APPENDIX D10

Geotechnical Recommendations, dated October 25, 2019

ALTA CALIFORNIA
GEOTECHNICAL INC.

170 North Maple Street, Suite 108
Corona, CA 92880
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EM RANCH, LLC
C/O Tarek Shaer
Dugally Ovberfeld
484 South San Vincente
Los Angeles, CA 90048

October 24, 2019
Project Number 1-0159-B

Attention: Mr. Tarek Shaer

Subject: **UPDATED GEOTECHNICAL RECOMMENDATIONS**
The District @ Rubidoux Project,
City of Jurupa Valley, California

References: See Appendix A

Dear Mr. Shaer:

Presented herein are Alta California Geotechnical, Inc.'s (Alta) updated geotechnical recommendations for The District @ Rubidoux project (aka Emerald Meadows), located in the City of Jurupa Valley, California. This report is based on a review of the referenced geotechnical and geologic investigations, reports and maps, and review of the Conceptual Overall Site Plan prepared by Architects Orange.

Alta's review of the data and site plan indicates that the proposed development is feasible, from a geotechnical perspective, provided that the recommendations presented in this report and in previous reports are incorporated into the grading and improvement plans and implemented during site development. This report, combined with our previous investigation/report (Alta, 2015a), constitutes a due diligence/EIR-level geotechnical review of The District @ Rubidoux project. As the design progresses and as grading plans are developed, it is anticipated that additional geotechnical investigations/reports for will likely be required.

The previous report for the site (Alta, 2015a) was based on a concept that was primarily for single-family residential lots, with a school, some commercial structures and parks. In contrast,

the current conceptual design (enclosed Plate 1) is primarily commercial/warehouse structures, with some multi-family residential structures. Discussions concerning the geologic and geotechnical conditions onsite presented in Alta (2015a) remain applicable to The District @ Rubidoux. This updated report provides discussions with appropriate exhibits pertinent to changes in the development concept, including:

- The current concept design (Plate 1);
- A plan showing topography, geology and subsurface excavations (Plate 2) from Alta (2015a);
- A discussion of the conceptual development;
- Discussions of liquefaction potential as it relates to the proposed design;
- Preliminary grading recommendations;
- Preliminary foundation/improvement design recommendations.

If you have any questions or should you require any additional information, please contact the undersigned at (951) 509-7090. Alta appreciates the opportunity to provide geotechnical consulting services for your project.

Sincerely,
Alta California Geotechnical, Inc.

By: _____

SCOTT A. GRAY/RGE 2857
Reg. Exp.: 12-31-20
Registered Geotechnical Engineer
Vice President

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Distribution: (3) Addressee

SAG/DAM: skt-1-0159-B, October 24, 2019 Updated Geotechnical Recommendations

1.0 INTRODUCTION

The following report presents Alta's updated geotechnical recommendations for The District @ Rubidoux project (aka Emerald Meadows), located in the City of Jurupa Valley, California.

1.1 Purpose

The purpose of this report is to examine the existing onsite geotechnical conditions and assess the impacts that the geotechnical conditions may have on the proposed development, as depicted on the enclosed Conceptual Overall Site Plan, prepared by Architects Orange (Plate 1). This updated report is intended to supplement the Alta (2015a) report, and together, form a due diligence/EIR-level geotechnical evaluation of The District @ Rubidoux project.

1.2 Scope of Work

Alta's *Scope of Work* for this geotechnical investigation included the following:

- Reviewing the referenced reports and maps (Appendix A);
- Preparing an updated geologic map utilizing the conceptual plans as a base (Plate 1, attached);
- Reviewing the previous liquefaction analysis;
- Preparing updated preliminary grading recommendations;
- Preparing updated preliminary foundation design recommendations;
- Preparing this report and accompanying exhibits.

1.3 Report Limitations

The conclusions and recommendations in this report are based on the information generated during previous investigations, review of the referenced reports, and our review of the Conceptual Overall Site Plan (Plate 1). The materials immediately adjacent to or beneath those observed may have

different characteristics than those observed, and no representations are made as to the quality or extent of material not observed.

2.0 PROJECT DESCRIPTION

The proposed development has been updated to be primarily commercial/warehouse structures and associated improvements. The development includes ten large commercial/warehouse structures, three medical office buildings, a hotel, several smaller retail structures, restaurants, youth/senior centers, basketball/tennis courts, a multi-family development, open space areas, and an open-air amphitheater. A grading concept is not available at this time, but it is anticipated the finished site will be relatively flat.

3.0 PREVIOUS SITE INVESTIGATIONS

In past years several geotechnical investigations have been conducted onsite (references), which included borings, CPT-soundings, and backhoe test pits, as well as associated laboratory testing. The latest report, which was prepared by Alta (2015a), compiles all the available data. The plan from Alta (2015a) showing topography, geology and locations of previous subsurface excavations, is attached herein (Plate 2). The available information is considered suitable for the proposed development at a due diligence/EIR-level.

4.0 GEOLOGIC AND ENGINEERING CONDITIONS

A full description of the geologic conditions onsite is presented in Alta (2015a), including stratigraphy, geomorphology, groundwater conditions, fault evaluations, and geologic hazards. Also included in Alta (2015a) are descriptions of the engineering characteristics of the onsite soils, including compressibility, expansion potential, corrosion potential, moisture contents, excavation characteristics, pavement support characteristics, and shear strengths. Those descriptions are still considered applicable to the current design.

5.0 LIQUEFACTION POTENTIAL

Seismic agitation of relatively loose saturated sands, silty sands, and some silts can result in a buildup of pore pressure. If the pore pressure exceeds the overburden stresses, a temporary quick condition known as liquefaction can occur. Liquefaction effects can manifest in several ways including: 1) loss of bearing; 2) lateral spread; 3) dynamic settlement; and 4) flow failure. Lateral spreading has typically been the most damaging mode of failure.

Portions of the younger alluvium have been determined to be potentially liquefiable, while the older alluvium is generally resistant to liquefaction. As such, there is a potential for liquefaction below proposed Buildings 1 through 8, 10, the youth/senior centers, the amphitheater, basketball/tennis courts, and portions of the multi-family development. A liquefaction analysis of the site was conducted for our previous report (Alta, 2015a). The general conclusions reached in (Alta, 2015a) regarding loss of bearing, lateral spread, dynamic settlement and flow failure remain applicable to the proposed design.

Due to the potential for liquefaction, Alta (2015a) recommended to remove and recompact the upper portions of the younger alluvium to at a depth that is at least ten (10) feet below existing grade. The purpose is to limit the potential settlement resulting from liquefaction to less than 4 inches within the limits of the proposed lots and street areas. After the remedial and design grading, an associated differential settlement on the order of 2-inches in 40 feet can be utilized in the design of the improvements onsite. This recommendation is applicable only to lightly-loaded structures that can be founded on post-tensioned or mat slabs designed for 2-inches in 40 feet of dynamic settlement. Based on the proposed design, this may include the youth/senior centers, basketball/tennis courts and some of the smaller buildings.

However, for larger structures, particularly Buildings 1, 2, 6 and 10, and possibly Buildings 3, 4, 5, 7 and 8, with their higher design loading and less tolerance for settlement, other methods of mitigating the liquefaction potential may be more suitable. These methods may include stone columns, dynamic compaction, or rammed aggregate piers. These methods are discussed further in Section 6.0.

The liquefaction analysis and conclusions presented in Alta (2015a) applied the dynamic settlement criteria across all of the younger alluvium. However, there is evidence that the liquefaction potential varies across the younger alluvium. As the design progresses, additional investigation of each building location would be beneficial to refine the liquefaction potential at each structure siting.

6.0 EARTHWORK RECOMMENDATIONS

Earthwork recommendations were presented in Alta (2015a). The general earthwork recommendations and the unsuitable soil removals presented for undocumented artificial fill and older alluvium remain applicable to the proposed project, although refinements will be required once the design/grades are known. The onsite older alluvium is considered suitable to support the proposed improvements upon completion of the unsuitable soil removals and recompaction. The older alluvium underlies Building 9, the medical office buildings, the hotel, the retail shops, the restaurants and a portion of the multi-family development. The approximate distribution of the geologic units is presented on the enclosed Plate 1.

As discussed in Section 5.0, the unsuitable soil removal and recompaction criteria presented in Alta (2015a) are applicable to lightly loaded structures founded on post-tensioned or mat slabs designed for dynamic differential settlement of 2-inches in 40 feet. For heavier/larger structures, alternate mitigations for the liquefaction potential may be more suitable. Below is a brief discussion on the potential mitigations for the proposed structures underlain by younger alluvium. The ultimate mitigation will likely

be determined on a building by building basis, based on additional subsurface exploration, the final building locations, and discussions with the structural engineer on loading and settlement tolerances.

6.1 Buildings 1, 2 and 6

Given the size, anticipated loading, and likely settlement tolerances of Buildings 1, 2, and 6, it is likely that unsuitable soil removals and recompaction will be insufficient to mitigate the liquefaction potential below these structures, unless de-watering and deep removals are accomplished, which is likely not cost effective. Utilizing alternate methods to mitigate the dynamic settlement to tolerant levels may be preferable. Potential methods include installation of stone columns, rammed aggregate piers, or dynamic compaction. The depth of the mitigation will be building-specific and depend on results of additional investigation, however, from a due diligence standpoint it can be assumed that the upper 20 to 30 feet of material will need to be mitigated. As the design progresses, Alta recommends that a contractor who specializes in deep ground modification techniques for liquefaction be consulted for the liquefaction mitigation for these buildings.

6.2 Buildings 3, 4, 5, 7, and 8

Liquefaction mitigation below Buildings 3, 4, 5, 7, and 8 will depend on structural loading and settlement tolerances. Structures that can be designed for dynamic settlements of 2 -inches and 40-feet can utilize the unsuitable soil removal criteria presented in Alta (2015a) for mitigation. Otherwise, the alternative mitigation methods presented in Section 6.1 may be applicable.

6.3 Building 10

As shown on Plate 1, Building 10 is sited over a transition between older alluvium and younger alluvium. As such, in addition to mitigating the liquefaction

potential in the younger alluvium, the potential differential settlement between the portions of the structure founded on older alluvium and younger alluvium will need to be mitigated. This may include over-excavation of the older alluvium and replacement with compacted fill, or deep foundations that extend to the older alluvium in the younger alluvial areas.

6.4 Multi-Family

A portion of the multi-family development will be founded over the liquefiable younger alluvium. Given typical multi-family structures, the unsuitable soil criteria and foundation design criteria presented in Alta (2105a) for younger alluvium are likely applicable, although this shall be verified as the design of the project progresses.

7.0 DESIGN CONSIDERATIONS

Design recommendations for lightly-loaded structures, retaining walls, pavement, flatwork, concrete and drainage were presented in Alta (2015a) and remain applicable under the 2019 CBC. Additional foundation design recommendations for larger structures will be required as the design of the project progresses and will depend on the liquefaction mitigation implemented for each structure. Presented below are comments on settlement monitoring during construction and updated seismic design values.

7.1 Settlement Monitoring

Placement of design fills will likely produce a settlement response in the underlying saturated alluvium that is likely to require 1 to 4 months after grading completion to occur. A majority of settlement will occur during grading as a result of the fill placement. A settlement monitoring program should be initiated after grading to monitor the primary settlement of the underlying alluvial

materials. The primary settlement should be confirmed to be complete before settlement-sensitive improvements (structures, utilities, etc.) are constructed at the site. Final release for utility and residential construction will be provided by the Geotechnical Engineer based on the results of the settlement monitoring program.

7.2 Seismic Design

The following seismic design parameters are presented to be code compliant to the California Building Code (2019). The subject lots have been identified to be "D" site class in accordance with Section 1613.3.2 of the 2019 CBC. Utilizing this information, the computer program ATC Hazards by Location and ASCE 7-16 criterion, the spectral response accelerations that can be utilized for the project are presented on Figure 1. These parameters should be verified by the structural engineer. Additional parameters should be determined by the structural engineer based on the Occupancy Category of the proposed structures.

8.0 FUTURE INVESTIGATIONS AND PLAN REVIEWS

This report represents updated geotechnical recommendations based on the conceptual site plan and is suitable for due diligence/EIR-level review when it is combined with the report by Alta (2015a). As the project design progresses, site specific geologic and geotechnical issues should be considered in the design and construction of the project. As previously noted, it is anticipated additional subsurface investigations will be required to refine liquefaction mitigation and provide foundation design recommendations for the commercial/warehouse structures onsite. Future plan reviews will also be necessary. These reviews may include reviews of:

- Grading Plans
- Improvement Plans

ATC Hazards by Location

Search Information

Coordinates: 34.0005, -117.3942

Elevation: ft

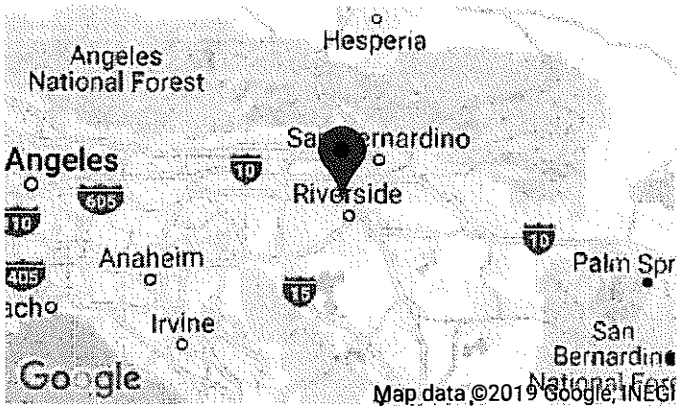
Timestamp: 2019-10-23T15:52:43.679Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D



Basic Parameters

Name	Value	Description
S_S	1.5	MCE_R ground motion (period=0.2s)
S_1	0.6	MCE_R ground motion (period=1.0s)
S_{MS}	1.5	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

▾Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.94	Coefficient of risk (0.2s)
CR_1	0.914	Coefficient of risk (1.0s)
PGA	0.535	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA

FIGURE 1

- Foundation Plans

These plans should be forwarded to the project Geotechnical Consultant for review.

9.0 CLOSURE

9.1 Geotechnical Review

For the purposes of this report, multiple working hypotheses were established for the project, utilizing the available data and the most probable model is used for the analysis. Future information collected during the proposed grading operations is intended to evaluate the hypothesis and as such, some of the assumptions summarized in this report may need to be changed. Some modifications of the grading recommendations may become necessary, should the conditions encountered in the field differ from the conditions hypothesized in this report.

Plans and sections of the project specifications should be reviewed by Alta, to evaluate conformance with the intent of the recommendations contained in this report. If the project description or final design varies from that described in herein, Alta must be consulted regarding the applicability of the recommendations contained herein and whether any changes are required. Alta accepts no liability for any use of its recommendations if the project description or final design varies and Alta is not consulted regarding the alterations.

9.2 Limitations

This report is based on the following: 1) the project as presented on the attached plan; and 2) the information presented in the referenced reports. The findings and recommendations are based on the results of previous subsurface investigations, laboratory testing, and office analysis combined with an interpolation and extrapolation of conditions between and beyond the subsurface excavation locations. However, the materials adjacent to or beneath

those observed may have different characteristics than those observed, and no precise representations are made as to the quality or extent of the materials not observed. The results reflect an interpretation of the direct evidence obtained. Work performed by Alta has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical profession currently practicing in the same locality under similar conditions. No other representation, either expressed or implied, and no warranty or guarantee is included or intended.

The recommendations presented in this report are based on the assumption that an appropriate level of field review will be provided by a geotechnical consultant who is familiar with the design and site geologic conditions. That field review shall be sufficient to confirm that geotechnical and geologic conditions exposed during grading are consistent with the geologic representations and corresponding recommendations presented in this report.

The conclusions and recommendations included in this report are applicable to the specific design of this project as discussed in this report. They have no applicability to any other project or to any other location and any and all subsequent users accept any and all liability resulting from any use or reuse of the data, opinions, and recommendations without the prior written consent of Alta.

Alta has no responsibility for construction means, methods, techniques, sequences, procedures, safety precautions, programs in connection with the construction, acts or omissions of the CONTRACTOR or any other person performing any of the construction, or for the failure of any of them to carry out the construction in accordance with the final design drawings and specifications.

APPENDIX A

REFERENCES

APPENDIX A

Selected References

1. Alta California Geotechnical, Inc., (2015a), Summary of Infiltration Testing, Emerald Meadows Ranch Project, Rubidoux Area of the County of Riverside, California, dated October 7, 2015 (Project No. 1-0159-A).

2. Alta California Geotechnical, Inc., (2015b), Updated Geotechnical Report, Emerald Meadows Ranch Project, Rubidoux Area of the County of Riverside, California, dated June 22, 2015 (Project No. 1-0159).

3. Converse Consultants (2003), Preliminary Geotechnical/Geologic Hazard Evaluation Report, Approximately 200+ Acre Site, Rubidoux Area of Unincorporated Riverside County, California, by Converse Consultants, Inc., September 3, 2003 for Converse Consultants.

4. Zeiser Kling Consultants, Inc. (2005a), Mass Grading Plan Review, Emerald Meadows Ranch, parcel map 32971, Rubidoux Area of Unincorporated Riverside County, California, dated September 23, 2005 for SunCal Companies.

5. Zeiser Kling Consultants, Inc. (2005b), Geotechnical Investigation, Emerald Meadows Ranch, Tentative Tract Map Number 32972, Lots 1 through 69, Rubidoux Area of Unincorporated Riverside County, California, dated March 18, 2005.

6. Zeiser Kling Consultants, Inc. (2005c), Geotechnical Investigation, Emerald Meadows Ranch, Tentative Tract Map Number 32973, 119 Lots, Rubidoux Area of Unincorporated Riverside County, California, dated March 18, 2005.

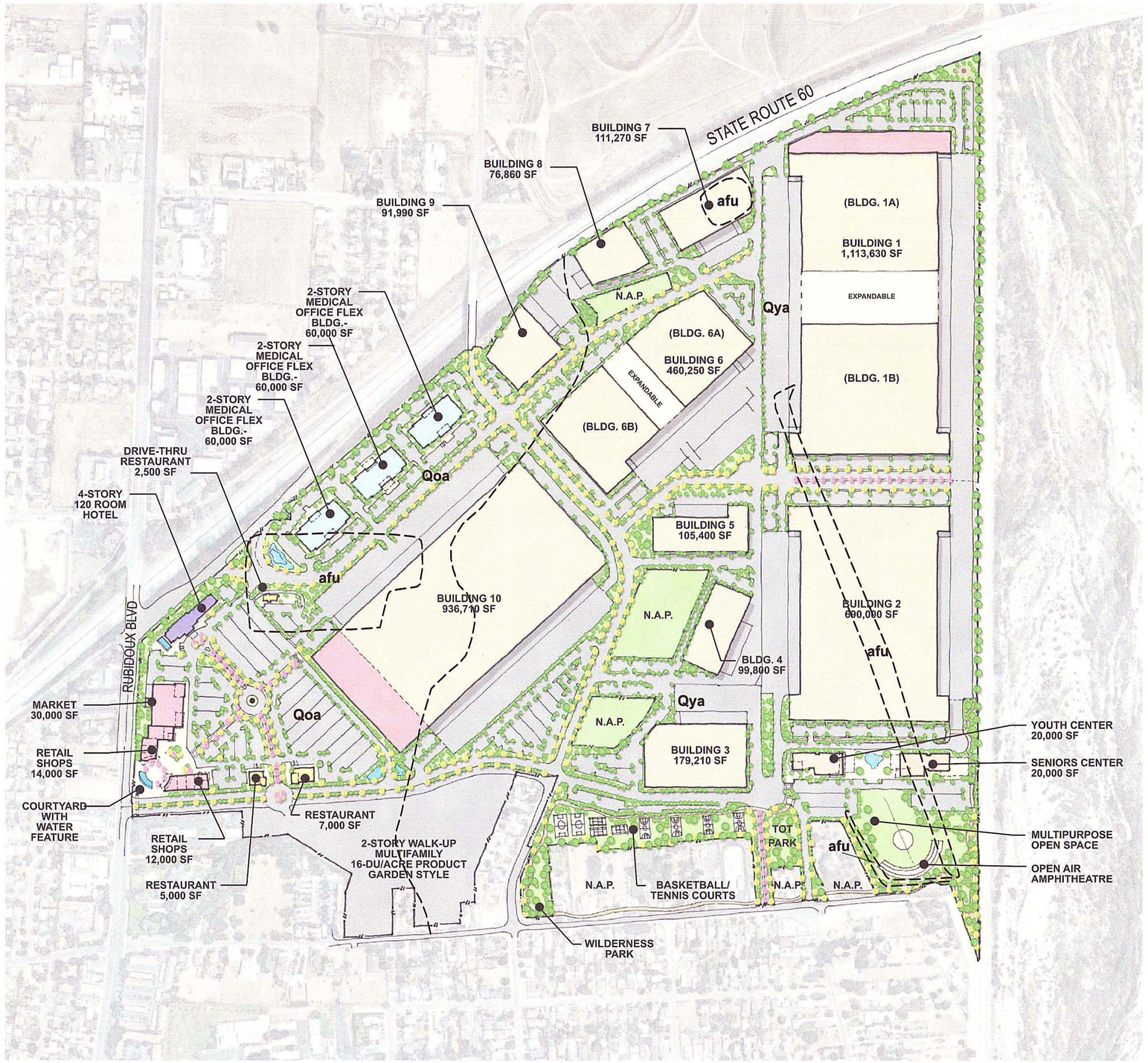
7. Zeiser Kling Consultants, Inc. (2005d), Geotechnical Investigation, Emerald Meadows Ranch, Tentative Tract Map Number 32974, Lots 1 through 68, Rubidoux Area of Unincorporated Riverside County, California, dated March 18, 2005.

8. Zeiser Kling Consultants, Inc. (2005e), Geotechnical Investigation, Emerald Meadows Ranch, Tentative Tract Map Number 32975, Lots 1 through 97, Rubidoux Area of Unincorporated Riverside County, California, dated March 18, 2005.

9. Zeiser Kling Consultants, Inc. (2005f), Geotechnical Investigation, Emerald Meadows Ranch, Tentative Tract Map Number 32976, Lots 1 through 176, Rubidoux Area of Unincorporated Riverside County, California, dated March 18, 2005.

10. Zeiser Kling Consultants, Inc. (2005g), Geotechnical Investigation, Emerald Meadows Ranch, Proposed Multi-Family Residential Site, Planning Area 19, a Portion of Parcel 2, Tentative Tract 32971, Rubidoux Area of Unincorporated Riverside County, California, dated April 14, 2005.

11. Zeiser Kling Consultants, Inc. (2005h), Geotechnical Investigation, Emerald Meadows Ranch, Proposed Multi-Family Residential Site, Planning Area 18, a Portion of Parcel 2, Tentative Tract 32971, Rubidoux Area of Unincorporated Riverside County, California, dated April 14, 2005.



LEGEND:

- 3,892,120 SF WAREHOUSE
- 120 ROOM HOTEL WITH 5,000 SF MEETING ROOMS
  AMENITIES: FITNESS ROOM , CAFE, OUTDOOR POOL
- 146,320 SF RETAIL SHOPS
  30,000 SF MARKET
- 14,500 SF RESTAURANT
- 180,000 SF MEDICAL OFFICE FLEX
- 33,280 SF OFFICE FLEX
- 20,000 SF YOUTH CENTER
  20,000 SF SENIOR CENTER

LEGEND	
afu	ARTIFICIAL FILL - UNDOCUMENTED
Qya	YOUNGER ALLUVIUM
Qoa	OLDER ALLUVIUM
- - -	APPROXIMATE LOCATION OF GEOLOGIC CONTACT

PLATE 1

ALTA CALIFORNIA GEOTECHNICAL, INC.
170 N. MAPLE STREET, STE 108, CORONA, CA 92880
TELEPHONE: (951) 509-7090
PROJECT NUMBER: 1-0159-B DATE: Oct. 24, 2019

EM Ranch LLC

THE DISTRICT @ Rubidoux

Jurupa Valley, California

CONCEPTUAL OVERALL SITE PLAN

144 North Orange Street, Orange, California 92866
714 / 639-9860
architectsorange.com

01

Scale 1" = 200'
Job No. 2018-245
Date 2019-08-14

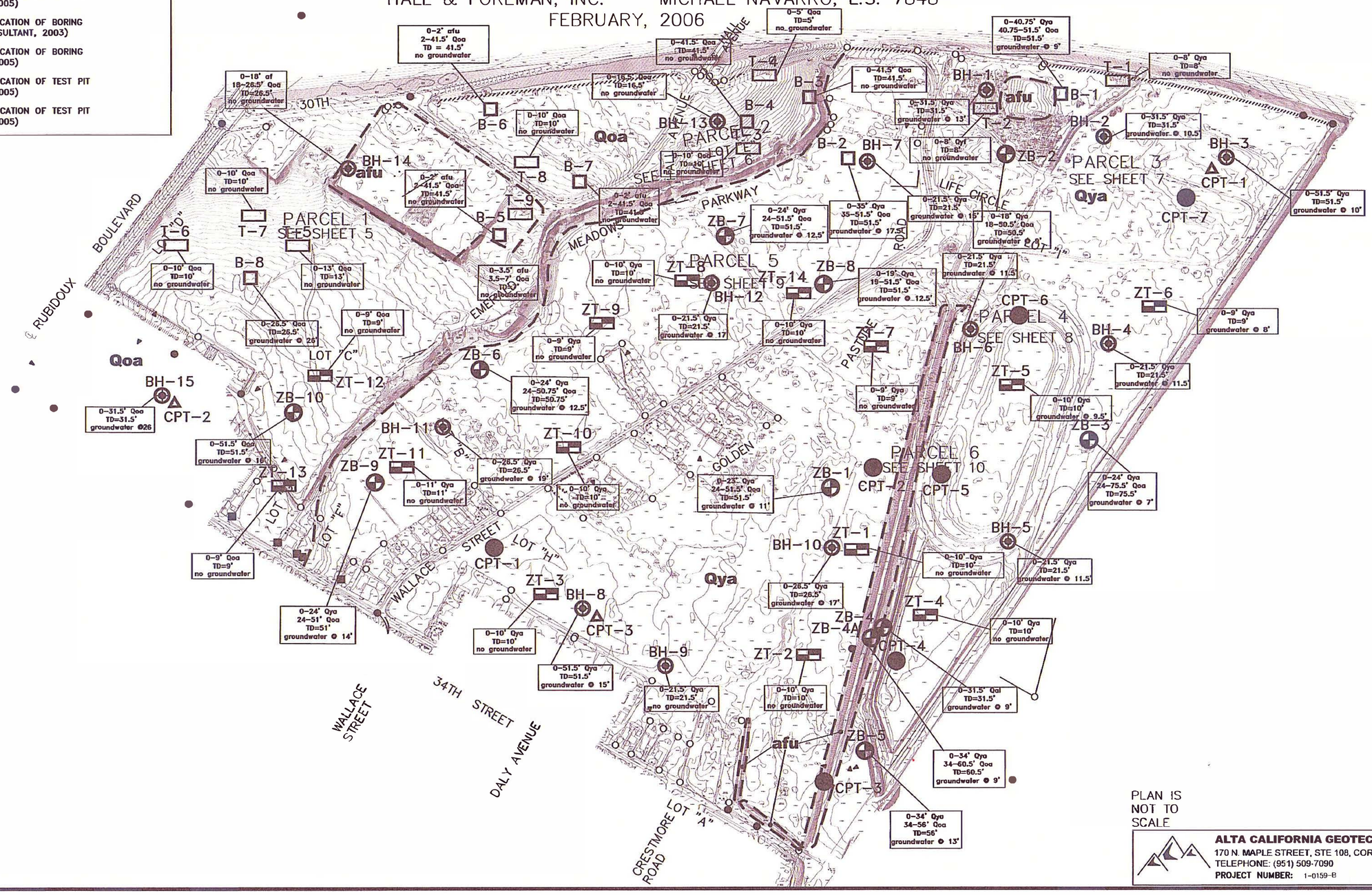
IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

PARCEL MAP NO. 32971

HALL & FOREMAN, INC. MICHAEL NAVARRO, L.S. 7848
FEBRUARY, 2006

LEGEND

- **afu** ARTIFICIAL FILL –UNDOCUMENTED
- **Qya** YOUNGER ALLUVIUM
- **Qoa** OLDER ALLUVIUM
- APPROXIMATE LOCAITON OF GEOLOGIC CONTACT
- CPT–7 APPROXIMATE LOCATION OF CONE PENETRATION TEST (ALTA 2015)
- CPT–1 APPROXIMATE LOCATION OF CONE PENETRATION TEST (CONVERSE CONSULTANT, 2003)
- ZB–7 APPROXIMATE LOCATION OF MUD ROTARY BORING (ZEISER KING, 2005)
- BH–3 APPROXIMATE LOCATION OF BORING (CONVERSE CONSULTANT, 2003)
- B–1 APPROXIMATE LOCATION OF BORING (ZEISER KING, 2005)
- T–1 APPROXIMATE LOCATION OF TEST PIT (ZEISER KING, 2005)
- ZT–1 APPROXIMATE LOCATION OF TEST PIT (ZEISER KING, 2005)



PLAN IS NOT TO SCALE

PLATE 2

ALTA CALIFORNIA GEOTECHNICAL, INC.
170 N. MAPLE STREET, STE 108, CORONA, CA 92880
TELEPHONE: (951) 509-7090
PROJECT NUMBER: 1-0159-B **DATE:** Oct. 24, 2019