The 2023 International Workshop on the High Energy Circular Electron Positron Collider

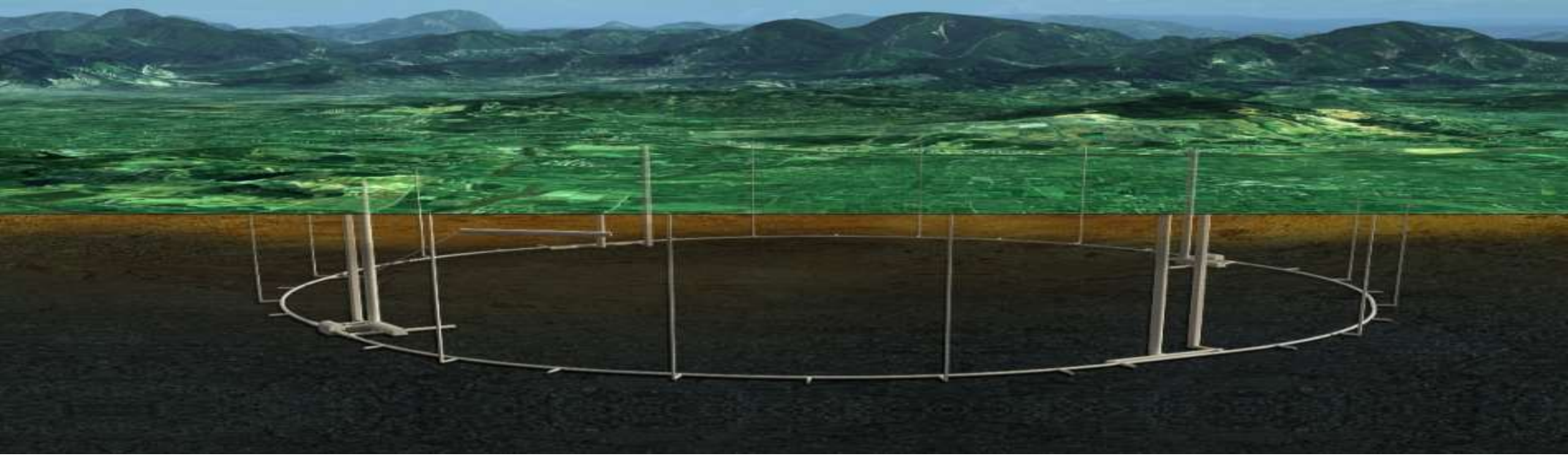
CEPC Siting & Civil Construction Preparation

Zhejiang Huzhou Site (One of the CEPC representative sites)

October 27th, 2023

中国电建 POWERCHINA 华东勘测设计研究院有限公司 HUADONG ENGINEERING CORPORATION LIMITED

CEPC Siting & Civil Construction Preparation



- **Introduction to Zhejiang Huzhou Site**

Introduction to Zhejiang Huzhou Site

Zhejiang Huzhou Site

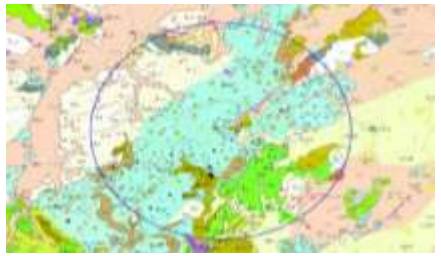
The center of the Yangtze River Delta
Northern Zhejiang Province

Huzhou site advantages:

Flat Terrain

Beautiful Historical Resorts

Science and Education Developed



Favorable Geological Condition

Convenient Transportation

Sufficient Energy & Abundant Water Source

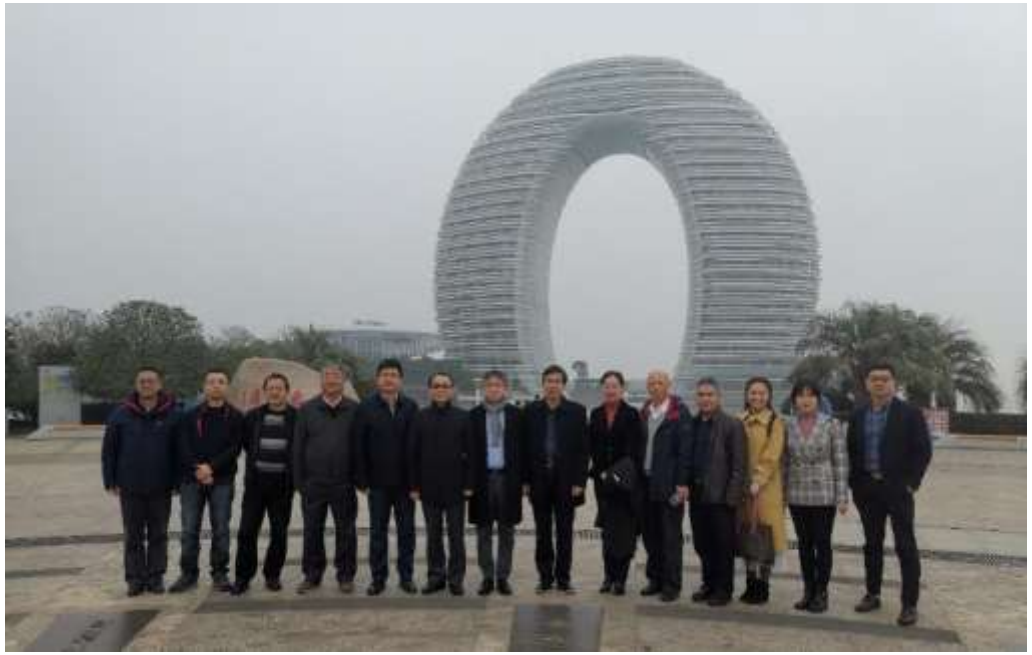
Introduction to Zhejiang Huzhou Site

From March 25 to 29, 2018

The starting point of Huzhou site

By October 2023

The work that has been done is as follows



Joint investigation team of
Zhejiang government and IHEP

- **CEPC report on site selection (Zhejiang Huzhou)**

  Answer the questions-Why did CEPC choose huzhou

- **CEPC report on socio-economic assessment**

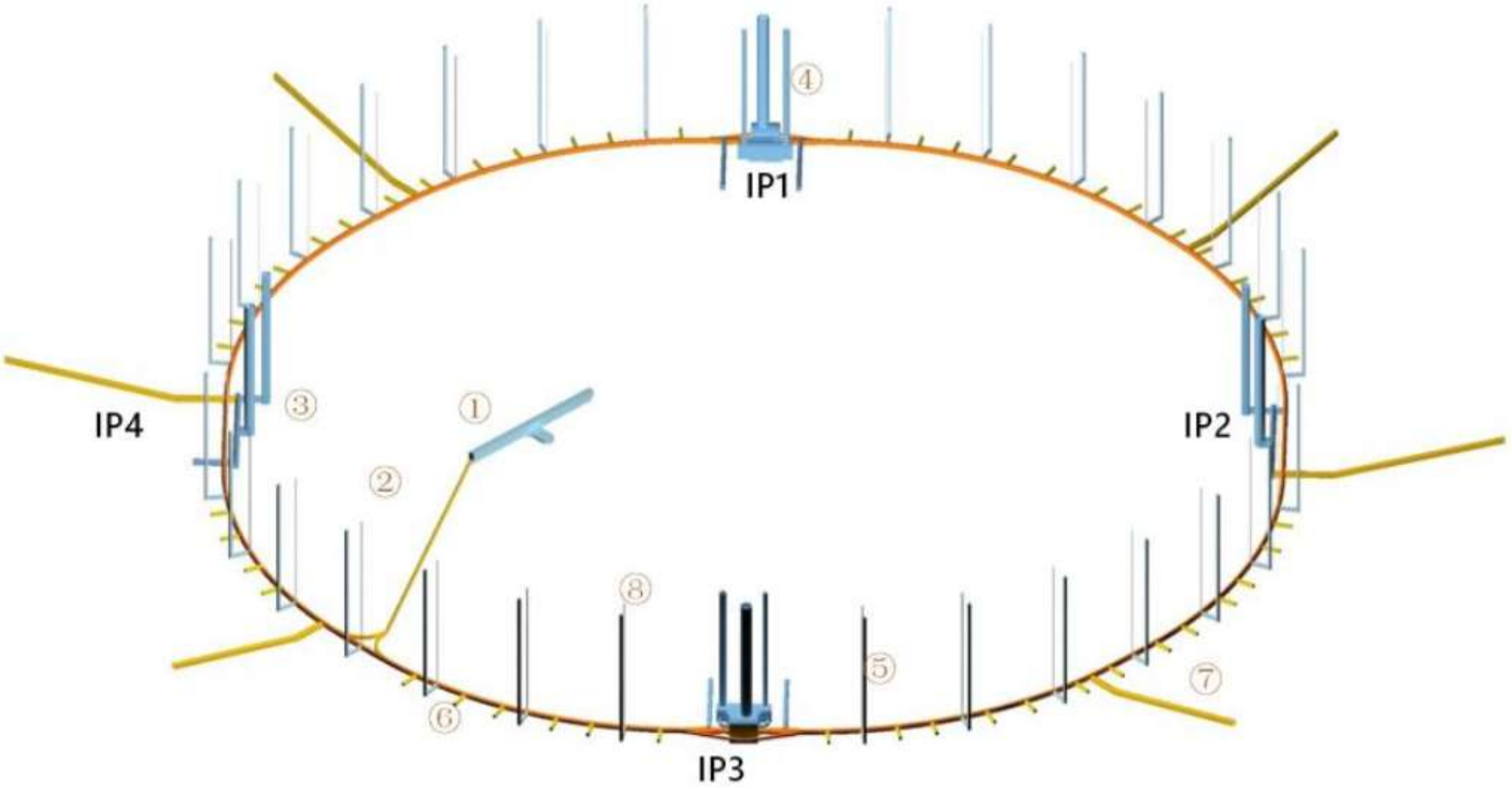
  Answer the questions-Why did huzhou choose CEPC

- **CEPC Technology Design Report on Civil engineering**
- **CEPC report on science city concept plan**

  Find a comfortable home for scientists

- **CEPC Technical Design Report (Huzhou Site)**
- **Civil Cost Estimation (Huzhou Site)**

Introduction to Zhejiang Huzhou Site



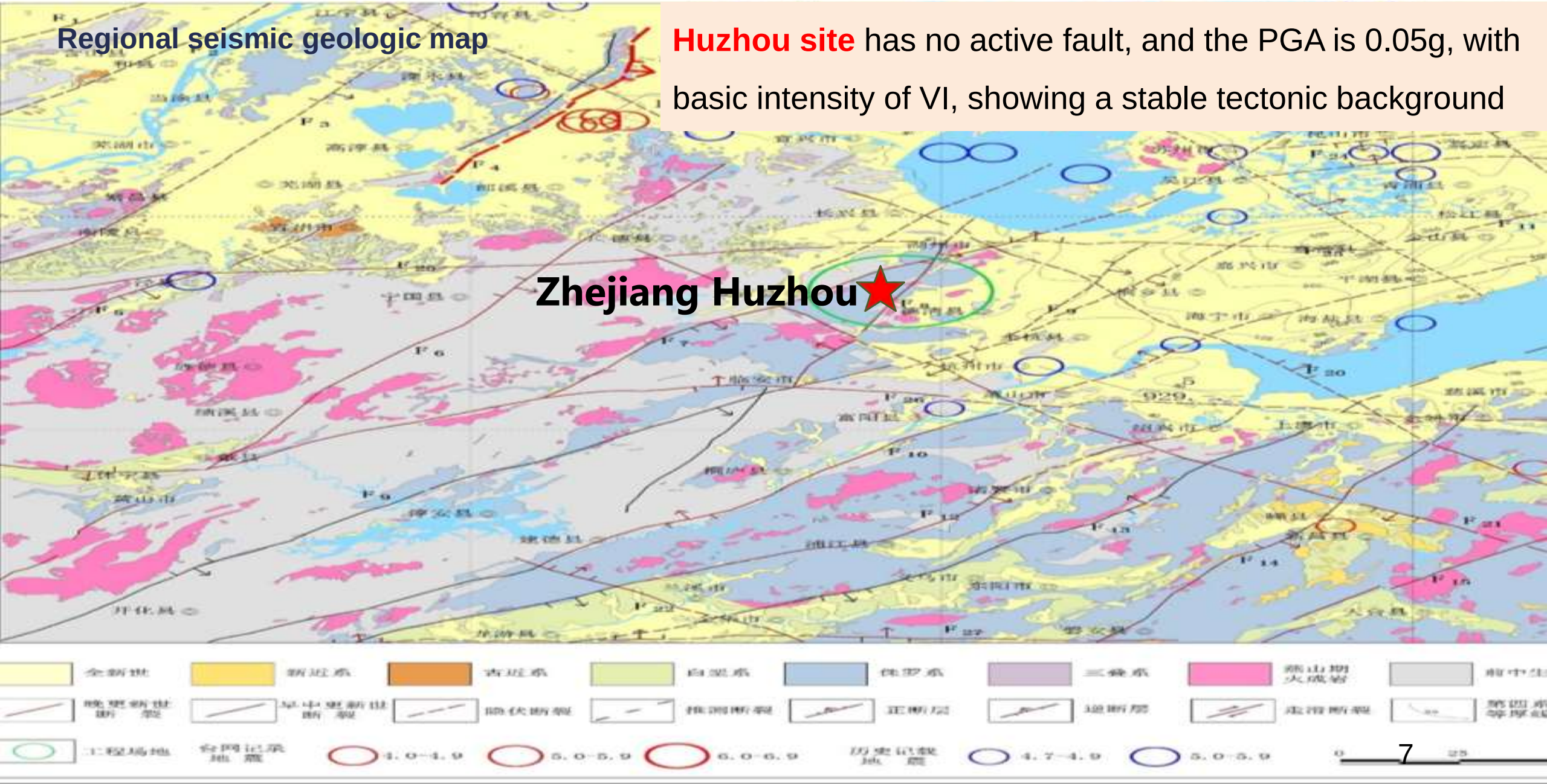
1. Linac Segment
2. Transfer Line
3. Tunnel Complex of RF Region
4. Detector Region Caverns
5. Main Ring Tunnel
6. Auxiliary Tunnel
7. Access Tunnel
8. Shaft for Access and Cable

Layout of main underground buildings

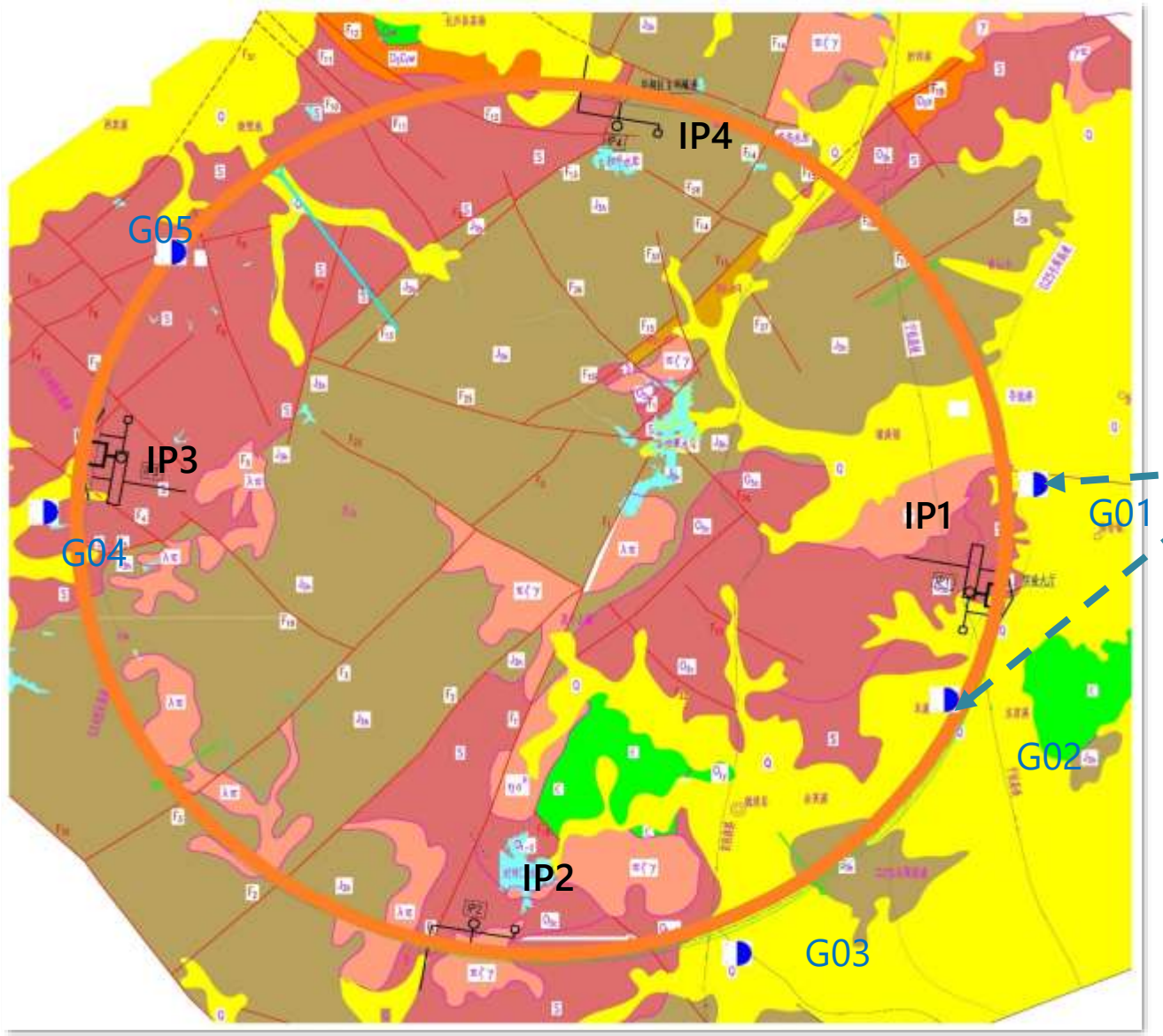
Introduction to Zhejiang Huzhou Site

Regional seismic geologic map

Huzhou site has no active fault, and the PGA is 0.05g, with basic intensity of VI, showing a stable tectonic background



Geologic map of the CEPC Huzhou site



Geological survey

G04钻孔奥陶系砂岩部分岩芯
The Ordovician sandstone cores in G04 hole (IP3)

The work is include 6 survey holes
and Geophysical prospecting work，and so on

第四系 the Quaternary
侏罗系熔结凝灰岩 Welded tuff of the Jurassic
泥盆系砂岩类 Sandstone of Devonian
志留系砂岩类 Sandstone of Silurian
奥陶系砂岩类 Sandstone of Ordovician
寒武系灰岩 Limestone of Cambrian
花岗岩 Granite

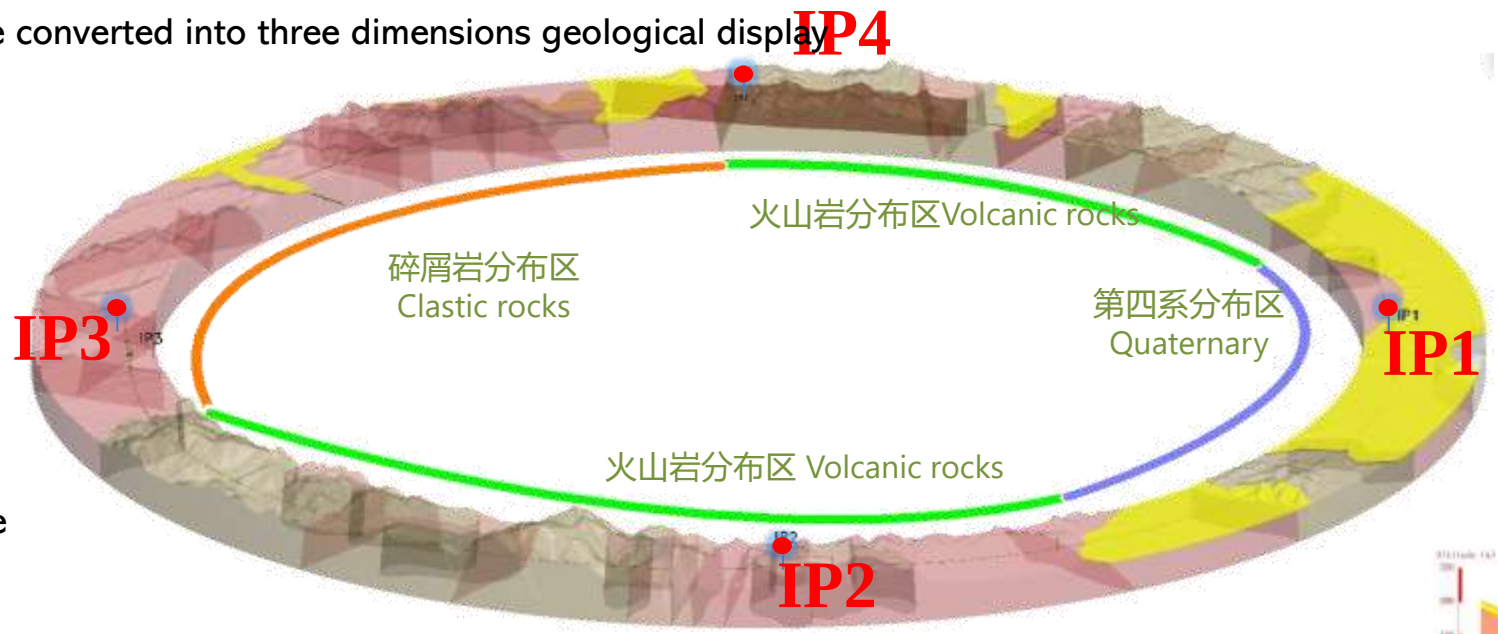
Introduction to Zhejiang Huzhou Site

The minimum depth of the main ring is 70m

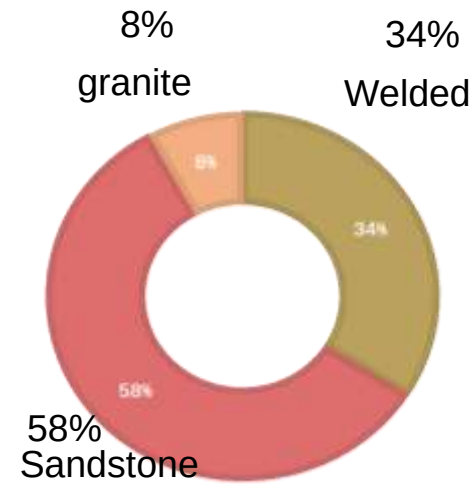
The geological work can be converted into three dimensions geological display

The sandstone and welded tuff in the site are relative moderate hard and stiff, respectively. The rock mass is intact along the tunnel.

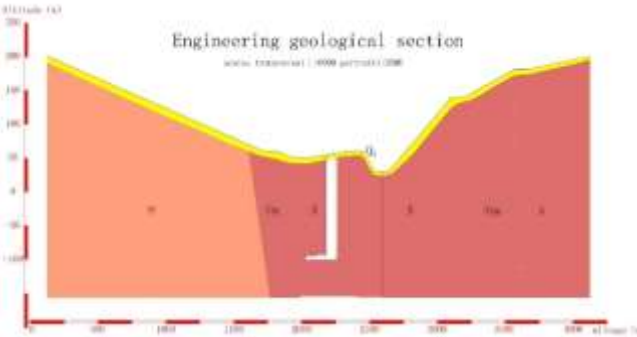
Therefore, it is believed that the rock shows high engineering quality here, and is suitable for the project constructions.



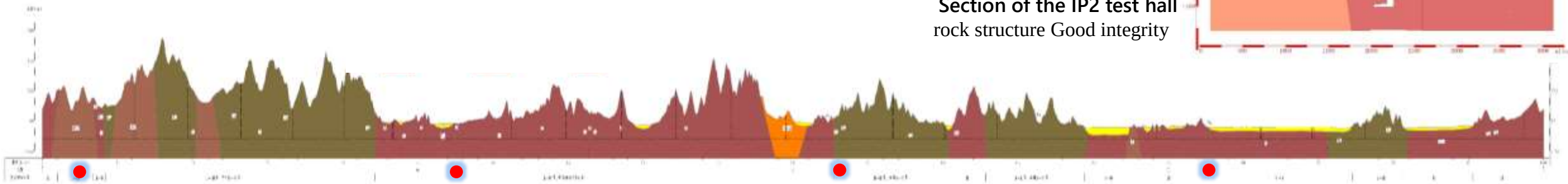
The 3-dimensional geological display



Lithologic of surrounding rock along tunnel axes



Section of the IP2 test hall
rock structure Good integrity



Geologic section of the ring tunnel along axes

Introduction to Zhejiang Huzhou Site

∴ **In-depth study of the Huzhou Site**

1. Exploration of CEPC Site Selection Evaluation Factors and Criteria
2. Supplementary analysis of site selection evaluation
3. Deepen the analysis of construction plan

In-depth study of the Zhejiang Huzhou Site

1. Site Selection Evaluation

- Analysis of the site selection rationality & suitability

  - Social conditions
  - Engineering conditions
  - Science city conditions
  - Ecological environment and land acquisition
  - Facilitation for large-scale international community cooperation

	Influence Factor	Description
1	Social conditions	The impact of social and cultural conditions on the project, external boundary conditions related to the project, the environment, and soft power
	National planning	National planning of the region
	Regional conditions	Regional self-planning
	Regional economy	Economic conditions, industrial planning
	Cultural environment	Ecological environment and cultural atmosphere
	Policy support	Government tendency and policy support
	Social atmosphere	Local government and people's support, social atmosphere, public opinion on the project, and good conditions for the project normal operation in the future
	Others	
2	Engineering construction and operation	The impact of natural conditions on the project, geographical conditions related to the site selection, construction, and operation of the project, and indicators of engineering technology
	Climate	Hydroclimatic conditions
	Transportation	Including water, land, and air transportation
	Energy supply	Sufficient energy supply, green energy
	Water supply	Sufficient water supply
	Terrain geology	Terrain and geological conditions
	Project costs	The influence of local transportation, materials, industry, etc. on project cost
	Construction	Construction conditions, including water supply, power supply, traffic conditions, etc. during construction
3	Science City	The suitability of science city planning
4	Ecological environment and land acquisition	Eco-environmental protection influences and countermeasures, resettlement land acquisition influences and countermeasures
	Ecosystem and resources	The influence of project construction on ecological environment and natural resources
	Land acquisition	The influence of project construction on resettlement, the influence of science city construction on local residents moving in and out, etc.

1. Site Selection Evaluation

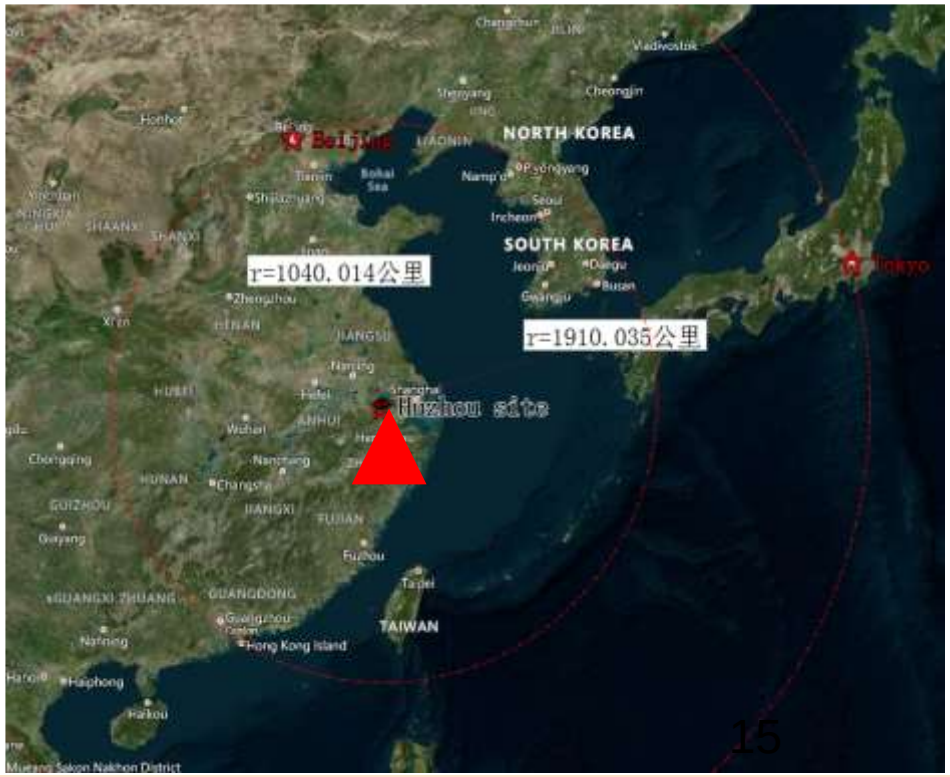
- The benefits of CEPC on local area

Social economic benefit evaluation

	Influence Factor	Description
•	Scientific significance	The promotion to scientific research and the significance to local scientific and technological development
•	Technology spillover	The promotion to technology, industry, and economic development
•	Talent effect	The attraction and training of talents, including researchers, operation managers, etc.
•	Social effect	The promotion effect of national influence and regional influence, significance for international cooperation, science education, cultivation of innovative cultural atmosphere, etc.
•	Others	

2. Supplementary analysis of site selection evaluation

External traffic



Convenient transportation The Zhejiang Huzhou site is 75km away from Hangzhou, 130km away from Shanghai, 1040km away from Beijing and 1910km away from Tokyo. It has a national first-class airport , and Extensive railways and highways

2. Supplementary analysis of site selection evaluation

External traffic

Highway：There are highways in all directions around the project area, such as high speed G25, S11, S14.

Railway：The project area is surrounded by a number of high-speed railways to Beijing, Shanghai, Hangzhou and other cities.

Shi-lai railway station is a transfer station for major parts of Tian-huang-ping pumped storage project. The major parts and special materials from outside can be transported to Shi-lai railway station by railway and then transferred to the project area by road.

2. Supplementary analysis of site selection evaluation

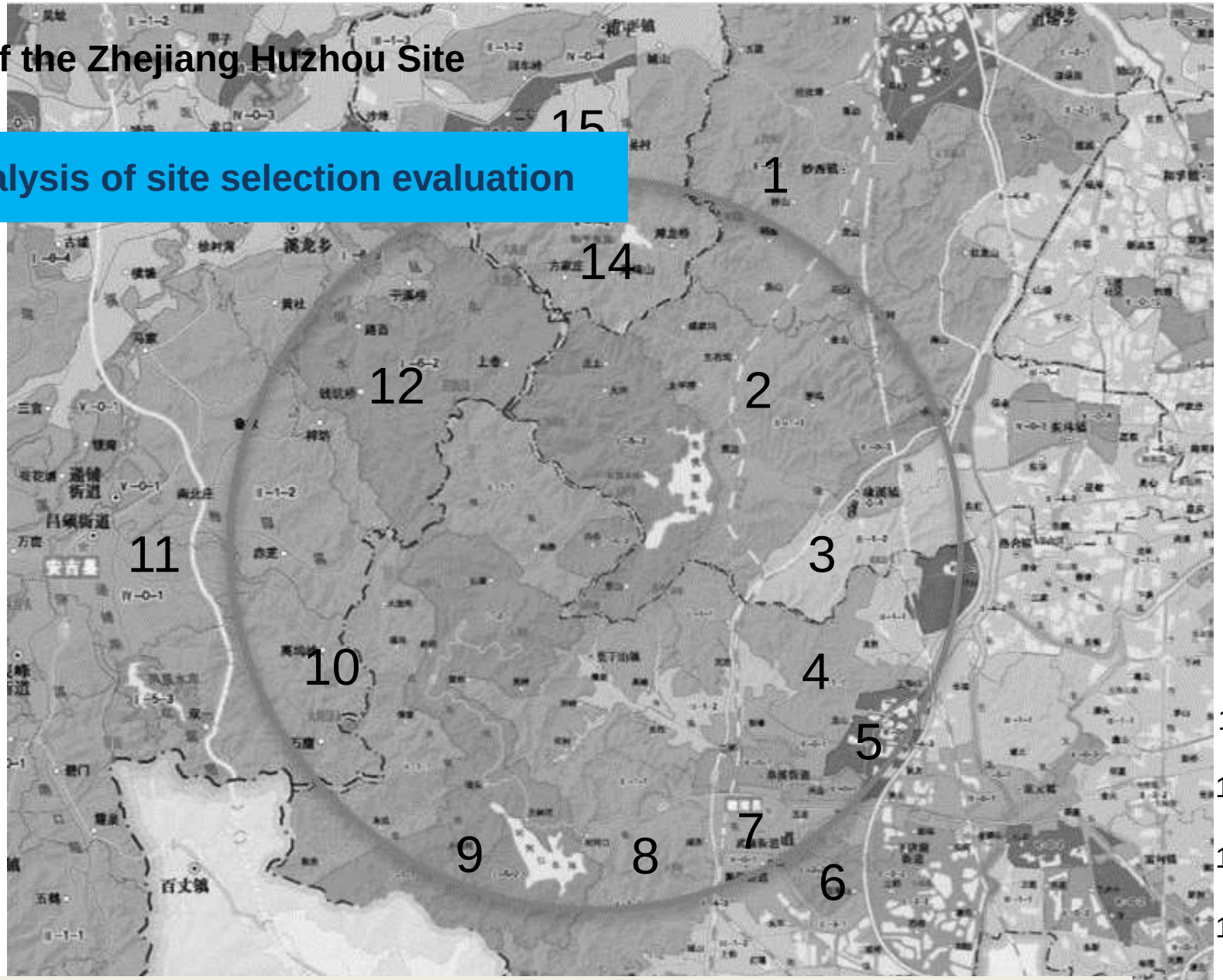
External traffic

Waterway：In 2018, Huzhou port handled 105 million tons, ranking first among inland river ports of the same type in China.

Huzhou a high-grade channel through the Yangtze River Delta seaport, the Yangtze River for the River, and sea combined transport

2. Supplementary analysis of site selection evaluation

Environmental protection



1 Soil and water conservation area
2 Water conservation area
3 Environmental protection zone
4 Agricultural Products Guarantee Area
5 Wetland Reserve
6 Environmental optimization zone
7 武康环境优化区
8 苕溪水源涵养区
9 对河口水源保护地
10 苕溪水源涵养区
11 城区环境保障区
12 梅溪公益林保护区
13 竹溪湿地保护区
14 长兴水源涵养区
15 长兴农产品保障区

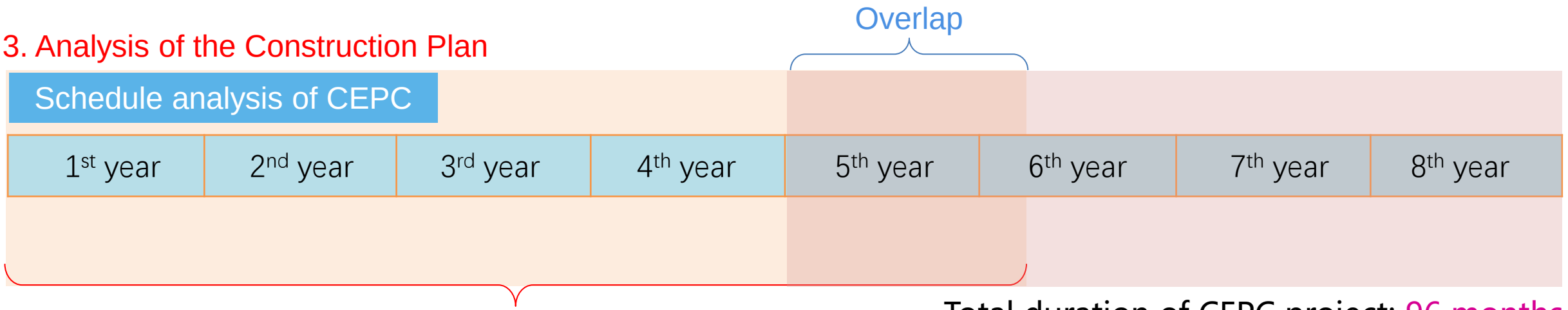
This chart shows the overall relationship between CEPC and environmental protection factors

After the project is implemented, the scope of the relevant protected areas can be adjusted

2. Supplementary analysis of site selection evaluation

The supplementary analysis of site selection evaluation of Huzhou site indicate that CEPC project is feasible in Huzhou site and there are no local constraints on the project.

3. Analysis of the Construction Plan



Total duration of CEPC project: 96 months

Preparatory construction period: 14 month

Preparation period: 3 months

Main ring tunnel excavation and support: 30 months

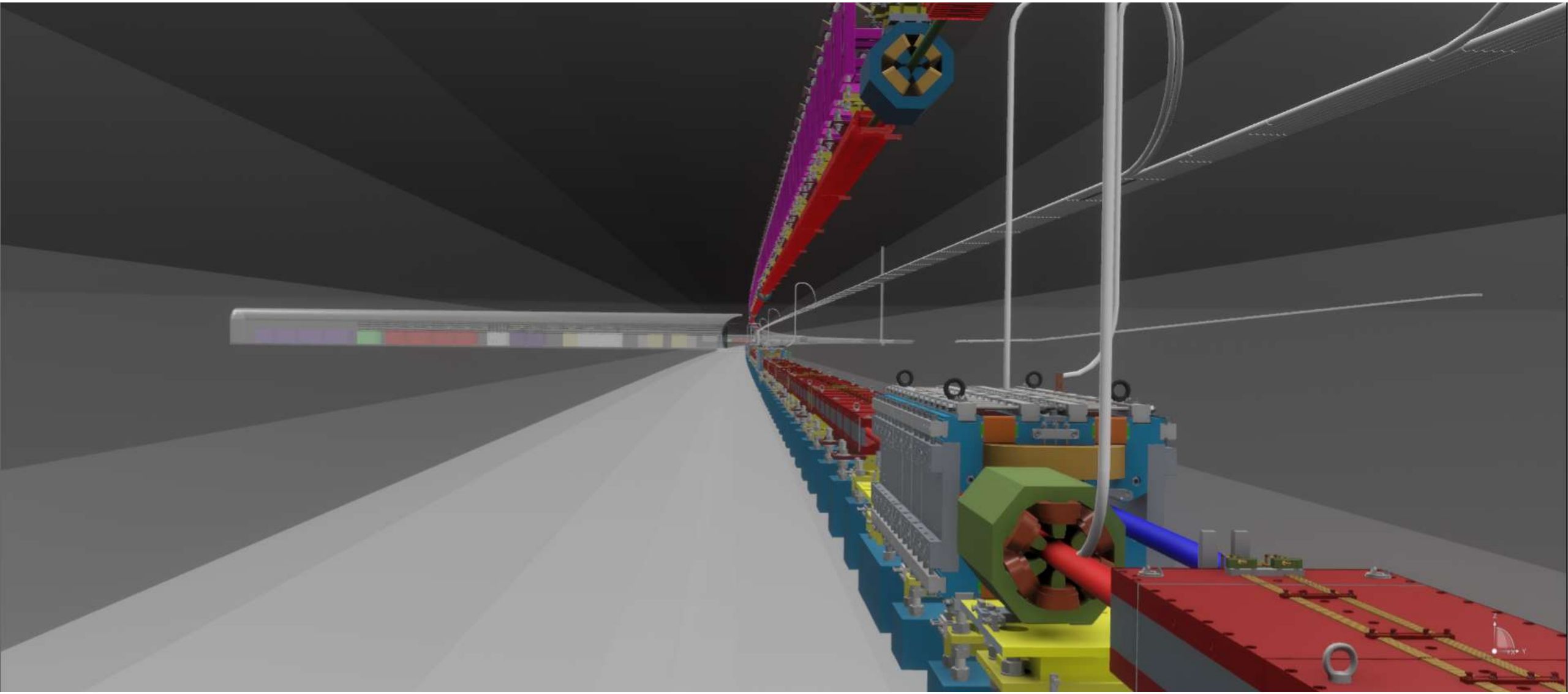
Main ring tunnel lining and grouting: 18 months

Civil construction completion period: 1 month

- Civil construction duration: 52 months
- EM equipment installation: 48 months
- Overlap period: 15 months
- Total duration: 96 months

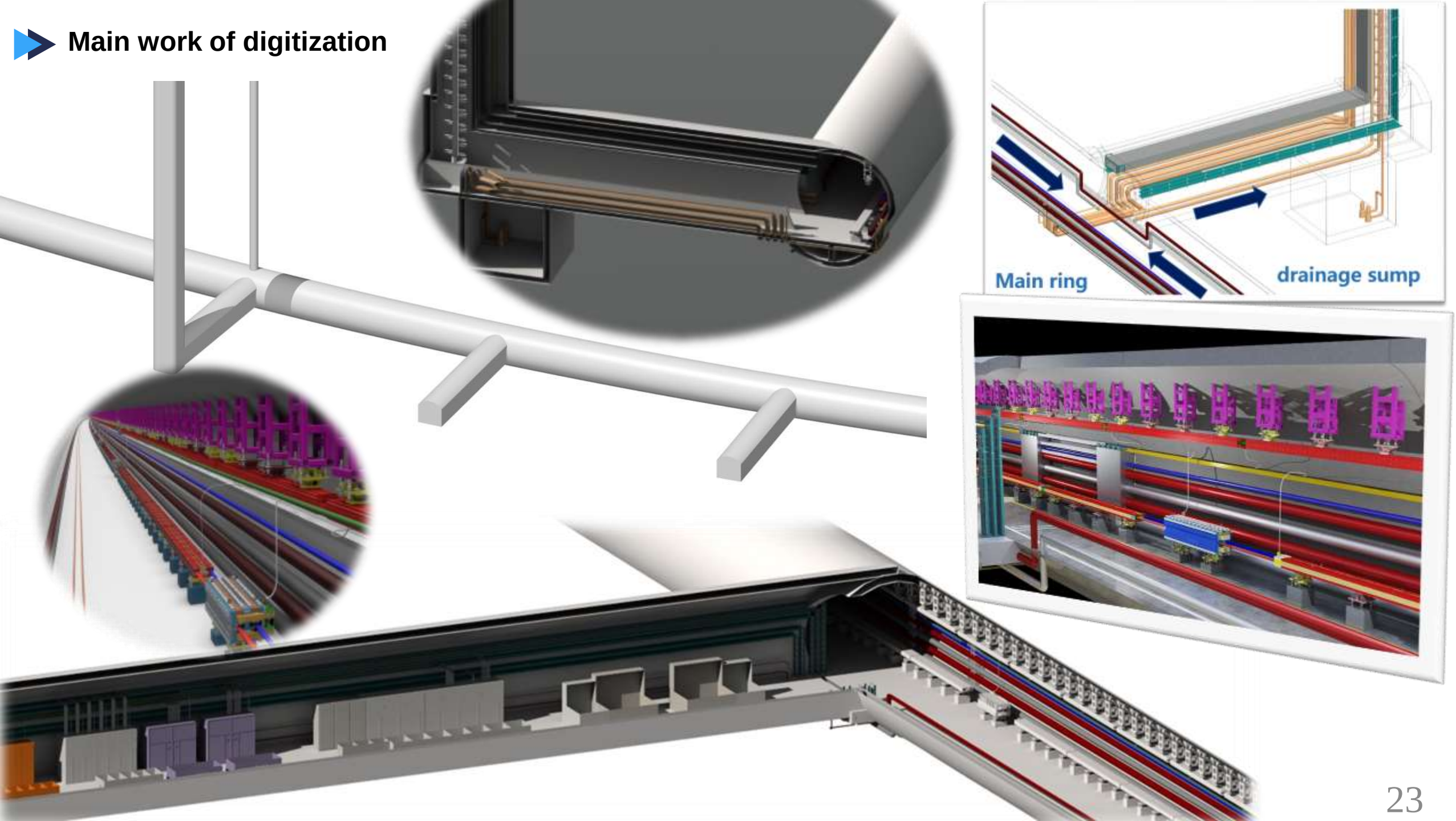
∴ Study on digital Management

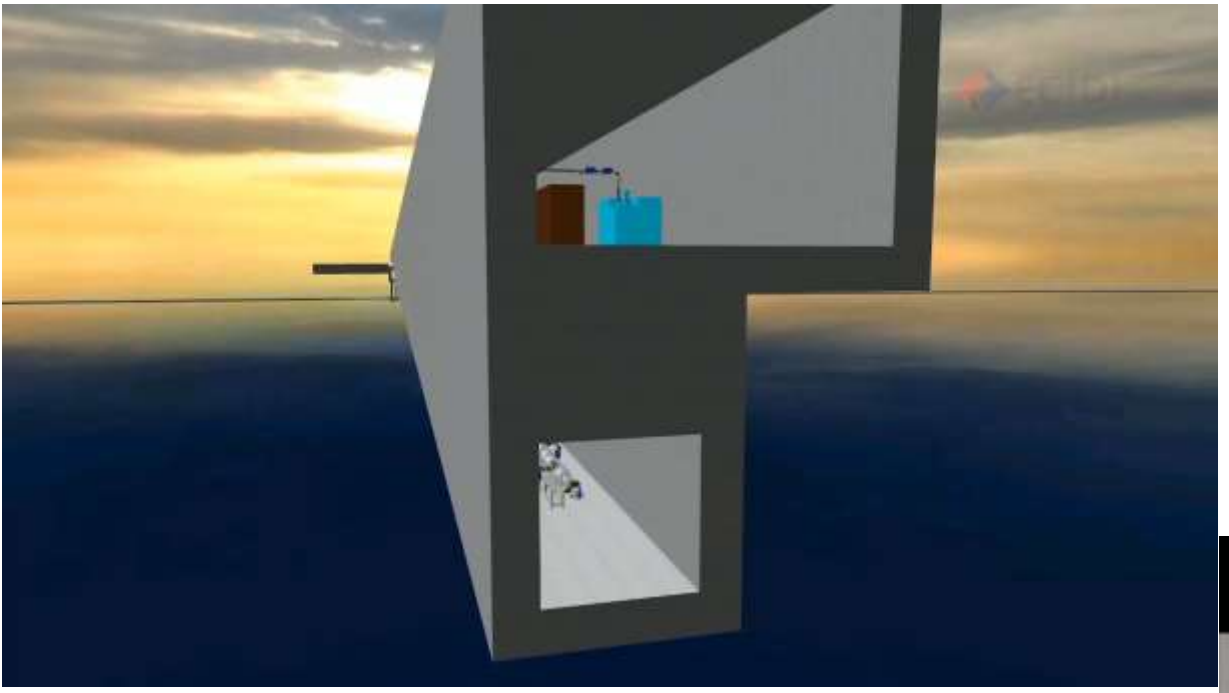
Main work of digitization



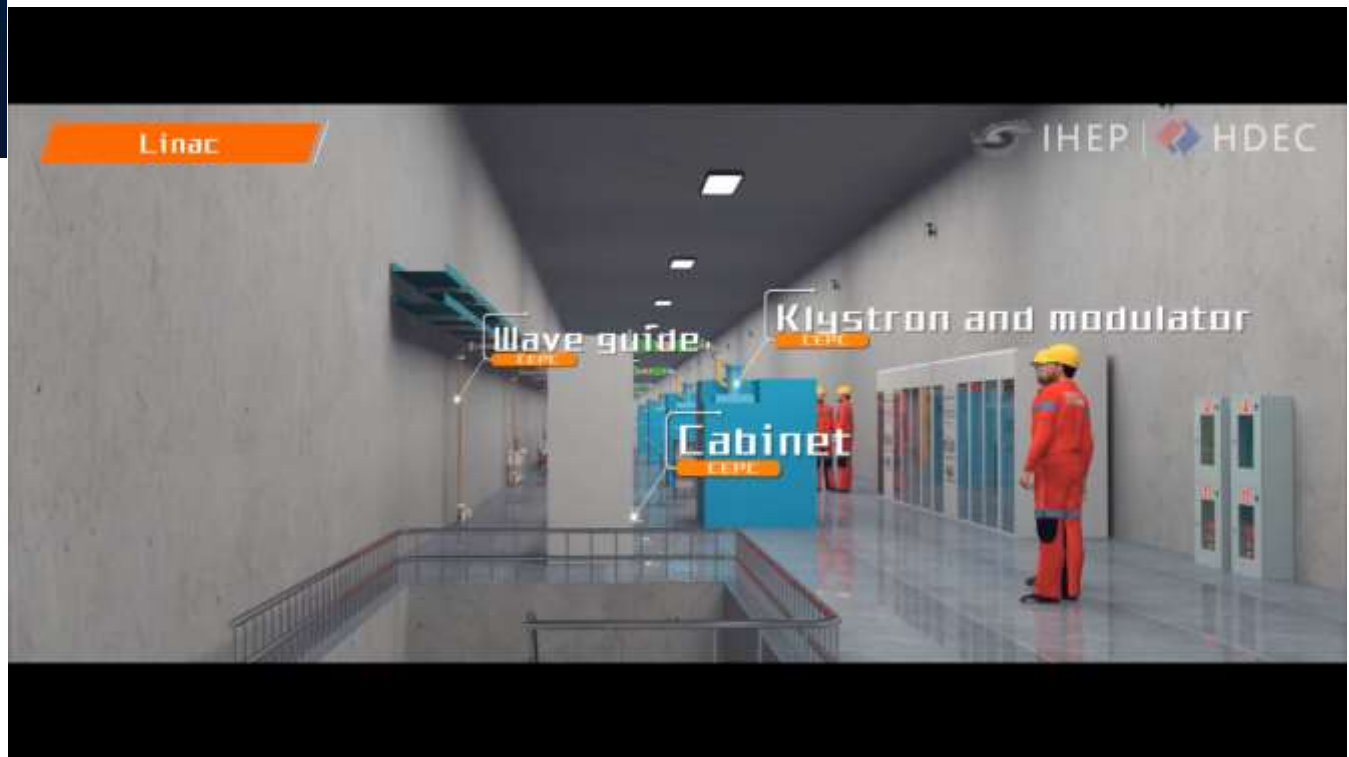
Integrated 3D model based on physical equipment to assist civil engineering design and site selection in Huzhou

Main work of digitization





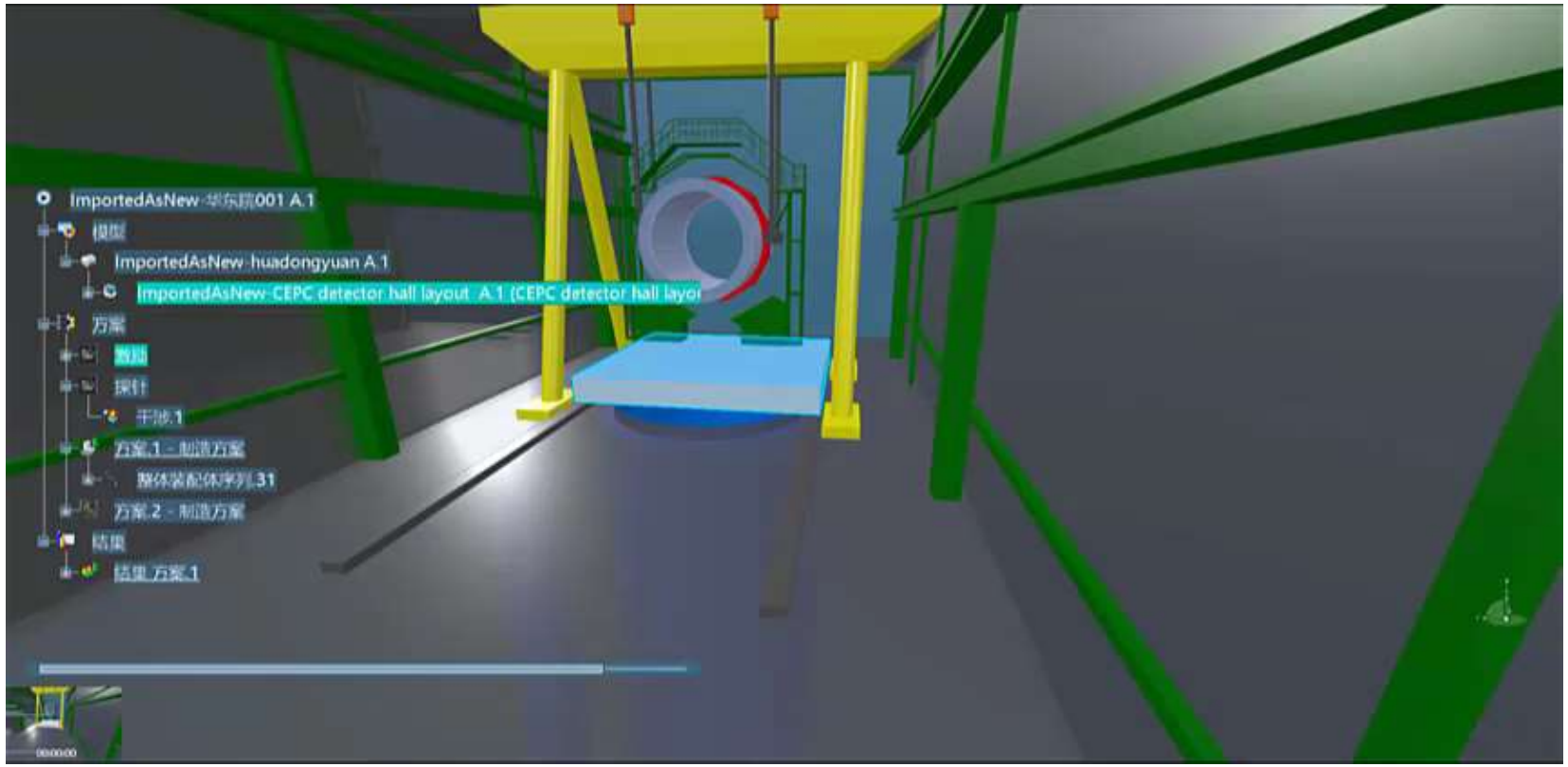
Complete model integration



Reorganized the model data and updated the detailed physical device model

Manage model data and realize rapid iteration and equipment installation simulation

Through data management and model linkage, the overall model update will be convenient



The latest developments in digitization

By 2023，Software development is carried out to improve the data management function, which is helpful to the project management of the CEPC project

:: Summary

Conclusion

- After conducting a comprehensive analysis of various influencing factors, it is evident that the site selection of Huzhou for the CEPC project is free from constraints, and the conditions in Huzhou align with the project's site requirements.
- Extensive progress has been made in civil engineering design, including the design of underground structures, construction organization design, and science city design.
- Relying on CEPC, research on digital solutions for the management of multi-source and massive data has produced rich results with obvious spillover benefits.

Wish CEPC settle in Huzhou, Yangtze River Delta early.

Thanks !