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TREVI FOUNDATIONS
KUWAIT CO. WLL
شركة تريفي الكويت للأساسات ذ.م.م

TECHNICAL REFERENCE



Hyundai and Genesis Service Center Showroom

Shuwaikh, Kuwait



Bored Piles
Ground Anchors
Berlin Wall
Contiguous Piles

Owner :

NORTHERN GULF TRADING CO

Main Contractor :

Combined Group Contracting Company

Duration of works:

2023 (6 month)

Introduction

The Hyundai/Genesis 3S Facility project in Shuwaikh Industrial encompasses a showroom, car service center, and associated offices.

The building comprises 2 basements, a ground floor, and mezzanine levels. The ground and mezzanine levels house the showroom and supporting offices, while car parking is situated on the second basement and car servicing on the first basement.

Trevi Scope

Trevi's scope of work for this project included shoring, excavation, dewatering, and piling.

On the two sides adjacent to the existing roads, Trevi utilized the standard method involving the use of timber and I-beams.

Up to four levels of anchors were included, with a spacing of 1.5m center-to-center, to ensure stability and support.

Soil investigation:

Based on SPT N-values, relative density of soil is classified as medium dense to dense soil encountered up to 7.0m followed by dense to very dense soil layers encountered until the drilled depth of the boreholes (40.0 m).



The site, measuring 150 m x 75 m, was bordered by roads on two sides and existing buildings on the remaining sides.

Excavation depths varied, with most areas reaching 12.85 meters below the existing ground level, while certain zones required excavation to depths of up to 15.8 meters.

Supporting Existing Buildings

To provide structural support to the existing buildings, Trevi employed the Continuous Flight Auger (CFA) method to install contiguous piles measuring 600 mm in diameter. These piles were spaced at 750 mm center-to-center and had a length of 18 meters.

In addition to one level of anchors was installed with a spacing of 2.25 m center-to-center.

Supporting Roadside Sides

Groundwater was encountered in the boreholes between 3.00 m to 3.30 m during drilling.

Works

The project presented a primary challenge of following a strict 240-day time schedule, which encompassed shoring, excavation, dewatering, and piling activities.

Trevi tackled this challenge by meticulously planning all project activities. Ensuring uninterrupted anchor installation was critical, considering the water level located 3 meters below the ground level. Permission for dewatering was time-consuming, prompting Trevi to execute preliminary test piles from a higher platform above the groundwater level as a workaround. This approach allowed independent curing and testing of the piles, irrespective of the progress of dewatering

and excavation. Notably, the design of the preliminary test piles was designed in such a way to neglect the influence of soil above the cut-off level.

Piles

A total of 253 working piles were installed using the Bucket and Auger method. These piles were categorized into three types based on their specifications:

- P1:** Diameter of 1000 mm and length of 12.5 meters.
- P2:** Diameter of 1000 mm and length of 16.5 meters.
- P3:** Diameter of 1000 mm and length of 20 meters.

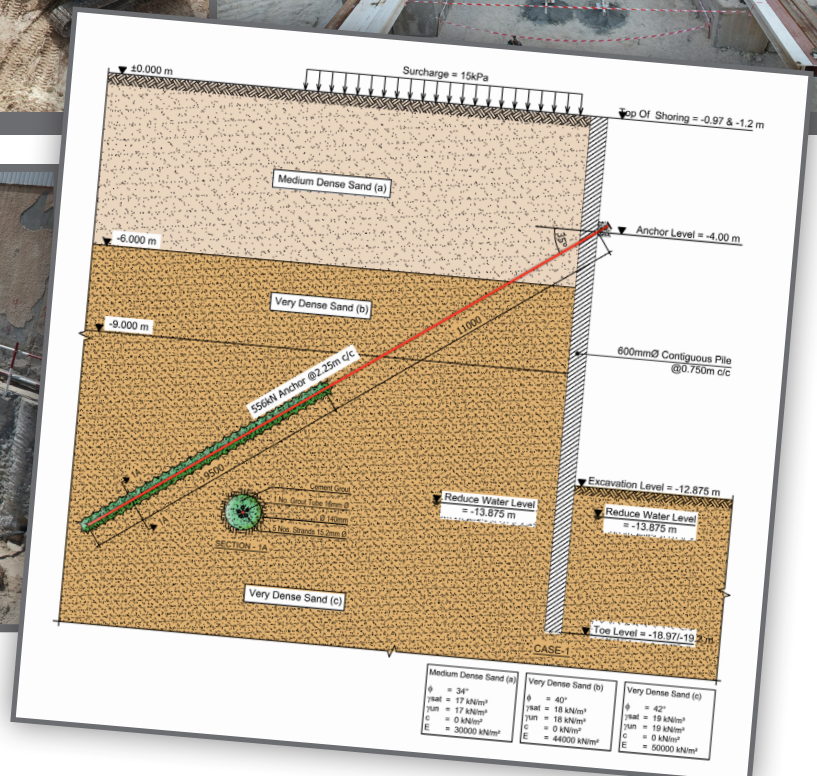
Testing

Preliminary test piles:

- 2 nos static bidirectional test pile with test load 7,300 kN.
- 2 nos static tension test pile with test load 6,000 kN.

Working test piles

- 2 nos static compression test piles with test load 5,475 kN.
- 2 nos static tension test piles with test load 4,500 kN.
- 7 nos Dynamic test piles with test load 5,475 kN.
- 1 nos Lateral test load with test load 109.5 kN.
- Cross hole sonic logging 15% of working piles.
- Low Strain integrity testing 100% of working piles.





235 nos

working piles ø 1000, depth 20 m

300 nos

shoring piles ø 600, depth 18 m

550 nos

anchors

Achievements

The project commenced on 10/Jan/2023, the last working pile was cast on 30/July/2023. All working pile tests were successfully completed by 5/August/2023. Trevi accomplished these milestones within 207 calendar days, effectively meeting the project's tight schedule.

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