GEOTECHNICAL INVESTIGATION

On

PROPOSED RESIDENTIAL DEVELOPMENT

At

Monterey Road
Morgan Hill, California

For
Dividend Homes

By
Quantum Geotechnical, Inc.

Project No. D057.G
January 8, 2018

QUANTUM GEOTECHNICAL INC.

Project No. D057.G
January 8, 2018

Mr. Martin Frankel
Dividend Homes
385 Woodview Avenue, Ste. 100
Morgan Hill, CA 95037

Subject: Proposed Residential Development
Monterey Road
Morgan Hill
GEOTECHNICAL INVESTIGATION

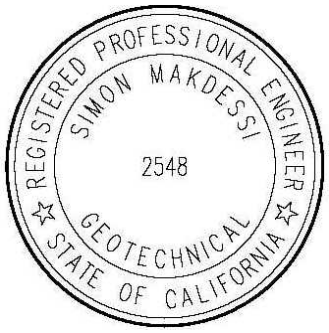
Dear Mr. Frankel:

In accordance with your authorization, ***Quantum Geotechnical, Inc.,*** has investigated the geotechnical conditions at the subject site located in Morgan Hilll, California

The accompanying report presents the results of our field investigation. Our findings indicate that development of the site for the proposed new residential development is feasible provided the recommendations of this report are carefully followed and are incorporated into the project plans and specifications.

Should you have any questions relating to the contents of this report or should additional information be required, please contact our office at your convenience.

Sincerely,
Quantum Geotechnical, Inc.



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GEOTECHNICAL INVESTIGATION

PURPOSE AND SCOPE

The purpose of the investigation for the proposed new residential subdivision located off of Monterey Road in Morgan Hill, California, was to determine the surface and subsurface soil conditions at the subject site. Based on the results of the investigation, criteria were established for the grading of the site, the design of foundations for the proposed development, and the construction of other related facilities on the property.

Our investigation included the following:

a. Field reconnaissance by the Soil Engineer;
b. Determine the general seismicity of the site in accordance with the 2016 CBC;
c. Excavation of three exploratory test pits;
c. Laboratory testing of soil samples;
d. Analysis of the data and formulation of conclusions and recommendations; and
e. Preparation of this written report.

PROPOSED DEVELOPMENT

It is our understanding that the proposed project consists of constructing a multi-family residential development, and associated civil improvements. The residences will be one to two stories high of wood frame construction and supported on a post-tensioned slab foundation system. Grading is anticipated to be minor cuts and fills of the order of 1 to 2 feet.

SITE LOCATION AND DESCRIPTION

The site is located in the central western part of Morgan Hill, within level terrain, as shown in the Site Vicinity and Fault Map, Figure 1, attached to the Appendix. The site measures approximately 5.8 acres in size and its currently vacant land. The site is rectangular in shape and bounded by Monterey Road to the southwest, an existing commercial building and parking lot to the southeast, and vacant, undeveloped lands to the northeast and northwest. The surface of the site is covered with 2-3 foot tall vegetation.

GENERAL GEOLOGIC CONDITIONS

The site resides in level terrain on the southern end of the Santa Clara Valley. Based on a review of geologic maps (reference 2), the site is underlain by Pleistocene alluvial sediments. These deposits will tend to consist of well consolidated silty clays, with pockets of gravel dispersed throughout.

The California Geological Survey, Seismic Hazard Zones Map for the Morgan Hill 7.5-Minute Quadrangle dated 2004 does not include the site in a hazard zone requiring special investigation for liquefaction hazards. According to this report, the historic high groundwater level within the vicinity will be found approximately 20-30 feet below ground surface. A review of the Association of Bay Area Governments liquefaction susceptibility map classifies the site area as being under low risk for liquefaction.

The nearest active faults to the site are the Calaveras Fault located approximately 3.6 miles northeast of the site, the Sargent fault approximately 7.5 miles to the southwest, and the San Andres fault approximately 10 miles southwest of the site as indicated on Figure 1, “Site Vicinity and Fault Map”, attached to the Appendix. Our review indicates that there are no known active faults crossing the site and the site is not mapped within a State of California Earthquake Fault Zone.

INVESTIGATION

The field investigation was performed on December 11, 2017, and included a reconnaissance of the site and the excavation of three exploratory test pits at the approximate locations shown on Figure 2, "Site Plan". The pits extended to depths ranging from 8 to 11 feet below current ground surface.

The stratification of the soils and descriptions are shown on the respective "Logs of Test Pits" contained within Appendix A.

Laboratory testing was conducted for Atterberg Limits, moisture density, gradation analysis, consolidation, and corrosion potential. The data received from the lab are presented on the test pit logs.

SUBSURFACE CONDITIONS

The subsurface conditions as encountered in the three test pits remained consistent throughout the site. Soil encountered consisted of stiff silt with gravel to 1-2 feet below existing grade. Beyond this depth, medium dense silty gravel was encountered to the test pit termination depth.

Groundwater was not encountered in the test pits at the time of our exploration. Fluctuations in the groundwater table may occur due to tidal influences, seasonal rainfall and urbanization.

A more thorough description and stratification of the soil conditions are presented on the respective "Logs of Test Pits" in Appendix A. The approximate locations of the pits are shown on Figure 2, "Site Plan" in Appendix A.

2016 CBC SEISMIC DESIGN CRITERIA

The potential damaging effects of regional earthquake activity should be considered in the design of structures. As a minimum, seismic design should be in accordance with Chapter 16 of the 2016 California Building Code (CBC). The 2016 CBC utilizes the design procedures outlined in the 2010 ASCE 7-10 Standard.

Using the criteria in Chapter 20 of ASCE 7-10, in its current condition, the site is classified as Site Class D. The seismic design parameters have been developed using the online U.S. Geological Survey, US Seismic Design Maps tool, version 3.1.0, last updated 11 July 2013, and a site location based on longitude and latitude. The parameters generated for the subject site for a latitude of 37.15567° N, and longitude of -121.67582° W, are presented in the following Table 1:

Table I
2016 CBC Seismic Design Criteria

Seismic Parameter	Coefficient	Value
Mapped MCE Spectral Acceleration at Short-Period 0.2 secs	S_s	1.507
Mapped MCE Spectral Acceleration at a Period of 1.0s	S_1	0.600
Site Class		D
Adjusted MCE, 5% Damped Spectral Response Acceleration at Short Period of 0.2s	S_{MS}	1.507
Adjusted MCE, 5% Damped Spectral Response Acceleration at Period of 1.0s	S_{M1}	0.900
Design 5% Damped Spectral Response Acceleration at Short Period of 0.2s for Occupancy Category I/II/III	S_{DS}	1.005
Design 5% Damped Spectral Response Acceleration at Period of 1.0s for Occupancy Category I/II/III	S_{D1}	0.600

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

GENERAL

1. From a geotechnical point of view, the site is suitable for the construction of the proposed residential development provided the recommendations presented in this report are incorporated into the project plans and specifications.

2. The most prominent geotechnical feature of the site as encountered in the borings is the presence of near surface gravelly soil. The underground contractor must be made aware of this condition and review the borings to evaluate the stability of trenching activities.

GRADING

3. The grading requirements presented herein are an integral part of the grading specifications presented in Appendix B of this report and should be considered as such.

4. The site contains significant vegetation cover and stripping of vegetation and topsoil may be required. Vegetation conditions may be different at the time of grading, and the extent of any stripping, mowing or discing as part of site preparation, will be revaluated at the time of grading. Any strippings will be stockpiled in an approved area that is unaffected by grading operations until their future use. Organically contaminated soil material may be utilized in landscape areas located outside the building footprint.

5. After site preparation, the top 8 inches of exposed ground should be scarified and compacted to a degree of relative compaction of at least 90% at 2 percent above optimum moisture content as determined by ASTM D1557-12 Laboratory Test Procedure.

6. The site may be brought to the desired finished grades by placing engineered fill in lifts of 8 inches in uncompacted thickness and compacting to a minimum relative compaction of 90% at 2 percent above optimum moisture content as determined by ASTM D1557-12 Laboratory Test Procedure.

7. All soils encountered during our investigation except those within the top few inches of predominantly organic material, are suitable for use as engineered fill when placed and compacted at the recommended moisture content and provided it does not contain any debris.

SURFACE AND SUBSURFACE DRAINAGE

8. All finish grades should be provided with a positive gradient to an adequate discharge point in order to provide rapid removal of surface water runoff away from all foundations. No ponding of water should be allowed on the pad or adjacent to the foundations. Surface drainage must be designed by the project Civil Engineer and maintained by the property owners at all times. The pad should be graded in a manner that surface flow is to a controlled discharge system.

9. Lot slopes and drainage must be provided by the project Civil Engineer to remove all storm water from the pad and to minimize storm and/or irrigation water from seeping beneath the structures. Should surface water be allowed to seep under the structure, foundation movement resulting in structural cracking and damage will occur. Where possible, finished grades around the perimeter of the structures should be compacted and should be sloped at a minimum 2% gradient away from the exterior foundation. Surface drainage requirements constructed by the builder should be maintained during landscaping. In particular, the creation of planter areas confined on all sides by concrete walkways or decks and the residence foundation is not desirable since any surface water due to rain or irrigation becomes trapped in the planter area with no outlet. If such a landscape feature is necessary, surface area drains in the planter area or a subdrain along the foundation perimeter must be installed.

10. Continuous roof gutters are recommended. According to local government requirements, roof downspout and drain flows should be directed to at grade bio-filtration areas, or raised planter boxes next to the building perimeter, where possible. From a geotechnical and maintenance point of view it is undesirable to discharge water into at grade bio-filtration areas near foundations, because of the possibility of water ponding for sustained periods of time.

BIO-FILTRATION FACILITIES

11. As mentioned earlier, it is undesirable to discharge water into at grade bio-filtration areas near foundations, because of the possibility of water ponding for sustained periods of time, potentially creating excessive moisture related issues. However, certain design features could be made to minimize such potential effects. In addition, the property owners must always maintain the bio-filtration area to ensure that they are performing as designed and that water does not pond in the area for longer than 48 hours.

12. Typically, the bio-filtration areas consist of an 18 inch layer of sandy loam over 18 inches of permeable gravel material. The top of the bio-filtration area is typically approximately 1 foot below pad grade, therefore, the base of the bio-filtration area will be approximately 4 feet below pad grade. The base of the bio-filtration area will typically contain a perforated pipe to drain any water that may collect within 24 hours. In some situations, the bio-filtration areas may be located immediately adjacent the building structure.

13. Where bio-filtration areas are located closer than 5 feet of the building, the section of loose loam and gravel will provide reduced lateral support, and we recommend a deepened footing be constructed along the perimeter the building adjacent to the bio-filtration area and extending 3 feet beyond in plan length. The depth of the deepened footing will depend on how close the bio-filtration area is located to the building perimeter. As a guide, the footing is to be deepened such that when an imaginary line inclined at 45 degrees from the outside edge base of the footings, it extends below the base of the bio-filtration area excavation. Where bio-filtration areas are located further than 5 feet, no special design is required. Provided the bio-filtration facility is lined with an impermeable liner, no waterproofing of the deepened footing is required.

14. Where bio-filtration areas are located closer than 3 feet of street pavements, a deepened curb footing is required. Where bio-filtration areas are located closer than 1 foot of street pavements, because pavements do not have a positive connection to a deepened curb/footing, the deepened curb/footing may need to be designed as a retaining wall rigid enough to create minimal lateral deflections.

15. Where bio-filtration areas are located closer than 2 feet of hardscape areas, a deepened edge footing is required. The deepened edge should extend at least 1 foot below the subgrade. Where the bio-filtration area is immediately adjacent the hardscape, the deepened edge is to extend at least 3 inches below the base of the bio-filtration system.

FOUNDATIONS

16. The proposed residential structures may be satisfactorily supported on a post-tensioned slab foundation.

Post Tensioned Slab on Grade

17. Post-tensioned slabs should be designed using the following criteria which is based on the design method presented in the Post-Tensioning Institute, Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive Soils (PTI DC10.5-12), 2012. Using the relevant site soil and climatic parameters, the recommended geotechnical criteria for use in the design of the post-tensioned slabs is as follows;

	Swelling Mode	
	Center Lift	Edge Lift
Edge Moisture Variation Distance (e_m)	9.0 feet	5.1 feet
Differential Soil Movement (y_m)	0.59 inches	1.09 inches

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The maximum allowable bearing pressure at the base of the slab and for localized thickened footings should not exceed 2,000 p.s.f. for dead plus sustained live loads.

General Construction Requirements for Post-Tensioned Slab

18. Prior to construction of the slab, the slab subgrade should be observed by the Soil Engineer to verify that all under-slab utility trenches greater than 18 inches in width have been properly backfilled and compacted, and that no loose or soft soils are present on the slab subgrade.

19. The slab subgrade is anticipated to be non-expansive silty material and therefore does not require soaking prior to foundation construction.

20. The four (4) inch (minimum thickness) layer of gravel typically placed to provide a capillary break beneath concrete slab-on-grade floors may be omitted beneath the monolithically poured mat slab foundations provided that the slabs are at least 10 inches thick. If it is desired to use a 4 inch layer or thinner of gravel section, the gravel should consist of broken stone, crushed or uncrushed gravel, quarry waste, or a combination thereof. The aggregate shall be free from deleterious substances. It shall be of such quality that the absorption of water in a saturated dry condition does not exceed 3% of the oven dry weight of the sample. The material shall be ¾" minus material with no more than 3% passing the #200 sieve, as specified in Appendix B.

21. A moisture vapor retarder/barrier is recommended beneath all slabs-on-grade that will be covered by moisture-sensitive flooring materials such as vinyl, linoleum, wood, carpet, rubber, rubber-backed carpet, tile, impermeable floor coatings, adhesives, or where moisture-sensitive equipment, products, or environments will exist. We recommend that design and construction of the moisture vapor retarder/barrier conform to Section 1805 of the 2013 CBC and relevant sections of American Concrete Institute (ACI) guidance documents 302.1R-04, 302.2R-06 and 360R-10.

22. The moisture vapor retarder/barrier can be placed above the 4 inches of gravel or directly on the soil subgrade and should consist of a minimum 10 mils thick polyethylene with a maximum perm rating of 0.1 in accordance with ASTM E 1745. Seams in the moisture vapor retarder/barrier should be overlapped no less than 6 inches or in accordance with the manufacturer's recommendations. Joints and penetrations should be sealed with the manufacturer's recommended adhesives, pressure-sensitive tape, or both. The contractor must avoid damaging or puncturing the moisture vapor retarder/barrier and repair any punctures with additional polyethylene properly lapped and sealed. The installation of the vapor retarder membrane must be in conformance with ASTM E1643.

23. A minimum of two inches of wetted sand should be placed over the vapor retarder membrane to facilitate curing of the concrete and to act as a cushion to protect the membrane. The perimeter of the mat should be thickened to bear on the prepared building pad and to confine the sand. During winter construction, sand may become saturated due to rainy weather prior to pouring. Saturated sand is not desirable because the sand cushion may become over saturated, and boil into the concrete causing undesirable structural monopolies of sand pockets within the slab. As an alternate, a sand-fine gravel mixture that is stable under saturated conditions may be used. However, the material must be approved by the Soil Engineer prior to use.

24. Alternatively, the sand layer may be eliminated provided the concrete has a maximum water/cement ratio of 0.45 and a 10 mil Class A vapor retarder membrane, such as Stego® Wrap. In any case, the vapor retarder/barrier should have a maximum perm rating of 0.3 in accordance with ASTM E 1745. Seams in the moisture vapor retarder/barrier should be overlapped no less than 6 inches or in accordance with the manufacturer's recommendations. Joints and penetrations should be sealed with the manufacturer's recommended adhesives, pressure-sensitive tape, or both. The contractor must avoid damaging or puncturing the vapor retarder/barrier and repair any punctures with additional polyethylene properly lapped and sealed.

25. Any exterior concrete flatwork such as steps, patios, or sidewalks should be designed independently of the slab, and expansion joints should be provided between the flatwork and the structural unit.

MISCELLANEOUS CONCRETE FLATWORK

26. Miscellaneous flatwork, driveways, and walkways may be designed with a minimum thickness of 4.0 inches. Control joints should be constructed to create squares or rectangles with a maximum spacing of 15 feet on large slab areas. Walkways should be separated from foundations with a thick expansion joint filler. Control joints should be constructed into walkways at a maximum of 5 feet spacing.

RETAINING WALLS

27. Retaining walls should be designed to resist lateral pressures exerted from a media having an equivalent fluid weight as follows:

Active Condition	=	45 p.c.f. for horizontal backslope
At-rest Condition	=	60 p.c.f.
Passive Condition	=	275 p.c.f.
Coefficient of Friction	=	0.35

28. For a non-horizontal backslope, the active condition equivalent fluid weight can be increased by 1.5 p.c.f. for each 2 degree rise in slope from the horizontal.

29. Active conditions occur when the top of the wall is free to move outward. At-rest conditions apply when the top of wall is restrained from any movement.

30. It should be noted that the effects of any surcharge, traffic or compaction loads behind the walls must be accounted for in the design of the walls.

31. The above criteria are based on fully drained conditions. If drained conditions are not possible, then the hydrostatic pressure must be included in the design of the wall. An additional linear distribution of hydrostatic pressure of 63 p.c.f. should be adopted, in this case.

32. In order to achieve fully-drained conditions, a drainage filter blanket should be placed behind the wall. The blanket should be a minimum of 12 inches thick and should extend the full height of the wall to within 12 inches of the surface. If the excavated area behind the wall exceeds 12 inches, the entire excavated space behind the 12-inch blanket should consist of compacted engineered fill or blanket material. The drainage blanket material may consist of either granular crushed rock and drain pipe fully encapsulated in geotextile filter fabric or Class II permeable material that meets CalTrans Specification, Section 68, with drainage pipe but without fabric. A 4-inch perforated drain pipe should be installed in the bottom of the drainage blanket and should be underlain by at least 4 inches of filter type material. A 12-inch cap of clayey soil material should be placed over the drainage blanket. A typical detail for retaining wall back drains is presented in Appendix C. All back drains should be outlet to suitable drainage devices. Retaining wall less than 3 feet in height should be provided with backdrains or weep holes.

33. As an alternate to the 12-inch drainage blanket, a pre-fabricated strip drain (such as Miradrain) may be used between the wall and retained soil. In this case, the wall must be designed to resist an additional lateral hydrostatic pressure of 30 p.c.f.

34. Piping with adequate gradient shall be provided to discharge water that collects behind the walls to an adequately controlled discharge system away from the structure foundation.

35. It is recommended that the retaining walls or soundwalls be founded on a spread footing or pier foundation system. Spread and pier footing design criteria are given below.

RETAINING WALL/SOUNDWALL FOUNDATION - SPREAD FOOTINGS

36. Spread footings should have a minimum depth of eighteen (18) inches below lowest adjacent pad grade (i.e., trenching depth) for soil subgrade. At this depth, the recommended design bearing pressure for continuous footings should not exceed 2,500 p.s.f. due to dead plus sustained live loads and 3,300 p.s.f. due to all loads which include wind and seismic.

37. To accommodate lateral loads, the passive resistance of the foundation soil can be utilized. The passive soil pressures can be assumed to act against the front face of the footing below a depth of one foot below the ground surface. It is recommended that a passive pressure equivalent to that of a fluid weighing 275 p.c.f. be used. The weight of the soil above the footing can be used in the frictional calculations. For design purposes, an allowable friction coefficient of 0.35 can be assumed at the base of the spread footing.

RETAINING WALL/SOUNDWALL FOUNDATION - PIER FOOTINGS

38. The piers should be designed on the basis of skin friction acting between the soil and the pier. For the soils at the site, an allowable skin friction value of 300 p.s.f. can be used for combined dead and live loads, below a depth of 1 feet. This value can be increased by one-third for total loads which include wind or seismic forces. The size, depth and spacing of the piers is to be determined by the structural engineer.

39. To resist lateral loads, the passive resistance of the soil can be used. The soil passive pressures can be assumed to act against the lateral projected area twice the pier diameter. It is recommended that a passive pressure equivalent to that of a fluid weighing 275 p.c.f be used below 1 foot of final pad grade.

PAVEMENT AREAS

40. R-value tests were not performed as part of this investigation, as the soil expected at subgrade level is not known and depends on the planned grading. Assuming the subgrade material will consist of the on-site surficial sandy fill material, we will assume an R-value of 20 for preliminary design. However, the final pavement section design will be based on collecting actual subgrade samples during construction.

41. Based on an R-Value of 20, the following flexible pavement sections are recommended.

Traffic Index	AC (inches)	Class II[1] AB (inches)
4.5	4.0	6.5
5.0	4.0	7.5
5.5	4.0	9.0
6.0	4.0	10.5
7.0	4.0	13.5

Notes: [1]Minimum R-Value = 78
R-Value = Resistance Value
All Layers in compacted thickness to Cal-Trans Standard Specifications

42. After underground facilities have been placed in the areas to receive pavement and removal of excess material has been completed, the upper 6 inches of the sub-grade soil shall be scarified, moisture conditioned, and compacted to a minimum relative compaction of 95% in accordance with the grading recommendations specified in this report.

43. All aggregate base material placed subsequently should be compacted to a minimum relative compaction of 95% based on the ASTM Test Procedure of D1557-12 (latest edition). The construction of the pavement areas should conform to the requirements set forth by the latest Standard Specifications of the Department of Transportations of the State of California and/or City of Morgan Hill, Department of Public Works.

44. If planter areas are provided within or immediately adjacent to the pavement areas, or if permeable pavers are used for some areas of pavement, provisions should be made to control irrigation and surface water from entering the pavement subgrade. Water entering the pavement section at subgrade level, which does not have a means for discharge, could cause softening of this zone and lead to pavement failure. We recommend that for areas of permeable pavers, the subgrade be graded to a low point where a subdrain is constructed to discharge any accumulated water.

UTILITY TRENCHES

45. Applicable safety standards require that trenches in excess of 5 feet must be properly shored or that the walls of the trench slope back to provide safety for installation of lines. If trench wall sloping is performed, the inclination should vary with the soil type. The underground contractor should request an opinion from the Soil Engineer as to the type of soil and the resulting inclination.

46. With respect to state-of-the-art construction or local requirements, utility lines are generally bedded with granular materials. These materials can convey surface or subsurface water beneath the structures. It is, therefore, recommended that all utility trenches which possess the potential to transport water be sealed with a compacted impervious cohesive soil material or lean concrete where the trench enters/exits the building perimeter.

47. Utility trenches extending underneath all traffic areas must be backfilled with native or approved import material and compacted to a relative compaction of 90% to within 6 inches of the subgrade. The upper 6 inches should be compacted to 95% relative compaction in accordance with Laboratory Test Procedure ASTM D1557 (latest edition). Backfilling and compaction of these trenches must meet the requirements set forth by the City of Morgan Hill, Department of Public Works. Utility trenches within landscape areas may be compacted to a relative compaction of 85%.

PROJECT REVIEW AND CONSTRUCTION MONITORING

48. All grading and foundation plans for the development must be reviewed by the Soil Engineer prior to contract bidding or submitted to governmental agencies so that plans are reconciled with soil conditions and sufficient time is allowed for suitable mitigative measures to be incorporated into the final grading specifications.

49. ***Quantum Geotechnical, Inc.*** should be notified at least two working days prior to site clearing, grading, and/or foundation operations on the property. This will give the Soil Engineer ample time to discuss the problems that may be encountered in the field and coordinate the work with the contractor.

50. Field observation and testing during the demolition and/or foundation operations must be provided by representatives of ***Quantum Geotechnical, Inc.*** to enable them to form an opinion regarding the adequacy of the site preparation, the acceptability of fill materials, and the extent to which the earthwork construction and the degree of compaction comply with the specification requirements. Any work related to the grading and/or foundation operations performed without the full knowledge and under the direct observation of the Soil Engineer will render the recommendations of this report invalid. This does not imply full-time observation. The degree of observation and frequency of testing services would depend on the construction methods and schedule, and the item of work.

REFERENCES

1. California Geological Survey. 2004. “Seismic Hazard Zone Report for the Morgan Hill 7.5-Minute Quadrangle, Santa Clara County, California”. Seismic Hazard Zone Report 096.

2. Graymer, R.W., Moring, B.C., Saucedo, G.J., Wentworth, C.M., Brabb, E.E., and Knudsen, K.L. 2006. “Geologic Map of the San Francisco Bay Region”. U.S. Geological Survey. Scientific Investigations Map 2918.

3. U.S. Geological Survey and California Geological Survey. 2006. "Quaternary fault and fold database for the United States". Accessed November 17, 2017 from USGS web site: http//earthquakes.usgs.gov/regional/qfaults/.

4. U.S Geological Survey. 2014. “US Seismic Design Maps”. Accessed December 28, 2017 from USGS web site: https://earthquake.usgs.gov/designmaps/us/application.php.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. It should be noted that it is the responsibility of the owner or his representative to notify ***Quantum Geotechnical, Inc.,*** in writing, a minimum of two working days before any clearing, grading, or foundation excavations can commence at the site.

2. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings and from a reconnaissance of the site. Should any variations or undesirable conditions be encountered during the development of the site, ***Quantum Geotechnical,*** will provide supplemental recommendations as dictated by the field conditions.

3. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the Architect and Engineer for the project and incorporated into the plans and the necessary steps are taken to see that the Contractor and Subcontractors carry out such recommendations in the field.

4. At the present date, the findings of this report are valid for the property investigated. With the passage of time, significant changes in the conditions of a property can occur due to natural processes or works of man on this or adjacent properties. In addition, legislation or the broadening of knowledge may result in changes in applicable standards. Changes outside of our control may render this report invalid, wholly or partially. Therefore, this report should not be considered valid after a period of two (2) years without our review, nor should it be used, or is it applicable, for any properties other than those investigated.

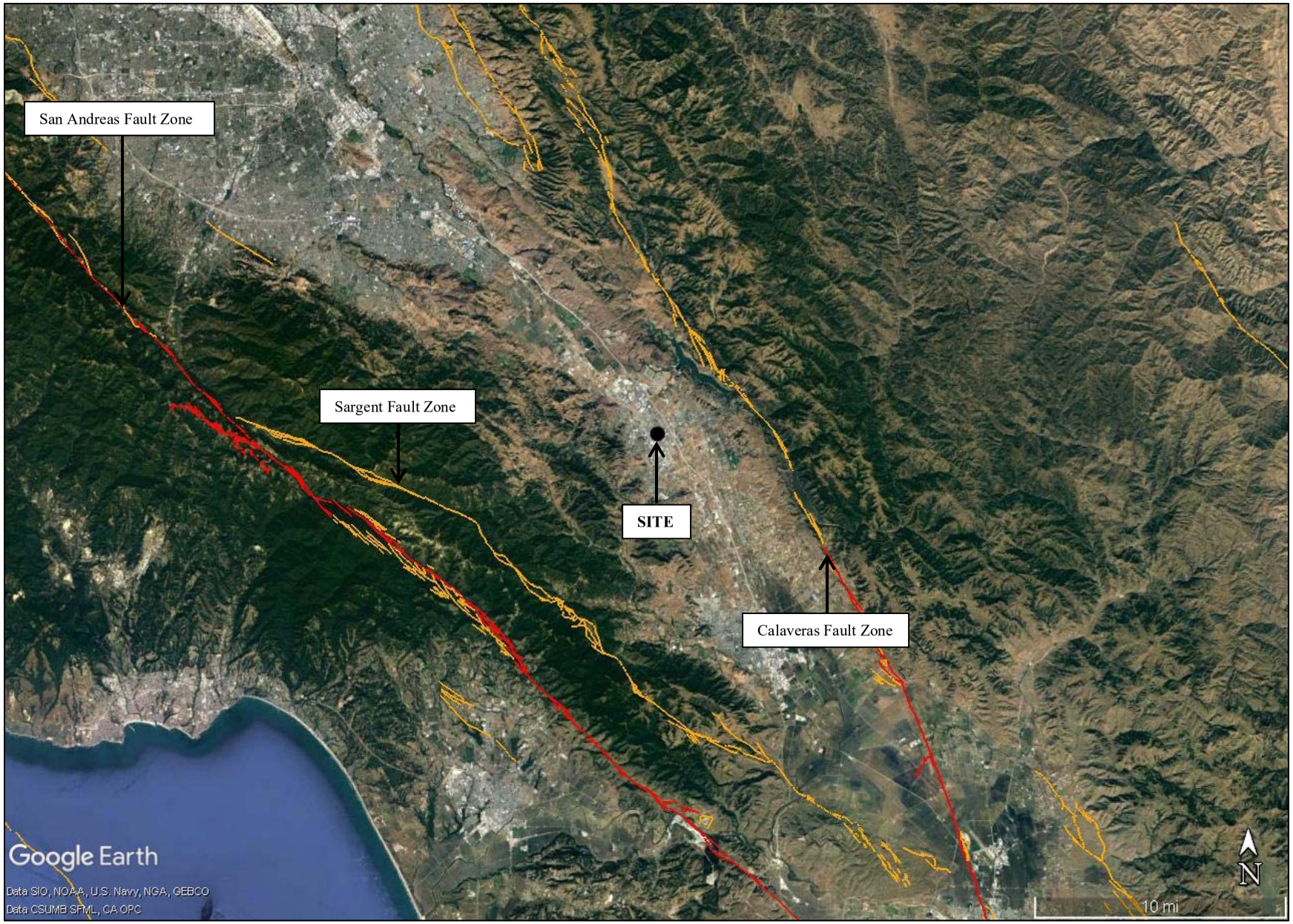
5. Not withstanding all the foregoing, applicable codes must be adhered to at all times.

APPENDIX A

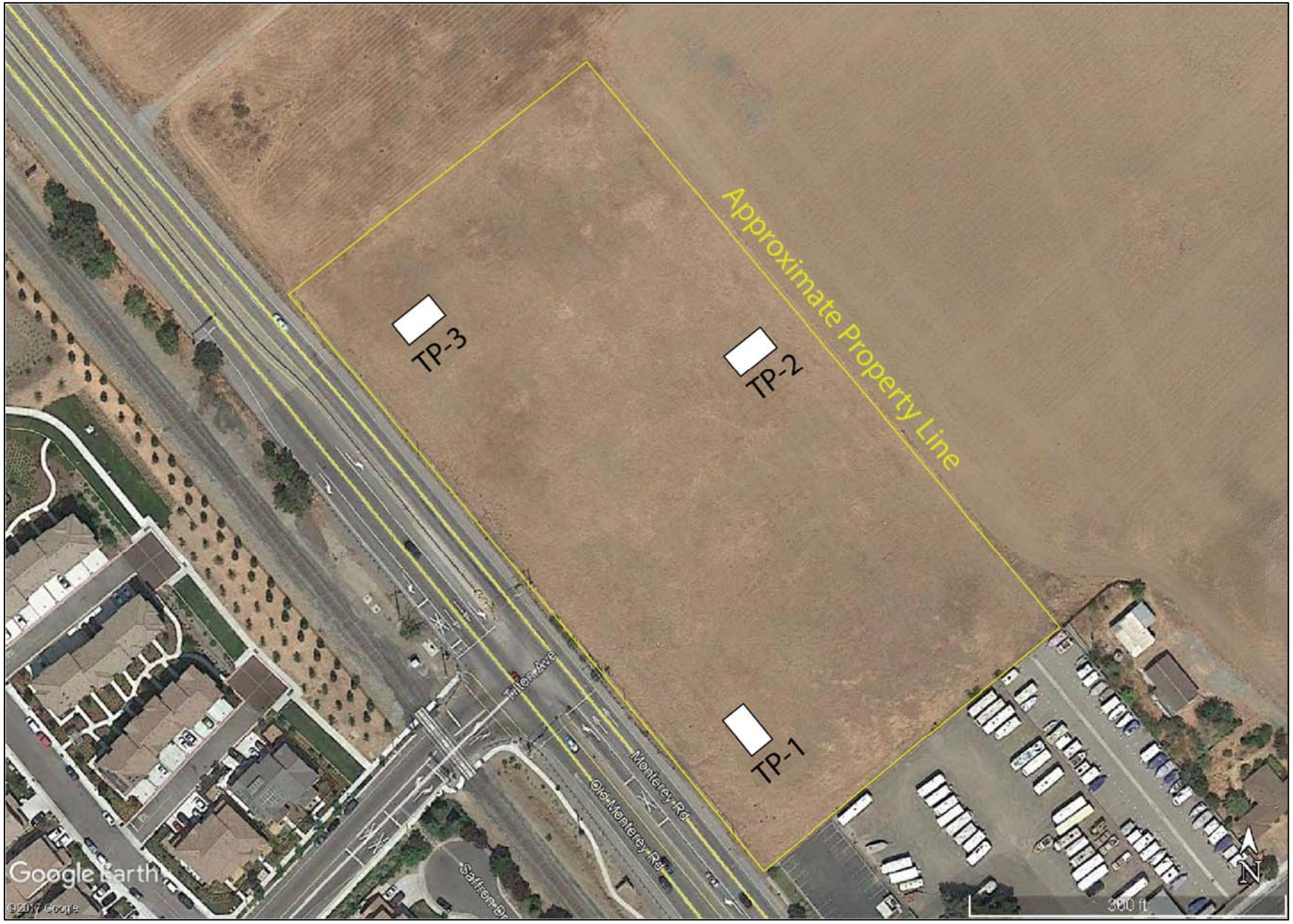
Site Vicinity and Fault Map

Site Plan

Logs of Test Pits



QUANTUM GEOTECHNICAL, INC.	SITE VICINITY AND FAULT MAP			
	Proposed Residential Subdivision Monterey Rd., Morgan Hill	Project No. D057.G	Drawn by: D.T.	Figure No. 1



QUANTUM GEOTECHNICAL, INC.	SITE PLAN			
	Proposed Residential Subdivision Monterey Rd., Morgan Hill	Project No. D057.G	Drawn by: D.T.	Figure No. 2

LOGS OF TEST PITS

Depth	USCS Soil Type	Soil Description
TP-1		
0-1.0 ft:	ML	SILT with Gravel: Light brown to reddish brown; dry; medium stiff; fine, subangular to subrounded gravel.
1.0-8.25 ft:	GM	Silty GRAVEL: Light reddish brown; dry; coarse, subrounded gravel to 6 in.
TP-2		
0-1.5 ft:	ML	SILT with Gravel: Light brown to reddish brown; dry; medium stiff; fine, subangular to subrounded gravel.
1.5-10.5 ft:	GM	Silty GRAVEL: Light reddish brown; dry; coarse, subrounded gravel to 6 in.
TP-3		
0-2.0 ft:	ML	SILT with Gravel: Light brown to reddish brown; dry; medium stiff; fine, subangular to subrounded gravel.
2.0-9.5 ft:	GM	Silty GRAVEL: Light reddish brown; dry; coarse, subrounded gravel to 6 in.

APPENDIX B

The Grading Specification

Guide Specifications for Rock Under Floor Slabs

THE GRADING SPECIFICATIONS
on
Proposed Residential Development
Diana Venue
Morgan Hilll, California

1. General Description

1.1 These specifications have been prepared for the grading and site development of the subject residential development. ***Quantum Geotechnical Inc.***, hereinafter described as the Soil Engineer, should be consulted prior to any site work connected with site development to ensure compliance with these specifications.

1.2 The Soil Engineer should be notified at least two working days prior to any site clearing or grading operations on the property in order to observe the stripping of organically contaminated material and to coordinate the work with the grading contractor in the field.

1.3 This item shall consist of all clearing or grubbing, preparation of land to be filled, filling of the land, spreading, compaction and control of fill, and all subsidiary work necessary to complete the grading of the filled areas to conform with the lines, grades, and slopes as shown on the accepted plans. The Soil Engineer is not responsible for determining line, grade elevations, or slope gradients. The property owner, or his representative, shall designate the person or organizations who will be responsible for these items of work.

1.4 The contents of these specifications shall be integrated with the soil report of which they are a part, therefore, they shall not be used as a self-contained document.

2. Tests

The standard test used to define maximum densities of all compaction work shall be the ASTM D1557-12 Laboratory Test Procedure. All densities shall be expressed as a relative compaction in terms of the maximum dry density obtained in the laboratory by the foregoing standard procedure.

3. Clearing, Grubbing, and Preparing Areas To Be Filled

3.1 If encountered, all vegetable matter, trees, root systems, shrubs, debris, and organic topsoil shall be removed from all structural areas and areas to receive fill.

3.2 If encountered, any soil deemed soft or unsuitable by the Soil Engineer shall be removed. Any existing debris or excessively wet soils shall be excavated and removed as required by the Soil Engineer during grading.

3.3 All underground structures shall be removed from the site such as old foundations, abandoned pipe lines, septic tanks, and leach fields.

3.4 The final stripped excavation shall be approved by the Soil Engineer during construction and before further grading is started.

3.5 After the site has been cleared, stripped, excavated to the surface designated to receive fill, and scarified, it shall be disked or bladed until it is uniform and free from large clods. The native subgrade soils shall be moisture conditioned and compacted to the requirements as specified in the grading section of this report. Fill can then be placed to provide the desired finished grades. The contractor shall obtain the Soil Engineer's approval of subgrade compaction before any fill is placed.

4. Materials

4.1 All fill material shall be approved by the Soil Engineer. The material shall be a soil or soil-rock mixture which is free from organic matter or other deleterious substances. The fill material shall not contain rocks or lumps over 6 inches in greatest dimension and not more than 15% larger than 2-1/2 inches. Materials from the site below the stripping depth are suitable for use in fills provided the above requirements are met.

4.2 Materials existing on the site are suitable for use as compacted engineered fill after the removal of all debris and organic material. All fill soils shall be approved by the Soil Engineer in the field.

4.3 Should import material be required, it should be approved by the soil Engineer before it is brought to the site.

5. Placing, Spreading, and Compacting Fill Material

5.1 The fill materials shall be placed in uniform lifts of not more than 8 inches in uncompacted thickness. Each layer shall be spread evenly and shall be thoroughly blade mixed during the spreading to obtain uniformity of material in each layer. Before compaction begins, the fill shall be brought to a water content that will permit proper compaction by either (a) aerating the material if it is too wet, or (b) spraying the material with water if it is too dry.

5.2 After each layer has been placed, mixed, and spread evenly, either import material or native material shall be compacted to a relative compaction designated for engineered fill.

5.3 Compaction shall be by footed rollers or other types of acceptable compacting rollers. Rollers shall be of such design that they will be able to compact the fill to the specified density. Rolling shall be accomplished while the fill material is within the specified moisture content range. Rolling of each layer shall be continuous over its entire area and the roller shall make sufficient trips to ensure that the required density has been obtained. No ponding or jetting shall be permitted.

5.4 Field density tests shall be made in each compacted layer by the Soil Engineer in accordance with Laboratory Test Procedure ASTM D1556-15 or D6938-10. When footed rollers are used for compaction, the density tests shall be taken in the compacted material below the surface disturbed by the roller. When these tests indicate that the compaction requirements on any layer of fill, or portion thereof, has not been met, the particular layer, or portion thereof, shall be reworked until the compaction requirements have been met.

5.5 No soil shall be placed or compacted during periods of rain nor on ground which contains free water. Soil which has been soaked and wetted by rain or any other cause shall not be compacted until completely drained and until the moisture content is within the limits hereinbefore described or approved by the Soil Engineer. Approval by the Soil Engineer shall be obtained prior to continuing the grading operations.

6. Pavement

6.1 The proposed subgrade under pavement sections, native soil, and/or fill shall be compacted to a minimum relative compaction of 95% at 2% above optimum moisture content for a depth of 12 inches.

6.2 All aggregate base material placed subsequently should also be compacted to a minimum relative compaction of 95% based on the ASTM Test Procedure D1557-12. The construction of the pavement in the parking and traffic areas should conform to the requirements set forth by the latest Standard Specifications of the Department of Transportation of the State of California and/or City of Morgan Hill, Department of Public Works.

6.3 It is recommended that soils at the proposed subgrade level be tested for a pavement design after the preliminary grading is completed and the soils at the site design subgrade levels are known.

7. Utility Trench Backfill

7.1 The utility trenches extending under concrete slabs-on-grade shall be backfilled with native on-site soils or approved import materials and compacted to the requirements pertaining to the adjacent soil. No ponding or jetting will be permitted.

7.2 Utility trenches extending under all pavement areas shall be backfilled with native or approved import material and properly compacted to meet the requirements set forth by the City of Morgan Hill, Department of Public Works.*

7.3 Where any opening is made under or through the perimeter foundations for such items as utility lines and trenches, the openings must be resealed so that they are watertight to prevent the possible entrance of outside irrigation or rain water into the underneath portion of the structures.

8. Subsurface Line Removal

8.1 The methods of removal will be designated by the Soil Engineer in the field depending on the depth and location of the line. One of the following methods will be used.

8.2 Remove the pipe and fill and compact the soil in the trench according to the applicable portions of sections pertaining to compaction and utility backfill.

8.3 The pipe shall be crushed in the trench. The trench shall then be filled and compacted according to the applicable portions of Section 5.

8.4 Cap the ends of the line with concrete to prevent entrance of water. The length of the cap shall not be less than 5 feet. The concrete mix shall have a minimum shrinkage.

9. Unusual Conditions

9.1 In the event that any unusual conditions not covered by the special provisions are encountered during the grading operations, the Soil Engineer shall be immediately notified for additional recommendations.

10. General Requirements

Dust Control

10.1 The contractor shall conduct all grading operations in such a manner as to preclude windblown dirt and dust and related damage to neighboring properties. The means of dust control shall be left to the discretion of the contractor and he shall assume liability for claims related to windblown material.

GUIDE SPECIFICATIONS FOR ROCK UNDER FLOOR SLABS

Definition

Graded gravel or crushed rock for use under slabs-on-grade shall consist of a minimum thickness of mineral aggregate placed in accordance with these specifications and in conformance with the dimensions shown on the plans. The minimum thickness is specified in the accompanying report.

Material

The mineral aggregate shall consist of broken stone, crushed or uncrushed gravel, quarry waste, or a combination thereof. The aggregate shall be free from deleterious substances. It shall be of such quality that the absorption of water in a saturated dry condition does not exceed 3% of the oven dry weight of the sample.

Gradation

The mineral aggregate shall be of such size that the percentage composition by dry weight, as determined by laboratory sieves (U.S. Sieves) will conform to the following gradation:

Sieve Size	Percentage Passing
¾''	90-100
No. 4	25-60
No. 8	18-45
No. 200	0-3

Placing

Subgrade, upon which gravel or crushed rock is to be placed, shall be prepared as outlined in the accompanying soil report.