

# AGS (HK) TECHNICAL VISIT

*Foundation for Public Rental Housing Development  
at Sha Tin Areas 16 & 58D Phase 1, Fo Tan*

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## **Background**

This project comprises the development of five residential blocks and a four-storey commercial centre in Fo Tan, New Territories (**Figure 1**). The residential blocks range from 34–40 stories and contain a total of 4,850 flats. These structures are supported by a combination of large diameter bored piles and raft footings. The site is situated in a challenging location due to steep slopes associated with a 38 m level difference across the site (**Figure 2**). In addition, the previous land use resulted in high levels of contaminants in the soil.

## **Temporary works**

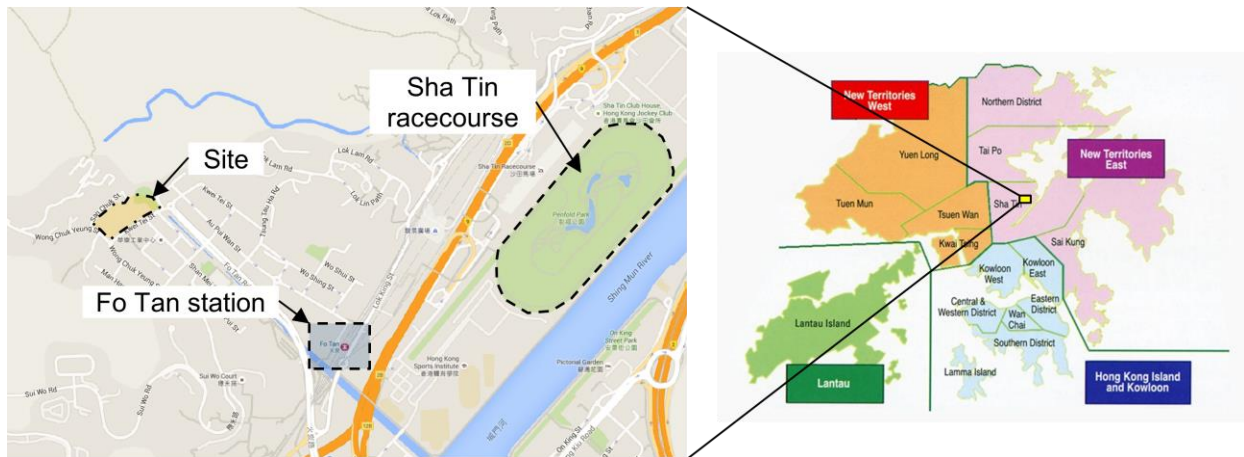
The difficulties imposed by the natural terrain were overcome by traffic ramps and temporary piling platforms. These were supported by modular block retaining walls comprising 1 m × 2 m segments (**Figure 3**). A shoring system of pipe piles, sheet piles and struts was also employed on site. Google SketchUp was used effectively to examine logistical and spatial constraints associated with the various construction activities.

## **Ground contamination**

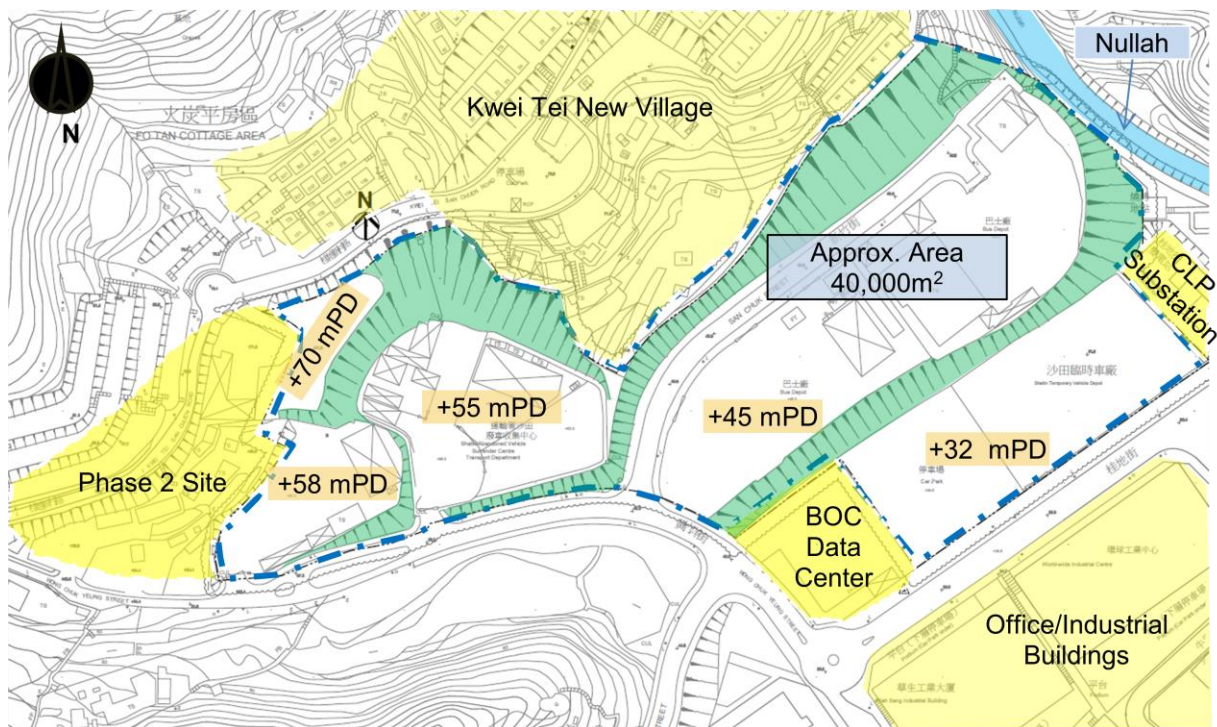
Elevated levels of lead and organic contaminants were encountered on this site. Cement stabilisation was employed to reduce the lead concentration in approximately 140 m<sup>3</sup> of soil and prevent leaching of this heavy metal. However, Prof. Yeung raised an important concern about future leaching if the soil reverts to an acidic state post-treatment. Organic contaminants in the form of DEHP and PCR were present in approximately 375 m<sup>3</sup> of soil. This soil was excavated using bored piles and subsequently treated with bio-remediation. This technique utilises a 15 m wide × 25 m long bio-pile unit, which contains a 1.5 m thick layer of contaminated soil underlain by 100 mm of sand. Aeration pipes run through the contaminated soil layer and the entire unit is wrapped in a HDPE liner (**Figure 4**).

## **Permanent works**

The residential blocks were supported by 99 no. large diameter bored piles and raft footings, while the commercial centre was supported by 65 no. socketed steel H-piles. The bored piles ranged from 2.5–2.7 m in diameter and 15–22 m in length. It was necessary to form an even larger diameter (3–3.2 m) hole to facilitate a permanent steel lining. This lining prevents ingress of soil/water during curing and protects piles in the long term. The piles were formed using the RCD technique and socketed into bedrock. A special attachment was used to form a bell-out at the base (**Figure 5**), before inserting the steel cage (**Figure 6**).



**Figure 1 - Site location** (© 2015 Google and www.hko.gov.hk)

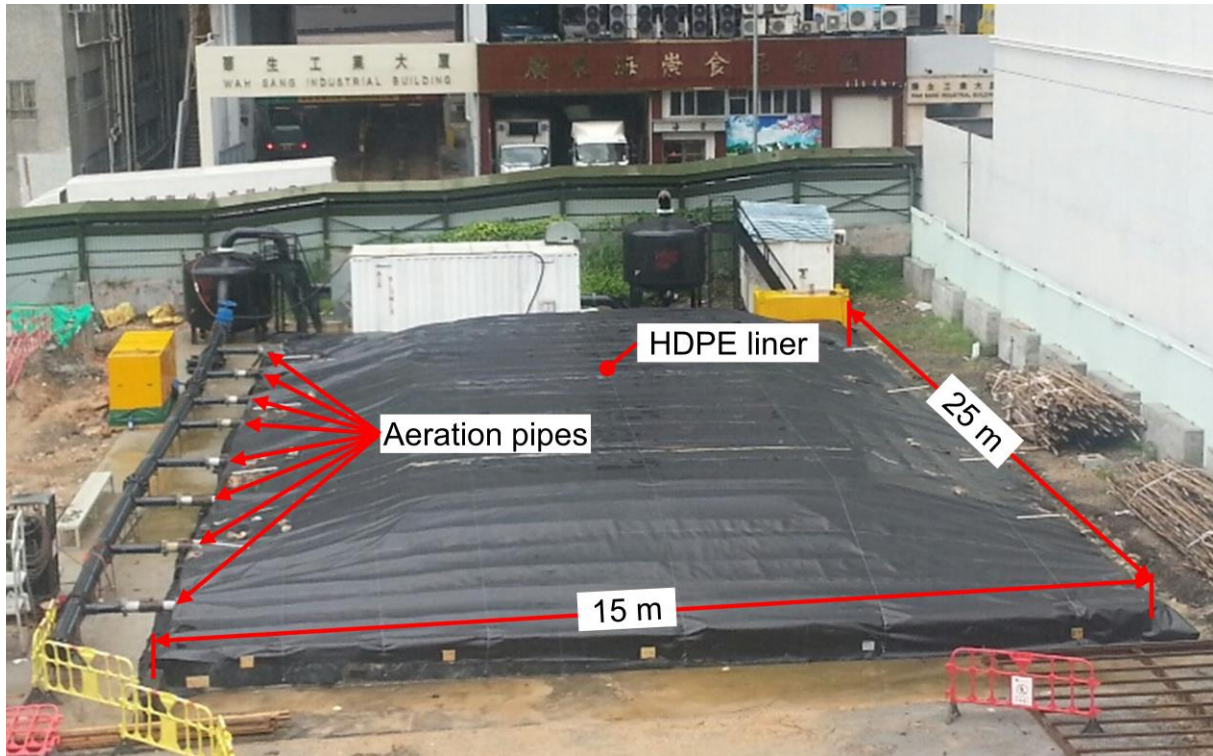


**Figure 2 - Site layout and ground elevations**





**Figure 3** - Traffic ramp and modular block retaining wall



**Figure 4** - Bio-pile unit used to reduce organic contamination in soil





(i)



(ii)

**Figure 5** - Mechanical drill-heads for (i) standard boring and (ii) bell-out at base





(i)



(ii)

**Figure 6** - Steel reinforcement cage: (i) side and (ii) end view