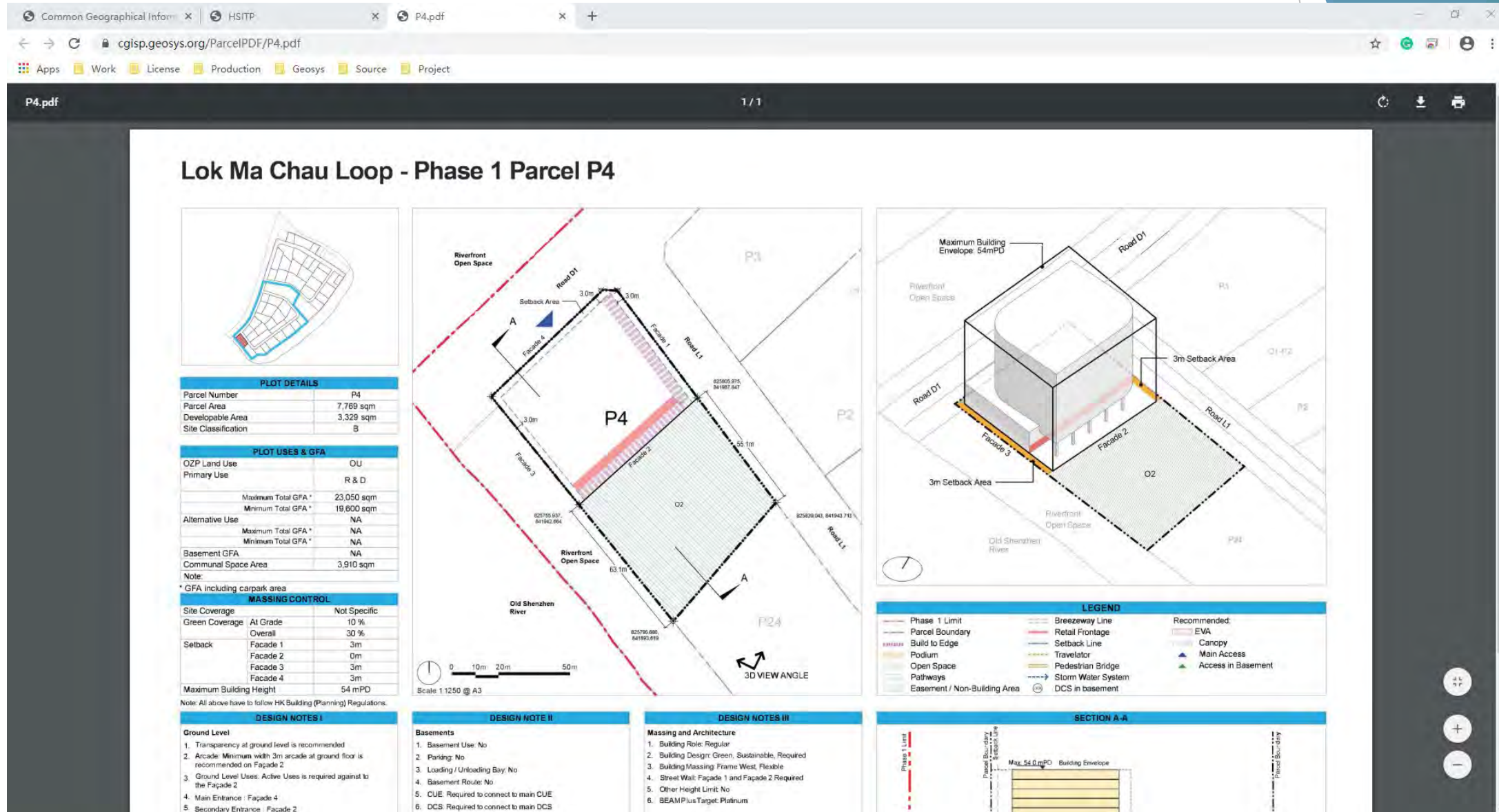
# 3D Route Navigation

- Indoor & Outdoor
- Shortest way to destination
- Vehicles, cycling & pedestrians



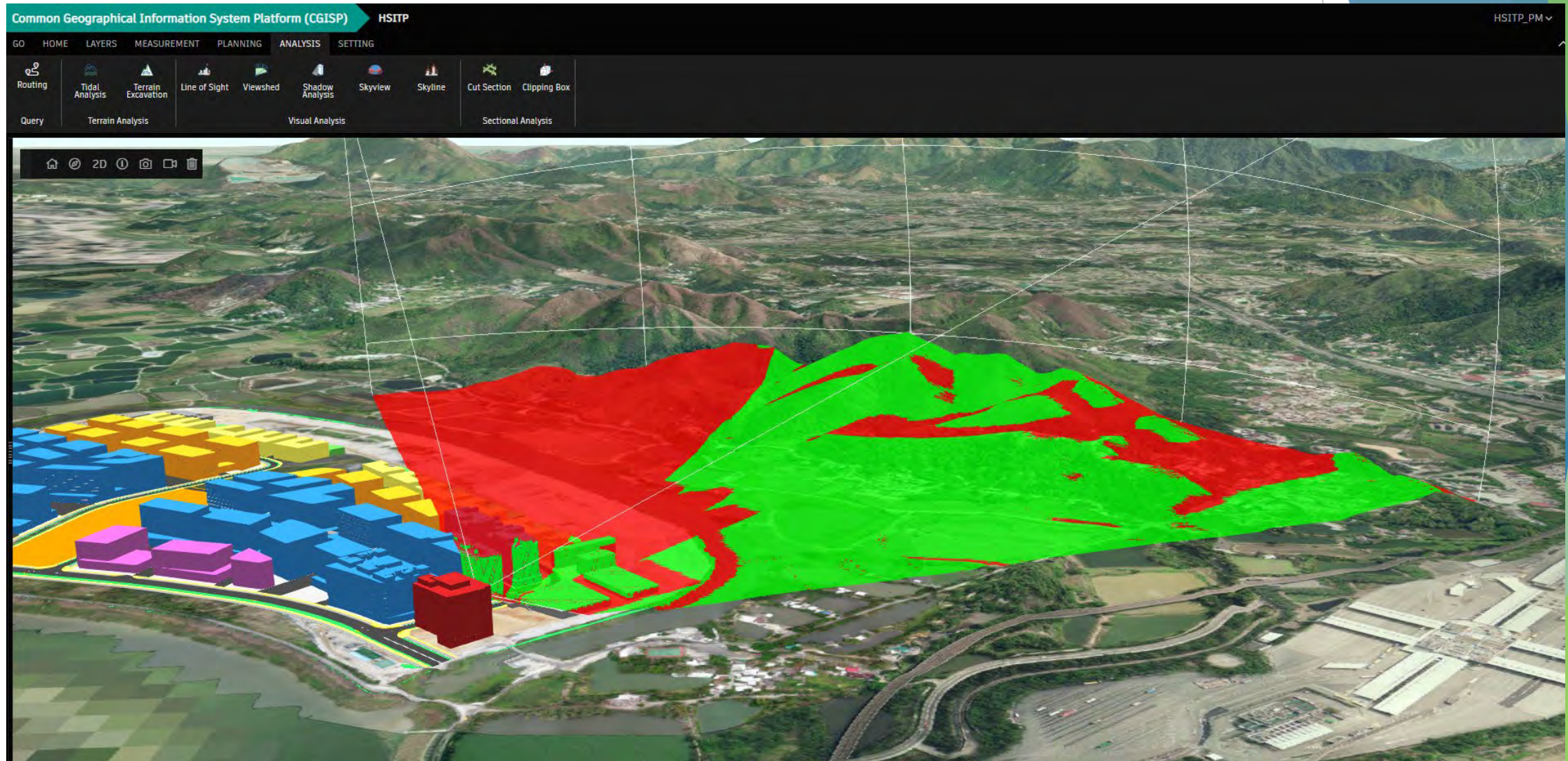


# Smart Planning Tools



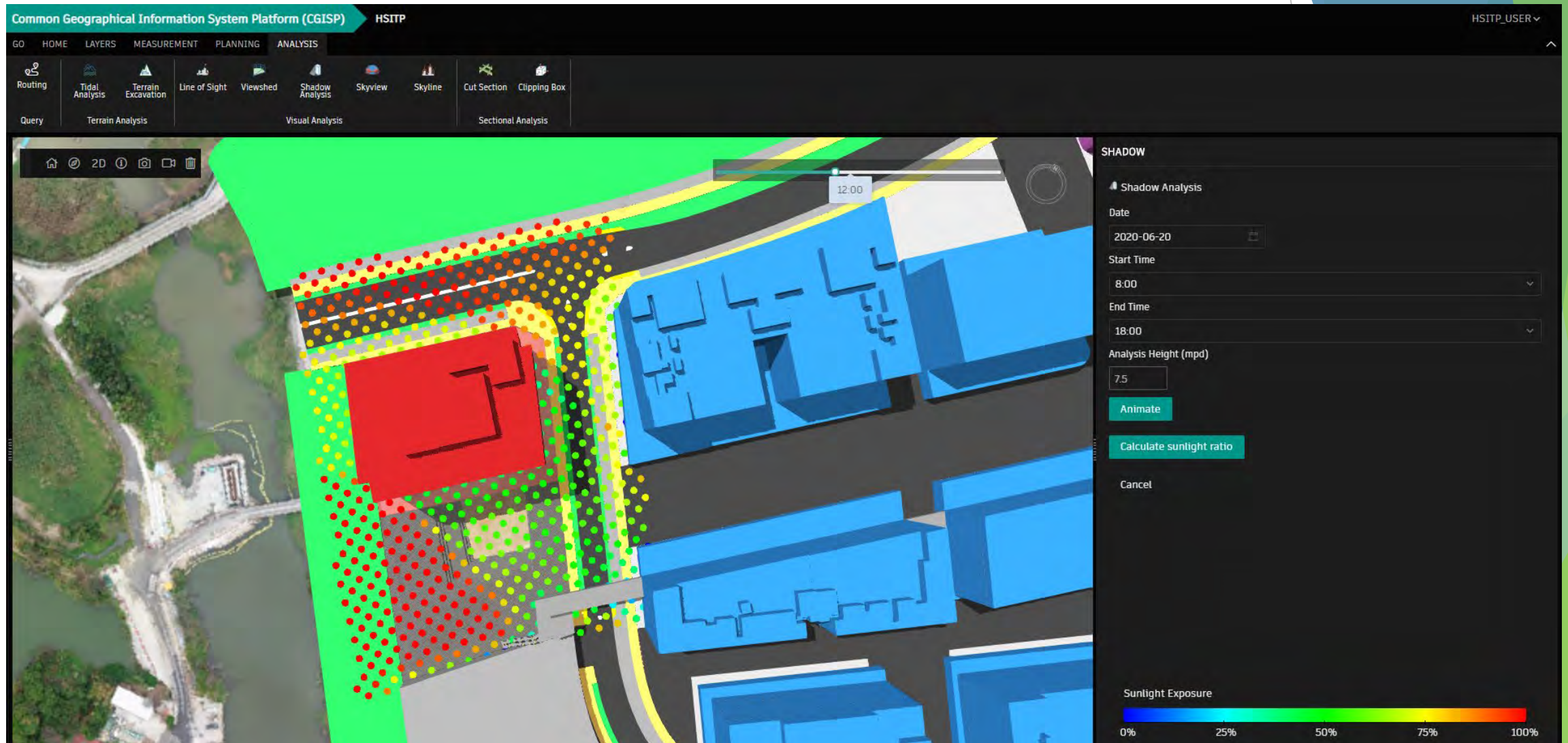


# Viewshed Analysis



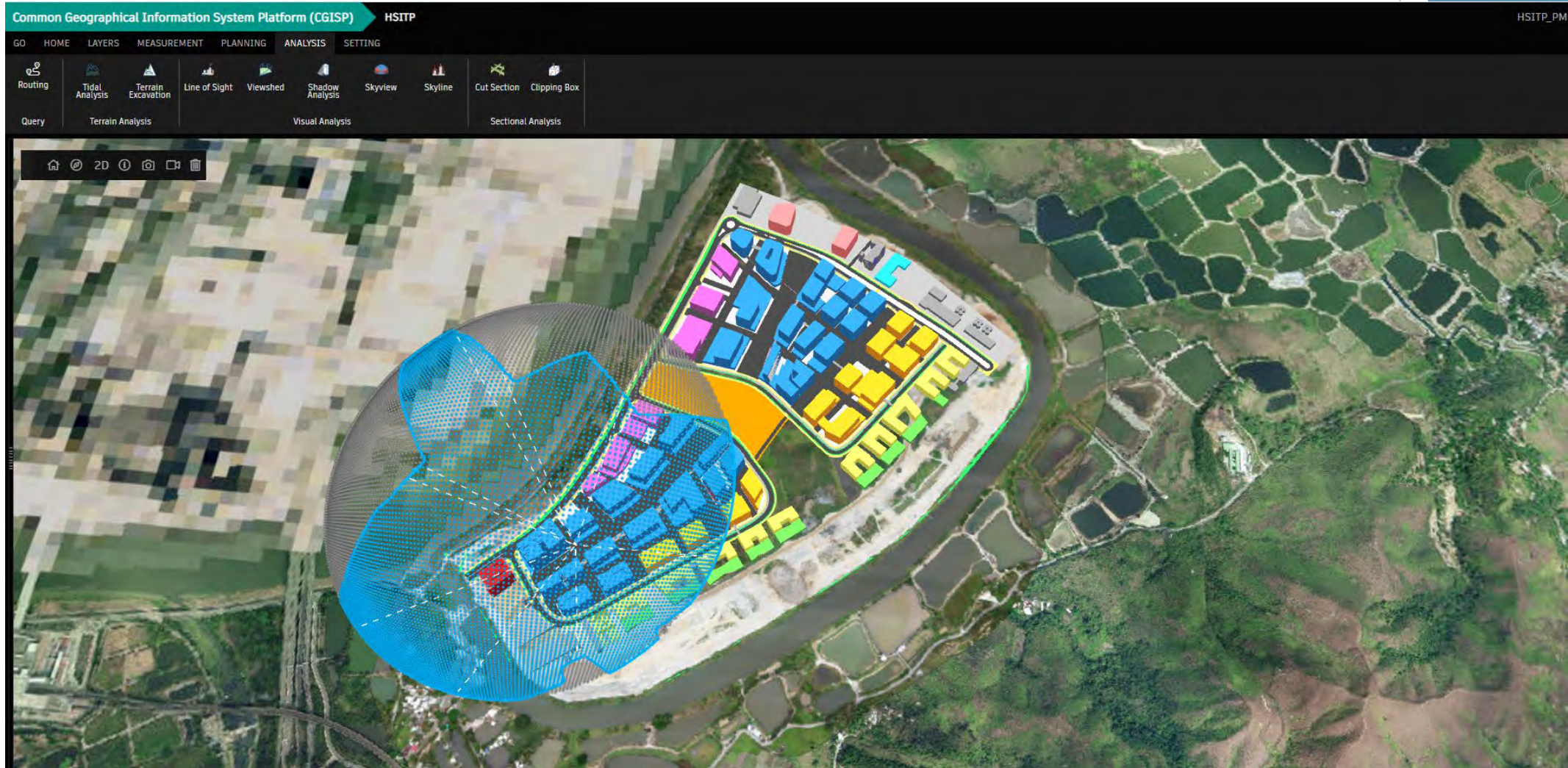


# Shadow Analysis





# Skyview Analysis






# Fly Through Animations

Common Geographical Information System Platform (CGISP) HSITP HSITP\_PM

GO HOME LAYERS MEASUREMENT PLANNING ANALYSIS SETTING

Home Fly to Lock Position Zoom to Bound Layer Management Save as Home Full Screen Reference View Bookmark Fly Through Low Normal High ACID ACID

Navigate Management Render Quality



DEMO

Fly speed (km/h)

120

Add Stop

Name	#
Stop2	...
Stop3	...
Stop4	...
Stop5	...
Stop6	...

☒ Save as video after animation

Animate & Play

[<< Back to Fly Through Management](#)

# Demonstration

Common Geographical Information System Platform

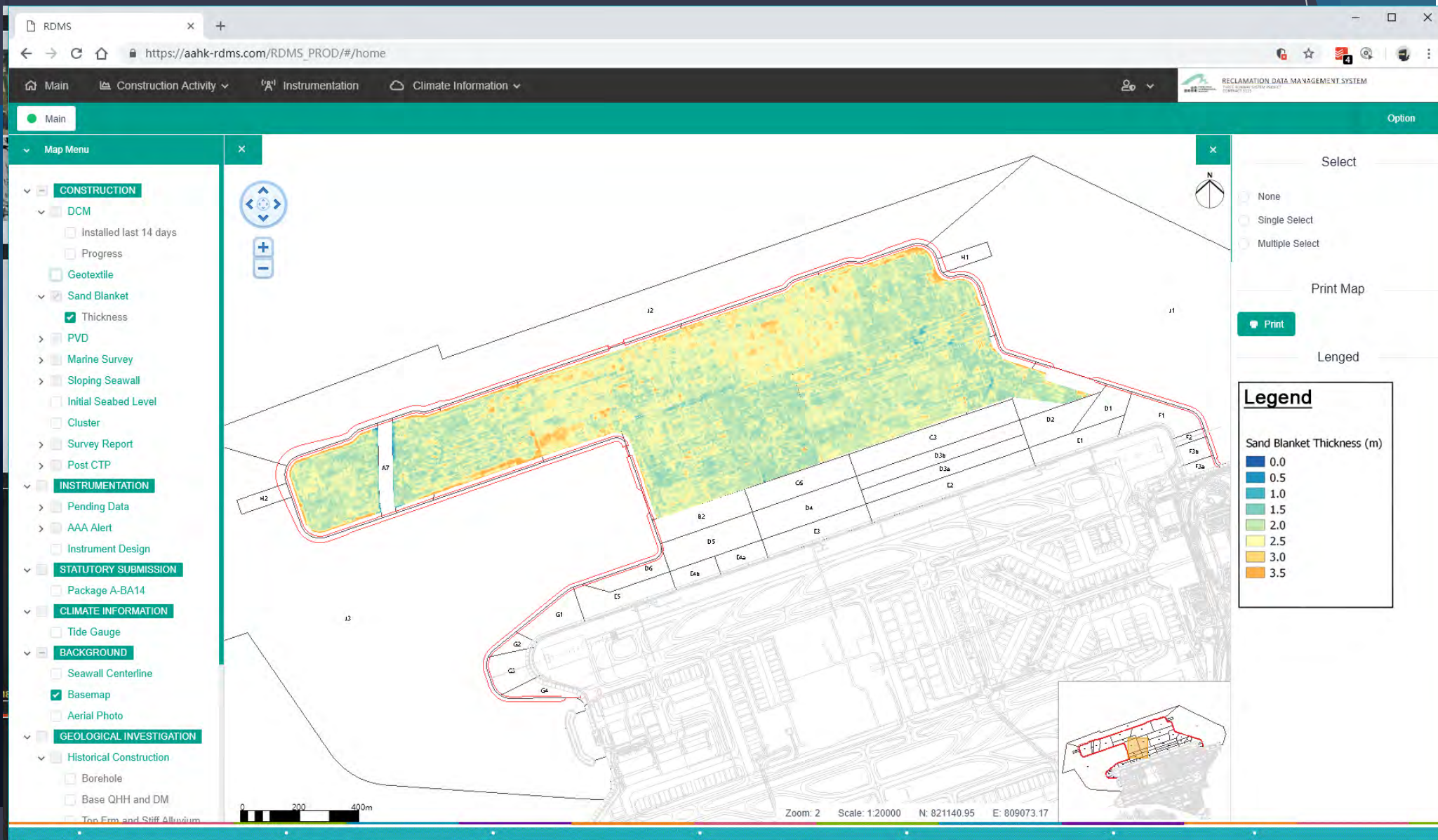


# Further Enhancement

Construction Stage



# Construction Data Management / Monitoring System





- Main
- ☐ MF\_2th

☐ MF\_1st
- ☐ Sloping Seawall

☐ Initial Seabed Level

☐ Cluster
- ☐ Survey Report

☒ Post CTP

☒ 3201

☐ 3202

☐ 3203

☐ 3204
- ☐ INSTRUMENTATION

☐ Pending Data

☐ AAA Alert

☐ Instrument Design
- ☐ STATUTORY SUBMISSION

☐ Package A-BA14
- ☒ CLIMATE INFORMATION

☒ Tide Gauge
- ☒ BACKGROUND

☒ Seawall Centerline

☒ Basemap

☒ Aerial Photo
- ☐ GEOLOGICAL INVESTIGATION

☐ Historical Construction

☒ Borehole

☒ Base QHH and DM

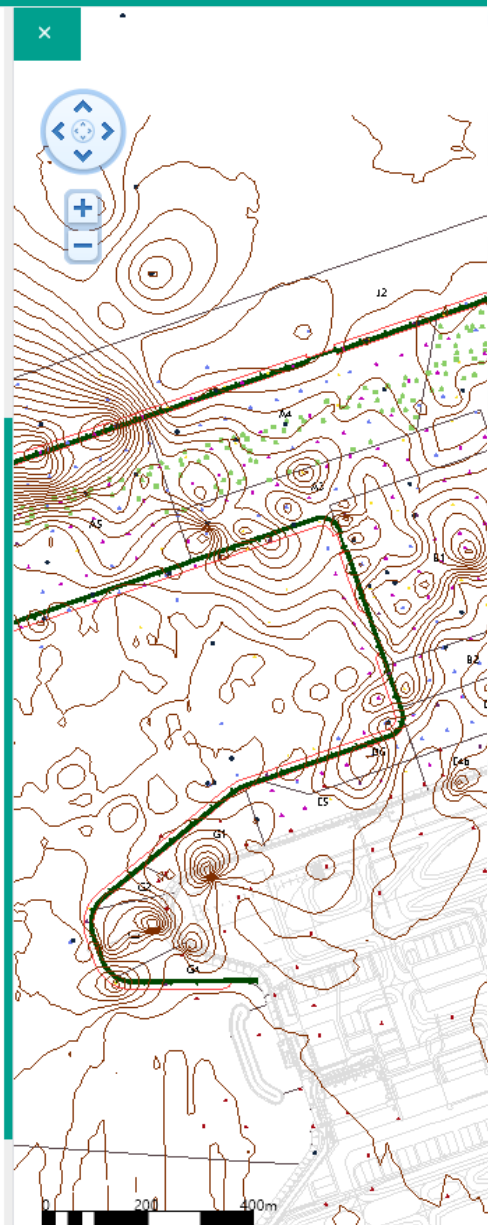
☐ Top Frm and Stiff Alluvium

☐ Top Lower Sand

☐ Top CDG

☐ Rockhead
- ☐ Post Construction

☐ CPT



DCM Search

Contract selection

Zone selection

☐ B01

☒ B03

☐ B05

☐ B07

☐ B09

☐ B11

☐ B12

☐ B02

☐ B04

☐ B06

☐ B08

☐ B10

☐ B12

☐ R14

Date Range

Result

Cluster ID:

submit

Result

Search:

Contract ID	ID	Install Date	Zone	Preliminary Check	Final Check	Remarks
C3203	<a href="#">SWA1E005</a>	29-04-2017 03:17:08	B03	NG	OK	Local point
C3203	<a href="#">SWA1E006</a>	29-04-2017 12:05:43	B03	NG	OK	Local point
C3203	<a href="#">SWA1E007</a>	30-04-2017 05:54:08	B03	NG	OK	Local point
C3203	<a href="#">SWA1E008</a>	09-06-2017 01:24:58	B03	OK	OK	
C3203	<a href="#">SWA1E009</a>	10-05-2017 01:51:52	B03	OK	OK	
C3203	<a href="#">SWA1E010</a>	15-05-2017 13:31:34	B03	NG	OK	Local point
C3203	<a href="#">SWA1E011</a>	10-05-2017 12:42:08	B03	NG	OK	Local point
C3203	<a href="#">SWA1E016</a>	29-04-2017 06:04:13	B03	NG	OK	Local point
C3203	<a href="#">SWA1E016</a>	29-04-2017 14:21:55	B03	NG	OK	Local point
C3203	<a href="#">SWA1E017</a>	30-04-2017 03:20:05	B03	NG	OK	Local point

Showing 1 to 10 of 138 entries

First Previous Page 1 of 14 Next Last

[Download Records in Excel](#) [Download Master Registry](#)

DCM Report

Installation Report

Show 1 entries

ID	W-Curve Date	Download Path
SWA1E005	29-04-2017 03:17:08	<a href="#">Download W-Curve Report</a>

Showing 1 to 1 of 1 entries

Compliance Report

Show 1 entries

Search:

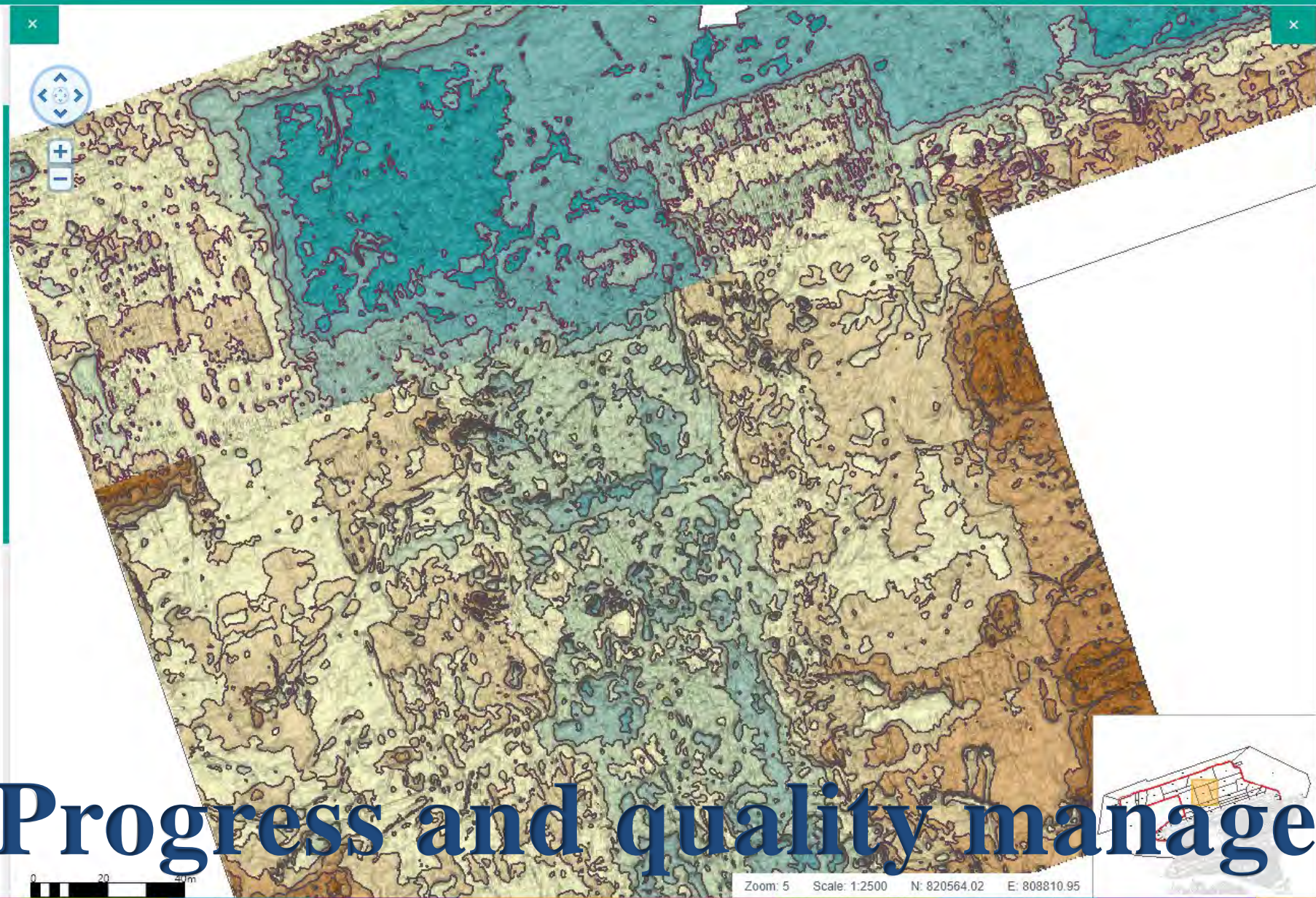
# DCM Progress



Main

Option

- ☒ Sand Blanket
  - ☐ Thickness
- ☒ PVD
  - ☐ As-built
  - ☐ Design
- ☒ Marine Survey
  - ☐ SR0001
  - ☐ SR0002
- ☒ Progress
  - ☐ MF\_4th
  - ☐ MF\_3rd
  - ☐ MF\_2th
  - ☐ MF\_1st
- ☒ Sloping Seawall
  - ☐ Initial Seabed Level
  - ☐ Cluster
- ☒ Survey Report
  - ☒ 3117
    - ☐ SR0001
    - ☒ SR0002
    - ☒ SR0003
    - ☒ SR0004
    - ☒ SR0005
    - ☒ SR0006
    - ☒ SR0007
    - ☒ SR0008
    - ☒ SR0009
    - ☒ SR0010
- ☒ Post CTP
  - ☒ 3201
  - ☐ 3202
  - ☐ 3203
  - ☐ 3204



Select

☐ None

☐ Single Select

☐ Multiple Select

Print Map

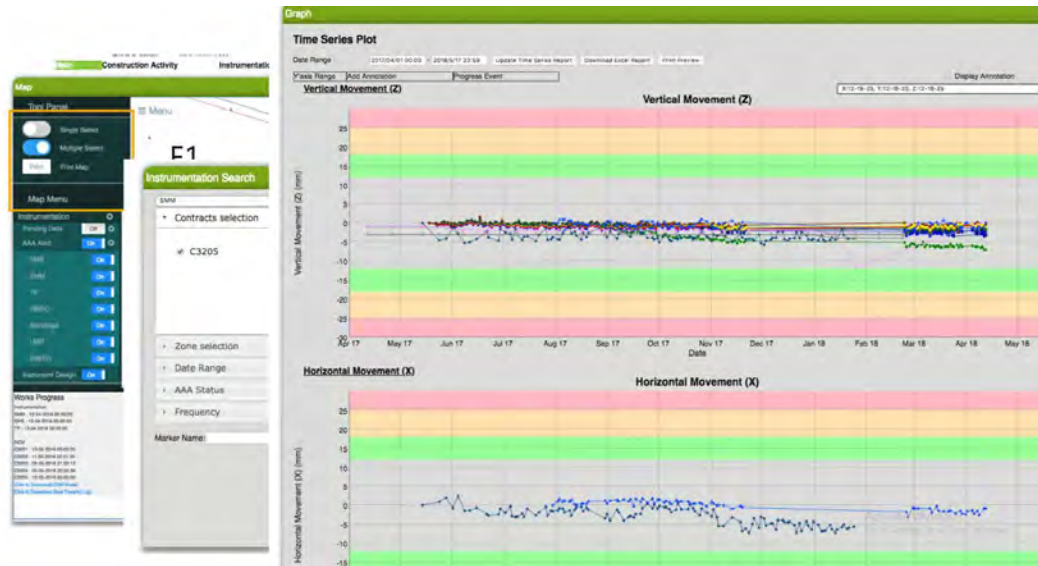
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# Progress and quality management



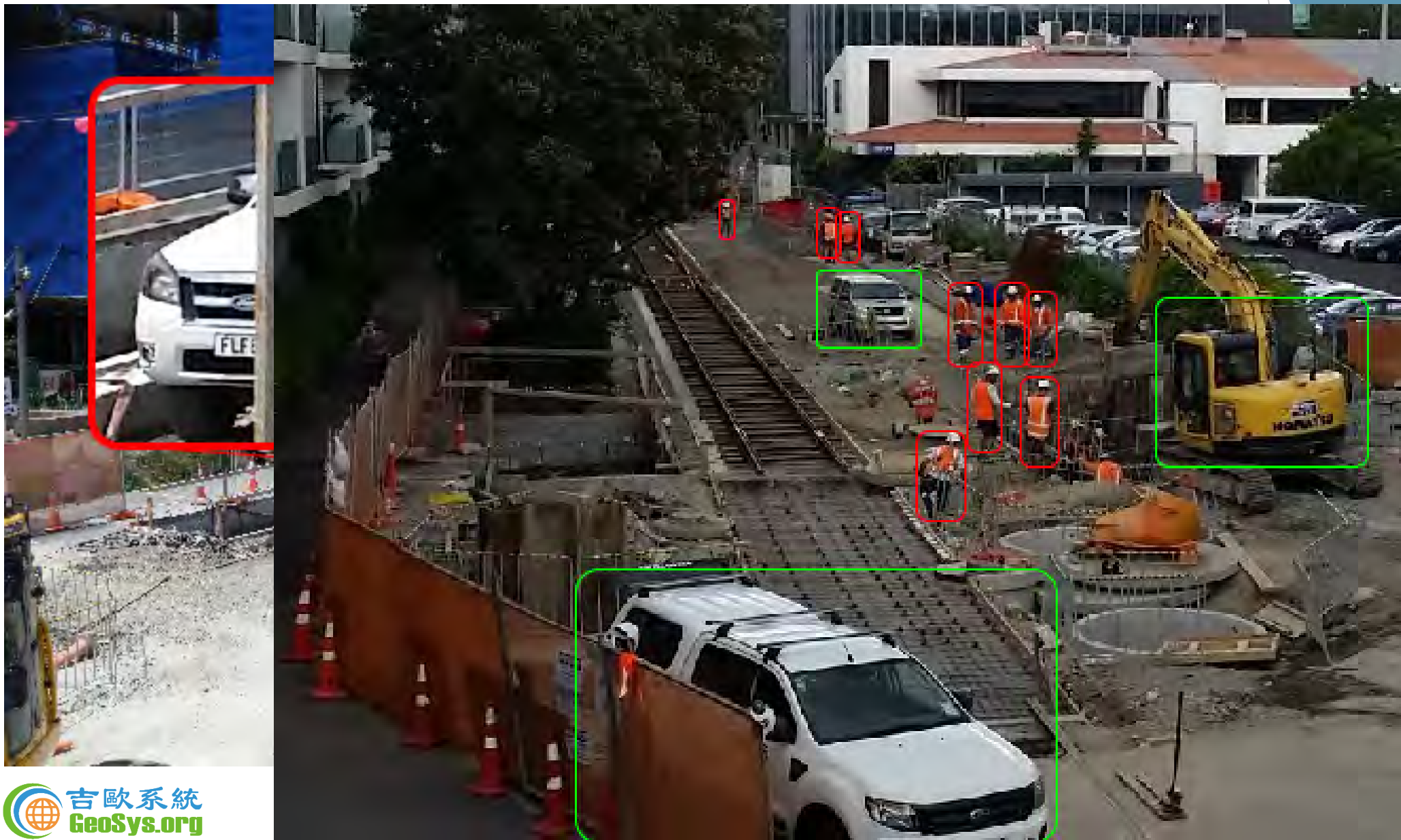
# Big data and AI Analysis Dashboard

- ▶ Progress Management with Comments and Alerts Interacting with Users
- ▶ IoT Big Data Management
- ▶ Reports with Graphical Plots/Charts





# Construction Traffic Monitoring









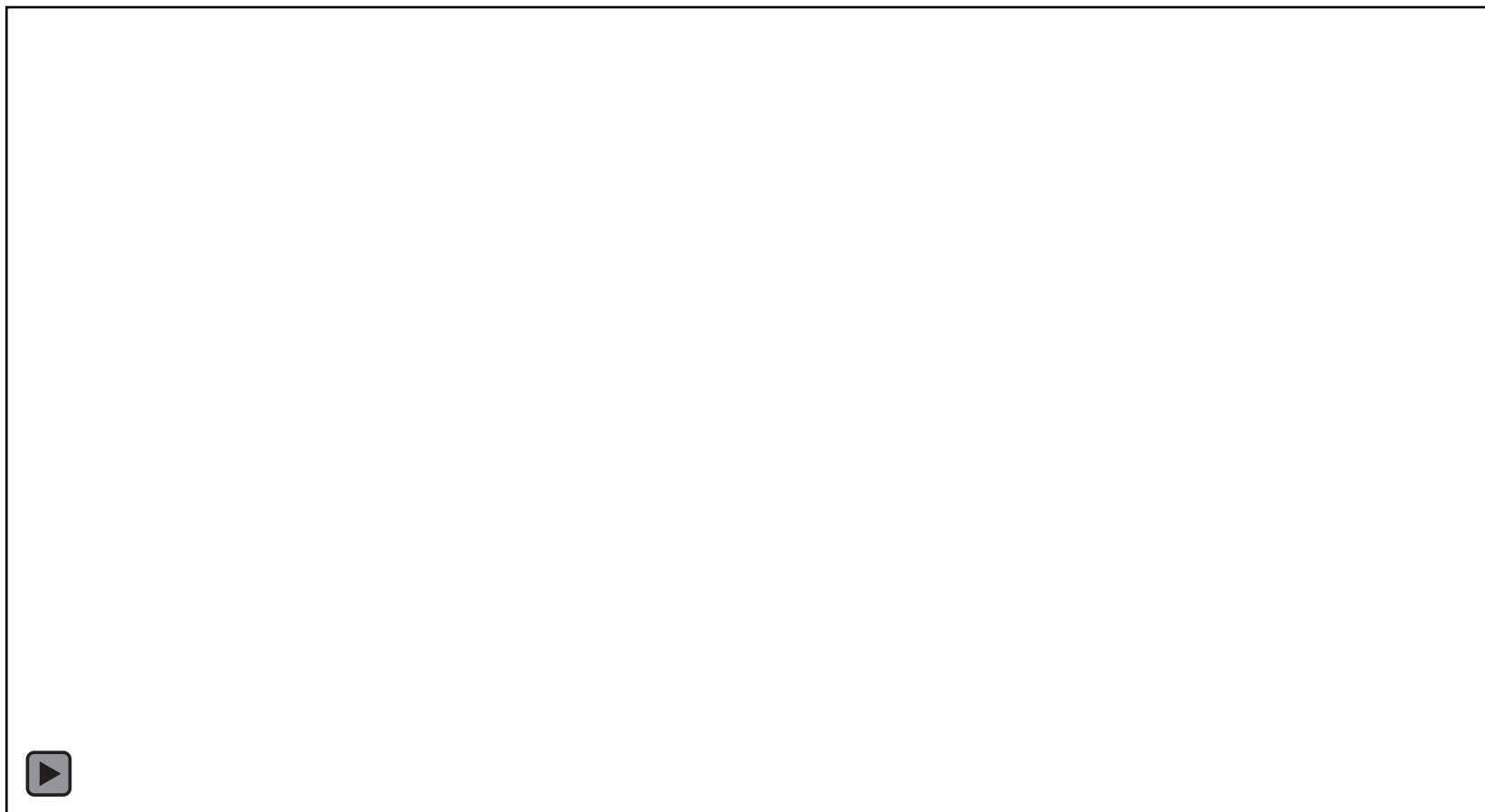




# Construction Site Progress Monitoring



**Home Affairs Bureau**  
The Government of the Hong Kong Special Administrative Region



**KAITAK  
SPORTS PARK**  
啟德體育園

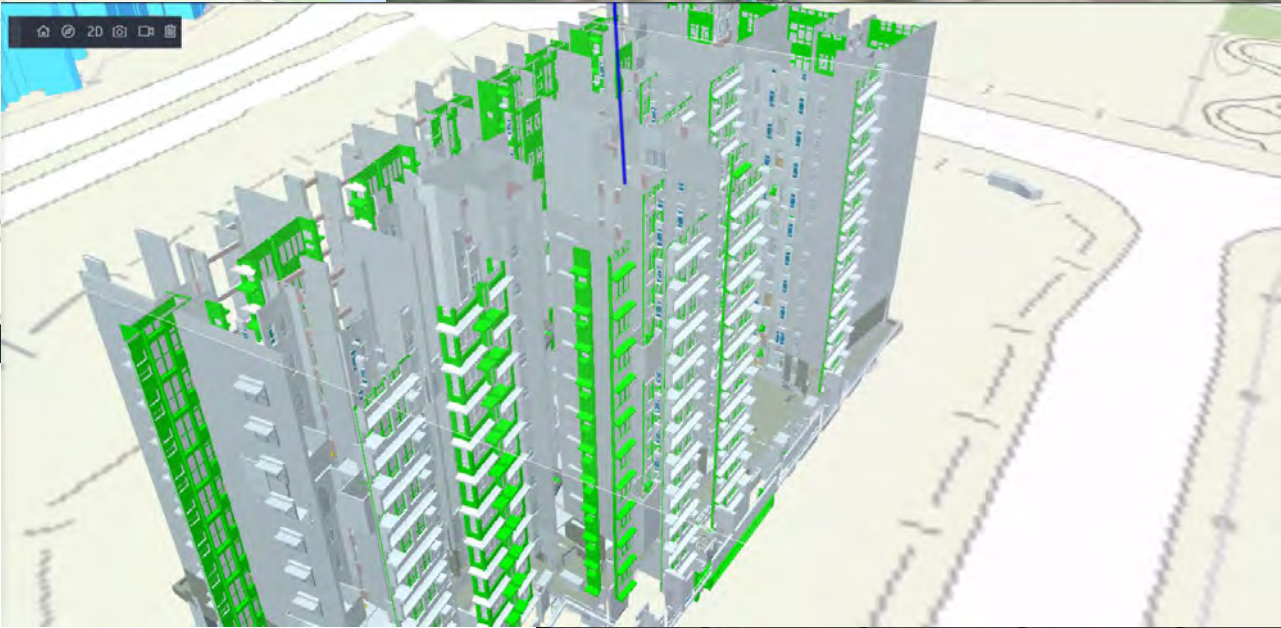
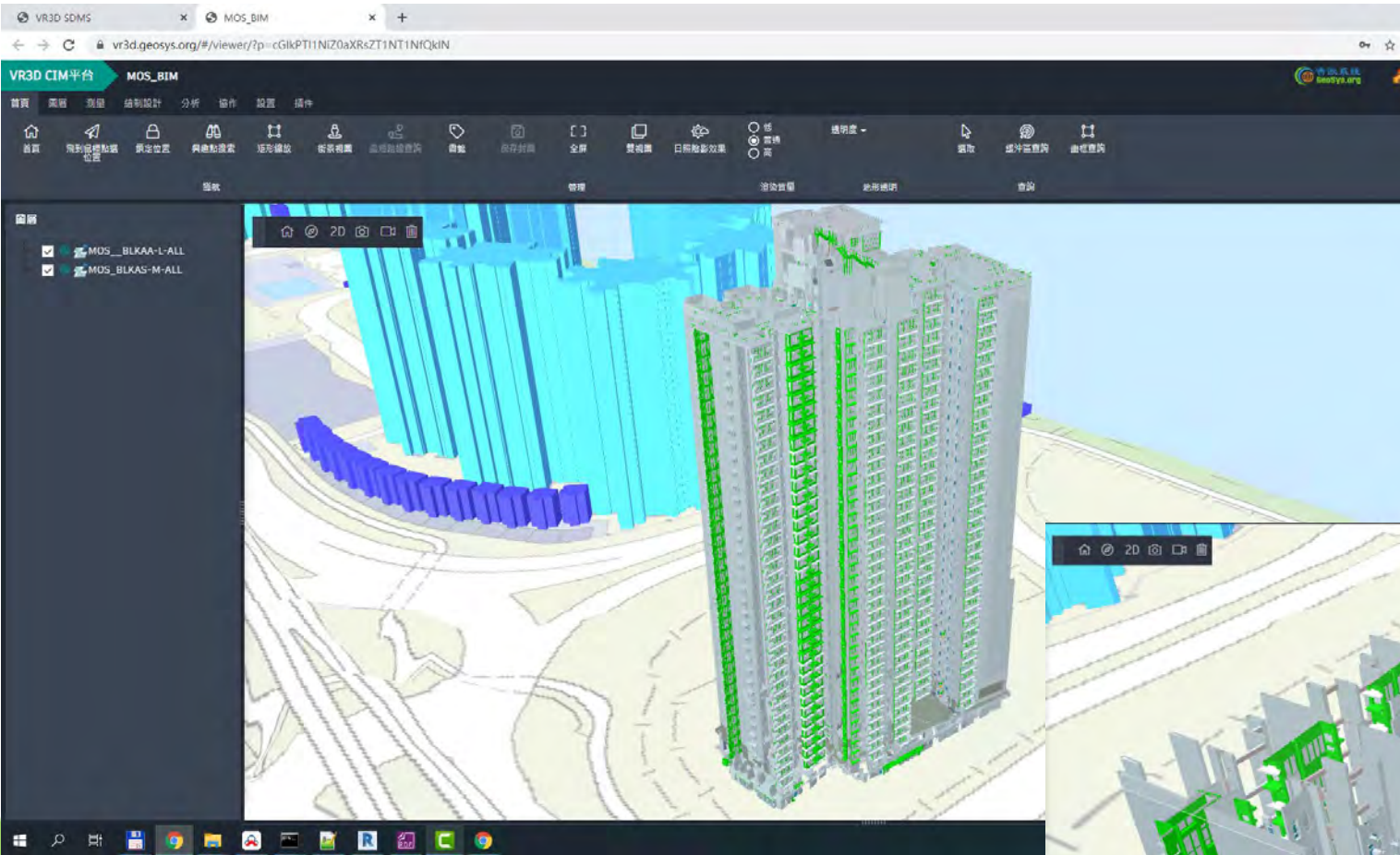
# Further Enhancement

FM/AM Stage





# External Wall Inspection



香港房屋委員會  
Hong Kong Housing Authority





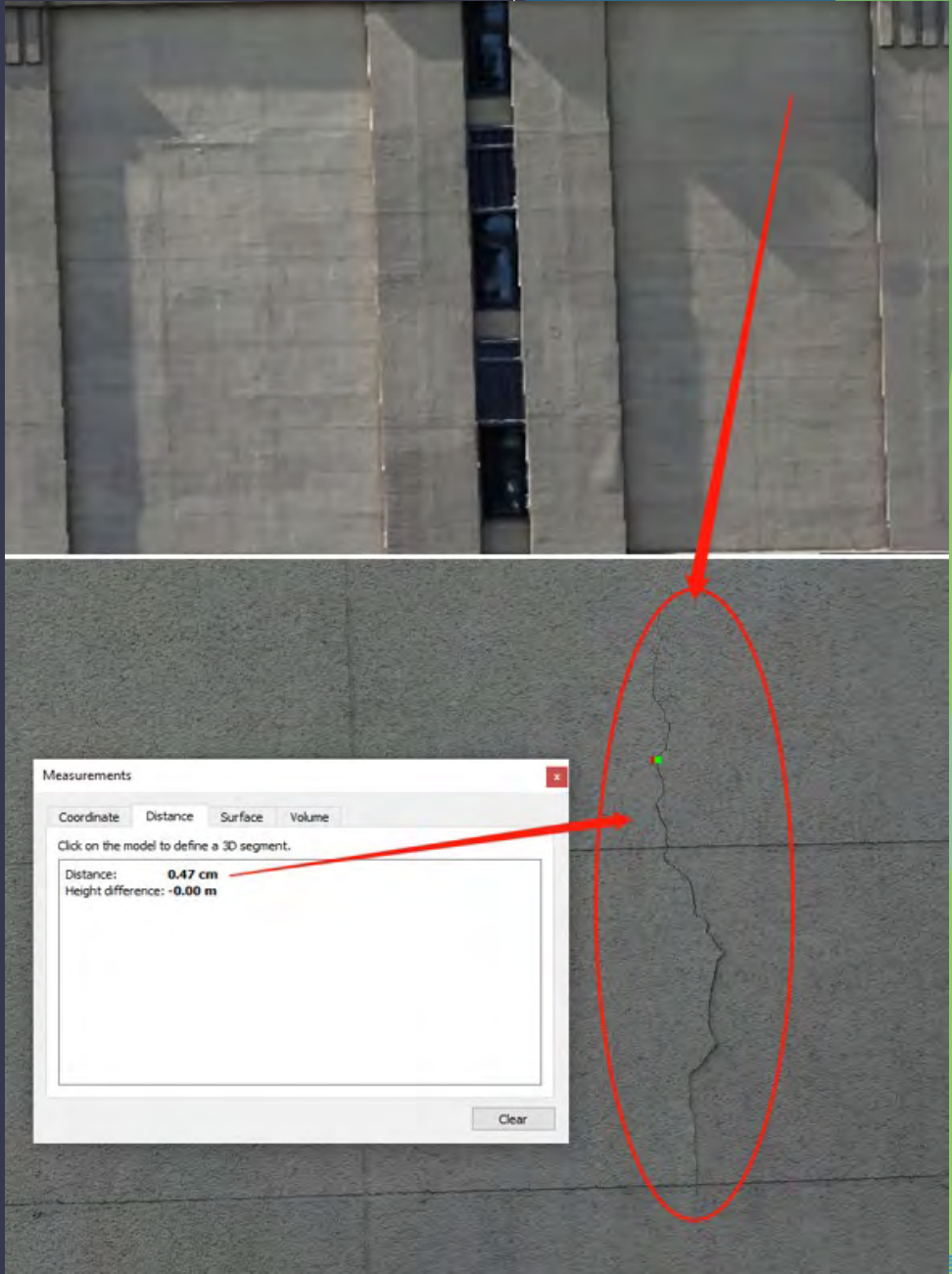
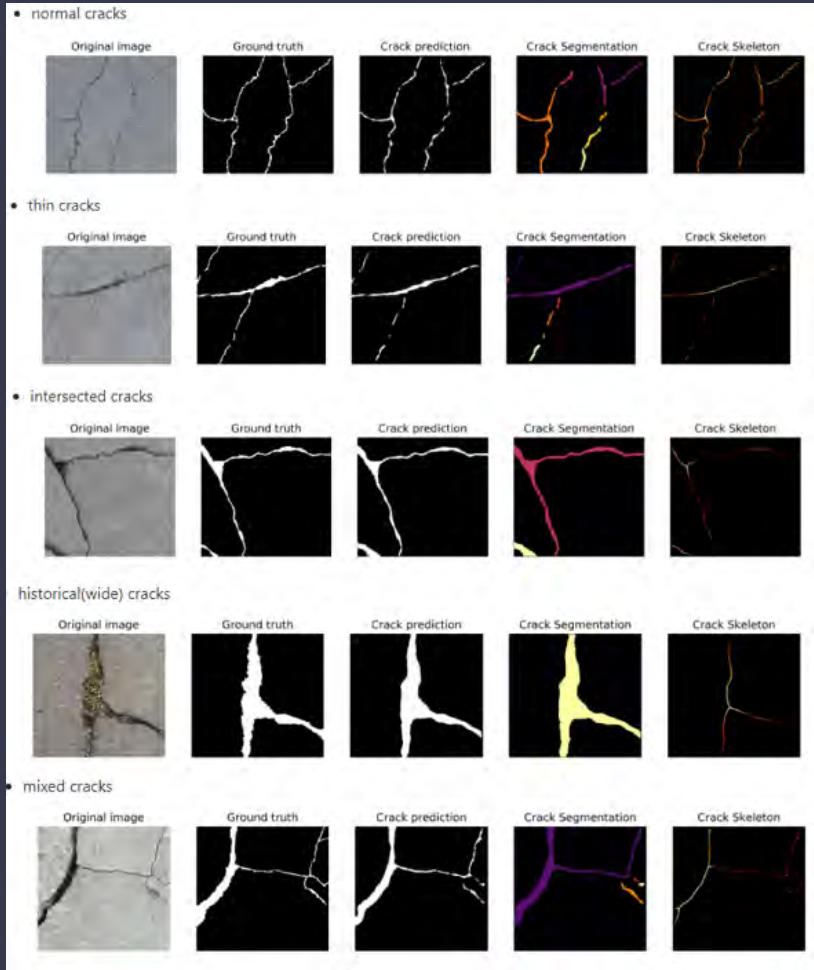
## ► Building Inspection and Mixed Reality Platform







# ► Use AI to detect potential defects of the building





# Compare the BIM / Reality in Mixed Reality Platform

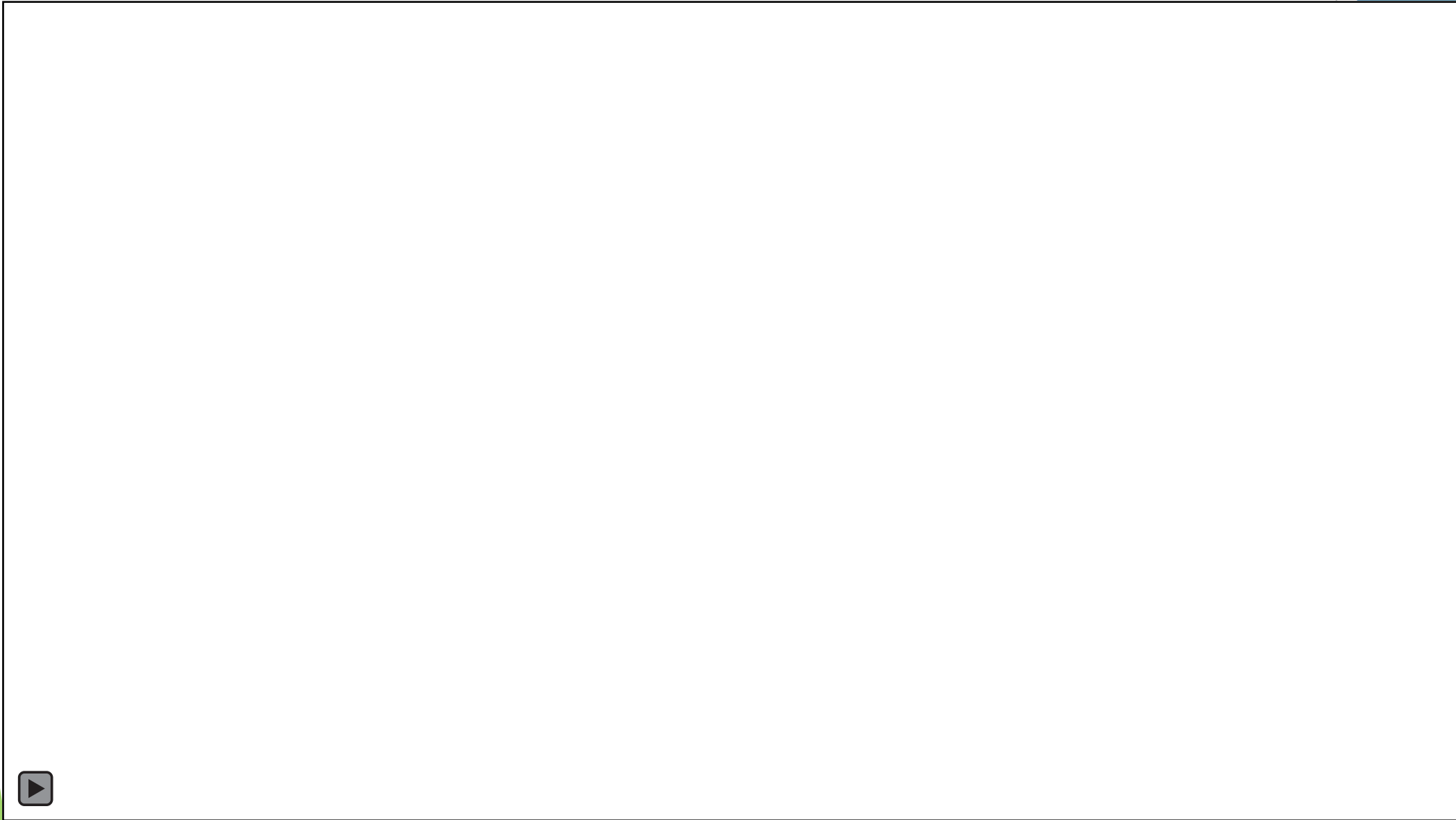
- ▶ Existing Condition Model Comparison with As-built Condition for BIM Project





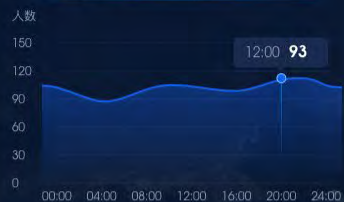


## ► Data integration of 360 Panorama and Point Cloud for Mixed Reality

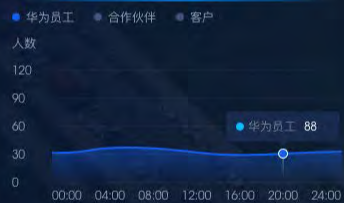




实时场内人数



场馆实时人数统计(按类型)



场馆实时人数统计(按区域)



闸机实时通行信息

张莉 女士	2/20 12:34:55	闸机A
李旭 男士	2/20 12:34:55	闸机B
乔慧 女士	2/20 12:34:55	闸机A
罗一菲 女士	2/20 12:34:55	闸机A
韩力 男士	2/20 12:34:55	闸机A
张莉 女士	2/20 12:34:55	闸机A
李旭 男士	2/20 12:34:55	闸机B
乔慧 女士	2/20 12:34:55	闸机A
罗一菲 女士	2/20 12:34:55	闸机A
韩力 男士	2/20 12:34:55	闸机A
张莉 女士	2/20 12:34:55	闸机A
李旭 男士	2/20 12:34:55	闸机B
乔慧 女士	2/20 12:34:55	闸机A

当前场内人数

1,203,2

伙伴+客户人数

7,650

进场人数

256

闸机离场人数

240

人脸识别轨迹



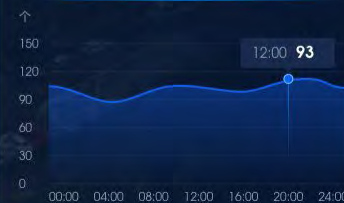
参展人数累计(按展厅)



参展人数累计(按类型)



人员通行异常事件统计





# Smart Management

- ▶ Smart Facilities
- ▶ Smart Business
- ▶ Smart Environment
- ▶ Smart Mobility

## i) Smart Facilities

- Asset Management (e.g. Tree, road furniture, etc.)
- Park & Garden Collection Management
- Security Patrol Route Planning and Monitoring
- Event Planning & Situational Awareness
- Crowdsourcing 3D Events Map
- Crime Trend Analysis

## ii) Smart Business

- Sun-shadow Analysis for Leasing Space Valuation
- Space Utilization Map
- Indoor Map & Indoor Navigation
- Open Data to induce innovation
- Smart Tourism

## iii) Smart Environment

- Green Estate monitoring for Carbon Emission Reduction
- Smart Bin monitoring and Collection Optimization
- Sun Calculator for Solar Potential & Renewable Energy Utilization

## iv) Smart Mobility

- Real-time Road Traffic and public transport information
- Real-time Parking Vacancy with support to the robotic parking
- Real-time crowd analysis
- Real-time indoor positioning
- Walkability Analysis
- Bike sharing station site selection

# Thank You