Introduction and Project Background

On 22 April 2023, AGS (HK) organized a technical visit to J3975 Foundation, Excavation and Lateral Support and Pile Cap Works for the Cyberport Expansion Project. The project, commissioned by Hong Kong Cyberport Management Company Limited and constructed by Gammon Construction Limited, was commenced in November 2021, and it is expected to be around 500 days. The contract sum is approximately HK$ 5,00M.

Figure 1. Aerial Photograph of the Site (22 April 2023)

Scope of Works

The site area covers approximately 25,000m^2. The scope of work includes:

1) Construction of site hoarding.
2) Felling of trees.
3) Transplanting and protection works.
4) Demolition works of meter cabinet.
5) Construction of 72 bored piles, and 33 socketed H-piles.
6) Construction of all temporary works that includes 407 clutched pipe piles, working platforms, and Excavation and Lateral Support (ELS) works.
7) Construction of pile caps, basement slabs and beams.

   The ELS contains four layers of struts with a total excavation volume of around 100,000m^3. The toe level of the pipe pile wall ranges from -14.5 to -28.0 mPD.

Clutched Pipe Piles

One of the major highlights of the project is the use of clutched pipe piles as the alternative ELS scheme. Clutched pipe piles have been successfully implemented in in Lyric Theatre Complex in West Kowloon District and Kai Tak West Section of Central Kowloon Route to construct the temporary cofferdams. The Gammon-patented clutched pipe piles reduce groundwater ingress by 17.9 times in a laboratory test as compared to sheet piles, which is crucial when working near the sea. The interlocking design of clutched pipe piles also provides excellent lateral stability, making them an ideal choice for ELS works in areas with high lateral loads. Apart from a customized drill bit, all other major plants and equipment are the same as those for conventional pipe pile construction.

To minimise ground disturbances during piling, Closed-air Loop Drilling System was also adopted. By means of this method, exhaust air during drilling was returned to the ground surface and muffled, and pumping water was used as medium to flush out the drilling cuttings to the ground surface. This results in better ground settlement control, especially with sensitive structures such as seawall and sewage tunnels in proximity.

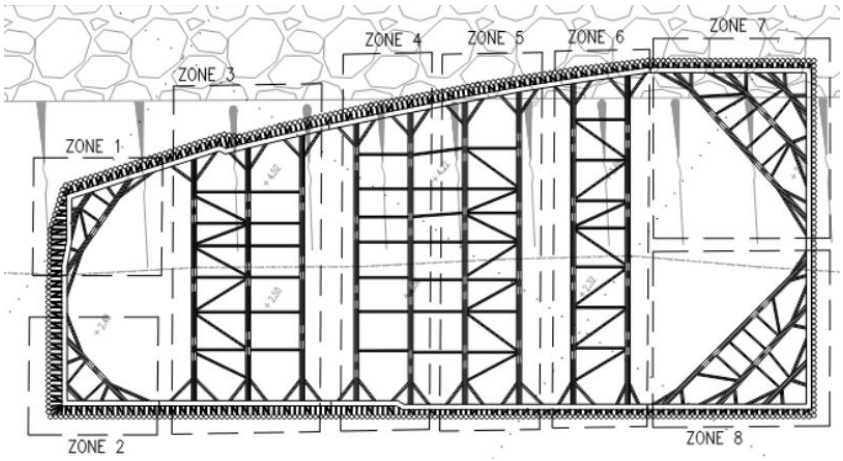

Figure 2. ELS Scheme

Challenges and Solutions

One of the major challenges encountered was the traffic impact to the neighbourhood including schools and residential buildings nearby. To minimize the volume of heavy vehicles, alternative marine access for delivery of excavation materials was employed at the barging point with temporary platforms constructed.

In compensation for the disturbance caused to nearby stakeholders, Gammon also implemented special measures for the betterment of the neighbourhood. Hoarding alignment was shifted to release more leisure space for park users. Benches were relocated to designated areas in the park, and water was supplied to nearby parks for greening purpose.

Conclusion

The technical visit provides valuable insight on seaside ELS adopting clutched pipe piles. I express my heartfelt gratitude to Gammon Construction Limited, and all the AGS(HK) for arranging the visit.