

**APPENDIX E.3**

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**Geotechnical Recommendation Review for CEQA**



# GROUP DELTA

October 4, 2019

**WIP Expo Crenshaw, LLC**

2716 Ocean Park Boulevard, Suite 2025  
Santa Monica, California 90405

**Attention:** Mr. Rick Westberg & Mr. Max Levenstein

**Subject:** Geotechnical Recommendation Review for CEQA  
Crenshaw Mixed-use development  
3606 West Exposition Boulevard  
3633 West Obama Boulevard  
3631-3645 South Bronson Boulevard, Los Angeles, California  
Tract 11393, Lot 1; PM 3201, Lots A, B, & C; & PM 2647, Lots A & B  
Group Delta Proposal No. IR19-054

Dear Mr. Westberg and Mr. Levenstein,

In response to your request, Group Delta Consultants has reviewed the geotechnical investigation report prepared by Geocon West, Inc. (Geocon) dated September 3, 2019 for the subject project for comment on the geotechnical design features to aid in the California Environmental Quality Act (CEQA) reporting process. The following outlines our understanding of the project, Geocon's recommendations and our recommendations to avoid or minimize impacts from the foundation design to the local environment.

Our understanding is that the subject site is located to the south of the intersection of Exposition Boulevard and Crenshaw Boulevard in the City of Los Angeles, California. The proposed development includes two properties located on the southwest corner (Site A) and the southeast corner (Site B) of the intersection of Exposition Boulevard and Crenshaw Boulevard. Site A will include a podium-style structure consisting of five levels of residential housing over three parking levels constructed at or near present site grade. Development of Site B will consist of an eight-story mixed-use structure wrapped around three levels of above grade parking constructed over one subterranean parking level.

The proposed development (Site A and Site B) will be constructed on either side of the recently constructed Metro Exposition/Crenshaw Station that is a two-level underground station at the northern terminus of the new Crenshaw/LAX Transit Corridor project. Based on our experience during construction of this station it was found that the static groundwater (connected to a wider groundwater system) in the area was approximately 45 feet below the ground surface and that there were occasional zones of perched

groundwater. Perched groundwater represents isolated zones that are limited in lateral extent that are located above the static groundwater level. Construction of the station limited groundwater inflow by building a cutter soil mix wall around the perimeter of the excavation and utilized a relatively impermeable natural clay layer that behaved as an aquitard at an approximate depth of approximately 75 feet.

Geocon performed a geotechnical investigation at the site including eight (8) hollow stem auger borings to a maximum depth of about 50 feet and prepared a Geotechnical Investigation report dated September 3, 2019 summarizing their findings and recommendations for the foundation of the subject structures. Geocon reported encountering groundwater at approximately 18 to 20 feet below the ground surface. Based on the construction scheme utilized to construct the Expo/Crenshaw station, we believe Geocon has reported the perched groundwater level and that the static groundwater is located at a deeper depth. Geocon reported that the material in the upper 30 feet consists of alluvial soils that are clays, silts and some loose sands and organic soils that is consistent with the findings during excavation at the Expo/Crenshaw station.

Based on Geocon's analysis shallow foundations have been ruled out to avoid excessive settlement from an earthquake event if liquefaction is realized. To mitigate the geotechnical concerns at the site Geocon has recommended three foundation options:

- Cast-In-Drilled-Hole (CIDH) concrete piles;
- Auger-Cast Pressure Grouted Displacement (APGD) piles; or
- Ground improvement methods, such as stone columns.

All provided foundation options will require penetration into the ground at least 30 feet below the proposed foundations. Site B will also require an excavation for facilitating space for the proposed subterranean parking level and construction of the foundations. The excavation is above the groundwater level and standard shoring will be required.

It is our opinion, of the three foundation solutions provided above, that the APGD pile is the most optimal. APGD piles are installed by rotating a continuous flight hollow shaft auger into the soil to a specified depth. High strength sand cement grout is pumped through the hollow shaft as the auger is slowly withdrawn while slowly turning in a clockwise direction. While the cement grout is still fluid, reinforcing steel is then inserted into the pile. The resulting grout column hardens and forms an APGD pile. Advantages of the APGD piles compared to the other foundation recommendations are listed below:

- Less noise - APGD piles are a drilled and pumped pile, not a driven pile. This eliminates the hammer impact noise created by driving piles.
- Minimizes vibrations - APGD piles can be installed adjacent to existing structures without the danger of settlement or damage to existing footings, walls, other

structural components, or nearby equipment caused by vibrations that may occur from other methods such as pile driving and impact placed ground improvement.

- APGD piles are cast in place, minimizing the concerns with over production and waste of raw materials, such as over length pile material or handling or moving piles to the jobsite.
- APGD piles generate less cutting than CIDH piles and less export transportation of cuttings is required.
- APGD piles require pile load testing that further validates the nominal capacity of the piles.

All three foundations are capable of transmitting the building loads to deeper competent material to support the proposed development. These foundations can be designed to mitigate against excessive settlements associated with seismic ground shaking and potential soil strength loss due to liquefaction. These methods can be utilize to limit or remove loading from adjacent structures such as the underground Metro station located along Crenshaw Blvd. In addition, the site is not located within an Alquist-Priolo Earthquake Fault Zone (AP) and no faults are mapped as crossing or projecting toward the site. Since the site is flat, lateral spreading and landslides are not a design concern for the subject site.

For geotechnical and seismic point of view, we believe the three foundation solutions proposed by Geocon are feasible and can protect against injury or death if properly designed and constructed for the final building configuration.

Sincerely,

**GROUP DELTA CONSULTANTS, INC.**



Shah Ghanbari, P.E.

President