

Ascencia @TTDI (On Construction Aspect)

Earthwork Excavation and R.C.Works Within Struttred Diaphragm Wall

(by Mr. Keong Kian Huat, Project Manager) (2014 Jul-Sep)

Introduction

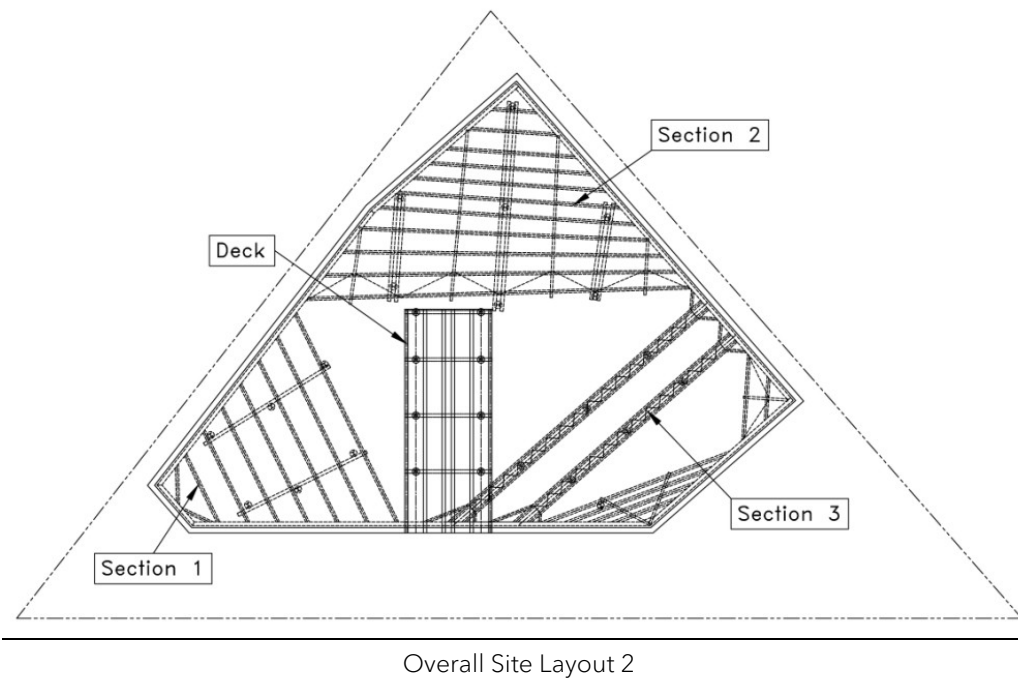
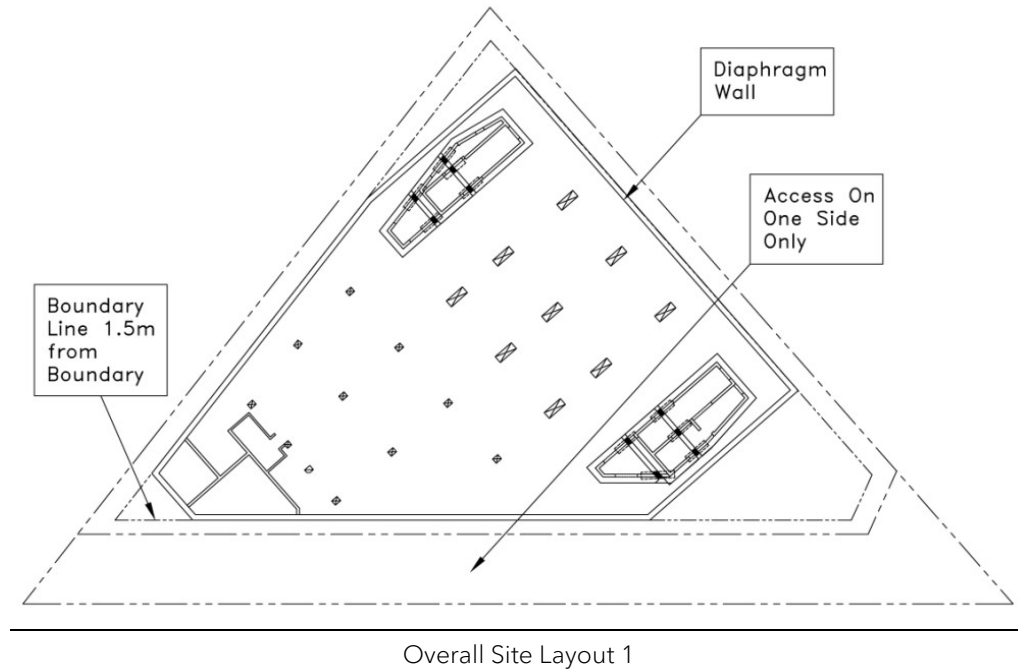
Ascencia @ TTDI is a 36 storey serviced apartment which contains 2 levels of basement car park. The design and construction aspects on the basement wall / diaphragm wall have already been covered in Issue 26 (Apr - Jun 2013). In this edition, the construction aspect covering the earthworks, strutting and reinforced concrete works are presented.



Overall Site Layout

Site Logistics

The land is triangular in shape and has an area that is approximately 3500 metres square. The basement built up area is roughly 2000 metres square. The setback line is only 1.5 metres away from the boundary making it accessible from one side only (see below). There is no circulation around the site as the hoarding is situated on the boundary line itself. The road reserve is the only area available for vehicles and construction plant to access the site. Due to the constrained nature of the site, the construction sequence had to be well planned. A deck was also proposed to facilitate the earthworks and reinforced concrete works for the basement construction.



Construction Sequence

Upon the completion of the diaphragm wall and bored piles, the earth was cut from the existing ground level of RL 46.5 to RL 42.3 (1 metre below strutting level). The struts were then constructed progressively in sections as indicated above. Upon the completion of the struts, a small excavator had to be deployed to remove earth from beneath the struts to the Basement 2 level of RL 37.6 The construction of pilecaps, Basement 2 slab,

Basement 2 columns and Basement 1 slab followed with the help of a crane and concrete pump stationed on top of the deck. The struts could only be removed upon the completion of the Basement 1 slab. The slab was designed to transfer the load from wall to wall and as such, sufficient slab area had to be completed to do the work of the struts. The removal of the deck and Section 3 struts had to be coordinated and planned for in order not to disrupt the flow of the construction works. Basement 1 columns and finally the Ground slab were constructed to complete the works.

Construction Difficulties Encountered

Earthworks for the project was an activity that had the most problems. Firstly, the circulation around the site was non-existent. The site is small which made constructing a temporary earth ramp impossible. Earth was transferred out from Sections 1 & 2 with the use of the excavator only. This involved a lot of double handling and as such time and cost. Initially 3 excavators were deployed to carry out the works when cutting to the strut level. However, after the strut level, only a small excavator could be used since it had to work under the struts. Another excavator was deployed on top to transfer the earth into trucks which transported the earth out. The site was also getting more congested as works progressed from Section 1 to Section 2 and then Section 3, with the reinforced concrete basement construction works following in full swing. Trying to balance the cut and fill was another issue that had to be dealt with. The site was over cut slightly to compensate for the earth from the pile cap excavation which was still ongoing. Finally, the small excavator had to be lifted out of the basement upon completion of the earthworks. A 60-ton crane was used for the operation (see photo).



A small excavator had to be lifted out of the basement upon completion of the earthworks